# System Catalog 2010

MICROSENS

Fiber optic technology is the future: trouble-free transmission with highest bandwidth across long distances.

As a world leader in supplying fiber optic transmission and access systems, MICROSENS offers devices and systems that satisfy the highest requirements in terms of performance and reliability. Market oriented development combined with the latest production technology ensures high end solutions that are optimally tuned to the customer expectations.

The creative MICROSENS solutions offer genuine added value at the highest level.
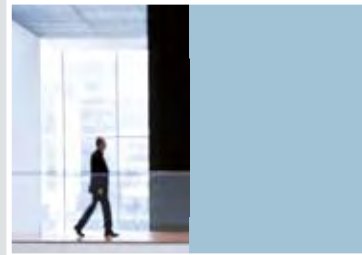
MICROSENS_ get connected!
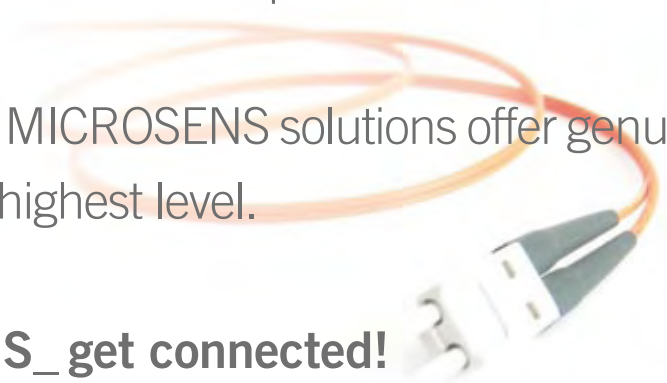
Company for future technology

Enterprise networks

Industrial solutions

Enterprise access

Metropolitan networks

Index

01

MICROSENS – a future based on tradition

MICROSENS GmbH & Co. KG is standing for fiber optic solutions since 1993. As one of the pioneers in fiber optic transmission systems, this internationally operating company caters for all areas of fiber optic technology. The product range starts with solutions for effective office networks and industrial applications in rough environment, and extends to the access of large-scale location networks and to high performance wide-area networks. MICROSENS guarantees efficient and fast data transmission for all of these fields of application.

New ideas generated in conjunction with the euromicron group and other high-tech manufacturers of fiber optic technology are aimed at the joint development of strategic fields of application and technology.

Oriented to the future since 1993

1993 _ Establishment of the MICROSENS company by engineers Dr. Hocine Bezzaoui, Hannes Bauer and Thomas Kwaterski.

1995 _ The concept of 'Fiber To The Office' (FTTO) is developed and lays the foundation stone for one point of focal emphasis at MICROSENS today. Own production commences.

2001 _ Industrial networking represents the development of a new future-oriented product division. A patent is filed for the redundancy mechanism to construct fault-tolerant ring networks.

2003 _ The latest product generation of optical multiplex systems achieves transmission capacities of 40 Gbps. MICROSENS is named IT company of the year.

2006 _ The entry of the new majority shareholder means that MICROSENS becomes part of the strongly expanding, high yield euromicron group which focuses on network and fiber optic technologies and has numerous interests in the industry. This sets the course for further growth.

2007 _ As a specialist for optical transport systems, MICROSENS introduces a new transmission platform for high speed services at the CeBIT. The flexible transmission system supports data transfer speeds of 10 Gigabits per transmission channel.

2008 _ The cooperation within the euromicron group also produces its first technological fruits. MICROSENS together with euromicron GmbH presents an active optical transceiver (SFP) for the new euromicron EM-RJ connector.

Quality_Made in Germany

At MICROSENS 'Made in Germany' stands for in-house development and production. Highly qualified staff and extensive laboratory and field tests enable short development cycles and ideal adjustment to changing application conditions.

Constant investment in the most recent technologies and continuous monitoring and assessment of internal processes ensure that performance remains at the most possible up-to-date level.

MICROSENS is an internationally successful manufacturer and sells its products throughout the world. In addition to the company headquarters in the Westphalian city of Hamm, MICROSENS has sales offices in France and Poland in order to be able to completely satisfy the different requirements of customers locally.

02

Company for future-proofed Technology

Intelligent network application levels

There are diverse requirements for the smooth transmission of data, voice and video information. Accordingly the application possibilities for the fiber optic technology provided by MICROSENS are numerous.

Solutions from MICROSENS offer the ability to customise application levels for fiber optic networks for local and wide area applications. The selection of components suited to the respective application purpose takes place taking various criteria into consideration in order to create an ideal solution based on flexibility, future needs and cost optimisation.

Equal focus is placed on ensuring the possibility of applying the components in existing systems and use in the area of overlapping application levels.

The solutions provided by MICROSENS extend to all application areas of fiber optic technology. Individually optimised connections are created from internal company local area networks (LAN) through access networks (Access) up to city networks (MAN).

Enterprise networks
Fiber optic technology in the area of the office and the intranet
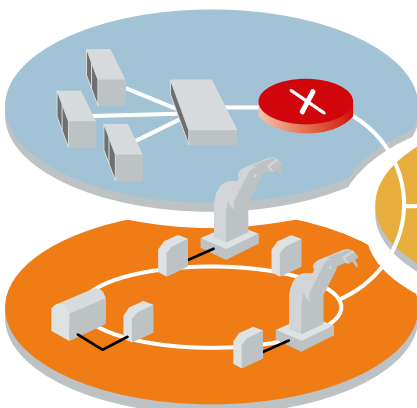
Enterprise access
Fiber optic technology between carrier and customer networks
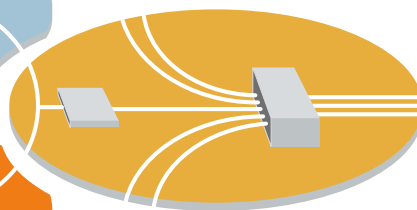
Metropolitan networks
Fiber optic technology for carrier networks and for connection at city and global level
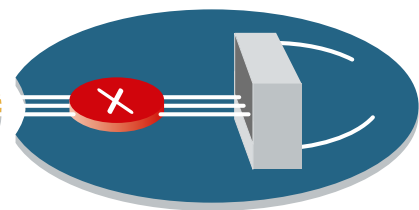
Industrial solutions
Fiber optic technology for rough environments
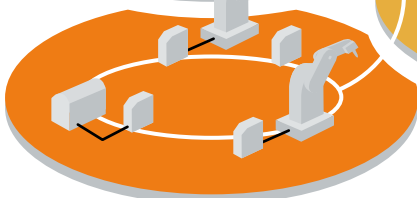
Enterprise networks

Enterprise access

Metropolitan networks

Industrial solutions

The Idea

Enterprise Networks

Originally only used in the backbone area, fiber optics is now widely seen in the office and intranet area. The integration of data, telephony and video guarantees long-term investment security. The Fiber To The Office (FTTO) concept developed by MICROSENS enables such networks to be implemented in both a flexible and cost-effective manner.

Industrial Solutions

A departure from in-house applications has lead to the IP protocol conquering new application areas. „Industrial Ethernet" has now become an established term that describes the use of Ethernet-based components with a high degree of reliability in rough environments. The ring mechanism developed by MICROSENS facilitates the construction of self-healing network topologies.

Enterprise Access

The connection between carrier and customer networks demands a high degree of flexibility regarding data transfer rates and protocols with simultaneous scalability and universal coupling of different services. The open access platform from MICROSENS offers an efficient, future-proof solution that provides enhanced reliability and easy servicing.

Metropolitan Networks

Network providers are consistently forced to expand their transport capacities in the light of rapidly growing bandwidth demand and new applications such as Video on Demand and triple play. MICROSENS optical platforms transport package data streams across long distances with the greatest reliability. This makes it extremely cost-effective both in terms of the initial costs (Capex) and the operating costs (Opex).

03

Some typical End Users

Education and Research, Public Authorities and Administration

New and innovative concepts are achieved in co-operation with universities and research institutions. The short distances and direct communication of the development team on site in Germany ensures rapid reaction and implementation of new technologies at the highest level. Users such as public authorities and administrations benefit from the greater efficiency of high performance networks based on fiber optics.

Health Care

The fast and safe access to information leads to high demands on the network infrastructure in the health care. In addition running medical institutions require a high degree of expert knowledge and specially adapted solutions. Through the close cooperation with technology partners MICROSENS provides customised solutions in the medical environment, ranging from efficient administration to operating room networking.

As a leading supplier of fiber optic products, MICROSENS understands the markets and demands of their customers. The customers in the areas of education and research, public authorities and administration, transport and traffic control, monitoring and automation as well as the health system, telecommunication and the most modern research centres value the industry-specific know-how and the resultant individual services provided.

In line with the 'get connected' maxim, MICROSENS guarantees efficient connections and data transfer at the highest level both for specific industries and across different industries. The supply of components and systems on a fiber optic basis with individual problem-solving capability is coordinated to the requirements of the business partners. Due to the exchange of experiences in the customers' markets continuous expansion in the knowledge and business activities of MICROSENS is guaranteed. In order to provide efficient advice and support the specialists are today analysing the markets of tomorrow so that secure connections can be created in the future.

Transport and Traffic Control, Monitoring, Automation

Ever more optimised and interwoven logistics and production processes will only be made possible by the availability of high performance networks. Critical infrastructures require protection and safety through monitoring. When it comes to the smooth operation, maximum reliability has the highest priority. In this respect the self-healing ring topology developed and patented by MICROSENS provides the greatest network availability with optimal network topology.

Telecommunication Providers and Data Processing Centres

The growing significance of data services demands ever more powerful and reliable networks at ever lower cost. Against this background MICROSENS provides efficient solutions to construct future-proof fiber optic infrastructures for data processing centres and telecommunication networks.

Enterprise networks

Fiber Technology between Carrier and Client Networks

Technical connections for the office and workplace range. Adaptable and cost-effective networks for the integration for a complex data interchange.

MICROSENS

Enterprise networks

FTTO – Fiber To The Office

Network solutions for the integration of voice and data services

Using an intelligent combination of fiber optic cable and copper cable, flexible and cost-effective networks can be simultaneously achieved. Active media conversion is enabled for the end equipment connection with FTTO. Therefore PC´s, printers or notebooks as well as VolP telephones and IP-cameras can be used together in a state-of-the-art fiber optic network.

In addition to this, a network based on fiber optic technology enables rapid introduction of new technologies without changing the cabling infrastructure. This ensures a long-term investment period which extends far beyond the prevailing investment cycle.

FTTO offers you:

- Cabling with high transmission range, almost unlimited bandwidths and a long life time
- The low cable volume reduces the expenditure connected with fire protection and the construction of cable runs
- Reduced space requirement and a gain in space area by not having to use active sub-distributors
- Discarding additional protection measures for access, fire alarm, extinguishing devices, floor air conditioning
- A central building distributor reducing operational costs and achieving higher performance as well as easy possibilities for scaling, migration and redundancy

Installation
Converter

PoE

floor box

Installation
Switch

PoE

WLAN

cable duct

PoE

Camera

IP Phone

PC

Central Switch
Multiport Converter
Patch Panel

19" cabinet
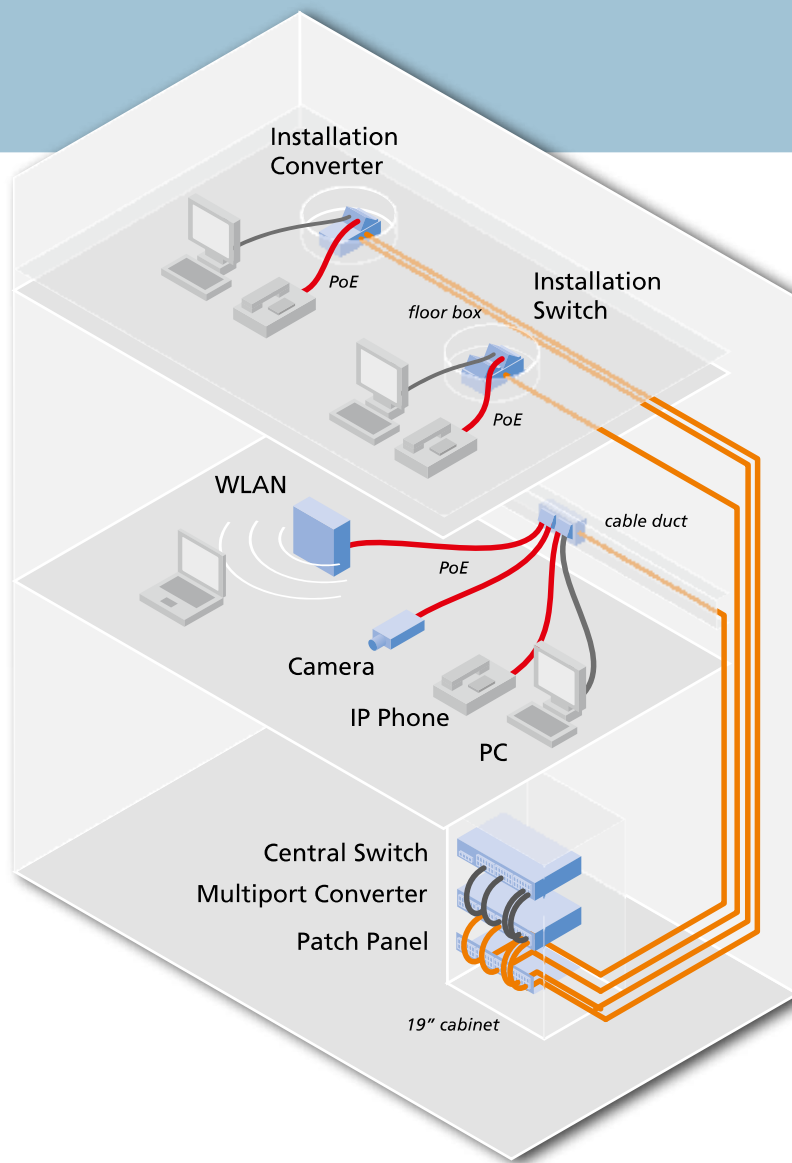
Integration into leading electrical and data installation systems

04

Modular System 45x45
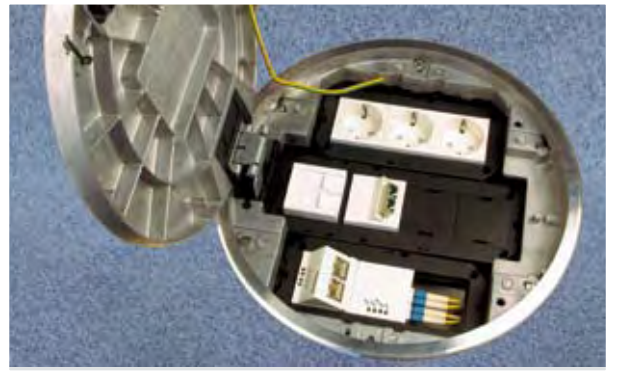
Future-oriented cabling concepts are primarily characterised by their flexibility. With the 45x45 equipment design MICROSENS offers the most compact solutions of active network components on the market.

The MICROSENS FTTO concept is based on the dimensions of 45 x 45 mm (system 45x45). This is a widespread design throughout the world that facilitates the use in national and international installation systems. Popular areas in addition to the standard installation in wall trunking systems and under floor systems are table and laboratory equipment as well as pillars in rooms and flush-mounted installations.

The greatest advantage of the system 45 x 45 is its cost efficiency compared to the classic systems, with a 50% reduction in the time and cost expenditure required for installation. Components are no longer screwed but are simply snapped into place in the device carrier or installation sockets provided. This enables the requisite installation time to be considerably reduced.

The installation components of MICROSENS are offered as horizontal and vertical versions. The equipment is delivered in a suitable form so that no conversion or time consuming assembly is necessary on site. This means that installation time is reduced and the robustness of components is greatly increased.

The system 45 x 45 – never have assembly and device integration been this fast and simple!

MICROSENS
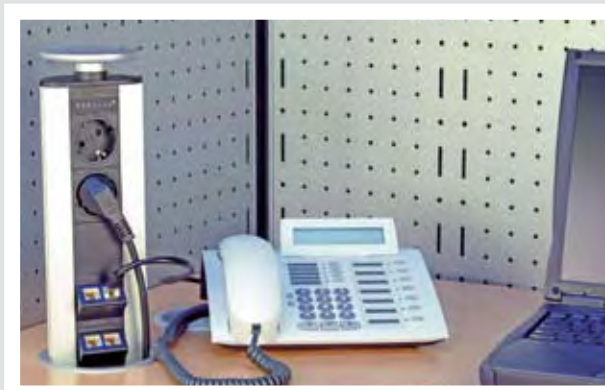
Enterprise Networks Fiber To The Office

MICROSENS

Fiber To The Office
Product Overview

GBE Micro Switches with FO-Uplink

Gigabit Ethernet switches with fiber-uplink, TP-downlink, PoE.

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GBE Micro Switches with TP-Uplink

Gigabit Ethernet switches with TP-uplink, TP-down-link, optional with PoE.

22

FE Micro Switches with FO-Uplink

Fast Ethernet switches with fiber-uplink, TP-downlink, PoE.

26

FE Micro Switches with TP-Uplink

Fast Ethernet switches with TP-uplink, TP-downlink, optional with PoE.

28

FE Twin Converter with PoE

2x 100Base-TX/100Base-FX with converter/bridge configuration.

29

48 VDC Power Supplies/ 19" Power Supply Units

For PoE-applications. Decentral and centralized power supplies.

32

Installation Accessories System 45x45

Device cups, cover frames, assembly sets.

34
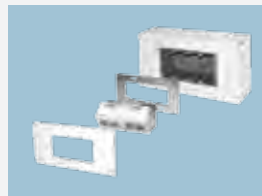
Multiple Port Converters and Accessories

12 and 24 port Fast Ethernet converter, 12 and 24 port Ethernet converter.

38

24 Port Switches

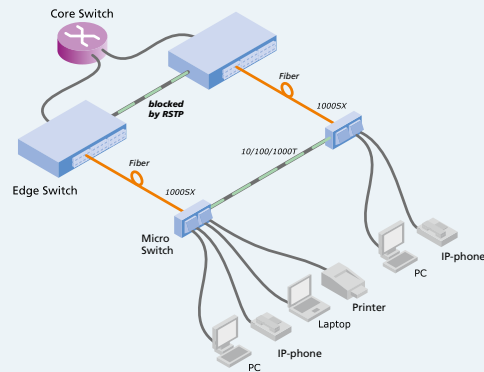Modular Fast Ethernet and Gigabit Ethernet SFP stwitch.

40

Network Management

NMP Network Management Platform.

42

MICROSENS

Gigabit Ethernet Micro Switches

GBE Micro Switch with fiber uplink

Benefits

▌ Gigabit performance at all ports

▌ Integrated power supply with 230 VAC input

▌ Comfortable administration (Web-, Telnet-, SNMP-interface and MICROSENS NMP-Software)

▌ High security through VLANs, 802.1X, SSH, accounting etc.

▌ Fast, tool-free mounting by snap-in installation

▌ Support for jumbo frames up to 9.600 bytes

▌ Optional SFP-uplink with dual speed 100/1000 Mbps

Description

The Gigabit Ethernet Micro Switches are extreme compact and are designed for the tool-free installation into cable trunks and sub-floor boxes. The design in 45x45 mm grid is compatible to the major international electro installation systems.

The Micro Switches offer the complete Gigabit performance on all ports. The uplink to the central switch is realised either by a fixed or pluggable optical transceiver. The 6 port version has an additional RJ-45 downlink 10/100/1000Base-T at the side of the device. After installation this port is hidden and allows the cascading of further devices. Thus the port capacities in the work place area can be increased easily.

The Gigabit Ethernet Micro Switch has an integrated 230 VAC power supply. The equipment generally has an integrated network management system and supports all management standards from the web browser over Telnet up to the SNMP. Furthermore, the switches have all common security features such as VLANs, authentication according to IEEE Std. 802. 1X up to accounting.

horizontal version

vertical version

Description	Art.-No. horizontal	Art.-No. vertical
5 Port Micro Switch, 4x 10/100/1000T, 1x 1000X Uplink		
Uplink-port multimode 850 nm ST duplex	MS450860M	MS450870M
Uplink-port multimode 850 nm SC duplex	MS450861M	MS450871M
Uplink-port single mode 1310 nm SC duplex	MS450862M	MS450872M
Uplink-port SFP 100/1000X dual speed	MS450869M	MS450879M
6 Port Micro Switch, 4x 10/100/1000T, 1x 1000X Uplink, 1x 10/100/1000T Downlink		
Uplink-port multimode 850 nm ST duplex	MS440200M	MS440210M
Uplink-port multimode 850 nm SC duplex	MS440201M	MS440211M
Uplink-port single mode 1310 nm SC duplex	MS440202M	MS440212M
Uplink-port SFP 100/1000X dual speed	MS440209M	MS440219M

Installation accessories see page 34, management software see page 42.

MICROSENS

GBE Micro Switches with PoE

GBE Micro Switches with additional downlink
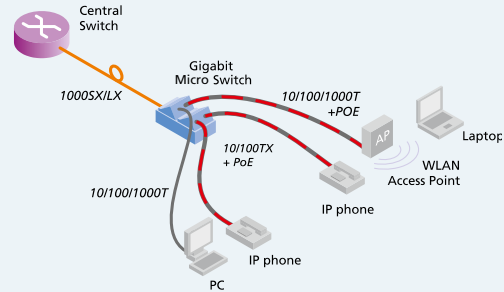
Benefits

▍ Optional RJ-45 downlink-port for hidden connection of Ethernet devices (10/100/1000T)

▍ Power-over-Ethernet at all five RJ-45 connectors

▍ Comfortable administration (Web-, Telnet-, SNMP-interface and MICROSENS NMP-Software)

▍ High security through VLANs, 802.1X, SSH, accounting etc.

▍ Fast, tool-free mounting by snap-in installation

▍ Optional SFP-uplink with dual speed 100/1000 Mbps

Description

The 6 port GBE Micro Switch constitutes an extension of the Gigabit Ethernet Micro Switch. In addition to the 1000Base-X fiber optic uplink, for linking to the central distributor, this switch has an additional RJ-45 downlink 10/100/1000Base-T. This additional connection is positioned at the rear of the switch and is also covered after the installation.

This additional connection can, amongst other things, be used for cascading other Micro Switches in order to obtain additional connection capacities. The interconnection of two switches via the TP port offers to increase the reliability of the network. If one fiber connection is interrupted the neighbouring switch handles the data traffic via RSTP.

All five RJ-45 ports (4 user ports and 1 downlink) support the complete Power-over-Ethernet functionality according the IEEE Std. 802.3af. Intelligent power management monitors the active current consumption of connected end equipment. The switches are powered by an external 48 V DC power supply.

SFP-Uplink-port version

downlink version

Description	Art.-No. horizontal	Art.-No. vertical
5 Port Micro Switch, 4x 10/100/1000T, 1x 1000X Uplink		
Uplink-port multimode 850 nm ST duplex	MS450860PM-48	MS450870PM-48
Uplink-port multimode 850 nm SC duplex	MS450861PM-48	MS450871PM-48
Uplink-port single mode 1310 nm SC duplex	MS450862PM-48	MS450872PM-48
Uplink-port SFP 100/1000X dual speed	MS450869PM-48	MS450879PM-48
6 Port Micro Switch, 4x 10/100TX, 1x 1000X Uplink, 1x 10/100/1000T Downlink		
Uplink-port multimode 850 nm ST duplex	MS440200PM-48	MS440210PM-48
Uplink-port multimode 850 nm SC duplex	MS440201PM-48	MS440211PM-48
Uplink-port single mode 1310 nm SC duplex	MS440202PM-48	MS440212PM-48
Uplink-port SFP 100/1000X dual speed	MS440209PM-48	MS440219PM-48

Power supplies see page 32, installation accessories see page 34, management software see page 42.

MICROSENS

Gigabit Ethernet Micro Switch with TP-uplink and -downlink

GBE Micro Switch
with TP-Uplink

Benefits

▍ Installation technology also for copper based (TP) LANs

▍ Gigabit performance on all ports

▍ Easy expansion of the port capacity (1 to 4 ports)

▍ Integrated power supply with 230 VAC input

▍ Easy administration (Web-, Telnet-, SNMP-interface and MICROSENS NMP Platform)

▍ High security through VLANs, 802.1X, SSH, Accounting, etc.

▍ Fast, tool-free mounting by snap-in installation

Description

In addition to the solution with the fiber optic connection, MICROSENS also offers Micro Switches with twisted pair uplink. With the most compactly designed integrated switches available on the market, upgrading of Ethernet connections as well as of Power-over-Ethernet can be made at the work location at no great expenditure.

In existing TP based local area networks the passive cable connection of the passive outlet in the cable trunk is simply connected to the uplink of the switch. The capacity is increased to 4 ports without installing new cables.

The equipment has an integrated network management system and supports all management standards from the web browser over Telnet up to the SNMP. Furthermore, the switches have all common security features such as VLANs, authentication according to IEEE Std. 802.1X up to Accounting.

Description	Art.-No. horizontal	Art.-No. vertical
5 port switch, 4x 10/100/1000T, 1x 10/100/1000T uplink	MS450184M	MS450185M
6 port switch, 4x 10/100/1000T, 1x 10/100/1000T uplink, 1x 10/100/1000TX downlink	MS450186M	MS450187M

Installation accessories see page 34, management software see page 42.

System Catalog 1610

MICROSENS
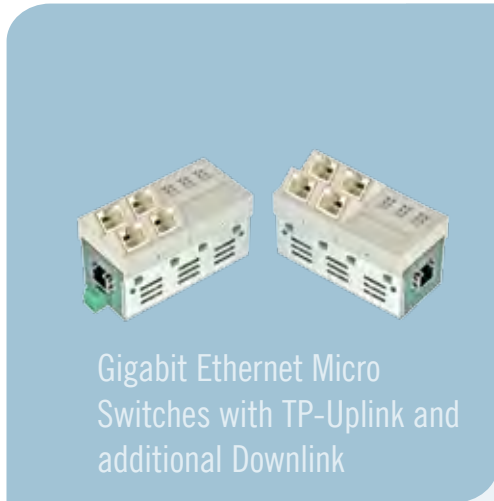
Gigabit Ethernet Micro Switches with TP-Uplink/-Downlink

Gigabit Ethernet Micro Switches with TP-Uplink and additional Downlink
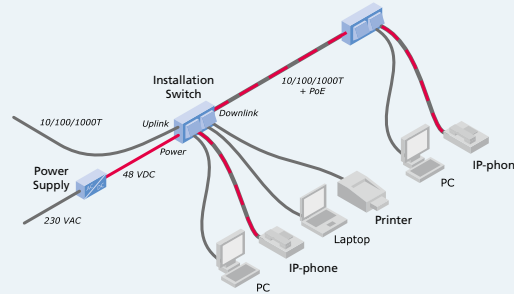
Benefits

▌ Additional RJ-45 port for hidden connection of Ethernet devices

▌ Power-over-Ethernet on all five RJ-45 ports

▌ Optional power supply - Power-over-Ethernet via the uplink port (Powered Device - PD)

▌ Easy administration (Web-, Telnet-, SNMP-interface and MICROSENS NMP Platform)

▌ High security through VLANs, 802.1X, SSH, Accounting, etc.

▌ Fast, tool-free mounting by snap-in installation

Description

The 6 port version of the GBE Micro Switch enables the connection of additional equipment via the extra port. Beside the 10/100/1000Base-T uplink for linking to the central distributor, the switch has an additional downlink port. This port is positioned at the rear of the switch and is covered after the installation.

This additional connection can be used for cascading other Micro Switches in order to obtain more connection capacities. In other applications, the connection is often used for the operation of Wireless Access Points (WLAN).

Optionally the switches can be supplied with power over the uplink (PD- Powered Device) and therefore they can be used without external power supply.

All five RJ-45 ports (4 user ports and 1 downlink) support the complete Power-over-Ethernet functionality according to the IEEE Std. 802.3af. Intelligent power management monitors the active current consumption of connected end equipment.

Description	Art.-No. horizontal	Art.-No. vertical
5 port switch, 4x 10/100/1000T (PSE), 1x 10/100/1000T uplink (PD)	MS450184PM-48	MS450185PM-48
6 port switch, 4x 10/100/1000T (PSE), 1x 10/100/1000T uplink (PD), 1x 10/100/1000TX downlink (PSE)	MS450186PM-48	MS450187PM-48

Power supplies see page 32, installation accessories see page 34, management software see page 42.

GBE-Switches
with Fiber- or TP-Uplink

Enterprise networks

Gigabit Ethernet Micro Switches with Fiber-Uplink

	5 Port Switch, horizontal	5 Port Switch, vertical	6 Port Switch, horizontal	6 Port Switch, vertical
Connections				
Local connections	4x 10/100/1000Base-T	4x 10/100/1000Base-T	4x 10/100/1000Base-T	4x 10/100/1000Base-T
Uplink	1x 1000Base-SX/LX	1x 1000Base-SX/LX	1x 1000Base-SX/LX	1x 1000Base-SX/LX
Downlink	-	-	1x 10/100/1000Base-T	1x 10/100/1000Base-T
Features				
Power supply	195..265 VAC	195..265 VAC	195..265 VAC	195..265 VAC
Configuration	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation-
Ordering information				
Multimode 850 nm, ST	MS450860M	MS450870M	MS440200M	MS440210M
Multimode 850 nm, SC	MS450861M	MS450871M	MS440201M	MS440211M
Single mode 1310 nm, SC	MS450862M	MS450872M	MS440202M	MS440212M
Single mode 1310 nm, ST	MS450863M	MS450873M	MS440203M	MS440213M
SFP-slot	MS450869M	MS450879M	MS440209M	MS440219M
RJ-45				
Catalogue page	**20**	**20**	**20**	**20**
Features				
Power supply	48 VDC	48 VDC	48 VDC	48 VDC
Number of PoE connections	4x PSE	4x PSE	5x PSE	5x PSE
Configuration	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto-negotiation
Ordering information				
Multimode 850 nm ST	MS450860PM-48	MS450870PM-48	MS440200PM-48	MS440210PM-48
Multimode 850 nm SC	MS450861PM-48	MS450871PM-48	MS440201PM-48	MS440211PM-48
Single mode 1310 nm SC	MS450862PM-48	MS450872PM-48	MS440202PM-48	MS440212PM-48
Single mode 1310 nm ST	MS450863PM-48	MS450873PM-48	MS440203PM-48	MS440213PM-48
SFP-slot	MS450869PM-48	MS450879PM-48	MS440209PM-48	MS440219PM-48
RJ-45	-	-	-	-
Catalogue page	**21**	**21**	**21**	**21**

Versions with int. 230 VAC

Versions with PoE (48 VDC)

MICROSENS

Gigabit Ethernet Micro Switches with TP-Uplink

5 Port Switch, horizontal	5 Port Switch, vertical	6 Port Switch, horizontal	6 Port Switch, vertical
4x 10/100/1000Base-T	4x 10/100/1000Base-T	4x 10/100/1000Base-T	4x 10/100/1000Base-T
1x 10/100/1000Base-T	1x 10/100/1000Base-T	1x 10/100/1000Base-T	1x 10/100/1000Base-T
-	-	1x 10/100/1000Base-T	1x 10/100/1000Base-T
195..265 VAC	195..265 VAC	195..265 VAC	195..265 VAC
NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
MS450184M	MS450185M	MS450186M	MS450187M
22	22	22	22
48 VDC or via uplink (PoE PD)	48 VDC or via uplink (PoE PD)	48 VDC or via uplink (PoE PD)	48 VDC or via uplink (PoE PD)
4x PSE, 1x PD (uplink)	4x PSE, 1x PD (uplink)	5x PSE, 1x PD (uplink)	5x PSE, 1x PD (uplink)
NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
MS450184PM-48	MS450185PM-48	MS450186PM-48	MS450187PM-48
23	23	23	23

Enterprise networks

Fast Ethernet Micro Switches

5/6 Port Fast Ethernet Switch
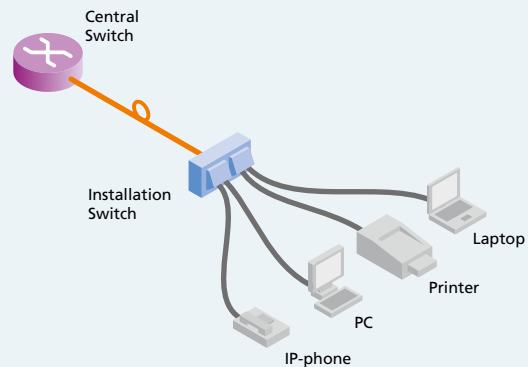
Benefits

▍ Cost efficient copper/fiber integration

▍ Vertical/horizontal version

▍ Fast, tool-free mounting by snap-in installation

▍ Optional integrated management with several configuration and monitoring features

▍ Optional version with an additional 10/100Base-TX downlink port

▍ Integrated power supply with 100 – 240 V AC input

Description

An intelligent combination of fiber optic (100Base-FX) and twisted pair (10/100Base-TX) is obtained with the Fast Ethernet Micro Switch. The device offers to the user also the standard RJ-45 ports for the connection of the end equipment to a fiber optic network.

The compact 45x45 switches are designed for the direct installation into cable trunks and sub-floor boxes. The 6 port version has on its rear side an additional RJ-45 downlink 10/100Base-TX that is covered after the installation. This additional connection enables cascading other Micro Switches offering thus additional connection capacities.

The Fast Ethernet Micro Switch has an integrated 230 VAC power unit. The device can be optionally manageable (article number with „M" extension). The manageable version offers VLAN operation according to IEEE 802.1Q and further security features such as IEEE 802.1X, accounting, etc.

horizontal version

vertical version

Description	Art.-No. horizontal	Art.-No. vertical
5 Port Switch, 4x 10/100TX, 1x 100FX Uplink		
Uplink-port multimode 1310 nm ST duplex	MS450230*	MS450240*
Uplink-port multimode 1310 nm SC duplex	MS450231*	MS450241*
Uplink-port single mode 1310 nm ST duplex	MS450232*	MS450242*
Uplink-port single mode 1310 nm SC duplex	MS450233*	MS450243*
6 Port Switch, 4x 10/100TX, 1x 100FX Uplink, 1x 10/100TX Downlink		
Uplink-port multimode 1310 nm ST duplex	MS450330*	MS450340*
Uplink-port multimode 1310 nm SC duplex	MS450331*	MS450341*
Uplink-port single mode 1310 nm ST duplex	MS450332*	MS450342*
Uplink-port single mode 1310 nm SC duplex	MS450333*	MS450343*

optional manageable version, article number with extension „M" (e. g. MS450230M),

FE Micro Switches with PoE

5/6 Port Fast Ethernet Switch with PoE
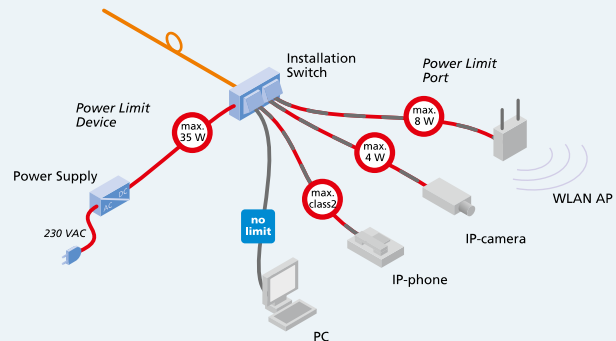
Benefits

▌ Power-over-Ethernet for powering VoIP phones, IP cameras, WLAN APs, etc.

▌ Cost efficient VoIP integration in fiber optic networks

▌ Easy administration (Web-, Telnet-, SNMP-interface and MICROSENS NMP Platform)

▌ VLANs, data prioritisation (QoS), authentication according to 802.1X

▌ Fast, tool-free mounting by snap-in installation

▌ Optional 6 port version with additional 10/100Base-TX downlink for cascading

Description

This switch version supplies power to connected end equipment such as VoIP telephones, IP cameras or wireless access points via Power-over-Ethernet. In addition to this, the complete Power-over-Ethernet operation according to IEEE Std. 802.3af is made available at all RJ-45 ports (also the downlink with the 6 port version).

The intelligent power management monitors the active current consumption of connected end equipment. In addition to the power classes of the IEEE802.3af standard it is possible to limit the power of each port step less. The power supply of the switch is done by an external 48 VDC power supply.

The device has an integrated network management system and supports all management standards from the web browser over Telnet up to the SNMP. Furthermore, the switches have the all common security features such as VLANs, authentication according to IEEE Std. 802.1X up to accounting.

Description	Art.-No. horizontal	Art.-No. vertical
5 port Switch, 4x 10/100TX, 1x 100FX Uplink		
Uplink-port multimode 1310 nm ST duplex	MS450230PM-48	MS450240PM-48
Uplink-port multimode 1310 nm SC duplex	MS450231PM-48	MS450241PM-48
Uplink-port single mode 1310 nm ST duplex	MS450232PM-48	MS450242PM-48
Uplink-port single mode 1310 nm SC duplex	MS450233PM-48	MS450243PM-48
6 Port Switch, 4x 10/100TX, 1x 100FX Uplink, 1x 10/100TX Downlink		
Uplink-port multimode 1310 nm ST duplex	MS450330PM-48	MS450340PM-48
Uplink-port multimode 1310 nm SC duplex	MS450331PM-48	MS450341PM-48
Uplink-port single mode 1310 nm ST duplex	MS450332PM-48	MS450342PM-48
Uplink-port single mode 1310 nm SC duplex	MS450333PM-48	MS450343PM-48

horizontal version

vertical version

Power supplies see page 32, installation accessories see page 34, management software see page 42.

Enterprise networks

System Catalog 1610

MICROSENS

Fast Ethernet
Micro Switches with TP-Uplink

5/6 Port FE Micro Switch
with TP-Uplink

Benefits

▌ Easy expansion of the port capacity
(1 to 4 ports)

▌ Easy administration (Web-, Telnet-,
SNMP-interface and MICROSENS
NMP Platform)

▌ VLANs, data prioritisation (QoS),
authentication according to 802.1X

▌ Fast, tool-free mounting by snap-in
installation

▌ Power-over-Ethernet for powering
VoIP phones, IP cameras, WLAN
APs, etc. (PoE version)

Description

In addition to the solution with the fiber optic connection, MICROSENS also offers micro switches with twisted pair uplink. With the integrated switches – the most compactly designed on the market – upgrading of Ethernet connections as well as Power-over-Ethernet can be made at the work location at no great expenditure.

Beside the standard version with integrated 230 VAC power unit, there is an extended version available with Power-over-Ethernet and 48 VDC power connection. The PoE version can be supplied over the uplink port via PoE and is therefore completely independent of an external power supply. The power of up to 15.4 W (Class 0) is not only for the own supply (Powered Device, PD) but can be fed to the user connections so that it is available to other users (Power Source Equipment, PSE).


horizontal version

vertical version

Description	Art.-No. horizontal	Art.-No. vertical
Standard Version with internal power supply 230 VAC		
5 port version, 1x 10/100Base-TX uplink, 4x 10/100Base-TX, manageable	**MS450150M**	**MS450155M**
6 port version, 1x 10/100Base-TX uplink, 1x 10/100Base-TX downlink, 4x 10/100Base-TX, manageable	**MS450156M**	**MS450157M**
Version with Power-over-Ethernet, 48 VDC		
5 port version, 1x 10/100Base-TX uplink PD, 4x 10/100Base-TX, PSE, manageable	**MS450154PM-48**	**MS450155PM-48**
6 port version 1x 10/100Base-TX uplink PD, 1x 10/100Base-TX, downlink PSE, 4x 10/100Base-TX, PSE, manageable	**MS450156PM-48**	**MS450157PM-48**

Power supplies see page 32, installation accessories see page 34, management software see page 42.

Enterprise networks

System Catalog 1610

MICROSENS

Fast Ethernet Micro Twin Converter

Fast Ethernet
Micro Twin Converter
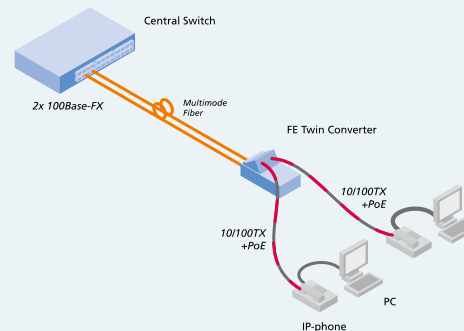
Benefits

▌ Fast Ethernet Micro Twin Converter 100Base-TX/100Base-FX for low space requirement

▌ Optional Power-over-Ethernet according to IEEE 802.3af, max. 15.4 W per port

▌ Bridge mode for speed adaptation 10/100 Mbps, half-/full-duplex

▌ Hidden fiber port for high robust-ness of the complete system

Applications

▌ Cost effective connection of VoIP telephones in Fiber To The Desk (FTTD) networks

▌ Retention of the dedicated ports in the central distribution for each end device

Description

The increased number of applications of IP telephones primarily confronts the user of Fiber To The Desk networks (FTTD) with the matter of active media conversion. In FTTD networks, end equipment is directly fitted with fiber optic ports and connected (dedicated) with the central building distributor. However, IP telephones generally have twisted pair ports.

For this application, MICROSENS offers a Fast Ethernet Micro Twin Converter with an optional Power-over-Ethernet (PoE) operation. The equipment contains two Fast Ethernet Media Converters, independent of each other, for a typical office environment with two work places. The conversion of the Fast Ethernet signals is made within extremely short latency periods and is transparent.

Besides the standard version with an integrated 230 VAC power unit, there is an extended version available with Power-over-Ethernet according to IEEE 802.3af. In this operation mode, end equipment can be supplied with data as well as with power via the connected twisted pair cable. A maximum power of 15.4 W per port enables operation of all end equipment, conforming to stan-dards, such as IP telephones, wireless access point, IP cameras, etc.

Furthermore, the equipment can be switched to the bridging mode. In this case a corresponding speed regulator, 10/100Base-TX, is achieved in addition to the media conversion. The device is independent of network management and all configurations for the converter, respectively bridge mode, as well as the PoE settings are made via a DIP switch.

Description	Standard Version	PoE Version
Fast Ethernet Twin Converter, 2x 100Base-TX/100Base-FX, multimode 1310 nm LC duplex	MS450295	MS450295P-48
Fast Ethernet Twin Converter, 2x 100Base-TX/100Base-FX, multimode 1310 nm MT-RJ duplex	MS450297	MS450297P-48
Fast Ethernet Twin Converter, 2x 100Base-TX/100Base-FX, single mode 1310 nm LC duplex 15 km	MS450294	MS450294P-48

48 VDC power supplies (for PoE version) see page 32, installation accessories see page 34.

MICROSENS

FE-Switches
with Fiber or TP Uplink

Enterprise networks

Fast Ethernet Micro Switches with Fiber Uplink

		5 Port Switch, horizontal	5 Port Switch, vertical	6 Port Switch, horizontal	6 Port Switch, vertical
	Connections				
	Local connections	4x 10/100Base-TX	4x 10/100Base-TX	4x 10/100Base-TX	4x 10/100Base-TX
	Uplink	1x 100Base-FX	1x 100Base-FX	1x 100Base-FX	1x 100Base-FX
	Downlink	-	-	1x 10/100Base-TX	1x 10/100Base-TX
Versions without Management	**Features**				
	Power supply	110..230 VAC	110..230 VAC	110..230 VAC	110..230 VAC
	Configuration	Fiber: Full duplex, RJ-45: Auto Negotiation	Fiber: Full duplex, RJ-45: Auto Negotiation	Fiber: Full duplex, RJ-45: Auto Negotiation	Fiber: Full duplex, RJ-45: Auto Negotiation
	Ordering information				
	Multimode 1310 nm ST	MS450230	MS450240	MS450330	MS450340
	Multimode 1310 nm SC	MS450231	MS450241	MS450331	MS450341
	Single mode 1310 nm ST	MS450232	MS450242	MS450332	MS450342
	Single mode 1310 nm SC	MS450233	MS450243	MS450333	MS450343
	Catalogue page	**26**	**26**	**26**	**26**
Versions with Management	**Features**				
	Power supply	110..230 VAC	110..230 VAC	110..230 VAC	110..230 VAC
	Configuration	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation	NMP / Telnet / Web / SNMP, or Auto Negotiation
	Ordering information				
	Multimode 1310 nm, ST	MS450230M	MS450240M	MS450330M	MS450340M
	Multimode 1310 nm SC	MS450231M	MS450241M	MS450331M	MS450341M
	Single mode 1310 nm ST	MS450232M	MS450242M	MS450332M	MS450342M
	Single mode 1310 nm SC	MS450233M	MS450243M	MS450333M	MS450343M
	RJ-45	-	-	-	-
	Catalogue page	**26**	**26**	**26**	**26**
Versions with Management and PoE	**Features**				
	Power supply	48 VDC	48 VDC	48 VDC	48 VDC
	Number of PoE connections	4x PSE	4x PSE	5x PSE	5x PSE
	Configuration	NMP / Telnet / Web / SNMP	NMP / Telnet / Web / SNMP	NMP / Telnet / Web / SNMP	NMP / Telnet / Web / SNMP
	Ordering information				
	Multimode 1310 nm ST	MS450230PM-48	MS450240PM-48	MS450330PM-48	MS450340PM-48
	Multimode 1310 nm SC	MS450231PM-48	MS450241PM-48	MS450331PM-48	MS450341PM-48
	Single mode 1310 nm ST	MS450232PM-48	MS450242PM-48	MS450332PM-48	MS450342PM-48
	Single mode 1310 nm SC	MS450233PM-48	MS450243PM-48	MS450333PM-48	MS450343PM-48
	RJ-45	-	-	-	-
	Catalogue page	**27**	**27**	**27**	**27**

MICROSENS

Fast Ethernet Micro Switches with TP Uplink

5 Port Switch, horizontal	5 Port Switch, vertical	6 Port Switch, horizontal	6 Port Switch, vertical
4x 10/100Base-TX	4x 10/100Base-TX	4x 10/100Base-TX	4x 10/100Base-TX
1x 10/100Base-TX	1x 10/100Base-TX	1x 10/100Base-TX	1x 10/100Base-TX
-	-	1x 10/100Base-TX	1x 10/100Base-TX
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
110..230 VAC	110..230 VAC	110..230 VAC	110..230 VAC
NMP-Software / Telnet / Web / SNMP,	NMP-Software / Telnet / Web / SNMP,	NMP-Software / Telnet / Web / SNMP,	NMP-Software / Telnet / Web / SNMP
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
MS450150M	MS450155M	MS450156M	MS450157M
28	28	28	28
48 VDC or via uplink (PoE PD)	48 VDC or via uplink (PoE PD)	48 VDC or via uplink (PoE PD)	48 VDC or via uplink (PoE PD)
4x PSE	4x PSE	5x PSE	5x PSE
NMP-Software / Telnet / Web / SNMP	NMP-Software / Telnet / Web / SNMP	NMP-Software / Telnet / Web / SNMP	NMP-Software / Telnet / Web / SNMP
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
MS450154PM-48	MS450155PM-48	MS450156PM-48	MS450157PM-48
28	28	28	28

MICROSENS

Compact 48 VDC Power Supply Unit
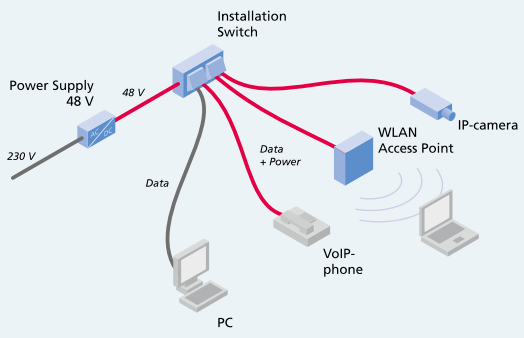
Compact 48 VDC
Power Supply 65 W

Benefits

▌ Compact and reliable power supply
with high efficiency

▌ Extended versions inclusive
mounting kits

▌ Full-controlled and protected
output, incl. shortcut and overload
protection

▌ Integrated over voltage protection

Description

In order to use MICROSENS components with Power-over-Ethernet operation according to IEEE 802.3af, the user must apply a universal compact power supply unit for placing into cable trunks, sub-floor systems, respectively wall mounting housings.

Having extremely compact dimensions, this 48 VDC power supply unit has a power of 65 W. The power loss is minimized by the high efficiency factor of 90%. The power unit is also equipped with an effective voltage surge protection as well as overload protection.

In addition to the standard version, special holder devices are available for accommodation in cable trunks from various manufacturers. For example: the power unit for Tehalit BR-Netway cable channels is combined with the front locking ground terminal. Furthermore, an optional accessory can be obtained for anchoring to a C-profile.

For the use in medical environments there are power supplies with approval according to EN60601-1 standard available.

Power supply front locking for Tehalit

Description	Art.-No.
Power supply 100-230 VAC / 48 VDC, 1.35 A, 65 W	MS700675-2
Medical power supply unit 110-230 VAC / 48 VDC, 1.25 A, 60 W	MS700680
Tehalit cable channel mounting, front fixed incl. power supply 110-230 VAC / 48 VDC, 65 W	MS700675-EKTH
Bracket for mounting to a C-profile for MS700675-2 (without power supply)	MS140075-1

System Catalog 1610

Enterprise networks

MICROSENS

Central 48 VDC Power Supplies

19" Power Supplies
with 1 U/2 U height

Benefits

▌ Extreme high power density and therefore low space requirement

▌ Versions from 500 W (1 U) up to 4500 W (2 U)

▌ High efficiency also at partial load

▌ DC output with temperature controlled powerful characteristic

▌ Wide operating temperature range: -33 to + 75 °C

▌ Easy installation, commissioning and upgrades

▌ LCD display for current, voltage and temperature

▌ Optional monitoring via USV protocol (RS-232)

Description

The use of a central 48 VDC power supply compared to decentred separate power supplies has many advantages. First of all it is more economical. Due to the exact dimensioning and scaling these systems are more energy efficient and distinguish themselves by a very low power consumption.

It is also very easy to implement redundancy with the central solutions and to use a battery back up (UPS). MICROSENS offers a very compact solution with a high power density which requires a minimum of space only. Thanks to the wide operating temperature range of -33 to +75 °C an expensive air conditioning is not necessary.

The power management of the Micro Switches interacts optimally with the central power supplies. The total power consumption is monitored permanently and an overload by wrong or faulty end devices is avoided.

The entry model consists of three compact rectifier modules with 500 W each that are combined in 1 U chassis to a total power of 1500 W. The next larger model is 2 U device with a max. power of 4500 W, which consists of three rectifier modules with 1500 W each and including the carrier chassis and a power distribution panel.

Description	Art.-No.
19" 1 U chassis, 3 slots for rectifier modules, max. 1.500 W, LCD display	**MS700811**
500 W / 48 VDC rectifier module for MS700811 chassis	**MS700820**
19" 1 U chassis, 3 slots for rectifier modules, max. 4.500 W	**MS700840**
19" 1 U chassis for MS700840, 6 power switches, LCD display	**MS700841***
1500 W / 48 VDC rectifier module MS700840 chassis	**MS700850**
MCU control units 8x I/O ports, RS-232, 3x relay contact	**MS700809**

Only in combination with MS700840.

MICROSENS

Installation Accessories
for System 45 x 45

Installation Accessories

Benefits

▌ 45x45 System: compact, international, future oriented

▌ Neutral design

▌ Easy mounting due to the tool-free snap-In installation

Applications

▌ Device installation or cable trunk systems

▌ Sub floor systems

▌ Room or power column

▌ In wall installations

▌ On wall installations

▌ Power distribution boxes

▌ Laboratory and medical units

▌ Desk installations

Description

The components of the modular 45 system can be used with all common installation systems of different manufacturers. In most of the cases they are applied in cable trunks and sub floor boxes.

The use in cable trunks is supported by several manufacturers, such as OBO Bettermann, Legrand, van Geel and GGK. For cable trunks of the company Tehalit MICROSENS offers special mounting kits which enable the tool-free installation. In addition a mounting kit for standard E2 boxes is available.

Due to the compact dimensions the 45x45 products are ideal in the area of sub floor installation. Here MICROSENS offers for example the complete mounting sets for the sub floor tanks from Ackermann.

For the conference or writing desktop solutions the modular 45 system offers many possibilities. For example the company Schulte Elektrotechnik offers with the EVOline® Port Line a solution that can be sunken in the table. Further chassis can be mounted with some special holders to table legs. For the mounting into walls MICROSENS offers special mounting kits as well. Furthermore there are finery mount boxes in different sizes available.

Do you have a new mounting task? We have the matching solution!

MICROSENS

Description	Art.-No.
Trunking Systems	
Universal mounting kit including cover frame for cable ducts with C-Profile	**MS140040BR**
Mounting kit including cover frame for Tehalit BRSN (metal), front locked	**MS140040F**
Universal mounting kit for E2 device casing, plate and cover frame	**MS140029**
Under floor	
2-parts GB2-Set, bracket 3x 45x45, blank cover, without 2x device box	**MS140024**
3-parts GB3-Set, bracket 3x 45x45, 2x blank cover, without 3x device box	**MS140025**
3-parts GB2-Set, bracket 3x 45x45, blank cover, incl. 2x device box	**MS140026**
4-parts GB3-Set, bracket 3x 45x45, 2x blank cover, incl. 3x device box	**MS140027**
Desktop Installation	
Desktop-Box, 4x 45x45, (additional there are 2x half (MS140034) and 1x full (MS140033) covers required)	**MS140125-cc**
cc- box colour: LG - light grey, RW - pure white, TR - transparent, BL- blue, AN - anthracite, AL - aluminium lacquered	
Universal, modular aluminium enclosure	
Modular enclosure in aluminium with 4x module 45 slots, end caps and two blind covers in black grey (RAL 7021)	**MS140131GT-4**
Modular enclosure in aluminium with 5x module 45 slots, end caps and two blind covers in black grey (RAL 7021)	**MS140131GT-5**
Modular enclosure in aluminium with 6x module 45 slots, end caps and two blind covers in black grey (RAL 7021)	**MS140131GT-6**
Options for cable entries cover 45x45 black grey (RAL 7021)	
with opening for cable trunk	**MS140162-GT**
with integrated power connector	**MS140150-GT**
with cable entry for up to 6 cables	**MS140161-GT**
with cable entry with cap	**MS140160-GT**
Options for mounting	
Under table mounting set	**MS140142**
Intermediate floor set, adapter for 2 boxes	**MS140143**
Screw clamp for desk mounting	**MS140144**
DIN rail holder	**MS140145**
Mounting magnet (1 piece, min. 2 pieces are required)	**MS140146**

Description	Art.-No.
Wall Mounting	
4 part set for cavity wall mounting, pure white, bracket, front cover, blind plate, cavity wall box	MS140040HW
4 parts set for in wall (solid) mounting, pure white, bracket, front cover, blind plate, in wall (solid) box	MS140040UP
Media column for conference systems	
Retractable, modular aluminium enclosure (silver anodised) with flapping opening (silver lacquered) and sleeve (silver)	MS140120-AL-n
Retractable, modular aluminium enclosure (black anodised) with flapping opening (black plastic) and sleeve (black)	MS140120-BK-n
Blind plates	
Blind plate 45x45, pure white	MS140033-RW
Blind plate 45x45, black grey	MS140033-GT
Blind plate 45x45, black	MS140033-BK
Blind plate 45x45, pure white, aluminium lacquered	MS140033-AL
Half blind plate 1/2 45x45, pure white	MS140034-RW
Half blind plate 1/2 45x45, black grey	MS140034-GT
Power distributor / 35 mm DIN rail	
Hat rail adapter for 35 mm DIN rails	MS140805
Accessory for TeLiTank	
3 part set, pure white, 3 slot bracket and font cover, blind plate	MS140064
2 part set, black device bracket, blind plate	MS140065
Others	
Front cover pure white (replacement cover for mounting set MS140029)	MS140031
Front cover like above but with labelling field	MS140031B
Overvoltage protection 230 V AC, 22.5 x 45 mm, optical indicator	MS140200
Reset-Tool for Fast Ethernet Micro Switches	MS140000
Field assembling RJ-45 connector (Cat 5e) for wire for solid and flexible wires, toll less assembly	MS190290
Screwdriver set for 45x45 installation-switches 3 part incl. case, consisting of: slotted screwdriver 105 x 25 mm, phillips screwdriver 105 x 25 mm, slotted screwdriver 175 mm	MS140002

MICROSENS

230 VAC Power Pick-off System

Two taps in less than one minute

Dismantle

Adjustment and contacting

Covering

Benefits

▌ Uninterruptible power entering for power cables 3x 1.5 to 2.5 mm²

▌ Reliable, tool-less cutting-clamping technology

▌ Efficient – two 100 - 240 VAC taps in less than one minute

▌ Compact and space saving, without big box

▌ Long term stability, vibration proof and corrosion resistant

▌ Extendable at any time

Description

The 100 - 240 VAC tap system offers uninterruptable power tapping for existing cablings. For easy handling the tap can be placed close to the end device. The system is compatible to common power cables (universal for 1.5 and 2.5 mm²).

The power tap is made with a few steps and without any additional tools. The installation is self-explanatory: The components are designed for each other and can not be mixed by mistake.

The tap is placed at any position of the power cable and at this position the cable has to be dismantled for 50 – 55 mm. Afterwards the cables can be positioned according to the marking and then contacted with the reliable cutting-clamping method. Finally the cover is mounted and the tap is ready for use.

Never before power tapping was so easy and comfortable. Optional this system is also available for 5 wired cables.

Dismantle tool

Description	Art.-No.
Power tap adapter with 3-pin connector for use with wires 3x 1.5 to 2.5 mm²	MS190054
Connection cable 3x 1.5 mm² for power tap adapter, black, length: 1.0 m	MS190052-1,0
Dismantle tool for round cables 3x 1.5 to 2.5 mm²	MS190050

MICROSENS

Enterprise networks

Multi-Port Fast Ethernet Converter

12 / 24 Port Fast Ethernet
Multi-Port Converter
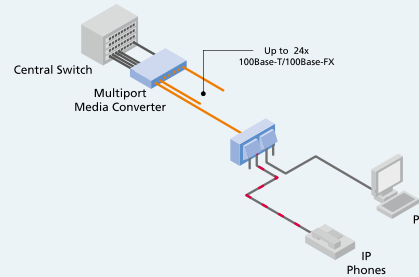
Benefits

▌ Cost efficient copper/fiber
conversion

▌ Compact design, high port density
possible

▌ Easy handling/installation

▌ Support of Auto Negotiation for the
automatic adjustment of half / full
duplex

▌ Integrated network management

▌ Easy service friendly replacement of
fan unit (hot swap)

▌ Redundant power supply concept
(RPSU unit)

Description

In fiber optic-based networks, such as FTTO and FTTD, a high number of active fiber optic ports are required in the central distribution area. From economical aspects the application of the media converter together with copper-based switches is of interest with respect to Fast Ethernet.

Multi-port converters offer copper/fiber optic conversion of up to 24 Fast Ethernet channels within one height unit (1 U). Apart from the high port density, the fiber optic ports are achieved with normal connectors such as ST or SC-Duplex. The connection to the central switches is made with TELCO or RJ-45 cables depending on the version.

Multi-port converters have such functions as integrated SNMP and Web Management, the connection of a redundant power supply unit as well as exchangeable fan modules.

Fan Module

Description	Art.-No. TELCO	Art.-No. RJ-45
12 Port Media Converter 12x 100TX/100FX		
Multimode 1310 nm ST duplex	MS416930M	MS416950M
Multimode 1310 nm SC duplex	MS416931M	MS416951M
Single mode 1310 nm ST duplex	MS416935M	MS416955M
Single mode 1310 nm SC duplex	MS416936M	MS416956M
24 Port Media Converter 24x 100TX/100FX		
Multimode 1310 nm ST duplex	MS416920M	MS416900M
Multimode 1310 nm SC duplex	MS416921M	MS416901M
Single mode 1310 nm ST duplex	MS416925M	MS416905M
Single mode 1310 nm SC duplex	MS416926M	MS416906M

Other versions with LC or MT-RJ connectors on request.

System Catalog 1610

MICROSENS

MICROSENS

Accessories of the Multi-Port Converter

RPSU Unit

Enterprise networks

Benefits

▌ Redundant power supply of the multi-port Converter

▌ Easy replacement of fan unit (hot swap)

▌ Long life fans

▌ Filter wad for effective fan performance

▌ Bundling of the copper ports with TELCO connectors

Description

The so-called TELCO cables are used for the connection of multi-port converters to the central copper switches. These cables unite 12 Fast Ethernet lines via a cable with RJ-21 connector giving, at the same time, flexibility and ease in assembly. Cables are available as 1:1 (TELCO/TELCO) as well as hybrid 1:12 (TELCO/RJ-45).

Furthermore, the power supply of the multi-port converters can have a redundant layout using an external RPSU unit. In doing this, a special RPSU cable is required for connection to the RPSU unit for each multi-port converter. In addition to this fan modules are exchangeable (hot swap). In order to achieve this corresponding service modules can be selected with standard as well as long life fans.

TELCO Cable

TELCO Hydra Cable

Description	Art.-No.
Redundant Power Supplies	
Redundant power supply unit (RPSU) 230 VAC for up to 6 devices of the series MS4169xxM	**MS416031**
RPSU cable for the connection of one device (MS4169xxM) to the RPSU unit, length 1 m	**MS190450-1**
RPSU cable for the connection of one device (MS4169xxM) to the RPSU unit, length 2 m	**MS190450-2**
TELCO Connection Cable	
TELCO connection cable 2x TELCO connector (50 pin, m), length 2 m	**MS190501-2**
TELCO connection cable 2x TELCO connector (50 pin, m), length 3 m	**MS190501-3**
TELCO hydra cable 1x TELCO (50 pin, m), 12x RJ-45, length 1.5 m	**MS190500-1,5**
TELCO hydra cable 1x TELCO (50 pin, m), 12x RJ-45, length 2 m	**MS190500-2**
Fan Module	
Fan- and filter module for multi-port converter MS4169xxM	**MS416990**
Long life fan- and filter module for multi-port converter MS4169xxM	**MS416991**
Fan filter wad for fan unit multi-port converter MS4169xxM	**MS416995**

System Catalog 1610

MICROSENS

Enterprise networks

24 Port Fast Ethernet Switch

Modular 24 Port Fast Ethernet
Switch with 3 Modules

8 Port SC Duplex Module
100Base-FX

8 Port RJ-45 Module
10/100Base-TX

Benefits

▌ 24 Fast Ethernet and
2 Gigabit Ethernet uplink ports

▌ Modular design for copper and fiber
networks

▌ High performance with 8.8 Gbps
backplane

▌ Network management via SNMP /
RMON1 / Telnet / CLI / Web, stacka-
ble up to 8 devices

▌ Extensive features such as QoS,
VLAN, IGMP. RSTP etc.

Description

The modular 24 port Fast Ethernet Layer 2+ switch is particularly suited for
the use in Fiber To The Office (FTTO) and Fiber To The Desk (FTTD) networks.
These fiber optic-based networks require a large number of active fiber optic
ports in the central distribution area.

On the front the switch has three modular slots each of which can be retrofitted
with 8 port modules. These modules come with eight 10/100-Base-TX copper
and eight 100Base-FX fiber optic ports. There are fiber optic port versions
available for multimode, single mode and single mode simplex.

At the rear of the switch there are two uplink ports which can be alternative-
ly used in the form of RJ-45 (10/100/1000Base-T) or SFP (1000Base-X) (Dual
Media). In addition to this, the network management of up to 8 switches can
be logically stacked.

Redundant Power Supply

Description	Art.-No.
24 port Fast Ethernet L2+ Access switch chassis, 19" 1 U, manageable, 3 Slots, 2x uplink 10/100/1000Base-T RJ-45 or 1000Base-X SFP	MS400820M
8 port 10/100Base-TX Module, 8x RJ-45	MS400822
8 port 100Base-FX Module, 8x multimode 1310 nm SC duplex 2 km	MS400823
8 port 100Base-FX Module, 8x single mode 1310 nm SC duplex 30 km	MS400824

System Catalog 1610

MICROSENS

24 Port Gigabit Ethernet SFP Switch

24 Port SFP Switch

Benefits

▌ High flexibility due to 24 dual media ports

▌ 2x Gigabit Ethernet uplink

▌ RJ-45 10/100/1000Base-T or SFP 100/1000Base-X

▌ Network management via SNMP / Telnet / CLI / Web

▌ Extensive features such as QoS, VLAN, IGMP. RSTP etc.

▌ Extremely compact design: 19", 1 U

▌ Modular, redundant power supply

▌ Version with 48 VDC and redundant power supply available

Description

The 24 port Gigabit Ethernet switch is designed for application in fiber optic-based networks (FTTO and FTTD), where great number of fiber optic ports are required on the central side.

Each of 24 Gigabit Ethernet ports located on the front of the device is configured as a combined RJ-45 (10/100/1000Base-T) or SFP port (100/1000Base-X). In this way, the switch is accorded a high degree of flexibility especially that the dual speed SFP ports support the Fast Ethernet as well as the Gigabit Ethernet SFP Transceiver.

At the rear of the switch there are two uplink ports which can be selectively used as RJ-45 (10/100/1000Base-T) or SFP (100/1000Base-X) ports.

The switch is equipped with integrated network management and supports all management standards from web browser via Telnet up to SNMP. Moreover the switches have all common security features like QoS, VLANs, STP/RSTP, IGMP snooping, link aggregation up to authentication according to IEEE Std. 802.1X.

Power supply of the switch has a modular layout. There are modules for 90 to 240 VAC and 48 VDC. Two power supply modules can be used in parallel (redundant) whereby the options for AC and DC are freely selectable and combinable.

Back side of the 24 Port SFP Switch

Description	Art.-No.
24 port Gigabit Ethernet switch with 2x Gigabit uplink,10/100/1000Base-T RJ- 45 or 100/1000Base-X SFP-Slot, SNMP/Web/Telnet-Management, incl. 1x 90-240 VAC power supply	**MS400870M-1A**
How on top, nevertheless, with 2x 90 - 240 VAC power supply modules	**MS400870M-2A**
How on top, nevertheless, with 1x 48 VDC power supply module	**MS400870M-1D**
How on top, nevertheless, with 2x 48 VDC power supply modules	**MS400870M-2D**

MICROSENS

Enterprise networks

NMP – Network Management Platform Universal Management for all Device Families of MICROSENS

Benefits

▌ Graphical visualisation of the device condition and detailed status information at a glance

▌ Automatic detection of all manageable MICROSENS devices in the network

▌ Logical structuring of the network by definition of device groups

▌ Integrated SNMP trap receiver for the active monitoring of devices

▌ Simultaneous configuration of complete groups or all devices

▌ Automatic firmware update of device groups

▌ Topology Manager

Licence Levels

▌ NMP Standard

▌ NMP Professional

▌ NMP Server

Description

The Network Management Platform (NMP) is a universal tool which can configure and monitor all the network components from MICROSENS. The administrator is considerably relieved of daily tasks by a clearly arranged graphic display and intelligent automatism.

The Network Management Tool works on the basis of a tree structure which enables network components to be grouped with the aid of equipment lists. The equipment can be allocated to either one or more groups depending on the organizational structure in order to simultaneously allot the settings of multiple devices.

MICROSENS components are automatically recognized by the automatic discovery function. This also applies to components which do not yet have an IP configuration. Using extended SNMP functions, all equipment families from the areas of Enterprise Networks, Industrial Solutions, Enterprise Access and Metro Networks can be administrated via a common tool.

Licenses are required for the operation of NMP software. The license is a multi-user license with unlimited validity. Future versions can also be directly included with an optional additional package.

Moreover, the new management platform has an integrated Topology Manager. Using this, the network components can be graphically positioned on a map and linked to each other. In this way, specific connections, respectively links, are monitored in addition to operating parameters.

With the server version the NMP is operated on a central server, the access from the clients is done via a web interface. Up to 30 clients can access the server in parallel. For higher demands the NMP server can be operated redundant in the network.

MICROSENS
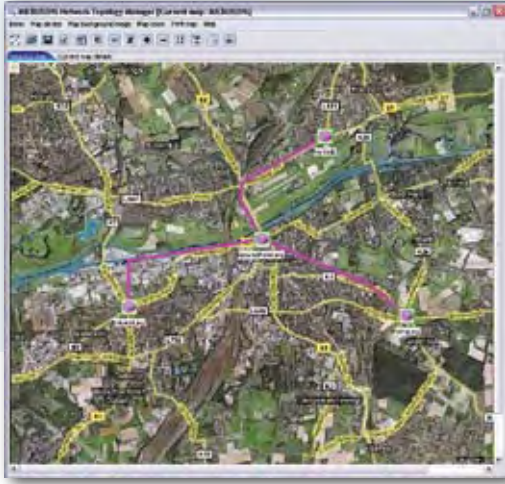
Visualising net topology at town level

Integration of plans and building plans

Network tree structure, device status and Event-Manager

Visualising of connections
on port level

Description	Art.-No.
NMP Professional - management software with 1 year update licence	**MS200160-1**
NMP Professional - additional update licence for n-years	**MS200161-n**
NMP Standard - management software with 1 year update licence	**MS200162-1**
NMP Standard - additional update licence for n-years	**MS200163-n**
NMP Server - management software with 1 year update licence, incl. 5 clients	**MS200164-1**
NMP Server - additional update licence for n-years	**MS200165-n**
NMP Server - additional client access licences for n-clients	**MS200166-Cn**

MICROSENS

Enterprise networks

Basic Fiber Optic Products

Devices for the future safe integration
of present and future peripherals

Under the name „Basic Fiber Optic Products" MICRO-
SENS developed a product line which fully complies with
the market requirements regarding the pricing and the
availability.

The mainstream of all the products in this product group
is an easy and cost efficient access of copper based end
devices to a fiber optic network.

The comprehensive portfolio of the "Basic Fiber Optic Pro-
duct" group includes standard solutions for Gigabit and Fast
Ethernet as well as media converters for serial interfaces
e. g. RS-232/422/485 and DVI/HDMI interfaces. Beside this
there are also multimode/single mode converters and PoE-
Injectors available.

Benefits:

- Cost efficient access of end devices to fiber optic
  networks
- Comprehensive product line from Gigabit Media
  converters to HDMI converters
- Support of the Power over Ethernet Standard 802.3af
- Easy and quick installation of devices
- Compact design

Central Switch
with MM ports

Headquarters

Long distances

PoE

Phone

PC

PC

Phone

PC

Printer

Phone

PC

MICROSENS

Basic Fiber Optic Products

Basic Fiber Optic Products
Product Overview

Enterprise networks

Gigabit Ethernet Desktop Switches
SNMP/Web/CLI smart management.

48

Fast Ethernet Desktop Switches
SNMP/Web/CLI management, optional with PoE.

51

Gigabit Ethernet Media and Bridging Converter
Fiber/TP, SFP/SFP.

54

Fast Ethernet Media and Bridging Converter
Media converter fiber/TP, optional with PoE.

58

MM/SM Converter
Protocol transparent, 155 Mbps..1.25 Gbps.

60

NIC Network Interface Adapter and PCMCIA-Card
Fast and Gigabit Ethernet PCI and Mini Bridge PC Cards.

62

Converter
RS-232/422/485.

65

Video Extender
DVI and HDMI extender.

66

PoE Injectors and Splitter
PoE injectors, PoE splitter for Gigabit and Fast Ethernet.

68

Medical Network Isolator
For the operation of Ethernet components in the medical and patient environment.

70

RJ-45 Patch Cable with Locking
Patch cable with two-sided lock.

71

Fiber Optic Patch Cable
Multimode, single mode, angled polish and couplers.

72

Gigabit Ethernet 8 Port Desktop Switch

Gigabit Ethernet
8 Port Desktop Switch
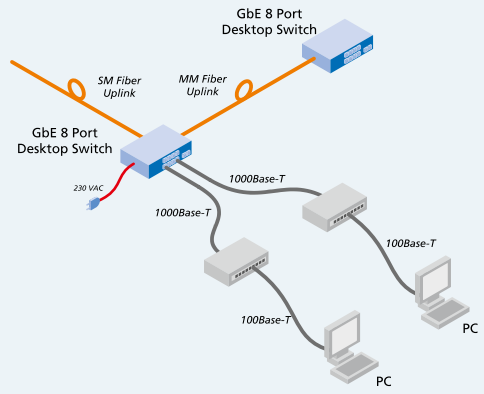
Benefits

▌ Compact, fan less Gigabit Ethernet desktop switch with integrated power supply

▌ High flexibility by SFP-slots

▌ Integrated management with Web-, SNMP,- and Telnet-interface

▌ Extensive functions like QoS, VLANs, STP/RSTP, IGMP-Snooping and many more

▌ Use in NMP Network Management

Description

8 port Gigabit Ethernet switch from MICROSENS with an integrated management was developed for the current bandwidth requirements in the office environ-ment. Two modular transceiver ports (SFPs) give the switch a special degree of flexibility for Fiber To The Office (FTTO) applications.

The office switch has eight twisted pair ports which automatically adjust to the speed (10/100/1000Base-T Auto Negotiation) of the connected equipment. Ports 7 and 8 can be, in addition to the RJ-45, alternatively used per SFP.

The equipment has a wide range of management functions. It can be integrated into the Network Management (NMP) in addition to accessing via console (RS-232), Telnet, Web or SNMP. By doing this, the administration of even a great number of equipment is considerably simplified.

With the internal 230 VAC power supply the switch is of top quality and rugged. Using optional assembly brackets it is possible to accommodate the device into 19" distribution racks.

Description	Art.-No.
8 port Gigabit Ethernet switch 8x 10/100/1000Base-T, 2x SFP ports*, management, integrated power supply 8 x RJ-45, 2x SFP, 1x 230 VAC	MS453522M
19" mounting adapter for 8 port Gigabit Ethernet switch MS453522M set includes 2 adapter and screws, black	MS453522MW

*Suitable SFP transceiver can be found in the section „Enterprise Access".

System Catalog 1610

MICROSENS

6 Port GBE Desktop Switch with PoE

Gigabit Ethernet
6 Port Desktop Switch with PoE
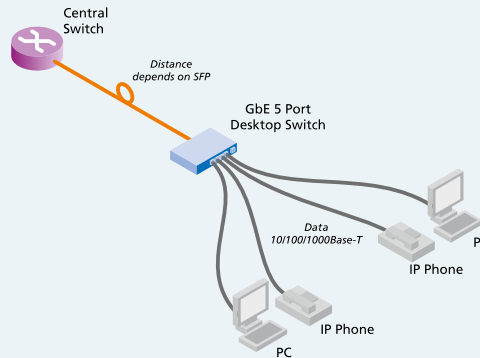
Benefits

▌ Universal Gigabit performance protects investments

▌ Cost efficient integration for VoIP (QoS, VLANs, PoE)

▌ Comfortable administration (NMP software)

▌ High security according to BSI by VLAN, 802.1X, Accounting, etc.

▌ Well equipped, compact, fan-less Gigabit Ethernet switch

▌ SFP-uplink with dual speed 100/1000 Mbps

Description

This office switch is based on the Gigabit Ethernet Micro Switch and therefore has the same features. The equipment offers the complete Gigabit performance on all ports. The connection to the central distributor is made via an integrated 100/1000Base-X fiber optic port.

The complete Power-over-Ethernet operation according to IEEE Std.802.3af is available on all four user ports. Intelligent power management monitors the active current consumption of the connected end equipment.

The switch is equipped with an integrated Network Management and supports all management standards like Web, Telnet and SNMP management. Available functions are data prioritisation, VLANs and authentication according to IEEE Std. 802.1X. The switch is also supported by the Network Management software (NMP).

Back side of 6 Port GBE Switch

Description	Art.-No.
6 port Gigabit Ethernet switch, 5x 10/100/1000Base-T, 1x SFP port*, management, external power supply with 48 VDC, screwable connector	**MS453501PM-48**
External switching power supply 48 VDC/1.25 A 65 W, output (48 VDC): screwable connector, input (100 - 240 VAC)	**MS700675B-2**

* Suitable SFP transceiver can be found in the section „Enterprise Access".

Gigabit Ethernet Desktop Switches

Central Switch

Distance depends on SFP

GbE 5 Port Desktop Switch

Data 10/100/1000Base-T

PC

IP Phone

IP Phone

PC

Gigabit Ethernet
5 Port Desktop Switch
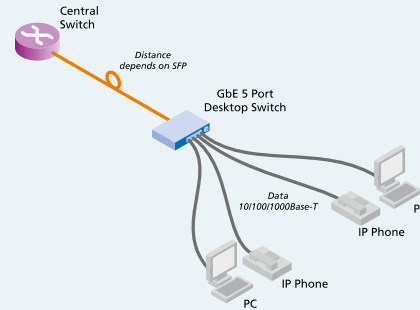
Benefits

▌ Cost effective, compact and fan less Gigabit Ethernet switch

▌ Ideal for small and medium sized networks

▌ Flexible connection due to SFP slot

▌ Requires no configuration

▌ Optional smart management with intuitive handling via web interface

▌ QoS, VLANs, RSTP, trunking, LACP, 802.1X etc. (Smart Management)

Description

The compact Gigabit Ethernet switches offer all major features for building up modern network structures. They are suitable for both the use in small enterprises and for the extension of existing networks.

The devices are having four RJ-45 ports with 10/100/1000Base-T and one SFP slot with 1000Base-X for the use of standard SFP transceivers. Optionally the switch is available with management which has an intuitive handling due to the clear arranged menu structure. Therefore without any special previous knowledge the following features can be configured: port configuration, data prioritisation (QoS), RSTP, port trunking, LACP, 802.1X authentication and others.

The switches can be used in home and office environments or in enterprise networks. The compact devices are equipped with a robust metal chassis. The fan less design enables the use in open offices without any disturbing noise.

Back side of GBE Switch

Description	Art.-No.
5 port Gigabit Ethernet Desktop switch, 4x 10/100/1000Base-T, 1x 1000Base-X SFP*, external power supply	MS453510
5 port Gigabit Ethernet Desktop switch with Web management, 4x 10/100/1000Base-T, 1x 1000Base-X SFP*, external power supply	MS453510M

* Suitable SFP transceiver can be found in the section „Enterprise Access".

MICROSENS

Fast Ethernet Desktop Switches with Management and PoE

Fast Ethernet 6 Port managed
Switch with Power-over-Ethernet
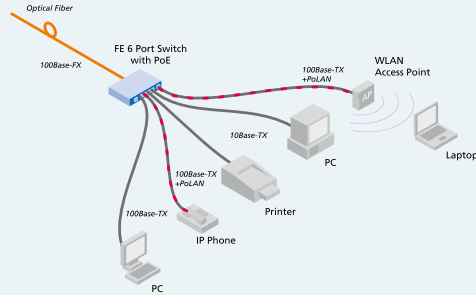
Benefits

▌ Fast Ethernet Mini-Switch with an integrated network management

▌ Optional Power-over-Ethernet according to IEEE 802.3af on four TP-ports

▌ Alternative power supply via PoE on the fifth TP-port (PoE-version)

▌ PoE-versions with external or internal power supply available

▌ Use in NMP Network Management

Description

This Fast Ethernet Desktop switch enables connection of up to five end devices via twisted pair cables (10/100Base-TX). An additional fiber optic port enables direct connection to a fiber optic segment according to 100Base-FX.

Network management functions are a permanent part of the equipment. In addition to the configuration of VLANs, data prioritisation (QoS) or the power management for PoE, the device can also be monitored. Access is made via normal standards such as Web, Telnet or SNMP. The switch is also supported by the NMP software.

The special feature of this equipment is that it is optionally available with an integrated Power-over-Ethernet function. While four of the five RJ-45 ports enable supply of PoE end equipment according to IEEE 802.3af (PSE – Power Source Equipment), the switch itself can be supplied with Power-over-Ethernet via the fifth port (PD – Powered Device). Therefore an additional power supply for the switch is not necessary.

The PoE version can be equipped with an external as well as with an internal power supply unit.

Description	Standard version with external power supply	PoE-version with external power supply	PoE-version with internal power supply
5 port switch, 5x 10/100TX	MS453080M	MS453080PM-48	MS453080PM
6 port switch, 5x 10/100TX, 100Base-FX, 1310 nm multimode ST	MS453081M	MS453081PM-48	MS453081PM
6 port switch, 5x 10/100TX, 100Base-FX, 1310 nm multimode SC	MS453082M	MS453082PM-48	MS453082PM
6 port switch, 5x 10/100TX, 100Base-FX, 1310 nm single mode SC	MS453083M	MS453083PM-48	MS453083PM
6 port switch, 5x 10/100TX, 100Base-FX, 1310 nm single mode ST	MS453084M	MS453084PM-48	MS453084PM
External power supply 48 VDC, 1.25 A, 65 W	Power supply included in the delivery package	MS700675B-2	Internal 230 VAC power supply

MICROSENS

Enterprise networks

Fast Ethernet Desktop Switches

Fast Ethernet
9 Port Desktop Switch

Benefits

▎ Cost effective connection of end devices

▎ No manual configuration required

▎ Compact desktop device with wall mounting option

▎ Versions for multimode and single mode fiber

▎ Optional version with an integrated power supply (9 port switch)

Description

The desktop switches are characterized by their extremely compact design. The equipment is very cost-effective and therefore excellently suited for the connection of end equipment via the 10/100Base-TX. An additional port in the form of a fiber optic uplink (100Base-FX) can be used for connection to a central distributor.

Initial operation is made in plug & play mode, manual configuration of the equipment is not necessary. The RJ-45 ports set automatically per Auto Negotiation and auto MDI/MDI-X. The equipment is based on a Layer2 switch with Store & Forward.

Depending on the version, the power supply is enabled by an internal or external power supply unit (belongs to the delivery package of the switch). Additionally, the equipment has integrated solutions for wall assembly.

6 Port Desktop Switch

Description	Art.-No.
6 Port Fast Ethernet Switch	
6 port Desktop switch, 5x 10/100Base-TX, 1x 100Base-FX, multimode 1310 nm SC duplex, external power supply	**MS453422**
6 port Desktop switch, 5x 10/100Base-TX, 1x 100Base-FX, single mode 1310 nm SC duplex 30 km, external power supply	**MS453423**
9 Port Fast Ethernet Switch	
9 port Desktop switch, 8x 10/100Base-TX, 1x 100Base-FX, multimode 1310 nm SC duplex, internal power supply	**MS453432**
9 port Desktop switch, 8x 10/100Base-TX, 1x 100Base-FX, single mode 1310 nm SC duplex 30 km, internal power supply	**MS453433**

System Catalog 1610

Gigabit Ethernet Desktop Switches

	8 Port GBE Switch with Management	5 Port GBE Switch with Management and PoE	5 Port GBE Switch with Web-Management	5 Port GBE Switch
Connections				
Local connections	8x 10/100/1000Base-T	4x 10/100/1000Base-T	4x 10/100/1000Base-T	4x 10/100/1000Base-T
Uplink	2x 1000Base-X (SFP)	1x 100/1000Base-X (SFP)	1x 1000Base-X (SFP)	1x 1000Base-X (SFP)
Network management	NMP / Telnet / Web / SNMP	NMP / Telnet / Web / SNMP	Web	–
No. of ports with PoE	–	4x PSE	–	–
Power supply	internal 110-230 VAC	external 48 VDC	external 12 VDC	external 12 VDC
Ordering information				
SFP version	MS453522M	MS453501PM-48	MS453510M	MS453510
Power supply unit	included in delivery	MS700675B-2	included in delivery	included in delivery
Catalogue page	**48**	**49**	**50**	**50**

Gigabit Ethernet Switches

Fast Ethernet Desktop Switches

	9 Port FE Switch	6 Port FE Switch with Management	6 Port FE Switch with Management and PoE		6 Port FE Switch
Connections					
Local connections	8x 10/100Base-TX	5x 10/100Base-TX	5x 10/100Base-TX		5x 10/100Base-TX
Uplink	1x 100Base-FX)	1x 100Base-FX	1x 100Base-FX		1x 100Base-FX
Network management	–	NMP / Telnet / Web / SNMP	NMP / Telnet / Web / SNMP		–
No. of ports with PoE	–	–	4x PSE, 1x PD		–
Power supply	internal 110-230 VAC	external 12 VDC	internal 230 VAC	external 48 VDC	external 9 VDC
Ordering information					
Multimode 1310 nm, ST		MS453081M	MS453081PM	MS453081PM-48	MS453421
Multimode 1310 nm, SC	MS453432	MS453082M	MS453082PM	MS453082PM-48	MS453422
Single mode 1310 nm, ST		MS453084M	MS453082PM	MS453084PM-48	
Single mode 1310 nm, SC	MS453433	MS453083M	MS453083PM	MS453083PM-48	MS453423
without Fiber uplink	–	MS453080M	MS453080PM	MS453080PM-48	–
Power supply unit	incl. in delivery	incl. in delivery	incl. in delivery	MS700675B-2	incl. in delivery
Catalogue page	**52**	**51**	**51**		**52**

Fast Ethernet Switches

Enterprise networks

Gigabit and Fast Ethernet Bridges

Chassis for the mounting of bridge modules
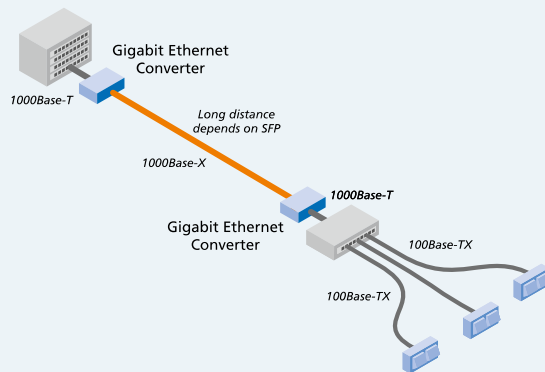
Benefits

▌ 19" chassis (3 U) for the mounting of up to 10 devices

▌ Centralised power supply, optionally redundant

▌ Free combination of devices of series MS4002xx

Description

The Gigabit and Fast Ethernet bridges are mainly used in company networks in order to universally combine copper and fiber optic media. In addition to the media conversion, speed matching for 10, 100 and 1000 Mbps can also be made. Therefore it is possible to also integrate older network equipment into a Gigabit Ethernet Network.

The fiber optic connection of the Gigabit Ethernet Bridges is generally arranged as an SFP slot according to 1000Base-X. The SFP slots enable application of all SFP variations available on the market whereby the equipment is endowed with a high degree of flexibility.

The connection status of both ports can be logically linked to each other via the DIP switch. The link status of a segment is fed on in this way, i.e. with a missing link on the fiber optic cable side no link will be generated on the twisted pair side.

The equipment is designed as a compact desktop device with an external power supply (included in the delivery package). In addition to the individual use of the device, a central arrangement can be made for which a 19" rack is available with and integrated power supply (also redundant as an option).

Description	Art.-No.
Gigabit Ethernet Bridges	
Gigabit Ethernet Bridge 10/100/1000T / 1000SX, 850 nm SC duplex, ext. power supply	**MS400220**
Gigabit Ethernet Bridge 10/100/1000T / SFP 1000X, ext. power supply	**MS400229**
Gigabit Ethernet Bridge SFP 100/1000X / SFP 1000X, ext. power supply	**MS400230**
SFP-Transceiver	
Gigabit Ethernet SFP 1000SX, multimode 850 nm LC duplex, max. 550 m	**MS100200**
Gigabit Ethernet SFP 1000LX, single mode 1310 nm LC duplex, max. 10 km	**MS100210**

MICROSENS

Gigabit Ethernet Bridge with 2x SFP

Gigabit Ethernet Bridge TP/SFP

Fast Ethernet Bridging Converter

- Simple range extension in Gigabit networks

- Media conversion for multimode and single mode fiber

- Speed conversion 100/1000 Mbps due to dual speed SFP slot

- High flexibility by use of pluggable SFPs

- Media conversion from twisted-pair to multimode and single mode fiber

- Speed conversion 10/100/1000 Mbps

- High flexibility by use of pluggable SFPs

- Auto MDI/MDI-X function for use of uniform patch cable

- Media conversion from twisted-pair to multimode and single mode fiber

- Speed conversion 10/100 Mbps (bridge mode)

- Configurable to converter mode by DIP switch to reduce latency

- Automatic or manual selection of half or full duplex mode

Description	Art.-No.
Fast Ethernet Bridging Converter	
Fast Ethernet Bridging Converter 10/100Base-TX / 100Base-FX, multimode 1310 nm SC duplex, 2 km, ext. power supply	**MS400200**
Fast Ethernet Bridging Converter 10/100Base-TX / 100Base-FX, single mode 1310 nm SC duplex, max. 30 km, ext. power supply	**MS400202**
Fast Ethernet Bridging Converter 10/100Base-TX / 100Base-FX, WDM single mode TX: 1310 nm, RX: 1550 nm SC simplex, ext. power supply	**MS400202A**
Fast Ethernet Bridging Converter 10/100Base-TX / 100Base-FX, WDM single mode TX: 1550 nm, RX: 1310 nm SC simplex, ext. power supply	**MS400202B**
19" Chassis	
19" chassis, 3 U for 10 media converters of series MS4002xx, incl. power supply	**MS400010**
Power supply unit for 19" chassis MS400010 230 VAC, also for redundancy	**MS400012**

Gigabit Ethernet Media Converter

Gigabit Ethernet
Media Converter
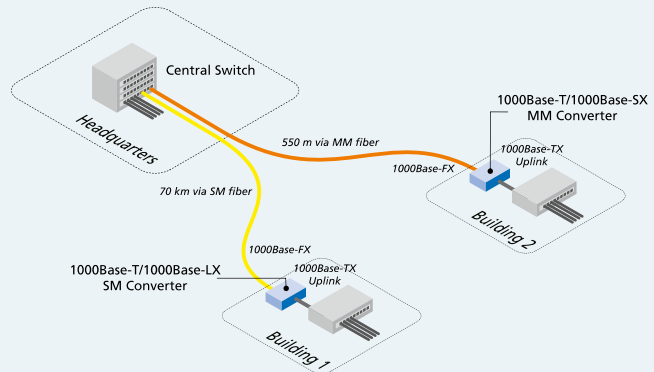
Benefits

▍ Simple range extension in Gigabit networks

▍ Fast and cost-effective media conversion for multimode and single mode

▍ Graded versions up to 70 km

▍ Optional via simplex fiber (WDM)

▍ Compact desktop unit with standard SC-connector

Description

The Gigabit converter enables quick and cost-effective media conversion of copper (1000Base-T) to fiber optic connections (1000Base-SX/LX). Using this direct coupling it is possible to extend twisted pair connections over the limit of 100 m.

The equipment operates in the converter mode so that the data is not stored in the equipment but is directly fed further. By doing this, extremely short latency periods are achieved.

The Auto Negotiation protocol is supported for automatic configuration of half and full duplex mode. Furthermore, the operation mode (full and half duplex) can be manually configured with a DIP switch.

The converter is designed as a desktop device with standard SC connectors and is available in two versions: for multimode (1000Base-SX) and single mode (1000Base-LX). An external plug-in power supply unit is contained in the delivery package.

Description	Art.-No.
Gigabit Ethernet Converter 1000Base-T / 1000Base-SX, multimode 850 nm SC duplex 550 m, ext. power supply	MS400190
Gigabit Ethernet Converter 1000Base-T / 1000Base-LX, single mode 1310 nm SC duplex 10 km, ext. power supply	MS400191
Gigabit Ethernet Converter 1000Base-T / 1000Base-LX, single mode 1310 nm SC duplex 20 km, ext. power supply	MS400192
Gigabit Ethernet Converter 1000Base-T / 1000Base-LX, single mode 1550 nm SC duplex 50 km, ext. power supply	MS400193
Gigabit Ethernet Converter 1000Base-T / 1000Base-LX, single mode 1550 nm SC duplex 70 km, ext. power supply	MS400194
Gigabit Ethernet Converter 1000Base-T / 1000Base-LX, WDM single mode SC simplex, ext. power supply	MS400191A MS400191B

MICROSENS

Gigabit and Fast Ethernet Bridge with Power-over-Ethernet

GBE Bridge with PoE and integrated power supply

Central Switch

Single mode up to 125 km

FE Bridge Single mode with PoE

100Base-FX

100Base-TX +PoE

Multimode up to 2km

100Base-FX

100Base-TX +PoE

FE Bridge Single mode with PoE
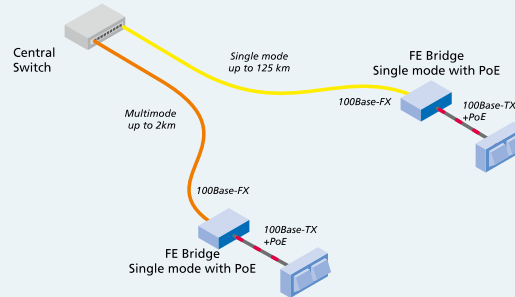
Benefits

▌ Media conversion for Gigabit (10/100/1000Base-T) and Fast Ethernet (10/100Base-TX)

▌ Power supply to connected end devices via PoE (PSE)

▌ 802.3af compatible, class 0 up to 15.4 W

▌ Optional version with PoE+ up to 30 W

▌ Automatic or manual configuration possible

▌ High class and robust device with integrated 230 V AC power supply

Description

The PoE Bridge enables beside the media conversion the power supply of end devices such as access points, web cameras and IP telephones via RJ-45 port. The wide spread positioning of IP cameras results into the use of fiber optic, because only in this way it is possible to cover these long distances.

With the use of Power-over-Ethernet (PoE) the application of 230 VAC power supplies, which have to be installed parallel to the networking cable by using the traditional technology, can be avoided. The networking technician can do the commissioning of the end devices completely because an electrician is not required and that results in further cost savings.

The Fast Ethernet PoE Bridge supports with the highest class 0 a maximum output power of 15.4 W. Standard compliant devices are detected automatically and are classified accordingly. The Gigabit Bridge is available with the PoE+ class and therefore offers a maximum output power of 30 W.

With an integrated power supply the devices are high class and robust. There are Gigabit and Fast Ethernet versions for multimode and single mode fiber available.

Fast Ethernet Bridge with PoE and integrated power supply

Description	Art.-No.
Gigabit Ethernet 10/100/1000Base-T /1000Base-X	
GBE PoE-Bridge, multimode 850 nm SC duplex 550 m, int. 230 VAC power supply	**MS400080**
GBE PoE+ 30 W Bridge, multimode 850 nm SC duplex 550 m, int. 230 VAC power supply	**MS400080H**
GBE PoE-Bridge, 1000X-port as SFP slot, int. 230 VAC power supply	**MS400089**
Fast Ethernet 10/100Base-TX /100Base-FX	
FE PoE-Bridge, multimode 1310 nm SC duplex 2 km, int. 230 VAC power supply	**MS400090**
FE PoE-Bridge, single mode 1310 nm SC duplex 30 km, int. 230 VAC power supply	**MS400092**

MICROSENS

Fast Ethernet Bridge with alternative power supply via USB or PoE

Fast Ethernet Bridge

Benefits

▌ Fast and cost-effective media conversion for multimode and single mode

▌ Simple segment splitting in Fast Ethernet networks

▌ Alternative power supply via USB-connection

▌ Optional version as Power-over-Ethernet user (PD)

Description

The Mini Bridge enables fast and cost-effective integration of 10 Mbps Ethernet equipment in fiber optic-based Fast Ethernet networks. In addition to media conversion there is a corresponding speed matching for 10/100Base-TX.

The Auto Negotiation protocol is supported for automatic configuration of half and full duplex mode. Furthermore, the operation mode (full and half duplex) can be manually configured with a DIP switch.

The bridge is designed as a desktop device and available in two versions: for multimode (1000Base-SX) and single mode (1000Base-LX). A special feature is the possibility of an alternative power supply via the USB port so that the attached power supply need not to be used.

In an extended version there is an additional power supply via Power-over-Ethernet possible. In this case, the Bridge is used as a consumer (PD – Powered Device) and taps the corresponding power from the RJ-45 port.

Fast Ethernet Bridge with optional power supply via USB port

Description	Art.-No.
Fast Ethernet Bridge 10/100Base-TX / 100Base-FX, multimode 1310 nm SC duplex 2 km, ext. power supply or USB	MS400160
Fast Ethernet Bridge 10/100Base-TX / 100Base-FX, multimode 1310 nm ST duplex 2 km, ext. power supply or USB	MS400161
Fast Ethernet Bridge 10/100Base-TX / 100Base-FX, single mode 1310 nm SC duplex 30 km, ext. power supply or USB	MS400162
Power supply via PoE	
Fast Ethernet Bridge 10/100Base-TX / 100Base-FX, multimode 1310 nm SC duplex 2 km, ext. power supply or PoE PD	MS400160PD
Fast Ethernet Bridge 10/100Base-TX / 100Base-FX, single mode 1310 nm SC duplex 30 km, ext. power supply or PoE PD	MS400162PD

MICROSENS

Media Converter for Ethernet and Fast Ethernet

Ethernet and
Fast Ethernet Converter

Benefits

▊ Cost-effective and repeater-less media conversion

▊ Logical linking of the link status (link through)

▊ Optional robust screwed connection for external power supplies

▊ Versions for 10 Mbps also available

Description

Using Fast Ethernet converters end devices with 100Base-TX copper interfaces, e.g. switches, routers and bridges, can be connected over longer distances via multimode or single mode fiber optic routes.

Depending on the area of application, the converters are available with different optical parameters. In addition to standard multimode applications for transmissions of up to 2 km, there are single mode versions for 15 km, 40 km, 80 km and 125 km available.

The link status of a segment is fed further by the converter, i.e. a missing link on the fiber optic side does not generate a link signal on the TP side.

There are two options available for the power supply connection. The power supply is realized by an external power supply (contained in the delivery package). Connection can also be made via a cost-effective jack (standard) or by a sturdy threaded connection.

FE Converter with SC connectors
and screwed power connection

Description	Art.-No. Standard Power Connector	Art.-No Screwable Power Connector
Fast Ethernet Converter 100Base-TX / 100Base-FX, multimode 1310 nm SC duplex 2 km, ext. power supply	MS410640	MS410511
Fast Ethernet Converter 100Base-TX / 100Base-FX, multimode 1310 nm ST duplex 2 km, ext. power supply	MS410641	MS410512
Fast Ethernet Converter 100Base-TX / 100Base-FX, single mode 1310 nm SC duplex 15 km, ext. power supply	MS410644	MS410513
Fast Ethernet Converter 100Base-TX / 100Base-FX, single mode 1310 nm ST duplex 15 km, ext. power supply	MS410645	MS410514
Fast Ethernet Converter 100Base-TX / 100Base-FX, single mode 1310 nm SC duplex 40 km, ext. power supply	MS410646	MS410523
Version for Ethernet (10 Mbps)		
Ethernet Converter 10Base-T/10Base-FL, multimode 850 nm ST duplex 2 km, ext. power supply	MS410501	MS410532

Further versions on request.

MICROSENS

MM/SM Converter max. 1.25 Gbps

Multimode/single mode
Converter max. 1.25 Gbps
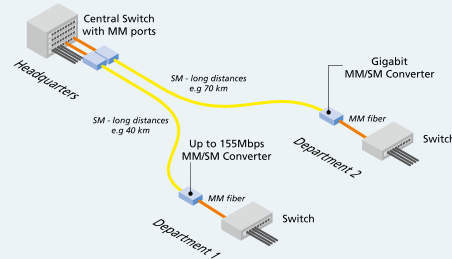
Benefits

▌ Bidirectional coupling of multimode to single mode fiber

▌ Universal for all interfaces up to 1.25 Gbps

▌ Logical linking of link-status

▌ Compact device with standard SC-connectors

Description

The multimode/single mode media converters enable a protocol transparent, bi-directional coupling of multimode to single mode fibers and support data rates of up to 1.25 Gbps. The coupling is realized directly and transparently without any protocol conversion.

The range of application extends to all applications in the LAN, MAN and WAN area such as Gigabit Ethernet, Fibre Channel and ATM/SONET owing to the given transparency working mode of the converter. This enables to transmit data and voice services simultaneously via already existing fiber optic links in City Networks, Backbones and Leased Lines.

In addition to the high bandwidths in the Gigabit range, distances of up to 70 km can be achieved. Moreover, the single mode interface is also available for simplex transmission in WDM applications. In this case the transmitter and receiver channel is transmitted at different wavelengths via one single fiber (simplex).

The link status of a segment is fed further by the converter, i.e. a missing link on the single mode side does not produce a link signal on the multimode side. The converters are designed as standalone devices with standard SC connectors. An external power supply is contained in the delivery package.

Description	Art.-No.
Multimode/single mode converter, max. 1.25 Gbps, multimode 850 nm SC on single mode 1310 nm SC, 10 km, ext. power supply	MS410590
Multimode/single mode converter, max. 1.25 Gbps, multimode 850 nm SC on single mode 1310 nm SC, 20 km, ext. power supply	MS410591
Multimode/single mode converter, max. 1.25 Gbps, multimode 850 nm SC on single mode 1550 nm SC, 50 km, ext. power supply	MS410594
Multimode/single mode converter, max. 1.25 Gbps, multimode 850 nm SC on single mode 1550 nm SC, 70 km, ext. power supply	MS410595
Multimode/multimode converter, max. 1.25 Gbps, multimode 850 nm SC on multimode 850 nm SC, max. 550 m, ext. power supply	MS410598

Further versions on request.

MICROSENS

MM/SM Converter max. 155 Mbps

Multimode/single mode
Converter max. 155 Mbps
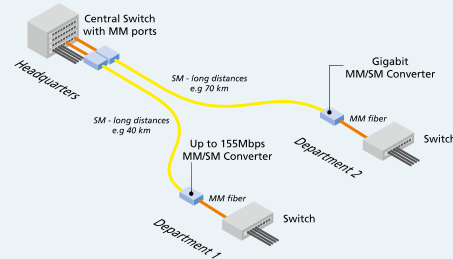
Benefits

▌ Optimal utilization of the bandwidth by direct data transfer

▌ Protocol transparency

▌ Bidirectional coupling of multimode to single mode fibers

▌ Compatible with all common protocols

▌ Versions with different optical budget up to 125 km

Description

These multimode/single mode converters support a protocol transparent and bi-directional coupling of multimode to single mode fiber optics with data rates of up to 155 Mbps. The coupling is realized directly without any protocol conversion.

The range of applications is extended to all data protocols in the LAN, MAN and WAN area such as Gigabit Ethernet, FDDI and ATM/SONET owing to the given transparency and data rate of up to 155 Mbps. Using a maximum of 40 Mbps, a special version supports even lower data rates for Ethernet (10 Mbps).

The converter is available with different optical power levels, wavelengths and connector types depending on the requirement. The equipment is designed as a desktop device. The power supply is generated by an external power unit contained in the delivery package.

Media Converter with ST-connectors

Media Converter with SC-connectors

Description	Art.-No. Multimode 1310 nm	Art.-No. Multimode 850 nm
Version max. 155 Mbps		
Multimode SC to single mode 1310 nm SC 15 km	**MS410567**	**MS410562**
Multimode ST to single mode 1310 nm SC 15 km	**MS410566**	**MS410568**
Multimode SC to single mode 1310 nm ST 15 km	**MS410565**	**MS410563**
Multimode ST to single mode 1310 nm ST 15 km	**MS410564**	**MS410561**
Multimode SC to single mode 1310 nm SC 40 km	**MS410589**	
Multimode ST to single mode 1310 nm SC 40 km	**MS410587**	
Version max. 40 Mbps		
Multimode ST to single mode 1310 nm ST 10 km		**MS410504**

MICROSENS

Gigabit Ethernet Network Cards

Gigabit Ethernet NIC
PCI Express Bus

Gigabit Ethernet NIC
PCI Bus

Benefits

- Selected portfolio of Network Interface Cards

- Versions for Fast Ethernet and Gigabit Ethernet

- Supporting different bus types such as PCI express, PCI or PCMCIA

- Optional use of Boot-ROMs

- Direct support by all common operating systems without additional drivers

- Flexible Gigabit Ethernet network adapter for PCI Express

- High network performance

- Hot-swap capability

- Advanced Configuration Power Management Interface (ACPI) 2.0

- Remote management possible via RFC 1157 SNMP v1

Supported Operating Systems:

- Windows® 2000/2003/XP/Vista

- Linux 2.4x/2.6x

- Novell Netware 5.x/6.x

- Flexible network adapter for 64 or 32 bit bus-systems

- PCI V2.2 MAC/BIU (automatic recognition)

- PCI plug & play compatible (PNP), low CPU-load

- According to IEEE 802.3 1000BASE-SX

Supported Operating Systems:

- Windows 95/98/Me/2000/NT/XP

- UNIX WARE 7, LINUX, SCO UNIX Openserver SOLARIS

- Netware Server 5.0

Inserted PCI FE Network Card

Description	Art.-No.
Gigabit Ethernet NIC PCI Express	
1000Base-SX, multimode 850 nm SC duplex 550 m, PCIe	**MS483750**
1000Base-LX, single mode 1310 nm SC duplex 10 km, PCIe	**MS483751**
1000Base-LX, single mode 1310 nm SC duplex 20 km, PCIe	**MS483752**
Gigabit Ethernet NIC PCI 64 Bit	
1000Base-SX, multimode 850 nm SC duplex 550 m, PCI	**MS483720**
1000Base-LX, single mode 1310 nm SC duplex 10 km, PCI	**MS483721**

MICROSENS

Fast Ethernet Network Cards
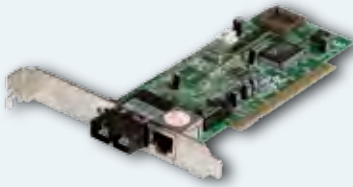
Fast Ethernet NIC
optional with RJ-45 connector

Fast Ethernet NIC
Express Card

Fast Ethernet NIC
PCMCIA

▌ Integrated fiber optic (100Base-FX) port optionally combined with copper port (10/100Base-TX)

▌ Network adapter for 32 bit bus master architecture

▌ Wake-On-LAN (WOL) function and remote wake-up

▌ PCI 2.2 plug & play compatible (PNP), low CPU-load

▌ Compatible with Express Card-standard

▌ Full duplex function for maximum performance up to 200 Mbps

▌ Optional SC/ST/LC connectors for 100Base-FX networks

▌ Supporting PXE Remote Boot

▌ Integrated fiber optic port (100Base-FX) for notebooks

▌ PCMCIA Type II 32 bit card bus

▌ Compact design without dongle

▌ PCMCIA Rel. 2.x, JEIDA 4.x conform

Supported Operating Systems:

▌ Windows 95/98/Me/2000/NT/XP

▌ Linux 2.2/2.6

▌ Novell Netware

Supported Operating Systems:

▌ Windows 98/NT/2000/XP/Vista/2003, Server /2008 Server

▌ Linux

Supported Operating Systems:

▌ Windows 95/98/2000/NT/XP

▌ Novell Netware

Plugged FE PCMCIA Network Card

Description	Art.-No. FX+TX, PCI	Art.-No. FX, PCI	Art.-No. Express Card	Art.-No. FX, PCMCIA
Multimode 1310 nm ST duplex 2 km	MS483620	MS482681	–	MS482751
Multimode 1310 nm SC duplex 2 km	MS483621	MS482682	MS482770	MS482750
Single mode 1310 nm SC duplex 15 km	MS483622	MS482687	MS482772*	MS482752
Boot Manage PXE PROM	–	MS482689	–	–

* 20 km version.

Enterprise networks

MICROSENS
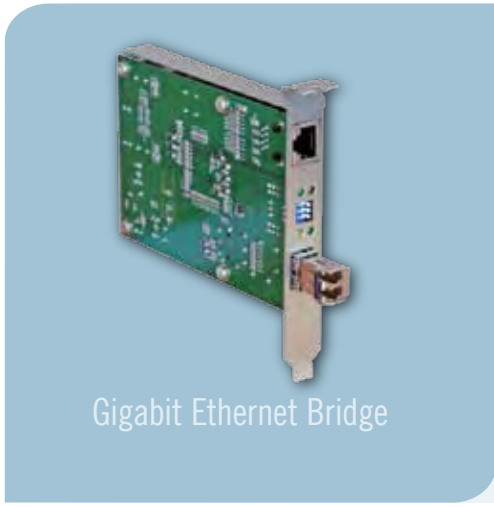
Gigabit Ethernet Bridge

PC-internal Bridges and Converters
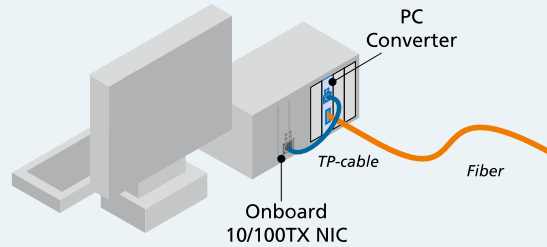
Benefits

▮ Upgrading to fiber by using the onboard NIC

▮ Simple installation and initiation

▮ No drivers needed, no incompatibility problems

▮ Power on internal PC-power supply

▮ Optional use of standby power for Wake-on-LAN

▮ Transparent in connection status by Link Through

Description

The PC-internal Bridge is integrated into the computer without changing the system and is connected with the existing copper network port of the computer via a short, external twisted pair cable. By using this „soft" migration a costly reconfiguration, or reinstallation, of the network drivers is not necessary.

The electrical supply of the bridge is realized via an optional adapter cable. In the standard version the power supply is made via the power supply connector for hard drives. The Y-adapter is included in the delivery package.

With the „A24" option the power supply is made via a Stand-By-Power tap of the PC power supply. In this case the „Wake on LAN" operation is retained whereby the PC internal bridge remains active even when the PC is switched off, a request to the network interface card is forwarded transparently.

The PC internal bridge is available in various versions for Fast Ethernet (100Base-FX) and Gigabit Ethernet (1000Base-X). With the Gigabit version the optical interface is designed as SFP slot.

PC GBE Bridge with A24-Option

Description	Art.-No. Power supply via Y-adapter	Art.-No. Power supply via A24-adapter
Gigabit Ethernet PC Bridge / Converter		
PC Bridge 10/100/1000Base-T / 1000Base-X, SFP-Slot	MS484229Y	MS484229A24
PC GBE Converter 1000Base-T / 1000Base-SX, multimode 850 nm SC duplex	MS484190Y	MS484190A24
PC GBE Converter 1000Base-T / 1000Base-LX, single mode 1310 nm SC duplex	MS484191Y	MS484191A24
Fast Ethernet PC Bridge		
PC Bridge 10/100Base-TX / 100Base-FX, multimode 1310 nm SC duplex	MS484160Y	MS484160A24
PC Bridge 10/100Base-TX / 100Base-FX, single mode 1310 nm SC duplex	MS484162Y	MS484162A24

Enterprise networks

System Catalog 1610

MICROSENS

Converter for RS-232/422/485

RS-232/422/485 Transceiver

Benefits

▌ Universal use for RS-232/422/485-media conversion

▌ Ideal for the fiber connection of network management/console ports

▌ Cost-effective and compact

▌ Data rates up to 115.2 kbps for RS-232

▌ Data rates up to 500 kbps for RS-422/485

▌ Versions for multimode and single mode available

Description

The transceiver has been designed for the universal transmission of RS-232, RS-422 or RS-485 signals via fiber optics. The selection of the relevant protocol to be transmitted is possible via the DIP switch.

The device is mainly used for the transmission of console ports of the network management cards. The distance from the manageable switch to the working place of the network administrator can be easily bridged.

There are two versions available. In the multimode version distances of 2 km can be bridged, with the single mode version transmission distances of up to 20 km are possible.

Description	Art.-No.
RS-232/422/485 Converter, multimode 850 nm ST 2 km, ext. power supply	**MS400131-V2**
RS-232/422/485 Converter, single mode 1310 nm ST 2 km, ext. power supply	**MS400132-V2**

Further versions on request.

MICROSENS

DVI Fiber Optic Extender

DVI Extender

Point to Multipoint
over Single Mode fiber

PC

DVI Extender (TX)

passive
Splitter

DVI Extender
(RX)

1   32
      monitors

Multi-Monitor Application
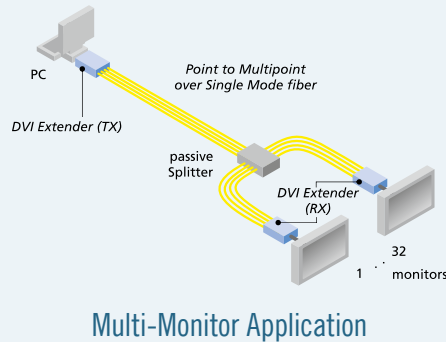
Benefits

▌ Transmission of DVI-D signals
up to 5 km

▌ High resolution and picture quality,
all resolutions up to 1920 x 1200

▌ For connection of LCD-displays, vi-
deo projectors, plasma displays, etc.

▌ Unidirectional transmission via
4 fibers (LC-connectors)

▌ Multi-monitor operation -
one transmitter sources up to
32 receivers

▌ External power supply included

Description

The DVI (Digital Visual Interface) is the interface for the digital transmission of video data. On computers, DVI is the standard interface for TFT displays and high end projectors. In the area of consumer electronics there are already television sets which have a DVI input and process signals from digital sources such as the PC.

The use of DVI extenders is of special interest for the operation of large video screens that can be found in stadiums, at exhibitions, stage technology, in external advertising or in control rooms and remote locations of airports and railway stations. By using passive splitters/couplers, a multi-monitor mode of operation can be accomplished easily, i.e. a video source supplies a number of displays.

The DVI extender of MICROSENS supports the digital standard DVI-D for single link operation with a maximum resolution of up to 1600 x 1200 (UXGA). With the use of fiber optics spatial separations of up to 500 m (62.5/125 µm multimode) and 700 m (50/125 µm multimode) can be very easily be bridged between displays and image sources with distances. Four fibers are used for the transmission which is operated in one direction (uni-directional). The connection is realized by using standard LC connectors.

DVI-D Signals
up to 700m over MM fiber
Point to Point

PC

DVI Extender (TX)

DVI Extender (RX)

LCD display

Single-Monitor Application
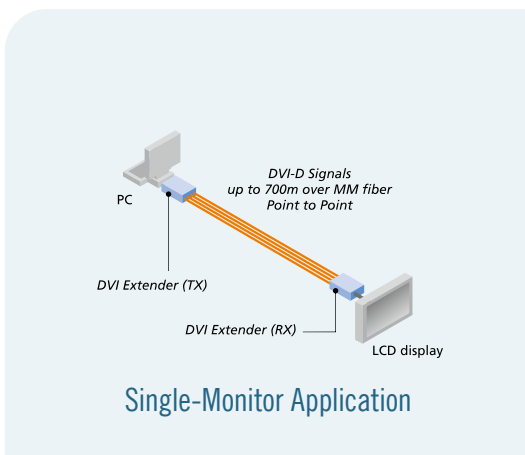
Description	Art.-No.
DVI extender transmitter, multimode 850 nm 4x LC duplex, max. 700 m, ext. power supply	**MS550010-PS***
DVI extender Receiver, multimode 850 nm 4x LC duplex, ext. power supply	**MS550011-PS***
DVI extender transmitter for up to 8 receiver (15 dBm), single mode 1310 nm 4x LC duplex, max. 5 km, ext. power supply	**MS550016-PS***
DVI extender transmitter for up to 32 receiver (23 dBm), single mode 1310 nm 4x LC duplex, max. 5 km, ext. power supply	**MS550017-PS***
DVI extender Receiver, single mode 1310 nm 4x LC duplex, ext. power supply	**MS550015-PS***

*PS = Power supply option: EU, UK, US.

Enterprise networks

MICROSENS

HDMI Fiber Optic Extenders

HDMI-Extender

HD video source

up to 200m over MM fiber
Point to Point

HDMI Extender (TX)

HDMI Extender (RX)

LCD display
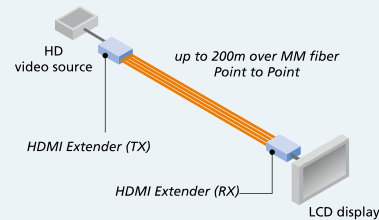
Benefits

▌ Extension of an HDMI connection up to 200 m on multimode

▌ Support of high resolutions for good image and audio quality

▌ HDMI connector type A (19-pin)

▌ Set consists of a transmitter and receiver including external power supplies

Description

HDMI (High Definition Multimedia Interface) is the interface for the digital transmission of audio and video data in the field of consumer electronics. The HDMI standard is intended for the copper cable connection for up to a maximum length of 15 m. However, there are HDMI copper cables obtainable with lengths of 20 m but these do not operate smoothly in all cases.

The HDMI extender is mainly applied in the entertainment sector for the connection of LCD or plasma displays with HDMI input. By the application of multimode fiber optics distances of up to 200 m are feasible for video and audio transmission. Four parallel fibers are required for the applications which are operated in one direction (uni-directional).

The device is available for the connection to multimode fiber optics with a standard LC connector. The delivery package consists of a transmitter and a receiver as well as the corresponding external power supply units.

<div style="text-align:right">Enterprise networks</div>

Description	Art.-No.
HDMI extender Set, 1x transmitter & 1x Receiver, 4x LC multimode, 2x external power supply, HDMI-connector Type A	**MS550020**

24 Port Power-over-Ethernet Injectors and Splitters

24 Port PoE-Injector

Benefits

▌ Simple PoE upgrading of existing TP-networks

▌ Up to 24x 15.4 W per port according to IEEE802.3af

▌ Integrated SNMP/Telnet/Web management

▌ Powerful, integrated 400 W power supply unit

▌ Redundant power supply and UPS optionally

▌ Compact design with 1 U height

Description

The application of Power-over-Ethernet is not necessarily connected with the procurement of new central switches because there is the possibility for easy upgrading with the 24 port PoE-Injector. In such case, the Power Injector is centrally arranged between the existing edge switches and the patch panel and takes over the PoE supply according to IEEE 802.3af standard.

In order to feed each of the 24 ports with the maximum power of 15.4 W as specified in the IEEE standard, the PoE injector is equipped with a high performance 400 W power supply with a 230 VAC input.

Using an external RPSU unit, the power supply for the PoE injector can be performed redundantly. This power supply unit also has an integrated UPS function which ensures the highest degree of availability even for demanding IT applications. In addition to this, the battery capacity can be increased by using additional external battery cells.

The PoE-Injector offers a comprehensive range of management functions via Telnet, Web or SNMP. Detailed information and configuration possibilities are available even for the redundant power supply unit. Additionally, monitoring of the corresponding power consumption of the connected end devices is ensured by using the management functionality. It is possible to remotely switch PoE equipment on and off or to simply initiate a re-start.

UPS/Redundant Power Supply

Central
MICROSENS
Switch (TX)

1 Port PoE Injector

WLAN
Access Point

MICROSENS
PoE Injector 24 Port managed

Power
Cable

TP
(Data + Power)

IP Camera

Redundant
Power Supply
incl. UPS

Installation
Switch (PD)

VoIP
Phone

PoE Devices

PoE Splitter

VoIP
Phone

Data   Power
Cable

VoIP
Phone

Combination PD / PSE

PC

Non-PoE
IP Camera

non-PoE Devices

MICROSENS
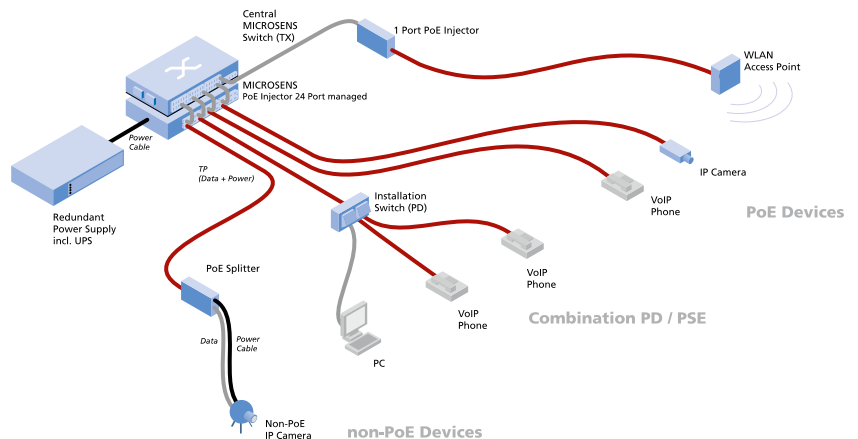
Gigabit Ethernet
1 Port PoE-Injector

Fast Ethernet
1 Port PoE-Injector

Fast and Gigabit
Ethernet Splitter

Benefits

- Supporting 10/100/1000Base-T

- Internal over-voltage protection

- Combining Gigabit Ethernet and PoE according to IEEE 802.3af

- Up to 100 m cable length possible

- Compact design with internal power supply

- For selective solutions

- Plug & play

- Supporting 10/100Base-TX

- Internal over-voltage protection

- Combining Fast Ethernet and PoE according to IEEE 802.3af

- Optional high power version with 30 W

- Up to 100 m cable length possible

- Compact design with internal power supply

- Plug & play

- For the supply of non PoE-devices instead of using a separate power supply unit

- Taking the power supply from the PoE-port

- Versions for Fast and Gigabit Ethernet

- Freely selectable output voltage (5 / 7.5 / 9 or 12 V) for end device

- Multiple connectors (2 and 2.5 mm)

- Fully compliant to IEEE 802.3af

Description	Art.-No.
24 Port PoE-Injector	
24 port PoE-injector Fast Ethernet, 19", 1 U, IEEE 802.3af, 48x RJ-45, 100..240 VAC, 1x RS-232	**MS400900M**
USV/redundant power supply 48 VDC / 400 W, 19", 1 U integrated UPS	**MS400910M**
1 port PoE-Injectors	
Gigabit Ethernet 1 port PoE-injector, 2x RJ-45 10/100/1000Base-T, IEEE 802.3af max. 15.4 W, 100..240 VAC power supply	**MS400930**
Fast Ethernet 1 port PoE-injector, 2x RJ-45 10/100Base-TX, IEEE 802.3af, max. 15.4 W, 100..240 VAC power supply	**MS400920**
Gigabit Ethernet 1 port PoE-injector, 2x RJ-45 10/100/1000Base-T, IEEE 802.3af max. 30 W, 100..240 VAC power supply	**MS400921**
PoE-Splitter	
Gigabit Ethernet 1 port PoE-splitter, 1x RJ-45 plug, 1x RJ-45 jack, Output 5 / 7.5 / 9 or 12 V via DC-plug	**MS400941**
Fast Ethernet 1 port PoE-splitter, 1x RJ-45 plug, 1x RJ-45 jack, Output 5 / 7.5 / 9 or 12 V via DC-plug	**MS400940**

MICROSENS

Medical Network Isolator for Gigabit and Fast Ethernet

Medical
Network Isolator

Benefits

▌ Versions for Gigabit (10/100/1000Base-T) and Fast Ethernet (10/100Base-TX)

▌ According to DIN 60601-1 (medical approval)

▌ Easy handling by interconnecting

▌ Universally suitable for central site (19" distribution) and workplace

▌ No power required (passive device)

Description

The operation of Ethernet components in the medical and patient environment is subject to specific requirements. Thus it must be made sure, for example that via a copper-based IT network no dangerous voltages can reach the patient.

With the network isolator the required galvanic isolation according to DIN 60601-1 of 4000 V is given. Thus it is prevented that in case of failure or average on the network dangerous voltages are passed on and endanger patients or medical staff.

The network isolator is a passive device, a power supply is not required. The device has 2x RJ-45 connectors and is simply interconnected between the network connection and the computer terminal. There are versions for Fast Ethernet (10/100Base-TX) and Gigabit Ethernet (10/100/1000Base-T) available.

Description	Art.-No.
Medical isolator for Fast Ethernet, 2x RJ-45 connector 10/100Base-TX, isolation min. 4000 V	MS140190
Medical isolator for Gigabit Ethernet, 2x RJ-45 connector 10/100/1000Base-T, isolation min. 4000 V	MS140191

MICROSENS

RJ-45 Patch Cable with Locking
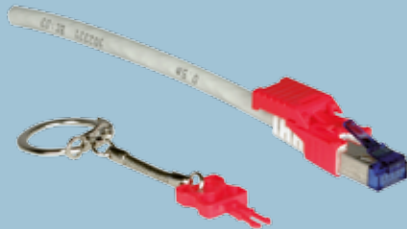
Lockable
RJ-45 Patch Cable

Benefits

▌ Lockable plug out protection at the RJ-45 patch cable

▌ Authorised access for RJ-45 connections

▌ Optionally with colour coding

▌ Suitable for high packet or port densities (switches etc.)

Applications

▌ Connection of IP cameras

▌ Operation of Wireless Access Points

▌ Manufacturing and industrial facilities

▌ Connection of medical apparatures

Description

Despite all precautions, it happens again and again: Someone unauthorized removes a patch cable from the work place. The connection breaks down, especially wireless access points are no longer available.

Particularly RJ-45 connectors at desktop switches, computers, peripherals or other network components offers possibilities of manipulation. With lockable patch cables, this point of vulnerability can be closed directly at the RJ-45 port with a few handles.

After engaging the release lever on the RJ-45 connector is blocked. The plug can be opened only by authorized persons with the appropriate key. The RJ-45 patch cords are lockable on both sides and available in lengths of 1, 2, 3 and 5 meters. Moreover, there is the possibility of colour coding (8 colours).

Furthermore, lockable dummies for RJ-45 ports are available. These can protect unused RJ-45 ports of switches or other network components.

Clips for colour coding of RJ-45 connectors

Description	Art.-No.
Patch Cable with both sided Locking	
RJ-45 patch cable Cat.6 S/STP, Pinout 1:1, colour grey , length 1 m*	MS190320-01,0
RJ-45 patch cable Cat.6 S/STP, Pinout 1:1, colour grey , length 2 m*	MS190320-02,0
RJ-45 patch cable Cat.6 S/STP, Pinout 1:1, colour grey , length 3 m*	MS190320-03,0
RJ-45 patch cable Cat.6 S/STP, Pinout 1:1, colour grey , length 5 m*	MS190320-05,0
Key for RJ-45 plug	MS190329
Clip for Colour Coding of the RJ-45 plug (Set with 12 Clips)	MS190327-f**
Dummy for RJ-45 connector	MS190328

*Patch cable without key.

**f..Colour number: 1. anthracite; 2. blue; 3. brown 4. green; 5. red; 6. violet; 7.white; 8.yellow.

MICROSENS

Enterprise networks

Fiber Optic Patch Cables

Benefits

▌ Combination of popular connector types

▌ Different lengths available

▌ Readily available (preferred length)

▌ Mechanically polished connector contacts

▌ Including patch cable test report

Description

For completion of the portfolio MICROSENS offers a wide range of fiber optic patch cables. For multimode and single mode applications all combinations of connector types and lengths are possible.

The connectors for single mode optical fibers are further divided into standard angled polish (PC = Physical Contact) and 8° angled polish (APC = Angel Physical Contact). By standard colours, the connectors are easily recognizable: standard (PC = blue) and angled (APC = green).

The standard patch cables are designed as a duplex cable (2 fibers for two-way transmit / receive) and the standard lengths are 1, 2, 3 and 5 m. Other lengths and simplex versions are available on request.

MICROSENS further provides matching optical couplers. These are designed either for a snap-in or screw connection. The versions for multimode (beige), single mode (blue) and single mode angled (green) differ according to the standard in colour and quality (materials, plastic, metal or ceramic).

Couplers (screwable)

Couplers (Clip)

	SC/SC duplex	SC/SC simplex	SC/ST simplex	ST/ST simplex	LC/LC duplex	E-2000 simplex
Multimode	MS121100	MS121600	MS121601	–	MS121122	–
Single mode (PC)	MS121000	MS121500	MS121501	–	MS121022	–
Single mode (APC)	MS121077	MS121577	–	–	MS121088	–
Couplers (screwable)						
Multimode	MS122100	MS122600	MS122601	MS122611	MS122122	MS122655
Single mode (PC)	MS122000	MS122500	MS122501	MS122511	MS122022	MS122555
Single mode (APC)	MS122077	MS122577	–	–	MS122088	MS122599

MICROSENS

Multimode 50/125 µm Duplex Patch Cable

	SC	ST	LC	MT-RJ	VF-45	E-2000
SC	MS123100-L	MS123101-L	MS123102-L	MS123103-L	MS123104-L	MS123105-L
ST	MS123101-L	MS123111-L	MS123112-L	MS123113-L	MS123114-L	MS123115-L
LC	MS123102-L	MS123112-L	MS123122-L	MS123123-L	MS123124-L	MS123125-L
MT-RJ	MS123103-L	MS123113-L	MS123123-L	MS123133-L	MS123134-L	MS123135-L
VF-45	MS123104-L	MS123114-L	MS123124-L	MS123134-L	MS123144-L	MS123145-L
E-2000	MS123105-L	MS123115-L	MS123125-L	MS123135-L	MS123145-L	MS123155-L

OM3 Multimode 50/125 µm Duplex Patch Cable

	SC	ST	LC	MT-RJ	VF-45	E-2000
SC	MS123300-L	MS123301-L	MS123302-L	MS123303-L	–	MS123305-L
ST	MS123301-L	MS123311-L	MS123312-L	MS123313-L	–	MS123315-L
LC	MS123302-L	MS123312-L	MS123322-L	MS123323-L	–	MS123325-L
MT-RJ	MS123303-L	MS123313-L	MS123323-L	MS123333-L	–	MS123335-L
E-2000	MS123305-L	MS123315-L	MS123325-L	MS123335-L	–	MS123355-L

Multimode 62,5/125 µm Duplex Patch Cable

	SC	ST	LC	MT-RJ	VF-45	E-2000
SC	MS123200-L	MS123201-L	MS123211-L	MS123203-L	–	MS123205-L
ST	MS123201-L	MS123211-L	MS123212-L	MS123213-L	–	MS123215-L
LC	MS123202-L	MS123212-L	MS123222-L	MS123223-L	–	MS123225-L
MT-RJ	MS123203-L	MS123213-L	MS123223-L	MS123233-L	–	MS123235-L
E-2000	MS123205-L	MS123215-L	MS123225-L	MS123235-L	–	MS123255-L

Single mode 9/125 µm Duplex Patch Cable

	SC	ST	LC	MT-RJ	VF-45	E-2000
SC	MS123000-L	MS123001-L	MS123002-L	MS123003-L	MS123004-L	MS123005-L
ST	MS123001-L	MS123011-L	MS123012-L	MS123013-L	MS123014-L	MS123015-L
LC	MS123002-L	MS123012-L	MS123022-L	MS123023-L	MS123024-L	MS123025-L
MT-RJ	MS123003-L	MS123013-L	MS123023-L	MS123033-L	MS123034-L	MS123035-L
VF-45	MS123004-L	MS123014-L	MS123024-L	MS123034-L	MS123044-L	MS123045-L
E-2000	MS123005-L	MS123015-L	MS123025-L	MS123035-L	MS123045-L	MS123055-L

Single mode 9/125 µm Duplex Patch Cable with 8°angeld polish

	SC/PC	SC/APC 8°	LC/PC	LC/APC 8°	E-2000/PC	E-2000/APC 8°
SC/APC 8°	MS123007-L	MS123077-L	MS123027-L	MS123078-L	MS123057-L	MS123079-L
LC/APC 8°	MS123008-L	MS123078-L	MS123028-L	MS123088-L	MS123058-L	MS123089-L
E-2000/APC 8°	MS123009-L	MS123079-L	MS123029-L	MS123089-L	MS123059-L	MS123099-L

n = Length in meter, standard length: 1 m, 2 m, 3 m (e. g.: MS122541-2 for one 2 m cable). Further connector combinations and lengths on request.

Industrial
solutions

Fiber optic technology for rough environments

Industrial Ethernet components are characterised by their robust design
and fit for use in rough and industrial environments.

Industrial solutions

MICROSENS

Industrial solutions

Profi Line

The highest level of hardened devices for rough environments

The IP protocol has long left the area of in-house applications and is in the process of conquering new fields of application. Industrial Ethernet is now a well-established term that describes the use of Ethernet based components with high reliability in rough environments.

The devices of the Profi Line range have been designed for specific applications that are prone to failure. An open firmware concept means that these devices can be adapted flexibly in order to suit individual customer and market requirements.

Extremely challenging applications such as those related to use in the utility and railway sector as well as in potentially explosive underground environments are underpinned by special certifications.

The devices have a protective mechanism patented by MICROSENS which permits the assembly of a fault-tolerant fiber optic ring with reconfiguration times of less than 20 ms. The reduced expenditure on cabling makes the physical ring structure both an optimum and cost-effective network topology.

Powerline
Communications

Main Switch

1000Base-X

Backup Switch

Ring Coupling
Backup Path

Fault Tolerant
Ethernet Ring

Powerline
Communications

100Base-FX

Data
+ Power

Ring

Ring Coupling

1000Base-X

100Base-TX

Ring

100Base-FX

Monitoring/
Traffic Information System

MICROSENS
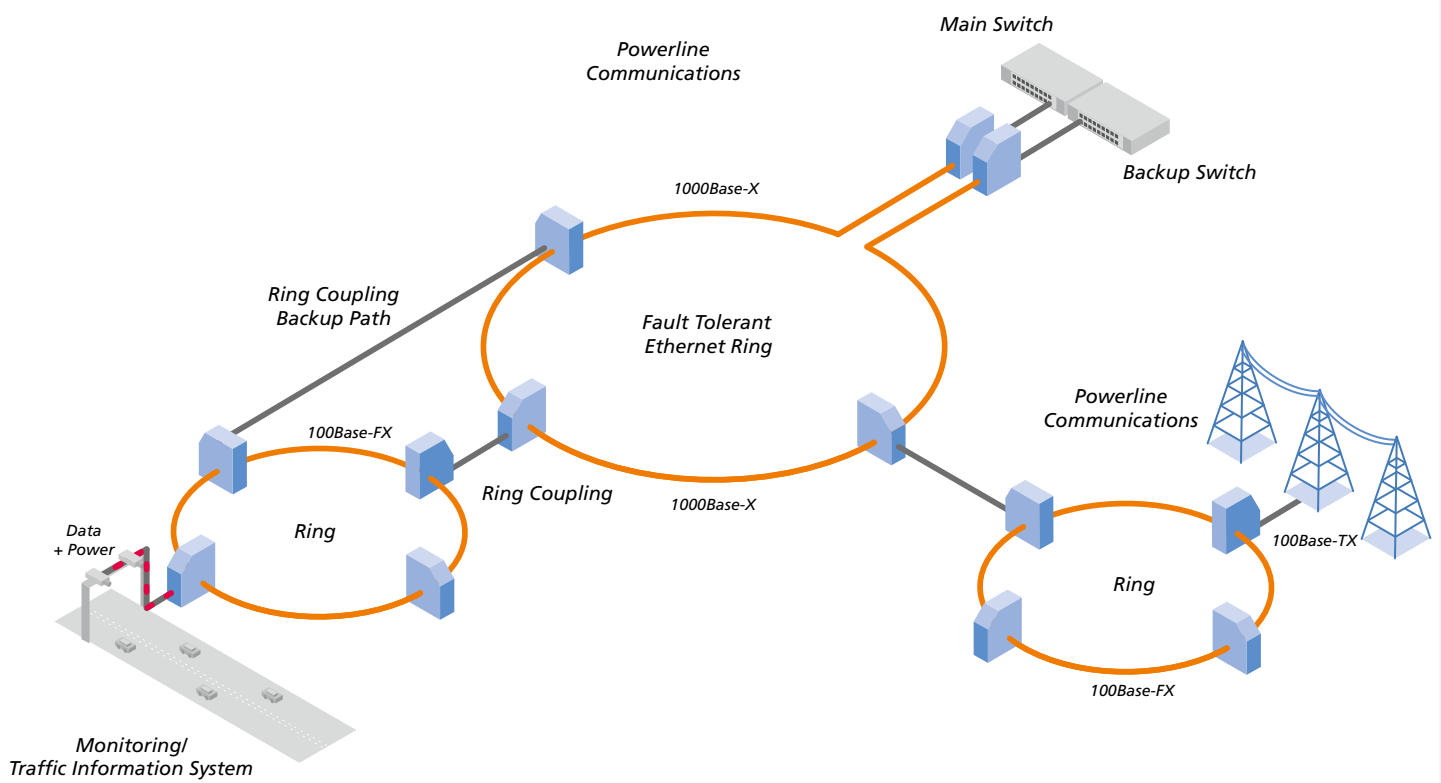
Industrial Solutions — Profi Line

Profi Line
Product Overview

GBE Ring Switches optional with PoE

10 Port Gigabit Ethernet Ring Switches with FX-Uplink. SFP-versions.

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GBE Ring Switches with Railway Certification

10 Port Gigabit Ethernet Ring Switches with FX-Uplink. SFP-versions.

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FE Ring Switches optional with PoE

6 Port Fast Ethernet Switches with FX-Uplink and Ring Redundancy.

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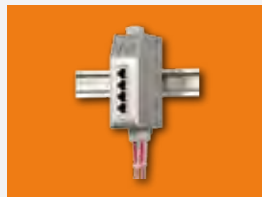
FE Switches, optional with PoE

5 Port Fast Ethernet Switches with FX-Uplink.

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Ethernet and Fast Ethernet Media Converter. RS-232/422/485 Converter.

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FE Switch in IP67 Quality

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Industrial solutions

MICROSENS

10 Port Gigabit Ethernet Ring Switches with Power-over-Ethernet Option

10 Port GBE Switch with
Power-over-Ethernet

Benefits

▌ Fault tolerant fiber ring with reconfi-
guration < 20 ms

▌ Extensive features such as VLAN,
QoS, IGMP-Snooping, STP/RSTP etc.

▌ Web-/SNMP-/CLI- management

▌ SFP version with 100/1000 Mbps

▌ Optional storage media card

▌ Power-over-Ethernet versions

▌ Operating temperature range
-20..+60 °C, extended -40..+75 °C

Description

With its extremely high performance, Gigabit Ethernet offers fast and reliable data transmission. For the user this means more reserve capacity for time-critical applications with increasing data volumes.

The 10 port Gigabit Ethernet Switch has up to three Gigabit Ethernet fiber optic connectors in compliance with 1000Base-SX/LX, which permit building up a fault-tolerant fiber optic ring. In the event of a fault, a mechanism patented by MICROSENS facilitates automatic reconfiguration in less than 20 ms (milliseconds).

The SFP version offers the dual speed support of the SFP port for data rate adjustment (1000Base-X and 100Base-FX). The switch version with SMC card is particularly service-friendly because the entire configuration of the device can be stored in one removable medium. The configuration can be simply transferred.

Description	Art.-No. Version with 24 VDC	Art.-No. PoE-Version 48 VDC
Gigabit Ethernet Industrial Switch with 2x Fiber-Uplink		
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 2x 1000SX, multimode 850 nm SC duplex, max. 550 m	MS650851M	MS650851PM-48
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 2x 1000LX, single mode 1310 nm SC duplex, max. 10 km	MS650852M	MS650852PM-48
Gigabit Ethernet Industrial Switch with 3x Fiber-Uplink		
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 3x 1000SX, multimode 850 nm SC duplex, max. 550 m	MS650861M	MS650861PM-48
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 3x 1000LX, single mode 1310 nm SC duplex, max. 10 km	MS650862M	MS650862PM-48
Gigabit Ethernet Industrial Switch with 3x SFP-Uplink		
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 3x 100/1000X dual-speed SFP-Slot (with SFPs)	MS650869M	MS650869PM-48
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 3x 100/1000X dual-speed SFP-Slot, extended Temperature Range -40..+75 °C	MS650869MX	MS650869PMX-48
10 port Gigabit Ethernet switch, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX) with Storage Media Card Slot, 3x 100/1000X dual-speed SFP-Slot (without SFPs, with 1x Storage Media Card*)	MS650869MSMC	MS650869PMSMC-48

*Additional storage media on page 89.

MICROSENS

10 Port Gigabit Ethernet Ring Switches with Railway and Power Substation Certification

GBE Switch for Railway and Power Substation Applications

Benefits

▌ Railway approval according to EN50121-4:2006 and EN50125-3:2003

▌ Power Substations approval according IEC 61850-3 and IEEE 1613

▌ Fault tolerant fiber ring with reconfiguration < 20 ms

▌ Extensive features such as VLAN, QoS, IGMP-Snooping, STP/RSTP etc.

▌ Flexibility through SFP version with dual speed 100/1000 Mbps

▌ Power-over-Ethernet version

▌ Operating temperature range -40..+75 °C

▌ Power supplies with railway approval with 24 VDC and 48 VDC / 60 W available

Description

This switch version has been specially certified for applications in the area of rail traffic. Certification in accordance with the standards EN50121-4:2006 (for more stringent EMC requirements on electromagnetic interference resistance) and EN50125-3:2003 (temperature, climate, vibration and shock resistance) means the device may be installed directly in 1 m distance from the rail track.

With the additional certification according to IEC 61850-3 and IEEE 1613 this switch can be used for data networks in the area of power plants, power substations and power transport.

The accredited Gigabit switch has 1000Base-X fiber optic ports permitting the construction of a fiber optic ring (fast redundancy). The fast redundancy is made possible by a mechanism patented by MICROSENS that executes a reconfiguration of the Ethernet network in a millisecond in the event of a fault.

Furthermore an upgraded version offers the Power-over-Ethernet (PoE) functionality. The switches are designed to be operated under extreme surrounding conditions, and stable operation along the railway line is guaranteed.

Railway certified 60 W Power Supply

Description	Art.-No.
10 port Gigabit Ethernet switch for railway and power substation applications, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX), 3x 100/1000X dual-speed SFP-Slot, 2x 24 VDC Power Supply Input, redundant	**MS650869M-B**
10 port Gigabit Ethernet switch for railway and power substation applications, 8x RJ-45 (1x 10/100/1000T + 7x 10/100TX) 3x 100/1000X dual-speed SFP-Slot, PoE according to IEEE802.3af, 2x 48 VDC Power Supply Input, redundant	**MS650869PM-48-B**
Power Supplies with Railway Certification	
Power Supply with Railway Certification 230 VAC / 24 VDC, 60 W	**MS700482-24B**
Power Supply with Railway Certification for PoE applications 230 VAC / 48 VDC, 60 W	**MS700482-48B**

MICROSENS

6 Port Fast Ethernet Ring Switches with Power-over-Ethernet Option

6 Port Fast Ethernet Switch with Ring Function

Benefits

▌ Fault tolerant fiber ring with reconfiguration < 100 ms

▌ Extensive features such as VLAN, QoS, IGMP-Snooping, STP/RSTP etc.

▌ Comfortable administration via web interface/SNMP/Telnet or NMP-software

▌ Power-over-Ethernet version

▌ Redundant power supply possible

▌ Effective over voltage protection

▌ Robust unit in industrial design

Description

Applications in the industrial environment require constant network availability. Fault-tolerant network components are increasingly being deployed to prevent failures and therefore standstill periods in production and other mission critical applications.

The 6 port Fast Ethernet Switch has two fiber optic connectors in compliance with 100Base-FX, which permit switching to a fault-tolerant fiber optic ring. In the event of a fault, a mechanism patented by MICROSENS facilitates reconfiguration in less than 100 ms (milliseconds).

The devices are generally equipped with integrated network management. Extensive switch functions may be easily configured using the web interface/SNMP/Telnet or NMP-software.

An optional version supports the full Power-over-Ethernet function on all four RJ-45 subscriber ports in accordance with IEEE Std. 802.3af. An intelligent power management system monitors the current power consumption of connected terminal devices. The power supply of this version is realized via a 48 VDC input terminal in redundant design.

Description	Art.-No. Version 24 VDC	Art.-No. PoE-Version 48 VDC
Fast Ethernet Industrial Switch for Multimode Applications		
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, multimode 1310 nm ST 2 km	MS650501M	MS650501PM-48
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, multimode 1310 nm SC duplex 2 km	MS650502M	MS650502PM-48
Fast Ethernet Industrial Switch for Single mode Applications		
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, single mode 1310 nm ST 15 km	MS650505M	MS650505PM-48
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, single mode 1310 nm SC duplex 15 km	MS650504M	MS650504PM-48
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, single mode 1310 nm ST 40 km	MS650507M	MS650507PM-48
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, single mode 1310 nm SC duplex 40 km	MS650506M	MS650506PM-48
6 port Fast Ethernet switch, 4x 10/100Base-TX, 2x 100Base-FX, single mode 1550 nm SC duplex 80 km	MS650509M	MS650509PM-48

Versions with extended temperature range -40..+75 °C on request.

MICROSENS

5 Port Fast Ethernet Switches with Power-over-Ethernet Option

5 Port Fast Ethernet Switch

Benefits

▮ Extensive features such as VLAN, QoS, IGMP-Snooping, STP/RSTP etc.

▮ Comfortable administration via web interface/SNMP/Telnet or NMP-software

▮ Power-over-Ethernet version

▮ 24 VDC power supply, redundancy possible

▮ Effective over voltage protection

▮ Robust unit in industrial design

Description

The 5 port Fast Industrial Ethernet Switch enables the setting up of powerful Ethernet networks in rough environments with high levels of reliability. The device has an extremely robust design and permits ambient temperatures ranging from -20 to +60 °C or from -40 to +75 °C in the extended version.

Using 10/100Base-TX it is possible to connect up to four end devices via the RJ-45 connectors. A 100Base-FX fiber optic uplink is available for connection to the central device.

An optional version supports the full Power-over-Ethernet function on all four RJ-45 subscriber ports in accordance with IEEE Std. 802.3af. An intelligent power management system monitors the current power consumption of connected devices. The power supply of this version is realized via a 48 VDC input terminal in redundant design.

Description	Art.-No. Version with 24 VDC	Art.-No. PoE-Version 48 VDC
Fast Ethernet Industrial Switch for Multimode Applications		
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, multimode 1310 nm ST 2 km	MS650461M	MS650461PM-48
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, multimode 1310 nm SC duplex 2 km	MS650462M	MS650462PM-48
Fast Ethernet Industrial Switch for Single mode Applications		
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, single mode 1310 nm ST duplex 15 km	MS650465M	MS650465PM-48
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, single mode 1310 nm SC duplex 15 km	MS650464M	MS650464PM-48
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, single mode 1310 nm ST duplex 40 km	MS650468M	MS650468PM-48
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, single mode 1310 nm SC duplex 40 km	MS650467M	MS650467PM-48
5 port Fast Ethernet switch, 4x 10/100Base-TX, 1x 100Base-FX, single mode 1550 nm SC duplex 80 km	MS650469M	MS650469PM-48

Versions with extended temperature range -40..+75 °C on request.

MICROSENS

Media Converter for Ethernet/ Fast Ethernet and RS-232/422/485

Ethernet/Fast Ethernet
Industrial Media Converter

Benefits

▌ Robust media converter for Fast Ethernet (100 Mbps) and Ethernet (10 Mbps)

▌ Additional version for serial protocols RS-232/422/485 with SUB-D9 and screw terminal

▌ Transparent conversion of the data

▌ External alarm contacts

▌ Connection for redundant power supply

▌ Effective overvoltage protection

Description

MICROSENS supplies special media converters in an industrial version for use in extremely demanding conditions. In addition to Ethernet (10Base-FL/10Base-T) and Fast Ethernet (100Base-FX/100Base-TX), the product range includes converters for serial interfaces. RS-232/V.24, RS-422/V.11 and RS-485 copper/fiber optic converters are available.

A fixture integrated in the device enables direct mounting onto 35 mm DIN rails. The power supply of the converters is provided by an external 24 VDC power adapter. A second power supply can be connected to supply the devices redundantly.

The Ethernet converters are equipped with a switch to change the assignment of the RJ-45 jack. This allows the 100Base-TX copper connection by using conventional 1:1 patch cords.

Media Converter for Fast Ethernet

Media Converter for RS-232

Description	Art.-No. ST-connector	Art.-No. SC-connector
Fast Ethernet Converter		
100Base-TX/FX, multimode 1310 nm, max. 2 km	MS650421	MS650420
100Base-TX/FX, single mode 1310 nm, max. 15 km	MS650425	MS650424
100Base-TX/FX, single mode 1310 nm, max. 40 km	MS650427	MS650426
Ethernet Converter		
10Base-T/FL, multimode 850 nm, max. 2 km	MS650400-T	-
10Base-T/FL, single mode 1310 nm, max. 10 km	MS650405-T	-
Serial Converter		
RS-232, multimode 1310 nm, max. 2 km	MS650142	MS650143
RS-232, single mode 1310 nm, max. 15 km	MS650145	MS650147
RS-422, multimode 1310 nm, max. 2 km	MS650242	MS650243
RS-422, single mode 1310 nm, max. 15 km	MS650245	MS650247
RS-485, multimode 1310 nm, max. 2 km	MS650342	MS650343
RS-485, single mode 1310 nm, max. 15 km	MS650345	MS650347

System Catalog 1610

MICROSENS

5 Port Fast Ethernet IP67-Switch

5 Port Fast Ethernet
IP67-Switch

Benefits

▌ Robust metal housing, protection class IP67

▌ Easy commissioning without manual configuration (auto negotiation, auto MDI/MDI-X)

▌ Operation temperature range -40..+70 °C

▌ 5x Fast Ethernet ports with M12 connector

Description

MICROSENS provides a Fast Ethernet switch complying with IP67 protection class in order to fulfil the extreme demands in the industrial environment. This type of protection guarantees complete dust containment, resistance to sprayed water and to jets of water as well as resistance to temporary submersion in water.

The switch is designed for the use in all indoor and outdoor applications. An adapted working environment in terms of humidity and temperature is not necessary. The switch can be installed closer to the relevant application and a special technology in order to protect the housing is not required any more. Working temperatures range widely from -40 to +70 °C.

The compact IP67 switch has 5x Fast Ethernet ports with 10/100Base-TX. All connectors are provided with the M12 technology.

Industrial solutions

M12 /M12 Extension

M12D / RJ-45 Data Cable

Description	Art.-No.
5 port Fast Ethernet industrial switch IP67, 5x 10/100Base-TX, M12D, 1x 9..30 V DC power supply M12A, -40..70 °C	MS655315
M12 male to M12 male Cat.5 cable, 3 m	MS100230-3,0
M12 male to M12 female Cat.5 cable, 10 m	MS190231-10,0
M12 male to M12 female Cat.5 cable, 30 m	MS190231-30,0
M12 male to RJ-45 Cat.5 data cable, 3 m	MS190234-3,0
M12 5-pin male to M12 5-pin female power cable, 10 m	MS190241-10,0
M12 5-pin male to M12 5-pin female power cable, 30 m	MS190241-30,0

MICROSENS

24 VDC Power Supplies

Industrial Power Supplies

Benefits

▌ Wide input range 85..264 VAC or 83..375 VDC

▌ Operation temperature range -10..+70 °C

▌ High efficiency 88% typ.

▌ Mechanical stability

▌ Integrated, effective over voltage protection

▌ Long-term short circuit, overvoltage, and overtemperature protection

▌ Parallel operation of up to 5 power supplies possible

▌ Power good LED

Description

The industrial power supplies are designed for extremely challenging use under rough conditions and have been optimally matched for the use with MICROSENS industrial devices.

In addition to the usual features such as effective surge protection or wide range input for worldwide use, these power supply units also offer potential for technical optimisation. The design of the housing enlarges the heat-emitting surface which, combined with the high degree of efficiency, gives the devices a long service life and the highest level of reliability.

The power supply units are supplied with a power of 24, 60 and 120 W. In addition to the standard versions for alternating current input (AC), a DC/DC converter with 24 W output power is available.

The compact power supplies can be directly latched onto DIN rails or mounted on the wall using the brackets supplied with the delivery. Removable clamp terminals simplify wiring.

DC/DC-Converter

Power	Output	Input	Art.-No.
Compact Power Supplies			
24 Watt	24 VDC / 1.0 A	85..264 VAC or 85..375 VDC	**MS700420**
60 Watt	24 VDC / 2.5 A	85..264 VAC or 85..375 VDC	**MS700421**
120 Watt	24 VDC / 5.0 A	85..264 VAC or 85..375 VDC	**MS700422**
DC/DC Converter			
24 Watt	24 VDC / 1.0 A	18..75 VDC	**MS700434**

MICROSENS

48 VDC Power Supplies
for Power-over-Ethernet Applications

Industrial
Power Supply 600 W

Benefits

▍ Auto range input 85..235 or 187..264 VAC

▍ Operation temperature range -25..+70 °C

▍ High efficiency 87% typ.

▍ Adjustable output voltage 48..56 VDC

▍ DC-OK signal via potential free relay contact

▍ Long-term short circuit, over-voltage, and overtemperature protection

▍ External on/off

Description

Industrial devices with a Power-over-Ethernet functionality require a power supply with 48 VDC. MICROSENS supplies a graduated range of power supplies for this purpose.

The availability of the overall application is essentially determined by the right choice of power supply. Principal applications are primarily IP based CCTV, wireless LAN or IP-telephony.

Robustness, resistance to electromagnetic interference and high reserves of power guarantee reliable operation. Other important features are a high level of efficiency as well as effective surge and overload protection. The quality has been designed to target a long service life and reliability. Removable clamp terminals simplify the wiring of the power supply units.

In addition to a compact power supply with 60 W, other power supply units are available with output power of 96, 192, 300 and 600 W. The 48 VDC output voltage can be increased up to a range of 56 VDC in order to counteract any drops in voltage that occur in the power supply line.

Power Supplies 96..360 W

Power	Output	Input	Art.-No.
Compact Power Supplies			
60 Watt	48 V DC / 1.25 A	85..264 VAC or 85..375 VDC	**MS700430**
Power Supplies			
96 Watt	48 V DC / 2.0 A	85..264 VAC	**MS700466**
192 Watt	48 VDC / 4.0 A	85..264 VAC	**MS700467**
360 Watt	48 VDC / 7.5 A	85..264 VAC	**MS700468**
600 Watt	48 VDC / 12.5 A	85..264 VAC	**MS700469**

Industrial solutions

System Catalog 1610

MICROSENS

SFP Transceiver with extended Temperature Range

SFP Transceiver with extended Temperature Range

Benefits

▌ Extended temperature range -40..+85 °C

▌ Installation during operation (hot swap)

▌ Versions for Fast Ethernet and Gigabit Ethernet

▌ Simplex option for FTTH applications

Description

The majority of all active network devices are now equipped with modular optical interfaces in the form of SFP ports. For the user this permits the highest possible flexibility in terms of network configuration.

MICROSENS provides a special range of SFP transceivers with extended temperature range especially for the insertion into network devices intended for operation in rough environments. The temperature range for operation is from -40 to +85 °C.

These SFP transceivers generally have an integrated digital diagnostics function and, depending on the version, are designed for Fast Ethernet (100Base-FX) or Gigabit Ethernet (1000Base-SX/LX). Multimode and single mode versions with different optical budget are available.

Description	Art.-No.	
Fast Ethernet		
100Base-FX SFP, multimode 1310 nm 2 km, LC duplex	**MS100190DX**	
100Base-FX SFP, single mode 1310 nm 15 km, LC duplex	**MS100191DX**	
Gigabit Ethernet		
1000Base-SX SFP, multimode 850 nm 550 m, LC duplex	**MS100200DX**	
1000Base-LX SFP, single mode 1310 nm 10 km, LC duplex	**MS100210DX**	
WDM (Simplex)	A-Side – TX: 1310 nm, RX: 1550 nm	B-Side – TX: 1550 nm, RX: 1310 nm
100Base-FX SFP, single mode 20 km, LC simplex	**MS100191DXA**	**MS100191DXB**
1000Base-LX SFP, single mode 10 km, LC simplex	**MS100221DXA**	**MS100221DXB**
1000Base-LX SFP, single mode 20 km, LC simplex	**MS100223DXA**	**MS100223DXB**
1000Base-LX SFP, single mode 40 km, LC simplex	**MS100224DXA**	**MS100224DXB**

further versions on request.

MICROSENS

Installation Accessories
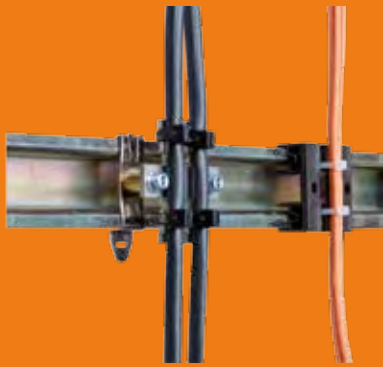
Installation Accessories

Benefits

▌ Cable sets for the connection of the power supply, delivered with core cable ends

▌ Cable guides and cable panels for the strain relief of cablings

▌ Mounting adapter for "Modular System 45x45", insertion depth flush with the cover of the switch-board

Description

Industrial solutions are usually mounted on DIN-rails. MICROSENS supplies suitable accessories for correct installation. The products are most frequently combined with suitable power supplies. MICROSENS offers corresponding cable sets in different lengths for this purpose.

When it comes to cabling, MICROSENS supplies two levels of tried and tested strain relief systems that are snapped onto the DIN rail. Metal cable safety strips are available for higher levels of traction. Other assembly accessories such as end clamps and brackets for the "Modular System 45x45" complete the industrial solutions range.

Description	Art.-No.
Cable Sets	
Cable feed conductor sleeves 2x 1,5 mm² 10 cm long, cord red/black, wire ends open	**MS190120-0,1**
Cable feed conductor sleeves 2x 1,5 mm² 20 cm long, cord red/black, wire ends open	**MS190120-0,2**
Cable feed conductor sleeves 2x 1,5 mm² 50 cm long, cord red/black, wire ends open	**MS190120-0,5**
Cable Guides or Cable Panels	
1x strain relief for DIN-rail plastics black	**MS140820-1**
4x strain relief for DIN-rail plastics black	**MS140820-4**
2x strain relief for DIN-rail metal	**MS140821-2**
4x strain relief for DIN-rail metal	**MS140821-4**
Other Accessories	
Block assembly for DIN-rail screwable, aluminium	**MS140806**
DIN-rail bracket for 45x45 installation switches	**MS140805**
DIN-rail brace for module 45 1x module 45, plastics	**MS140804**
SMC-memory card 256 MB for industrial switches -40..+85 °C	**MS140890X-256**
19" profile with DIN-rail 4 U for installation in 19" cabinets	**MS140819**

Further accessories and IP67-housing on request.
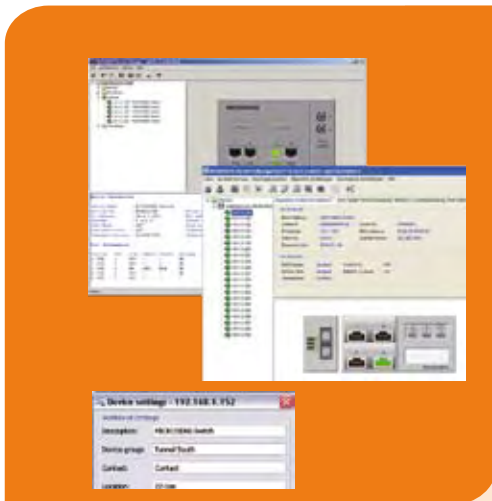
MICROSENS

NMP Network Management Platform – Universal Management

Benefits

▌ Visualisation of the device status and detailed status information with at a glance

▌ Automatic detection of all manageable MICROSENS devices in the network

▌ Logical structuring of the network by definition of device groups

▌ Integrated SNMP-trap receiver and active monitoring of devices

▌ Simultaneous configuration of complete groups or all devices

▌ Automatic firmware update of device groups

Description

Equipment in the Profi and Expert Lines are supported by the network management software (NMP). Furthermore all MICROSENS network components may be configured and monitored using NMP.

The network management tool operates with the aid of lists of devices that permit network components to be grouped together on the basis of a tree diagram. When ring topology is used the groups are automatically generated using the rings while global settings are simultaneously assigned.

In the Professional version the NMP has an integrated topology manager which especially enables the rings to be managed in a clear manner. In addition to general operating parameters, targeted monitoring of ring ports and their connections is possible.

With the server version the NMP is operated on a central server, the access from the clients is done via a web interface. Up to 30 clients can access the server in parallel. For higher demands the NMP server can be operated redundant in the network.

Description	Art.-No.
NMP Professional - management software with 1 year update licence	**MS200160-1**
NMP Professional - additional update licence for n-years	**MS200161-n**
NMP Standard - management software with 1 year update licence	**MS200162-1**
NMP Standard - additional update licence for n-years	**MS200163-n**
NMP Server - management software with 1 year update licence, incl. 5 clients	**MS200164-1**
NMP Server - additional update licence for n-years	**MS200165-n**
NMP Server - additional client access licences for n-clients	**MS200166-Cn**

System Catalog 1610

MICROSENS

Element Manager

Topology Manager

Port Access Control

IGMP Configuration

SNMP Setting

MICROSENS
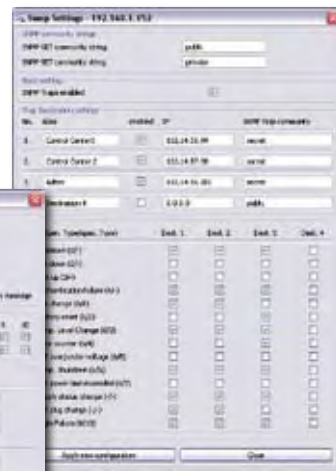
Industrial Switches
Profi Line

Gigabit Ethernet

	Gigabit Ethernet Industrial Switch with ring function	Gigabit Ethernet Industrial Switch with ring function (SFP)
Interfaces		
Number of ports 10/100Base-TX	7	7
Number of ports 10/100/1000Base-T	1	1
Number of ports with PoE		
PoE mode		
100Base-X ports		
1000Base-X ports	2 or 3	
Number of ports SFP		3
Nominal input voltage	18 - 36 VDC	18 - 36 VDC
Power consumption	8 W	8 W
Operating temperature range	-20..+60 °C	-20..+60 °C
Extended operating temperature range*		-40..+75 °C
Dimensions (W x D x H) mm	50 x 108 x 116	50 x 108 x 116
Management features		
NMP Management Software	•	•
Telnet / SNMP / Web	•	•
VLAN / QoS / authentification	•	•
Power-over-Ethernet (PoE)	–	–
Ring coupling redundancy	•	•
IGMP snooping	•	•
RSTP	•	•
CDP	•	•
Ordering information		
Multimode 850, 4 x ST	MS650850M	
Multimode 850, 4 x SC	MS650851M	
Multimode 850, 6 x SC	MS650861M	
Multimode 1310, 4 x ST		
Multimode 1310, 4 x SC		
Multimode 1310, 2 x ST		
Multimode 1310, 2 x SC		
Single mode 1310, 4 x SC		
Single mode 1310, 4 x ST		
Single mode 1310, 10 km, 4 x SC	MS650852M	
Single mode 1310, 10 km, 6 x SC	MS650862M	
Single mode 1310, 15 km, 2 x SC		
Single mode 1310, 15 km, 2 x ST		
Single mode 1310, 40 km, 2 x SC		
Single mode 1310, 40 km, 2 x ST		
Single mode 1310, 40 km, 4 x SC		
Single mode 1310, 40 km, 4 x ST		
Single mode 1310, 15/40 km, 4 x SC		
SFP version		MS650869M
SFP version for railway application		MS650869M-B
Catalogue page	**80**	**80/81**

* Versions available for extended operating temperature range, article number MS650869MX or MS650869PMX-48.

Industrial solutions

MICROSENS

Fast Ethernet

Gigabit Ethernet Industrial Switch with Ring Function and PoE (SFP)	Gigabit Ethernet Industrial Switch with ring function and PoE	Fast Ethernet Industrial Switch		Fast Ethernet Industrial Switch with ring function
7	7	4		4
1	1			
8	8			
PSE	PSE			
		1		2
	2 or 3			
3				
48 VDC	48 VDC	18 - 36 VDC		18 - 36 VDC
70 W (62 W for PoE)	70 W (62 W for PoE)	6 W		6 W
-20..+60 °C	-20..+60 °C	-20..+60 °C		-20..+60 °C
50 x 108 x 116	50 x 108 x 116	38 x 108 x 116		38 x 108 x 116
		not manageable	**manageable**	
•	•		•	•
•	•		•	•
•	•		VLAN/QoS	VLAN/QoS
–	•		–	–
•	•		–	–
•	•		•	•
•	•		•	•
•	•		–	–
	MS650850PM-48			
	MS650851PM-48			
	MS650861PM-48			
				MS650501M
				MS650502M
		MS650461	MS650461M	
		MS650462	MS650462M	
	MS650852PM-48			
	MS650862PM-48			
		MS650464	MS650464M	
		MS650465	MS650465M	
		MS650467	MS650467M	
		MS650468	MS650468M	
				MS650506M
				MS650507M
				MS650508M
MS650869PM-48				
MS650869PM-48-B				
80/81	**80**	**83**	**83**	**82**

Industrial solutions

Expert Line

The highest level of robust design for rough environments

The devices of the Expert Line constitute a link between the specific solutions provided with the Profi Line switches/converters and the simple and competitive solutions offered with the Entry Line devices. The comprehensive features of devices of the Expert Line mean they are deployed in high quality applications ranging from the control network to CCTV.

The range of possible applications is enhanced by the possibility of the construction of fault-tolerant fiber optic rings (M-Rings). Furthermore, the ring topology can also be combined with standard protocols such as Spanning Tree (STP) and Rapid Spanning Tree (RSTP), thus producing additional flexibility for the network structure.

The devices are fully supported in terms of network management by the MICROSENS NMP (network management platform). Above all this enables a multitude of devices to be configured and administered easily.

The devices of the Expert Line product range are characterised by their general support of features such as QoS, VLANs, Port Trunking with LACP, bandwidth control, 802.1X authentication and IGMP-Snooping. Versions with an increased number of user ports or with Power-over-Ethernet are also available.

1000Base-X

Layer 3 Switch

Industrial
Ethernet Ring

100Base-TX

PoE

Sensor

100Base-TX

Camera IP

1000Base-X

Up to
16 ports

100Base-TX

100Base-TX

Sensor

IP
Phone

Camera IP

MICROSENS

Industrial Solutions _ Expert Line

MICROSENS
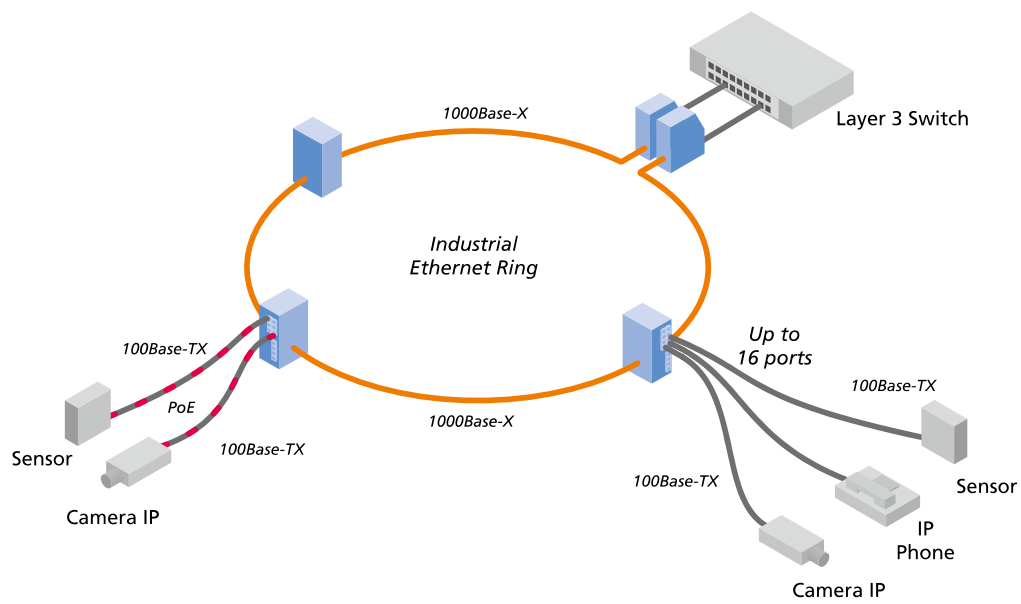
Expert Line
Product Overview

8 Port GBE Switch

6x 10/100/1000Base-T
2x 100/1000Base-X with
2x SFP combo ports.

98

18 Port FE Switch

16x 10/100Base-TX
2x 100/1000Base-X with
2x SFP combo ports.

99

10 Port FE Switch with PoE

8x 10/100Base-TX with PoE
2x 100/1000Base-X with
2x SFP combo ports.

100

Power Supplies 24 and 48 VDC

Power supplies
in different
power classes.
86

SFP-Transceiver with extended Temperature Range

Especially adjusted trans-
ceiver for industrial use.
88

Network Management

NMP - Network
Management Platform.

90

Industrial solutions

MICROSENS
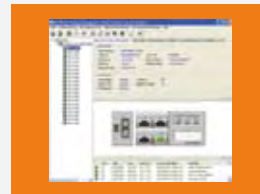
8 Port Gigabit Ethernet Switch

8 Port GBE Ring Switch

Benefits

▊ Redundant connection with ring functionality or dual homing with a backup time of less than 20 ms

▊ Standardised management access via SNMPv1/v2c/v3, Telnet, web and NMP

▊ Extensive features such as VLAN, QoS, IGMP snooping, STP/RSTP, port trunking

▊ SFP ports for flexible combination of multimode and single mode with different distances

▊ SFP ports with dual speed for 100X and 1000X

▊ Temperature range -10..+60 °C

Description

The 8 port Gigabit Industrial Ethernet Switch is characterised by the full Gigabit support which is provided to all of the eight 10/100/1000Base-T ports. The Gigabit performance means that more reserve capacity can be set aside for time-critical applications or for increasing bandwidth. This also has a direct impact on the stability and availability of networks.

Two of the eight RJ-45 ports are designed for alternative use via an SFP module. Due to the modular design it is possible to freely combine the appropriate SFP multimode and Single Mode transceivers as well as different choices of range. A further advantage is the dual speed support (100Base-FX/1000Base-X) of the SFP module. This allows Gigabit and Fast Ethernet fiber optic networks to be directly coupled to each other.

The construction of a fault-tolerant fiber optic ring is possible via the SFP ports. A special mechanism (M-Ring) makes network reconfiguration possible in less than 20 ms (milliseconds) in the event of a fault. For critical networks the central connection of a Gigabit Ethernet switch may alternatively take place redundantly via the dual homing function. The GBE switch may be freely combined with other switches of the Expert Line range.

Description	Art.-No.
8 port industrial Gigabit Ethernet switch with M-Ring function, 6x 10/100/1000Base-T, 2x 100/1000X SFP or 2x 10/100/1000Base-T dual media	MS651310M

MICROSENS

18 Port Fast Ethernet Switch with Gigabit Uplink

Fast Ethernet Ring Switch

Benefits

▐ High port density

▐ Redundant connection with ring functionality or dual homing with a backup time of less than 20 ms

▐ Standardised management access via SNMPv1/v2c/v3, Telnet, web and NMP

▐ Extensive features such as VLAN, QoS, IGMP snooping, STP/RSTP, port trunking

▐ SFP ports with dual speed for 100X and 1000X

▐ Temperature range -10..+60 °C

Description

With its 16 Fast Ethernet (10/100Base-TX) and two Gigabit Ethernet ports the 18 port switch offers a high number of connections per square kilometre. The two Gigabit Ethernet ports serve as uplink ports and are designed both as RJ-45 (10/100/1000Base-T) and as SFP port (100/1000Base-X) (dual media).

The construction of a fault-tolerant fiber optic ring is possible via the SFP ports. In the event of a fault, a special mechanism (M-Ring) facilitates network reconfiguration in less than 20 ms (milliseconds). For mission critical applications the central connection of a Gigabit Ethernet switch may alternatively take place redundantly via the dual homing function. Combination with other switches of the Expert Line range is possible.

Due to the modular design of the fiber optic connectors it is possible to freely combine multimode and single mode fibers as well as different choices of range. A further advantage is the dual speed support of the SFP port providing speed adaptation (1000Base-X and 100Base-FX).

Description	Art.-No.
18 port industrial switch with M-Ring function, 16x 10/100Base-TX, 2x 100/1000Base-X SFP or 2x 10/100/1000Base-T dual media	MS651230M

MICROSENS

10 Port Fast Ethernet Switch with PoE and Gigabit Uplink

FE Ring Switch with 8x PoE

Benefits

▐ Power-over-Ethernet according to IEEE802.3af on 8 TX ports

▐ Redundant connection with ring functionality or dual homing with a backup time of less than 20 ms

▐ Standardised management access via SNMPv1/v2c/v3, Telnet, web and NMP

▐ Extensive features such as VLAN, QoS, IGMP snooping, STP/RSTP, port trunking

▐ SFP ports for flexible combination of multimode and single mode with different distances

▐ SFP ports with dual speed for 100X and 1000X

▐ Temperature range -10..+60 °C

Description

The 10 port Fast Ethernet Switch provides the Power-over-Ethernet functionality on eight ports (10/100Base-TX) in accordance with IEEE 802.3af. Two other ports serve as uplink ports and are designed as dual media both as RJ-45 (10/100/1000Base-T) or SFP port (100Base-FX/1000Base-X).

PoE enables IP-telephones, wireless access points, web cameras etc. to be supplied with power via the data connection. It is no longer necessary to install data or power cables to every network device, so that costs can be significantly reduced.

The construction of a fault-tolerant fiber optic ring is possible via the SFP ports. In the event of a fault a special mechanism (M-Ring) facilitates network reconfiguration in less than 20 ms (milliseconds). For mission critical networks the central connection of a Gigabit Ethernet switch may alternatively take place redundantly via the dual homing function. Combination with other switches from the Expert Line range is possible.

Due to the modular design of the fiber optic ports it is possible to freely combine multimode and single mode fibers as well as different choices of range. A further advantage is dual speed support providing speed adjustment (1000Base-X and 100Base-FX).

Description	Art.-No.
10 port industrial PoE-switch with M-Ring function, 8x 10/100Base-TX with PoE, 2x 100/1000Base-X SFP or 2x 10/100/1000Base-T dual media	**MS651220PM-48**

Industrial Switches
Expert Line Ring Switches

	Expert Line managed 8 Port GBE Switch with M-Ring Function	Expert Line managed 10 Port FE Switch with M-Ring Function and PoE	Expert Line managed 18 Port FE Switch with M-Ring Function
Interfaces			
No. of 10/100TX ports	-	8	16
No. of 10/100/1000T ports	6	2	2
No. of Combo Ports (SFP+10/100/1000T)	2	2	2
No. of ports with PoE	-	8	-
PoE mode	-	PSE	-
Nominal input voltage	12 - 48 VDC	48 VDC	12 - 48 VDC
Power consumption	18 W	max. 116 W (w/ PoE, Full Load)	11.5 W
Operating temperature range	-10 °C .. 60 °C	-10 °C .. 60 °C	-10 °C .. 60 °C
Extended operating temperature range*	-40 °C .. 85 °C	-40 °C .. 85 °C	-40 °C .. 85 °C
Dimensions (W x D x H) mm	69 x 132 x 176	69 x 132 x 176	69 x 132 x 176
Management features			
Telnet / Web	• / •	• / •	• / •
SNMPv1 / SNMPv2 / SNMPv3	• / • / •	• / • / •	• / • / •
Network Management Platform (NMP)	•	•	•
VLAN / QoS / authentification	• / • / •	• / • / •	• / • / •
Power-over-Ethernet (PoE)	–	•	–
Ring / Dual Homing / Ring Coupling	• / • / •	• / • / •	• / • / •
IGMP-snooping	•	•	•
Spanning Tree / Rapid Spanning Tree	• / •	• / •	• / •
Flow Control	•	•	•
SNMP Trap / System Event Log	• / •	• / •	• / •
Port Trunking	•	•	•
Firmware upload (TFTP)	•	•	•
Ordering information			
8 ports	MS651310M		
10 ports		MS651220PM-48	
16 ports			MS651230M
Catalogue page	**98**	**100**	**99**

on request available.

System Catalog 1610

MICROSENS

Industrial solutions

Entry Line

Industrial Ethernet with highest efficiency regarding cost and functionality

The market also needs basic, extremely competitive, reliable products for diverse industrial applications.

MICROSENS has been an established manufacturer of industrial Ethernet devices for many years. In addition to the success of fiber optic switches widely used in the market, there also supplied several devices based on twisted pair cabling.

The use of copper wiring still is very cost-effective especially for lower data rates in the terminal device sector. Therefore these copper switches are extremely well suited for industrial networking particularly across short distances. In such an environment the benefits of the Entry Line product range become very apparent:

- Cost-effectiveness
- Easy installation
- Simple in operation (Plug and Play)
- Compact design
- Extended temperature range
- Relay contacts

Industrial solutions

Fault tolerant
Ethernet Ring

MM Fiber

SM Fiber

1000Base-FX

Sensor

Sensor

Serial
Interface

Industrial
Machine

MICROSENS

Industrial Solutions _ Entry Line

Entry Line
Product Overview

Gigabit Ethernet Switches

5/8 Port Gigabit Ethernet Switches optional with 1/2 SFP-ports.

106

Fast Ethernet Switches

5 and 8 Port Fast Ethernet Switches, optional with Fiber Ports.

107

Fast Ethernet Switches with Power-over-Ethernet

5 and 8 Port Fast Ethernet Switches, with fiber ports, optional with PoE.

108

Gigabit and Fast Ethernet Bridges, optional with PoE

Gigabit Bridge.
Fast Ethernet Bridge, optional with PoE.

109

RS-232/422/485 Device Server

RS-232/422/485 Converter to Ethernet (IP). 10/100TX or 100FX fiber interface.

110

Fast Ethernet VDSL Extender

Fast Ethernet Extender, 10/100TX via VDSL max. 1900 m.

111

SFP-Transceiver with extended Temperature Range

Especially adjusted Transceiver for industrial use.

88

Power Supplies 24 and 48 VDC

Power Supplies in different power classes.

86

MICROSENS

5 and 8 Port Gigabit Ethernet Switch with SFP-Slot

5/8 Port Gigabit Ethernet Switches with SFP-Slots

Benefits

▌ Gigabit performance for Industrial Ethernet

▌ Cost efficient and compact design

▌ Automatic configuration

▌ 12..48 VDC power input, redundant

▌ Effective overvoltage protection

▌ Potential free alarm relay contact

▌ 5 port version: SFP slot for 1000X

▌ 8 port version: dual speed SFP slot for 100X or 1000X

Description

The Entry Line product range offers graduated Gigabit Ethernet switches for rough environments. Therefore it contains compact switches with up to 8 GBE ports. The basic products are designed for copper-based networks and have 5 or 8 RJ-45 ports with 10/100/1000Base-T.

The 5 port version may optionally be provided with an SFP port and is therefore ideally suited for use in a fiber optic network. The pluggable SFP transceiver provides the greatest possible flexibility when selecting the optical connection.

The product with the highest port number of this range has two modular SFP ports. Ports 7 and 8 may optionally be used via the RJ-45 or SFP port. An important feature is the dual speed capability of the SFP port. Gigabit Ethernet (1000Base-X) as well as Fast Ethernet (100Base-FX) are supported, in which case provision takes place via a suitable SFP transceiver. In this way Fast Ethernet fiber optic networks can be easily incorporated into Gigabit structures.

The devices are taken into operation without any manual configuration (plug & play). Ports are set automatically by Auto Negotiation (10/100/1000Base-T) and Auto MDI/MDI-X.

8 Port GBE Switch with SFP-Ports

Description	Art.-No.
5 port Gigabit Ethernet switch 5x 10/100/1000Base-T	**MS655200**
5 port Gigabit Ethernet switch 4x 10/100/1000T 1x 1000X, 1x SFP-port	**MS655201**
8 port Gigabit Ethernet switch 8x 10/100/1000Base-T	**MS655208**
8 port Gigabit Ethernet switch 8x 10/100/1000T 2x 1000X, 2x SFP-port (100/1000 Mbps dual speed)	**MS655210**

Please find suitable SFP transceiver on page 88.

MICROSENS

Fast Ethernet Switches

**8 and 5 Port
Fast Ethernet Switches**

Benefits

▌ Easy configuration, no extensive configuration

▌ 5x or 8x 10/100TX ports

▌ Version with fiber port for multimode and single mode

▌ 12..48 VDC power input, redundant

▌ Potential free contact indicates power loss

▌ Effective overvoltage protection

Description

The Entry Line series comprises a number of compact Fast Ethernet switches. The basic devices have 5x or 8x RJ-45 copper ports.

Extended switch versions are equipped with additional fiber optic ports. For example, in addition to the 4x 10/100Base-TX ports in the 5 port version, a fiber optic port is available in the multimode or single mode version. The 6 port Fast Ethernet switch also has two fiber optic ports and can therefore be used for cascading.

The devices can be operated immediately and require no configuration. Ports are set automatically by Auto-Negotiation (10/100/1000Base-T) and Auto MDI/MDI-X.

The power supply ports are designed redundantly. An isolated alarm contact reports a possible fault in the power supply of the device.

Description	Art.-No.
5 port Fast Ethernet switch 5x 10/100TX	MS655100
8 port Fast Ethernet switch 8x 10/100TX	MS655140
5 port Fast Ethernet switch 4x 10/100TX 1x 100FX, 1x multimode 1310 nm SC duplex 2 km	MS655102
5 port Fast Ethernet switch 4x 10/100TX 1x 100FX, 1x single mode 1310 nm SC duplex 30 km	MS655104
6 port Fast Ethernet switch 4x 10/100TX 2x 100FX, 2x multimode 1310 nm SC duplex 2 km	MS655122
6 port Fast Ethernet switch, 4x 10/100TX, 2x 100FX, 2x single mode 1310 nm SC duplex 30 km	MS655124

Industrial solutions

System Catalog 1610

MICROSENS

Fast Ethernet Switches with Power-over-Ethernet

Fast Ethernet Switches
with 4x PoE

Benefits

▌ Easy configuration, no extensive configuration

▌ 4x 10/100TX ports with PoE according to IEEE802.3af

▌ Version with fiber port for multimode and single mode

▌ 48 VDC power input, redundant

▌ Potential free contact indicates power loss

▌ Effective overvoltage protection

Description

Selected Fast Ethernet switches are available with integrated Power-over-Ethernet functionality. Four 10/100Base-TX ports facilitate the direct supply of terminal devices via the data connection in accordance with IEEE 802.3af with an output of up to 15.4 W per port.

In the copper version the device has a fifth 10/100Base-TX uplink port. Other versions are provided with a fiber optic port in the multimode or single mode version.

Generally the power supply to devices is 48 VDC. The ports are designed redundantly. Dedicated LED displays provide information on the power supply status up to the PoE functionality for each port.

The devices can be operated immediately and require no configuration. Connectors are set automatically by Auto-Negotiation (10/100/100Base-TX) and Auto MDI/MDI-X as well as in accordance with the PoE standard IEEE 802.3af.

Description	Art.-No.
5 port Fast Ethernet PoE-switch, 4x 10/100TX with PoE, 1x 10/100TX uplink, 48 VDC power supply	**MS655100P-48**
5 port Fast Ethernet switch 4x 10/100TX with PoE, 1x 100FX multimode 1310 nm SC duplex 2 km, 48 VDC power supply	**MS655102P-48**
5 port Fast Ethernet switch 4x 10/100TX with PoE, 1x 100FX, single mode 1310 nm SC duplex 30 km, 48 VDC power supply	**MS655104P-48**

System Catalog 1610

MICROSENS

Gigabit and Fast Ethernet Bridges with PoE-Option

Gigabit Ethernet Bridge
with SFP-Port

Benefits

▌ Optional converter or bridging function (via DIP-switch)

▌ Power-over-Ethernet optional

▌ Automatic speed adjustment per Auto Negotiation

▌ Integrated Auto Crossover function for use of standardized patch cable

▌ Link Through function

▌ SFP-Slot for 1000Base-X

▌ Optional for extended temperature range -40 to +75 °C

Description

The Fast and Gigabit Ethernet bridges of the Industrial Ethernet Entry Line range create the interface between fiber optic and copper applications. In addition to fiber optic/copper coupling, bridging technology provides speed adjustment for 10/100Base-TX or 10/100/1000Base-T.

The Fast Ethernet Bridges can also be operated using a DIP switch in 100 Mbps converter mode (100BaseTX to 100BaseFX); this is reducing latency times to a minimum.

A Fast Ethernet Bridge with integrated PoE controller is available for Power-over-Ethernet applications. An access point or IP camera connected via fiber optics can be directly supplied with power here.

With its modular uplink port the Gigabit Ethernet Bridge provides maximum flexibility during connection. Conventional multimode or single mode SFPs can be inserted.

The devices can be operated immediately and require no configuration. Connectors for power supply are designed redundantly. An isolated alarm contact reports a possible fault in the power supply.

Fast Ethernet Bridge

Description	ArtNo.
Fast Ethernet Bridging converter 1x 10/100TX 1x 100FX, multimode 1310 nm SC duplex	**MS655060**
Fast Ethernet Bridging converter 1x 10/100TX 1x 100FX, single mode 1310 nm SC duplex 30 km	**MS655062**
Fast Ethernet Bridging converter 1x 10/100TX with PoE 1x 100FX, multimode 1310 nm SC duplex, 48 VDC	**MS655060P-48**
Fast Ethernet Bridging converter 1x 10/100TX with PoE 1x 100FX, single mode 1310 nm SC duplex 30 km, 48 VDC	**MS655062P-48**
Gigabit Ethernet Bridging converter 1x 10/100/1000T 1x 1000X, 1x SFP-port	**MS655099**

MICROSENS

Ethernet Device Server
RS-232/422/485

RS-232/422/485 Device Server

Benefits

▌ Universal for RS-232/422/485

▌ Conversion to Ethernet (IP)

▌ Emulation of a virtual COM port on a PC (Driver)

▌ Version with integrated fiber port (100FX)

▌ Operation in a pair for point to point connection possible

▌ Windows software included

▌ 12..48 VDC power input

Description

The Device Server facilitates a simple and fast network connection of serial devices with RS-232, RS-422 or RS-485 interfaces. Transmission takes place via the existing Ethernet IP-topology.

A virtual COM port is set up on a control PC through the installation of special drivers. This enables any number of device servers to be connected. Communication with the devices takes place via the network connection of the PC.

In the case of a point-to-point application the devices can also be used in pairs after appropriate configuration. Powerful Windows software facilitates the configuration and control of devices.

The type of interface (RS-232/422/485) can be freely selected. For the Ethernet connection, depending on the version, the devices have two RJ-45 connectors (2 port switch 10/100BaseTX or for redundant connection) and a fiber optic uplink (1x 100BaseFX).

Device Server with Fiber-Uplink

Description	Art.-No.
Ethernet Device Server, 1x RS-232/422/485, 2x 10/100TX, Power Supply 12..48 VDC	MS655400
Ethernet Device Server, 1x RS-232/422/485, 1x 100FX, multimode 1310 nm SC duplex 2 km, Power Supply 12..48 VDC	MS655401
Ethernet Device Server, 1x RS-232/422/485, 1x 100FX, single mode 1310 nm SC duplex 15 km, power supply 12..48 VDC	MS655403
4 port Ethernet Device Server, 4x RS-232/422/485, 2x 10/100TX Power Supply 12..48 VDC	MS655420

MICROSENS

VDSL Extender

Fast Ethernet VDSL Extender

Benefits

▌ Transmission of Fast Ethernet via 2-wire cables

▌ High performance of up to 50 Mbps (at 300 m)

▌ Easy commissioning with plug-and-play

▌ 12..48 VDC power input, redundant

▌ Effective overvoltage protection

▌ Potential free alarm relay contact

▌ Operation temperature range -40..+75 °C

▌ Vibration proof and shock resistant

Description

The Fast Ethernet VDSL Extender offers transmission of Fast Ethernet across conventional 2-wired lines (telephone or ISTY cable) at distances of up to 1900 m.

With transmission speeds of up to 50 Mbps, this extender provides high network performance and can achieve a range of up to 300 m. The bandwidth that can be achieved is reduced correspondingly in the case of greater distances of up to 1900 m. The use of devices is in pairs according to the master/slave principle, in which case configuration is performed using a DIP switch.

The network connection takes place via an RJ-45 jack with 10/100Base-TX. The 2-wire line can optionally be connected via an RJ-11 jack or a clamp terminal. The maximum transmission speed is automatically negotiated in 10 speed levels according to distance and transmission quality and signalled to the user via LED displays.

In an extended version, the VDSL2 Extender, the maximum transmission capacity can be increased up to 88 Mbps (at 300 m). The maximum distance possible is 2000 m with a data rate of 9 Mbps. The device is design for an operating temperature range of -40 to +75 °C. Here the connection to the 2-wire cable is done via a RJ-45 port.

VDSL2-Extender

Description	Art.-No.
Fast Ethernet VDSL Extender, 10/100Base-TX via 2-wire cables (RJ-11 jack or terminal clamp) up to 50 Mbps, 12..48 VDC Power Supply, redundant connection	**MS655010**
Fast Ethernet VDSL2 Extender, 10/100Base-TX via 2-wire cables (RJ-11 jack) up to 88 Mbps, 12..48 VDC Power Supply, redundant connection	**MS655020X**

MICROSENS

Product Overview
Entry Line

	Gigabit Ethernet Switches		Fast Ethernet Switches	
	5 and 8 Port Gigabit Ethernet Switch	**5 and 8 Port Gigabit Ethernet Switch with SFP-uplink**	**5 and 8 Port Fast Ethernet Switch**	**5 and 6 Port Fast Ethernet Switch with FX-uplink**
Interfaces				
Number of 10/100/1000T ports	5 or 8	5 or 8	-	-
Number of 10/100TX ports	-	-	5 or 8	4
Number of PoE-ports	-	-	-	-
SUB-D9	-	-	-	-
Uplinks				
Number of 100/1000X SFP ports	-	1 or 2	-	-
Number of 1000X SFP ports	-	-	-	-
Number of 100FX ports	-	-	-	1 or 2
Features				
Configuration	Plug'n'Play	Plug'n'Play	Plug'n'Play	Plug'n'Play
Auto Negotiation	•	•	•	•
Auto MDI/MDI-X	•	•	•	•
Power supply redundant	•	•	•	•
Voltage range	12 - 48 VDC	12 - 48 VDC	12 - 48 VDC	12 - 48 VDC
Power consumption	5 W (MS655200) 8 W (MS655208)	5 W (MS655201) 17 W (MS655210)	3 W (MS655100) 5 W (MS655140)	4 W (MS655102/104) 6 W (MS655122/124)
Operating temperature range	-10..+60 °C	-10..+60 °C	-10..+60 °C	-10..+60 °C
Potential-free relais contact	•	•	•	•
Overvoltage protection	•	•	•	•
Dimensions max. in mm	30 x 95 x 140	72 x 105 x 152	30 x 95 x 140	30 x 95 x 140
Ordering information				
Version with 2x RJ-45	-	-	-	-
Version with 5x RJ-45	MS655200	-	MS655100	-
Version with 8x RJ-45 uplink	MS655208	-	MS655140	-
Version with 1x SFP-uplink	-	MS655201	-	-
Version with 2x SFP-uplink	-	MS655210	-	-
1x multimode uplink 1310 nm, SC	-	-	-	MS655102
1x single mode uplink 1310 nm, SC	-	-	-	MS655104
2x multimode uplink 1310 nm, SC	-	-	-	MS655122
2x single mode uplink 1310 nm, SC	-	-	-	MS655124
Catalogue page	106	106	107	107

Industrial solutions

MICROSENS

Bridges		**Power-over-Ethernet**		**RS-232/422/485 Device Server**	
Gigabit Ethernet Bridge	Fast Ethernet Bridge	5 Port Fast Ethernet Switch optional with FX-uplink	Fast Ethernet Bridge	Twisted Pair uplink	Fiber-uplink
1	-	-	-	-	-
-	1	5 / 4	1	2	-
-	-	4	1	-	-
-	-	-	-	1	1
-	-	-	-	-	-
1	-	-	-	-	-
-	1	0 / 1	1	-	1
DIP-switch	DIP-switch	Plug'n'Play	DIP-switch	Software	Software
•	•	•	•	•	-
•	•	•	•	•	-
•	•	•	•	•	•
12 - 48 VDC	12 - 48 VDC	48 VDC	48 VDC	12 - 48 VDC	12 - 48 VDC
5 W	3 W (MS655060) 2 W (MS655062)	3 W w/o PoE, 57 W full load w/ PoE (MS655102P-48)	–	–	–
-10..+60 °C	-10..+60 °C	-10..+60 °C	-10..+60 °C	-10..+60 °C	-10..+60 °C
•	•	•	•	•	•
•	•	•	•	•	•
30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	72 x 32 x 100	72 x 32 x 100
-	-	-	-	MS655400	-
-	-	MS655100P-48	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
MS655099	-	-	-	-	-
-	MS655060	MS655102P-48	MS655060P-48	-	MS655401
-	MS655062	MS655104P-48	MS655062P-48	-	MS655403
-	-	-	-	-	-
-	-	-	-	-	-
109	109	108	109	110	110

Industrial solutions

Enterprise
access

Fiber Optic Connections between Carrier and Enterprise Networks

Constantly increasing demand for bandwidth, and the geographical spread of data networks, have increased the deployment of fiber optics at all application levels.

Today's network infrastructures require open systems based on fiber optics that can be installed easily and adapted flexibly according to changing requirements. The MICROSENS Access Platform offers a wide range of access modules for LAN and WAN applications as well as for the interfacing of telecommunication and industrial networks.

Enterprise access

MICROSENS

Enterprise access

Modular Access Platform

Modular Platform with universal insertion cards and various chassis versions.

The rapid development of the information technology drives the convergence of local and wide area networks (LAN/WAN).

This convergence demands new connectivity for local Enterprise Networks, the Enterprise Access.

Protocol transparent converters enable the direct interfacing of communications equipment such as switches, routers and bridges to long-haul single mode networks.

Due to this transparency, these components are not limited to particular applications, but can be used with a variety of applications such as Gigabit Ethernet, SONET/SDH, ESCON® or Fibre Channel.

- Open, modular conversion system for the LAN/WAN interconnection
- Easy scalable and flexible configuration
- Optimal adjustment in terms of bandwidth, optical parameters and connection technology
- Free combination of different services in one system
- Service friendly, because changes can be made during operation (hot swap)
- Network management for consistent network monitoring and device configuration

Mobile
Antenna

Mobile
Operator

Base Station
Controller

E1

Gigabit Long Haul Fiber Link

Optical Crossbar
for Backup

Backup
Data
Center
(SAN)

GbE, Fibre Channel,
2x Fibre Channel

Redundant
Fiber Link

Data
Center
(SAN)

Optical Crossbar
for uplink

GbE, FC, SDH
Fiber Link

19" Racks with
Fiber Repeaters

Fiber Access Ring

Core Network

Business
Center

GbE

PABX

E1

Phones

Fast Ethernet Fiber Link
(Long Haul)

GbE Fiber Link

nx GbE Fiber Link (WDM)

PABX

E1

LAN

SOHO

E1 + IP
Mux

Phones
(POTS)

Laptop

GbE Fiber Link

GbE Access
Switch

LAN

FTTH
SOHO

VoIP-Phone

Laptop

PC

Enterprise

nx GbE

Core Switch

Copper Cable
Fiber Cable

Enterprise access

MICROSENS

Enterprise Access_ Modular Access Platform

Enterprise Access
Basic Components
Product Overview

Chassis

19" Chassis with 3 and 4 U. Desktop housing 1x/2x. Power supplies, blind covers, management.

120

4-Channel Optical Crossbar Module

4 Channel Optical Crossbar with modular SFP slots.

122

2x GBE TDM Module

Gigabit Ethernet TDM Module.

123

3x GBE Module

Gigabit Ethernet Converter Module.

124

GBE Ring Switch Module

Gigabit Ethernet Switch Module.

125

Multimode Gigabit Extender Module

Gigabit Extender for multi-mode fiber.

126

MM/SM Converter Modules

Transparent MM/SM Converter, also as Gigabit Version.

127

Fast Ethernet and Ethernet Modules

Fast Ethernet Converter/ Bridge (Single/Twin), Ethernet Converter.

128

Other Transceiver/ Converter

RS-Transceiver, G.703 Converter and Multirate Transceiver.

130

SFP-Transceiver

Matching SFP transceivers for each application area. Local B&W and WDM simplex.

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Enterprise access

MICROSENS

Chassis for the Modular Access Platform

28 Slot Carrier Chassis, 4 U

14 Slot Enterprise Chassis, 3 U

Benefits

■ Free combination of all modules

■ Hot swappable modules

■ Optional redundant power supply, combination of AC/DC possible

■ Administration of the modules via optional management module (1x per chassis)

■ Management-Software NMP

■ 28 module slots (14 on the front side, 14 on the back side)

■ Power supply via modular central power supply by doubling power supply with redundancy

■ Optional, field exchangeable fan modules

■ Using 2 power supplies and 2 fan modules up to 18 access modules can be installed

■ 14 module slots on the front side

■ Due to low depth also suitable for small wall cabinets

■ Power supply via modular central power supply by doubling power supply with redundancy

■ Field exchangeable fan module on the back side

■ Using 1 power supply up to 12 access modules can be installed

Description	Art.-No.
28 slot carrier chassis, 19", 4 U, without power supply and fan	MS416010M
14 slot enterprise chassis, 19", 3 U, without power supply and with one fan	MS416001M
Power supply module, 100..230 VAC 90 watt, manageable, occupies 2 slots	MS416004M
Power supply module, 48 VDC, manageable, occupies 2 slots	MS416005M
Power supply module, 24 VDC, manageable, occupies 2 slots	MS416005M-24
Fan module for carrier chassis (MS416010M), occupies 3 slots	MS416040M
Management module SNMP/Web/Telnet, occupies 1 slot	MS416020-B
NMP Standard – management software incl. 1 year update license	MS200162-1

Enterprise access

System Catalog 1610

MICROSENS

3 Slot Enterprise Chassis, 1 U

1 and 2 Slot Desktop Chassis

Accessories

- 3 module slots, horizontal mounting

- Compact design, one height unit

- Integrated power supply, all three slots are available for access modules

- Optional version with redundant power supply

- Single and twin slot version

- Depending on version internal or external power supply

- Twin slot version can be used with management module

- Optional wall bracket

- Management module for SNMP/ Web/Telnet

- Blind covers for unused module slots

- Administration via NMP management software

Description	Art.-No.
3 slot enterprise chassis, 19", 1 U, incl. internal 230 V AC power supply	**MS416006M**
3 slot enterprise chassis, 19", 1 U, incl. redundant power supply 2x 230 VAC	**MS416007M**
2 slot desktop chassis with integrated 230 VAC power supply	**MS417051M**
2 slot desktop chassis with external power supply	**MS417041M**
1 slot desktop chassis with integrated 230 VAC power supply	**MS417021**
1 slot desktop chassis with external power supply	**MS417001**
Wall bracket for desktop chassis	**MS417001-WH**
Blind cover for one unused module slot	**MS416100**

Enterprise access

System Catalog 1610

MICROSENS
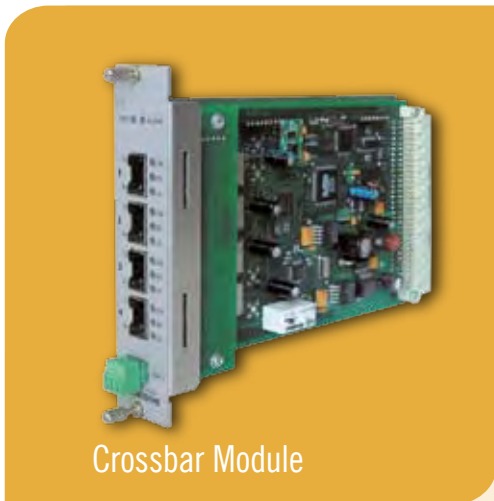
4 Channel Optical Crossbar and Wide Range Retimer Module

Crossbar Module

Benefits

▌ Insertion module with four SFP-slots

▌ Free programmable logic for "Any-to-any Port" switching

▌ Full 3R signal regeneration mode

▌ Data rates from 50 Mbps up to 2.7 Gbps

▌ Redundant operation for back-up applications

▌ Channel protection mode

▌ Protocol transparent operation is supported

▌ Ideal as double xWDM transponder for smallest footprint

▌ SNMP manageable via MICROSENS NMP-Platform

Description

The Optical Crossbar module is part of the MICROSENS access platform and offers full 3R signal regeneration bundled with a free configurable crossbar matrix for data rates from 50 Mbps up to 2.7 Gbps.

This module includes a flexible switchable crossbar logic. It allows free allocation of four channels – besides the protection of the optical link.

Plenty of different applications are possible: Twin converter for point-to-point links with high port density, hardware-redundant configuration, channel protection and signal multiplication (Broadcast). It is possible to monitor the status information of the SFP via the chassis management.

The Optical Crossbar converter is designed as a plug-in module card, which is installed into MICROSENS modular converter system. A potential free alarm contact, which can be used for the connection to external alarm systems, is a further feature.

Description	Art.-No.
4 Channel Optical Crossbar + Wide Range Retimer Module from 50 Mbps up to 2.7 Gbps (FE, STM-1, SDI. STM-4, GBE, 1x/2x Fibre Channel, OC-48/STM-16)	**MS416453MR**

SFP Modules can be found on page 132.

MICROSENS

2x Gigabit Ethernet TDM Module

GBE TDM Module

Benefits

▌ Module for 19" Enterprise Access and Metro Platform

▌ 3 modular ports with pluggable SFPs

▌ TDM for 2x Gigabit Ethernet

▌ Efficient use of capacity

▌ Cost reduction for long haul applications

▌ Simple increase of available transmission capacities

▌ Direct connection to MICROSENS xWDM multiplexer

▌ SNMP manageable via MICROSENS NMP-Platform

▌ Integrated management agent for local and remote unit

Description

With the Gigabit Ethernet TDM module it is possible to double the capacity of Gigabit Ethernet. With the time division multiplexing (TDM) technology two Gigabit Ethernet data streams (2x 1.25 Gbps 1000Base-X) are combined to one channel (1x 2.5 Gbps).

This aggregation is completely transparent for each Gigabit Ethernet channel. Switch features such as VLANs, stacked VLANs, Flow Control, buffer management etc. are not affected.

The Gigabit Ethernet TDM is equipped with SFP slots for modularity of the optical interfaces. For xWDM applications the line interface can be equipped with a coloured SFP transceiver.

For the installation into a 3 U or 4 U Modular Access Platform chassis, the adapter plate must be used. Each adapter plate occupies 6 slots and can hold 2 TDM Modules.

Enterprise access

Adapter Chassis for TDM Modules

Description	Art.-No.
Gigabit Ethernet TDM module, 2x 1.25 Gbps 2x SFP, line interface 1x 2.5 Gbps, 1x SFP, manageable	MS416440M
Blind cover plate for unused slots in adapter chassis	MS416048
Adapter chassis for 2 TDM modules, width 6 Slots, 3 U	MS416049

SFP Modules can be found on page 133

Gigabit Ethernet 3 Port Media Converter Module 1000Base-T/X

GBE 3 Port Access Module

Benefits

▌ 3x Gigabit Ethernet media converter on only one card

▌ Insertion Card for Modular Access System

▌ Flexibility with modular pluggable transceivers (SFPs)

▌ Highest port density in central distribution rooms

▌ Easy network monitoring due to Link Through function

▌ "Hot swap" of modules

▌ SNMP manageable via MICROSENS NMP-Platform

Description

The access module allows for triple Gigabit Ethernet media conversion (3x 1000Base-T to 1000Base-X) and is based on SFP slots. This modular design makes the access module particularly flexible. A wide range of plug-in optical transceiver modules for multimode and single mode applications is available.

The 1000Base-T Gigabit ports are configured automatically with the Auto Negotiation protocol with transparent forwarding. An integrated Link Through function guarantees additional link transparency for the whole connection. The components connected to the converter detect the whole connection status.

Description	Art.-No.
3 Port Gigabit Ethernet Access Module, manageable, 3x SFP slot, 3x RJ-45	**MS416195M**

SFP Modules can be found on page 133.

MICROSENS

Gigabit Ethernet 10 Port Switch Module with Ring Function

GBE 10 Port Switch Module

Benefits

▍ Gigabit Ethernet Switch Module

▍ 1x 10/100/1000Base-T, 7x 10/100Base-TX and 2x SFP slots

▍ Configurable SFP slots for Gigabit or Fast Ethernet SFP's

▍ Ring redundancy functionality, ultra-fast recovery time < 20 ms

▍ Compatible with MICROSENS Industrial Ring Switches

▍ Central power supply (110 - 230 VAC, 48 VDC or 24 VDC) with redundancy (optional) possible

▍ Integrated management agent (PC-Tool, web based, SNMP or Telnet)

▍ Full VLAN support and data prioritisation according to IEEE802.1q

▍ Potential free alarm contact

Description

The Gigabit Ethernet Switch Module has two SFP slots, which can be operated with Fast Ethernet or Gigabit Ethernet SFP's. Additionally the switch module offers seven 10/100Base-TX connections for linking such as Ethernet terminals, machine controls, network uplinks, consoles and other network users. Also one 10/100/1000Base-T port for a central uplink connection is available.

The switches can be configured and monitored either by SNMP or a PC-based management tool (NMP-Platform). In addition to the NMP-platform the status is displayed web based by using an integrated HTTP server. This switch module for the MICROSENS 19" Access Platform allows the central concentration of the industrial fiber optic ring switches.

Enterprise access

Description	Art.-No.
Gigabit Ethernet 10 Port Switch Module, 7x 10/100TX, 1x 10/100/1000T, 2x 100/1000X, integrated Network Management	**MS415259M**

SFP Modules can be found on page 133.

Multimode Gigabit Extender Module

Gigabit Ethernet Multimode Extender Module

Benefits

▍ Easy extension of transmission distance for Gigabit up to 2 km for multimode fiber

▍ Migration to Gigabit without changing of fiber type

▍ Fits into all different chassis types

▍ Manageable via MICROSENS NMP-Platform

▍ Plug & Play installation

Description

The Gigabit Extender enables Gigabit transmissions via multimode optic fiber of up to two kilometres.

Many existing backbone links are based on multimode fiber optics, enabling transmission distances of up to two kilometres between individual switches and nodes and using standards such as Fast Ethernet, FDDI or ATM. The adverse characteristics of multimode fiber optics, due to mode dispersion, severely limit their use especially with high data volumes in the Gigabit range.

For example, the distance achievable via 50/125 µm multimode fibers in a Gigabit Ethernet in accordance with the 1000Base-SX standard is reduced to 550 meters and via 62.5/125 µm multimode fibers to as little as 275 meters. In order to overcome this, and to enable the use of multimode backbone structures for Gigabit bandwidths, MICROSENS offers a Gigabit Extender for the transmission of Gigabit applications via existing multimode links over distances of up to two kilometres. This enables the easy and cost-effective migration of multimode-based backbones to future Gigabit applications. There is no need to replace existing multimode with single mode fibers. Other applications such as Gigabit Fibre Channel (1.0625 Gbps) can also be transmitted.

The new Gigabit Extender complements the broad range of functionality modules supplied by MICROSENS for installation in modular card systems. In addition to single and dual desktop cabinets, a 19" chassis capable of housing up to 18 inserts is available.

Description	Standard	Manageable
Gigabit Multimode Extender max. 1.25 Gbps, multimode 850 nm SC, Line Interface multimode SC min. 2 km	MS416651	MS416651M

MICROSENS

Transparent Multimode/Single Mode Converter Module

MM/SM Converter

Benefits

▪ Insertion card for Modular Access System

▪ Easy and reliable multimode to single mode conversion

▪ Ideal for the enterprise access to the carrier backbone

▪ Protocol transparent. Versions up to 155 Mbps, 200 Mbps and 1.25 Gbps

▪ Optical interfaces with 850, 1310 or 1550 nm up to 125 km

▪ Single fiber version available (WDM)

▪ SNMP manageable via MICROSENS NMP-Platform

Description

The MICROSENS multimode / single mode media converter offers a protocol transparent bidirectional connection of multimode to single mode fiber at data rates of up to 1.25 Gbps.

With these converters it is possible to connect communication equipment like switches, routers, bridges and PBXs over long distance single mode fiber in LAN, MAN and WAN areas.

Due to the given protocol transparency the use of the converter is not limited to one application. It is possible to transmit different protocols like Gigabit Ethernet, Fibre Channel and ATM OC-12 with the same converter.

If the maximum bandwidth of Gigabit is not used, distances even longer than 100 km are possible.

Enterprise access

Description	Standard	Manageable
Converter from 155 Mbps up to 1.25 Gbps		
850 nm multimode SC duplex / 1310 nm single mode SC duplex, 10 km	MS416590	MS416590M
850 nm multimode SC duplex / 1310 nm single mode SC duplex, 20 km	MS416591	MS416591M
850 nm multimode SC duplex / 1550 nm single mode SC duplex, 50 km	MS416594	MS416594M
850 nm multimode SC duplex / 1550 nm single mode SC duplex, 70 km	MS416595	MS416595M
Converter 200 Mbps (ESCON)		
1310 nm multimode SC duplex / 1310 nm single mode SC duplex, 20 km	MS416550	MS416550M
Converter from 8 up to 155 Mbps		
1310 nm multimode SC duplex / 1310 nm single mode SC duplex, 15 km	MS416567	MS416567M
1310 nm multimode ST duplex / 1310 nm single mode ST duplex, 15 km	MS416566	MS416566M
1310 nm multimode SC duplex / 1310 nm single mode ST duplex, 15 km	MS416565	MS416565M
1310 nm multimode ST duplex / 1310 nm single mode ST duplex, 15 km	MS416564	MS416564M
850 nm multimode ST duplex / 1310 nm single mode SC duplex, 15 km	MS416568	MS416568M

MICROSENS

Fast Ethernet Bridge Modules (Single and Twin)

Twin FE Bridge Module

Benefits

▌ Twin Bridge insertion card with higher port density

▌ Bridge with redundancy function

▌ Work as 4 Port Fast Ethernet switch

▌ Bandwidth limitation

▌ Status monitoring and configuration via optionally management module

▌ Optional simplex version (WDM)

▌ Full compatibility with all modules of the Access Family

Description

The use of the Fast Ethernet bridge module (single and twin version) offers the connection of Ethernet and Fast Ethernet segments to fiber optic networks according to IEEE802.3u.

In the past it has been a problem to integrate old equipment or existing Ethernet segments into modern fiber based Fast Ethernet networks. With a copper/fiber media converter it is very easy to convert the media, but without speed adaption. This is the application for the two port bridge, because this bridge is doing the speed adaption additionally to the media conversion. This speed adaption is possible for 10 or 100 Mbps.

Beside the multimode versions MICROSENS offers bridges with single mode interfaces and optimised optical parameters. With these single mode versions it is possible to cover distances from 15 km in the basic version up to 125 km in the extended version.

Main application of these single mode versions are Fiber To The Home (FTTH) projects. The end user can use services such as Internet, Video on Demand (VoD) and VoIP applications with a standard 10/100Base-TX copper port. The configuration of the copper ports is done automatically with the Auto Negotiation protocol or manually with the integrated DIP switches.

Single Fast Ethernet Bridge Module

Description	Single Bridge	Twin Bridge
Fast Ethernet Bridge, 1310 nm multimode ST duplex	MS416160M2	MS416360M
Fast Ethernet Bridge, 1310 nm multimode SC duplex	MS416161M2	MS416361M
Fast Ethernet Bridge, 1310 nm single mode SC duplex, 15 km	MS416162M2	MS416362M
Fast Ethernet Bridge, 1310 nm single mode ST duplex, 15 km	MS416163M2	MS416363M
Fast Ethernet Bridge, 1310 nm single mode SC duplex, 40 km	MS416164M2	MS416364M
Fast Ethernet Bridge, 1550 nm single mode SC duplex, 80 km	MS416165M2	MS416366M

Enterprise access

System Catalog 1610

MICROSENS

MICROSENS

Fast Ethernet and Ethernet Converter Module (Single and Twin)

Fast Ethernet
Twin Converter Module

Benefits

▌ Twin converter module for high port densities

▌ Cost optimised and repeater less copper/fiber conversion

▌ Link Through – link transparency

▌ Support of half and full duplex connections

▌ Status monitoring via optional management module

▌ Full compatibility with all modules of the Access Family

Description

The media converter offers depending on the version a direct coupling of Fast Ethernet (100Base-TX/100Base-FX) or Ethernet (10Base-T/10Base-FL) segments. The modules are available as single and twin versions. Especially with the twin version it is possible to reach high port densities in central telecommunication racks. The main application is the flexible conversion of RJ-45 ports to fiber. With the direct coupling it is possible to extend twisted pair connections over the limit of 100 m. Half and full duplex modes are supported.

The link status of the segment is forwarded by the converter (so called "Link Through"), which means in case of missing link on the fiber side there will be no link generated on the TP side. All Ethernet and Fast Ethernet media converters of MICROSENS are equipped with this feature. In the "M" version the modules can be monitored and configured via a central management module. All ports are accessible from the front side which simplifies the installation and maintenance.

Enterprise access

Fast Ethernet Single Converter Module

Description	Single Converter	Twin Converter
Fast Ethernet (100FX/100TX)		
Fast Ethernet converter, 1310 nm multimode SC duplex	MS416107M	MS416231M
Fast Ethernet converter, 1310 nm multimode ST duplex	MS416108M	MS416230M
Fast Ethernet converter, 1310 nm single mode SC duplex, 15 km	MS416206M	MS416235M
Fast Ethernet converter, 1310 nm single mode ST duplex, 15 km	MS416207M	MS416234M
Fast Ethernet converter, 1310 nm single mode SC duplex, 40 km	MS416208M	MS416236M
Ethernet Converter (10FL/10T)		
Ethernet converter, 850 nm multimode ST duplex	MS416105*	MS416205*
Ethernet converter, 1310 nm single mode ST duplex, 10 km	MS416111*	MS416216*

*Option "M" for manageable version (e. g. MS416107M)

MICROSENS

RS-232/422/485
Media Converter Module

RS-232
Media Converter Module

Benefits

▌ Conversion of serial protocols RS-232/422/485 with SUB-D9

▌ Transparent conversion of data incl. hardware handshake

▌ Compatible to industrial MICROSENS Profi Line converter

▌ Full compatibility with all modules of the Access Family

Description

For coupling of devices, switch gear and machine control systems with standard serial interfaces MICROSENS provides accordant fiber converter. It supports RS-232, RS-422 and RS-485 interfaces, the modules are compatible with the Profi Line industrial converters.

The RS-485 converter also supports the various industrial field bus systems such as Profibus, Bitbus, Interbus. The implementation is transparent, so no adjustment to the data rate is necessary.

Furthermore, the device converts the RS-232 signals including hardware handshake signals. Data rates from DC up to the maximum are supported. The electrical RS-232 interface is designed as female SUB-D9 connector.

Using multimode fiber it is possible to cover distances up to 2 km, independent from the data rate. The versions for single mode allow distances of up to 120 km.

Description	RS-232	RS-422	RS-485
1310 nm multimode SC duplex	MS415013	MS415023	MS415033
1310 nm multimode ST duplex	MS415012	MS415022	MS415032
1310 nm single mode SC duplex, 15 km	MS415017	MS415027	MS415037
1310 nm single mode ST duplex, 15 km	MS415015	MS415025	MS415035
1310 nm single mode SC duplex, 40 km	MS415016	MS415026	MS415036

Enterprise access

System Catalog 1610

E1 / ITU G.703 Converter

E1 / ITU G.703
Converter Module

Benefits

▌ Insertion card for Modular Access System

▌ Electrical / optical conversion for legacy E1/G.703 interfaces with 2,048 kbps

▌ Connecting PABX's to modern fiber networks

▌ Distance extension between GSM base station controllers

▌ Multimode and single mode versions up to 125 km

▌ "Hot swap" of modules

▌ Stand alone deployment by using single slot housing

▌ Different optical connectors, e.g. SC, ST or LC

Description

The MICROSENS ITU G.703 converter enables the full duplex transmission of a 2,048 kbps G.703 standard interface via optical fiber.

As a result of the use of optical fiber it is possible to extend electrical G.703 connections by up to 2 km. The electrical G.703 signals are transmitted transparently on the optical fiber, which means that the full information (e.g. to synchronize the frames) is transmitted.

The use of fiber optic offers low attenuation and the advantage of immunity against disturbances and tapping.

The converter is designed in the form of an insertion card, which can be built into the MICROSENS 19" Access Platform. Up to 12 insertion modules can be mounted into one typical 19" rack. If a redundant power supply is required, there are only 10 slots left. In case of a partial assembly, the unused slots can be filled with blank covers. The MICROSENS ITU G.703 Optical Converter is also available as stand alone version.

Colour coded LEDs indicate the operation status of the converter and can be used for error diagnostics.

Description	Standard	Manageable
ITU G.703 converter, 1310 nm multimode ST duplex, 5 km	MS416301	MS416301M
ITU G.703 converter, 1310 nm multimode SC duplex, 5 km	MS416308	MS416308M
ITU G.703 converter, 1310 nm single mode ST duplex, 15 km	MS416303	MS416303M
ITU G.703 converter, 1310 nm single mode SC duplex, 15 km	MS416304	MS416304M
ITU G.703 converter, 1310 nm single mode SC duplex, 40 km	MS416305	MS416305M
ITU G.703 converter, 1550 nm single mode SC duplex, 80 km	MS416306	MS416306M
ITU G.703 converter, 1550 nm single mode SC duplex, 120 km	MS416307	MS416307M

Enterprise access

SFP-Transceiver

SFP-Transceiver

Benefits

▌ Data rates from 100 Mbps up to 4 Gbps

▌ Compatible with the SFP specification version 5.4

▌ Versions for duplex and simplex transmissions (WDM)

▌ Option „D" for digital diagnostic functions with detailed status information via the network management

▌ Installable during operation (hot swap)

▌ Optional extended temperature range -40 .. +85° C (catalog page 88)

Protocol/Services

▌ Gigabit Ethernet (GBE)

▌ Fast Ethernet (FE)

▌ 1x/2x/4x Fibre Channel (1FC/2FC/4FC)

▌ STM-1, STM-4 and STM-16 or

▌ OC-3, OC-12 and OC-48

▌ ESCON

Description

The acceptance of pluggable, optical transceiver is now supported by a majority of the active network components. For the user this means the maximum flexibility in network configuration. Due to the special construction, the installation can be done even during operation (hot swap).

MICROSENS provides for applications such as telecom (SONET / SDH), data (Fast and Gigabit Ethernet) and storage (ESCON, Fiber Channel), a wide range of pluggable transceivers. Choosing the right transceiver depends on the supported data rate.

Optionally, the SFP transceivers with digital diagnostic functions (option „D", for example MS100200D) are available. This makes them visible to network management, including the additional operating parameters such as optical budget in the form of current transmit and receive powers issue.

Besides the usual duplex versions with special WDM SFPs (wavelength division multiplexing), the transmission on individual simplex fiber is possible by using different wavelengths for transmission directions (RX/TX) and the implementation of a wavelength sensitive filter.

This WDM SFPs are used in pairs (A and B version), because the wavelengths for the transmission and reception channels are correspondingly opposite directions. The transceivers are compliant with the Gigabit Ethernet 1000Base-BX IEEE802.3ah ® standard.

For Gigabit Ethernet applications there are also SFP transceivers with copper connections available.

Duplex

Simplex

Copper

MICROSENS

Service/Protocol	Data rate	Fiber type + Wavelength	Opt. Budget	Range	Art.-No.
Data (LC duplex)					
Gigabit Ethernet	1.0625..1.25 Gbps	Multimode 850 nm	8.5 dB	550 m	**MS100200***
Gigabit Ethernet	1.0625..1.25 Gbps	Single mode 1310 nm	10.5 dB	10 km	**MS100210***
Gigabit Ethernet	1.0625..1.25 Gbps	Single mode 1310 nm	14 dB	25 km	**MS100211**
Gigabit Ethernet	1.0625..1.25 Gbps	Single mode 1550 nm	19 dB	50 km	**MS100213***
Gigabit Ethernet	1.0625..1.25 Gbps	Single mode 1550 nm	21 dB	80 km	**MS100214D**
Gigabit Ethernet	1.0625..1.25 Gbps	Single mode 1550 nm	28 dB	120 km	**MS100215***
Fast Ethernet	125 Mbps	Multimode 1310 nm	12 dB	2 km	**MS100190***
Fast Ethernet	125 Mbps	Single mode 1310 nm	17 dB	15 km	**MS100191***
Data (LC simplex / WDM)		Single mode			
Gigabit Ethernet	1.25 Gbps	TX: 1310 / RX: 1550 nm	11 dB	10 km	**MS100221DA**
Gigabit Ethernet	1.25 Gbps	TX: 1550 / RX: 1310 nm	11 dB	10 km	**MS100221DB**
Gigabit Ethernet	1.25 Gbps	TX: 1310 / RX: 1490 nm	15 dB	20 km	**MS100223DA**
Gigabit Ethernet	1.25 Gbps	TX: 1490 / RX: 1310 nm	15 dB	20 km	**MS100223DB**
Gigabit Ethernet	1.25 Gbps	TX: 1310 / RX: 1550 nm	19 dB	40 km	**MS100224DA**
Gigabit Ethernet	1.25 Gbps	TX: 1550 / RX: 1310 nm	19 dB	40 km	**MS100224DB**
Gigabit Ethernet	1.25 Gbps	TX: 1490 / RX: 1570 nm	24 dB	80 km	**MS100228DA**
Gigabit Ethernet	1.25 Gbps	TX: 1570 / RX: 1490 nm	24 dB	80 km	**MS100228DB**
Fast Ethernet	125 Mbps	TX: 1310 / RX: 1550 nm	18 dB	20 km	**MS100191A**
Fast Ethernet	125 Mbps	TX: 1550 / RX: 1310 nm	18 dB	20 km	**MS100191B**
Data (RJ-45 / Copper)					
1000Base-T RJ-45 SFP	1.25 Gbps	-	-	-	**MS100090**
Storage					
1x/2x/4x Fibre Channel	1.0625..4.25 Gbps	Multimode 850 nm	6 dB	500 m	**MS100360D**
1x/2x/4x Fibre Channel	1.0625..4.25 Gbps	Single mode 1310 nm	9.6 dB	4 km	**MS100364D**
1x/2x/4x Fibre Channel	1.0625..4.25 Gbps	Single mode 1310 nm	18 dB	10 km	**MS100366D**
1x/2x/4x Fibre Channel	1.0625..4.25 Gbps	Single mode 1310 nm	18 dB	30 km	**MS100368D**
1x/2x Fibre Channel	1.0625..2.125 Gbps	Multimode 850 nm	9 dB	550 m	**MS100240***
1x/2x Fibre Channel	1.0625..2.125 Gbps	Single mode 1310 nm	11.5 dB	10 km	**MS100241***
1x/2x Fibre Channel	1.0625..2.125 Gbps	Single mode 1310 nm	21 dB	50 km	**MS100242***
1x/2x Fibre Channel	1.0625..2.125 Gbps	Single mode 1550 nm	21 dB	80 km	**MS100243***
1x/2x Fibre Channel	1.0625..2.125 Gbps	Single mode 1550 nm	29 dB	110 km	**MS100244***
ESCON	155..266 Mbps	Multimode 850 nm	8.5 dB	2 km	**MS100180**
ESCON	155..266 Mbps	Single mode 1310 nm	19 dB	15 km	**MS100181**
Telecommunication					
STM-1/4/16 / OC-3/12/48	100..2488 Mbps	Single mode 1310 nm	10 dB	2 km	**MS100060D**
STM-1/4/16 / OC-3/12/48	100..2488 Mbps	Single mode 1310 nm	15 dB	15 km	**MS100061D**
STM-1/4/16 / OC-3/12/48	100..2488 Mbps	Single mode 1310 nm	25 dB	40 km	**MS100063D**
STM-1/4/16 / OC-3/12/48	100..2488 Mbps	Single mode 1550 nm	15 dB	40 km	**MS100062D**
STM-1/4/16 / OC-3/12/48	100..2488 Mbps	Single mode 1550 nm	26 dB	80 km	**MS100064D**
STM-4 / OC-12	622 Mbps	Single mode 1310 nm	13 dB	15 km	**MS100040D**
STM-4 / OC-12	622 Mbps	Single mode 1310 nm	26 dB	40 km	**MS100041D**
STM-4 / OC-12	622 Mbps	Single mode 1550 nm	25 dB	80 km	**MS100042D**
STM-1 / OC-3	155 Mbps	Multimode 1310 nm	7.5 dB	2 km	**MS100193**

Option "D" for Digital Diagnostic Function (e.g.: MS100200D)
Versions with extended temperature range please find on page 88.

Enterprise access

System Catalog 1610

MICROSENS

Enterprise access

FTTH- Fiber To The Home
Triple Play – Data, Voice, Video

Triple Play, Video on Demand and IP TV are the new and by now known keywords. The application behind this is the transmission of data, voice and video up to the private households via a broadband Internet connection. With the new implementation of fiber optic cables from the providers' central location down to the end user this high speed service is possible at the first time. This concept is called Fiber To The Home (FTTH).

As a specialist in optical transmission MICROSENS always invested in the development of new, innovative technologies for current and future market demands. Thus the Fiber To The Home concept of MICROSENS meets all present requirements of the service providers combined with low installation and operation costs.

Internet

VoIP PABX

IPTV Server

Core Router

Access Switch

Distribution
Panel

Internet

VoIP

IPTV

Application

Carrier

CPE Gateway

Routing

Infrastructure

Subscriber
Connection

Transport

User

Physical

Enterprise access

MICROSENS
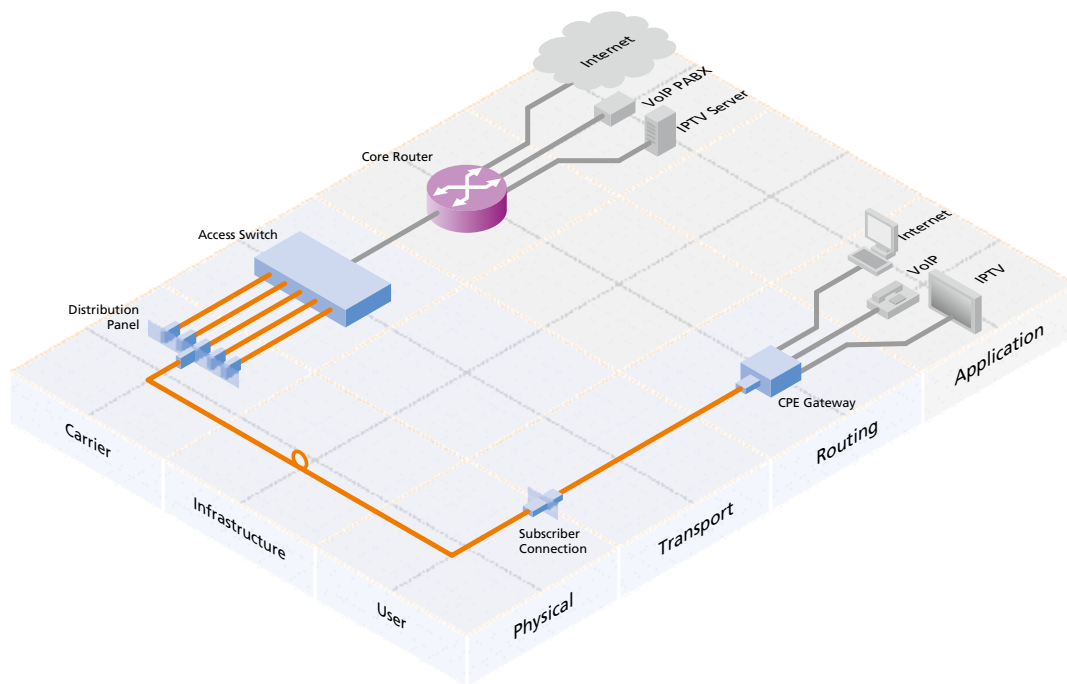
Enterprise Access_ Fiber To The Home

MICROSENS

Fiber To The Home
Product Overview

CPE with Wireless Access Point
Triple Play via fiber (data, voice and video) with Wireless Access Point.
138

CATV Optical Node
Optical Cable-TV receiver in rugged metal housing.

139

24 Port FE Switch
Modular Fast Ethernet Switch for FTTH-Applications.

140

24 Port GBE Switch with SFP-Ports
Capable Gigabit Ethernet Switch with SFP.

141

Enterprise access

MICROSENS

CPE with Fiber Connector and Wireless Access Point

FTTH-Access Unit (CPE)

Benefits

▊ Residential Gateway with built-in switch and router

▊ Triple Play for data, voice and video

▊ Modular design with passive fiber tray and active device

▊ Integrated WLAN Access Point according to IEEE 802.11b/g

▊ Two SIP gateways for analogue telephones

▊ 100FX Fiber WAN Interface: 100 Mbps downstream and 100 Mbps upstream

▊ 4-port Fast Ethernet switch 4x 10/100TX

▊ Optional CATV receiver

▊ Support TR-069 and TR-104

Description

The new range of Fiber To The Home (FTTH) CPE units has been designed to meet all requirements of modern fiber based access networks.

With the integrated QoS features according to IEEE802.3p/Q it is ensured that time critical applications are handled with the required quality. Thanks to the support of TR-069 and TR-104 protocols there is no configuration by the end user required. The configuration is uploaded from the central side by the provider.

The CPE has four integrated 10/100Base-TX ports to connect multiple end devices. Typical applications can be Internet, VoIP, Video on Demand and others. Additional there are two analogue telephone ports integrated. With SIP or SDP protocol both standard protocols for internet telephony are supported.

The WLAN Access Point offers a wireless high speed connection with up to 54 Mbps for mobile end devices and the integrated firewall which secures the connection to the World Wide Web.

Optionally, the residential gateway can be delivered with an integrated receiver which allows the common transmission of the CATV signal with the IP Data over the same fiber pair.

For the central distribution centres MICROSENS offers high port density multiport media converter and switches. With these devices it is possible to provide the central fiber optic ports in a very cost effective way and with an extreme high port density.

Description	Connectors	Art.-No.
FTTH Residential Gateway (CPE) with 4 port switch, 2x SIP, WLAN, ext. power supply	1x SC-simplex, 4x RJ-45, 2x RJ-11 1x Power Supply	**MS541102A**

System Catalog 1610

MICROSENS

MICROSENS

CATV Optical Node

CATV Optical Node

Benefits

▌ Compact and robust metal housing

▌ Forward bandwidth 45..870 MHz

▌ Optical receive power -6 to +2 dBm

▌ Wavelength 1200 to 1600 nm

▌ -20 dB RF test point with 1 V / mW

▌ RF output level adjustment range of 0 to 20 dB

Description

The CATV Optical Node is one of the smallest fully featured optical forward receiver nodes on the market. It is designed for the transmission of standard analogue CATV signals via modern fiber optic infrastructures. Due to the low attenuation in fiber optic networks it is possible to distribute the TV signals over very long distances.

The node is a very cost effective solution and is ideal for the use in high density applications such as business parks, hospitals, schools and universities.

The optical receiver has an extremely high output level of 25 dBmV at a 0 dBm optical input. This node also has an adjustment potentiometer with an RF output level adjustment range of 0 to 20 dB for easy setup in the field.

Enterprise access

Description	Art.-No.
CATV Optical Node for in-house applications, 1x SC/APC single mode simplex 2x F-plug (coax), 1x power supply (ext.)	**MS542100**

MICROSENS

24 Port Fast Ethernet Switch

Modular 24 Port Fast Ethernet Switch with 3 Slots

8 Port SC duplex Module
100Base-FX

8 Port RJ-45 Module
10/100Base-TX

Benefits

▌ 24 port Fast Ethernet + 2x Gigabit Ethernet uplink

▌ Modules with single fiber ports

▌ High performance 8.8 Gbps capacity

▌ SNMP/RMON1/Telnet/CLI/ Web management

▌ QoS, VLAN, IGMP, Rapid Spanning Tree etc.

▌ Redundant power supply option

Description

This modular 24 Port Fast Ethernet layer 2+ switch is a high performance device mainly for Fiber To The Home (FTTH) applications with single fiber transmission.

The switch has three modular slots on the front which can be equipped with 8 port switching modules. These modules are available with 10/100-Base-TX copper interfaces or with fiber optic ports. The fiber ports can be chosen as multimode, single mode or single mode simplex interfaces.

On the back of the switch are 2x uplink ports that can be used alternatively in the form of RJ-45 (10/100/1000Base-T) or SFP (1000Base-X) (Dual Media). Furthermore, the network can be logically grouped by up to 8 switches (stacking).

Redundant Power Supply

Description	Art.-No.
24 port Fast Ethernet L2+ Access switch chassis, 19" 1 U, manageable, 3 Slots, 2x uplink 10/100/1000Base-T RJ-45 or 1000Base-X SFP	MS400820M
8 port 10/100Base-TX module, 8x RJ-45	MS400822
8 port 100Base-FX module, 8x multimode 1310 nm SC duplex 2 km	MS400823
8 port 100Base-FX module, 8x single mode 1310 nm SC duplex 30 km	MS400824

Enterprise access

System Catalog 1610

MICROSENS

24 Port Gigabit Ethernet SFP-Switch

24 Port GBE SFP-Switch

Benefits

- High performance with full Gigabit speed on all ports

- Maximised flexibility with dual media ports (RJ-45 and SFP)

- Ideal for modern FTTx networks

- Low space requirements due to compact design

- High availability due to redundant power supply option

- High security due to integrated security standards (802.1x etc.)

- Modular, redundant power supply

- Versions with 48 VDC power supply available

Description

This 24 Port Gigabit Ethernet switch combines high performance and high flexibility in one device. All 24 Gigabit Ethernet ports on the front side are designed as dual media, which means that they can be used either via the RJ-45 port or fiber with the SFP slot. All state-of-the-art security and networking standards are supported by using this switch.

Especially in modern FTTx networks this switch is the ideal choice. The high throughput avoids bottle necks and offers enough bandwidth for all triple play applications like IPTV, VoIP, internet and many more. Its compact design offers the highest density for the central communication rooms.

Overall this switch offers the best performance and price ratio which is available on the market.

The switch has an integrated management agent and supports from web browser via Telnet up to SNMP all management standards. Furthermore switches have with QoS, VLANs, STP/RSTP, IGMP Snooping, Link Aggregation and authentication according to IEEE802.1x all common security features integrated.

Enterprise access

Backside of the 24 Port SFP-Switch

Description	Art.-No.
24 port Gigabit Ethernet switch with 2x Gigabit uplink, 10/100/1000Base-T RJ-45 or 100/1000Base-X SFP slot, SNMP/Web/Telnet-Management, incl. 1x 90-240 VAC power supply	MS400870M-1A*
Fast Ethernet SFP, single mode LC simplex, TX: 1310 nm RX: 1550 nm	MS100191A
Fast Ethernet SFP, single mode LC simplex, TX: 1550 nm RX: 1310 nm	MS100191B
Gigabit Ethernet SFP, single mode LC simplex, TX: 1310 nm RX: 1550 nm	MS100221DA
Gigabit Ethernet SFP, single mode LC simplex, TX: 1550 nm RX: 1310 nm	MS100221DB

Power supply options: „-2A" for 2x 230 VAC, „-1D" for 1x 48 VDC, „-2D" for 2x 48 VDC, further SFP versions can be found on page 133.

System Catalog 1610

Metropolitan networks

Fiber optic technology for Carrier and Enterprise networks enables effective and economical connections within and between optical Metro backbones using WDM (Wavelength Division Multiplexing) technology.

Metropolitan networks

MICROSENS

Metropolitan networks

10G Optical Transport System

DWDM platform for 10 Gigabit Ethernet
Switching and SDH-Networks

The MICROSENS 10G Dynamic, Multi-Reach Transport system is a next generation optical transport platform that provides DWDM and CWDM on a single system that addresses Metro, Regional, and Long Haul applications. The MICROSENS 10G platform handles rates from 100 Mbps to 40 Gbps and can scale to 100 Gbps. It supports 80 DWDM channels at 10 Gbps. It consists of a 6 U chassis for high density applications and a compact 2 U chassis for low density applications. The platform includes optical multiplexers (Mux/DeMux), reconfigurable optical add/drop multiplexers (ROADM) and optical amplifiers (OA). Mux and DeMux filter modules are designed in a modular fashion to accommodate channel growth without service interruption. The 10G Platform supports a wide variety of services today and the special technology enables it to adapt to meet future service requirements quickly and cost effectively.

- Flexible, scalable architecture
- Highly scalable as you grow with low up front costs
- Metro, regional and long haul distances up to 2000 km
- Small footprint – 2 U and 6 U as much as half the size of competitive solutions
- 80 DWDM channels at 10 Gbps
- Multiple services over one wavelength

Long-Haul
with protection

Metro Ring

High
relliability

5x 1/2GFC
TDM

Disaster Recovery Center

5x FC Server

4x FE/STM-1
TDM

CWDM or DWDM

Simplex fiber

10G Transponders

10 G

10 G

10 G

SDH

IP

Storage

Lower
operational cost

Reduce the number
of wavelengths

HD Video
TDM

GbE

FE

Stadium

4x HD SDI

4x STM-16
TDM

SDH
2.5G

Up to 4 SDH 2.5G
connections

Metropolitan networks

MICROSENS

Metropolitan Networks 10G Optical Transport System

MICROSENS
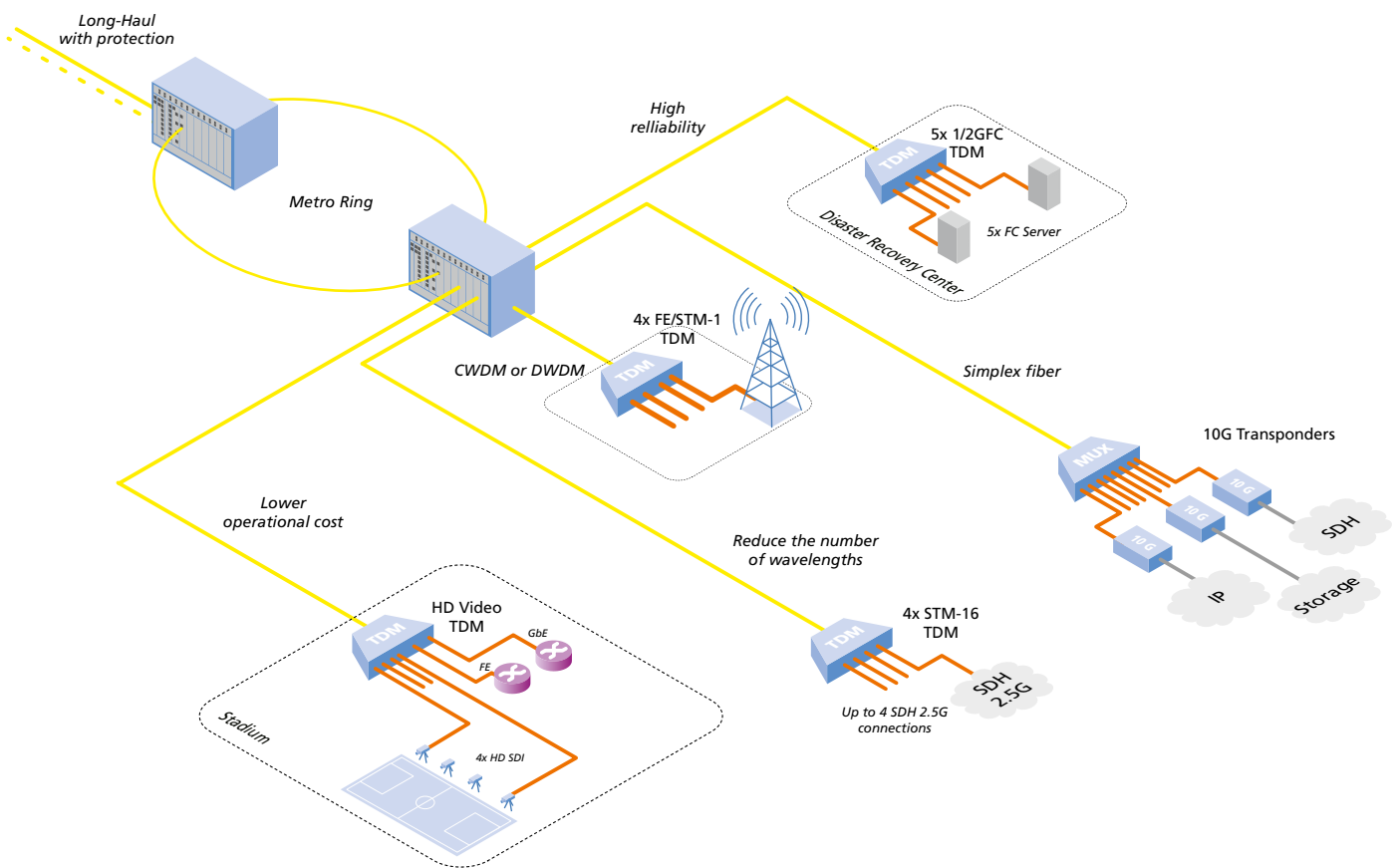
10G Optical
Transport System
Product Overview

Chassis
2 and 6 U Chassis,
Power Supply,
Accessories.

148

Transponder
10G Transponder,
3R Long Haul Transponder
with FEC.

150

High Speed TDMs
8x GBE on 10G,
4x STM-16 on 10G,
5x GFC on 10G.

153

Video TDMs
4x HD-SDI on 10G,
SDI Video TDM.

156

Low Speed TDMs
2x GBE on STM-16,
4x STM-1 on GBE.

158

10G Converter
Inverse Multiplexer,
10G LAN to 10G WAN
Interface Converter.

160

Optical Amplifier
EDFA and Raman.
Booster/Pre and
In Line Amplifier.

162

Passive Modules
DWDM Multiplexer,
OADMs, Coupler,
Optical Dispersion Com-
pensation Module
164

FFI Interface
Integrated optical
10 Gbps Transceiver
B&W + DWDM.

168

XFP-Transceiver
10 Gbps XFPs,
up to 80 km,
B&W + DWDM.

169

SFP-Transceiver
CWDM- and DWDM-SFPs.

182

Network Management
NMP Software, Management
Module, In-band Module.

170

Metropolitan networks

MICROSENS

10G Chassis 6 U

Modular Chassis 6 U

Benefits

▌ 6 U chassis

▌ Up to 19 pluggable modules

▌ Up to 190 Gbps aggregation and transport

▌ -48 VDC or 100/240 VAC supply

▌ Carrier class

▌ NEBS and ETSI compliant

▌ BROCADE Data Center Ready

Description

The MS430502M is a 6 U, 19" modular chassis that can hold 19 standard-size modules in addition to the management card. Both chassis are 600 mm wide and 300 mm deep and are ETSI compliant.

The chassis hosts also two horizontal drawers dedicated to the mandatory FAN module and an optional optical Mux/DeMux shelf. With the mount kit provided, use a 19" (48.3 cm) equipment rack, correctly grounded and secure.

The chassis may also be installed in a 23" or ETSI rack with the aid of suitable extension brackets.

Description	Art.-No.
19" chassis 6 U, 19 module slots, 2x 48 VDC power supplies, incl. backplane	**MS430502M**
19" 1 U dual power supply, 2x 110/220 VAC input, 2x 48 VDC output redundant max. 300 W	**MS430518M**
48 VDC cable, 2 m	**MS430540-2**
Fan unit for 6 U chassis MS430502M incl. dust filter (service)	**MS430526**
Dust filter, 5x set for 6 U chassis MS430502M	**MS430529**
Single blind cover for one not used module slot	**MS430530**
Twin blind cover (double width) for two not used module slots	**MS430531**

MICROSENS

10G Chassis 2 U

Modular Chassis 2 U

Benefits

▉ Compact 2 U chassis

▉ Up to 5 pluggable modules

▉ Up to 50 Gbps aggregation and transport

▉ Removable fans and dust filter

▉ Carrier class

▉ NEBS and ETSI compliant

▉ BROCADE Data Center Ready

Description

The MS430500M is a 2 U, 19" modular chassis. It can hold 5 standard-size modules in addition to a pluggable management card. Modules are hot swappable. These carrier class chassis' offer dual redundant and load sharing DC power supplies and have removable fans and dust filter.

An AC power option is available as a plug-in module in the 2 U chassis. With the mount kit provided, use a 19" (48.3 cm) equipment rack, correctly grounded and secure.

The chassis may also be installed in a 23" or ETSI rack with the aid of suitable extension brackets.
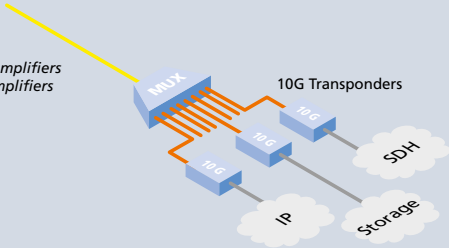
Description	Art.-No.
5 slot chassis 19", 2 U, 2x 48 VDC power supplies, incl. backplane	**MS430500M**
Power supply adapter 110/220 VAC input, 48 VDC output max. 130 W (used only with MS430500M)	**MS430518M**
Power supply module 2x 110/220 VAC redundant (2 slots)	**MS430516M**
Single blind cover for one not used module slot	**MS430530**
Twin blind cover (double width) for two not used module slots	**MS430531**
Fan unit for 2 U chassis MS430500M (service)	**MS430525**
Dust filter, 5x set for 2 U chassis MS430500M	**MS430528**

Metropolitan networks

10G Long-Haul Transponder & Repeater

up to 300 km without In-Line Amplifiers
up to 2000 km with In-Line Amplifiers

MUX

10G Transponders

10G

10G

10G

SDH

IP

Storage

10G Transponder Module with FFI and XFP

Benefits

▌ 10G transponder for short and long haul applications

▌ Distances up to 1,400 km for multi-span DWDM applications

▌ Increase capacity of existing WDM networks

▌ Increase bandwidth capacity at low cost

▌ Optional FEC and NG FEC for very long haul applications

▌ Ideal solution for metro, regional and long haul optical networks

Description

The 10G transport modules are used as 10G or OC-192/STM-64 signal repeaters, long haul extenders and as DWDM transponders. The transport modules consist of the Long-Haul transponder and the Repeater Module.

The Transponder support OC-192/STM-64 and 10 GBE LAN on the client side and G709 on the line side. Repeater support all 10G protocols from 9.95 Gbps to 10.709 Gbps, including 10GBE LAN PHY, WAN PHY and OC-192/STM-64. The Long-Haul module can be used to transport 10G traffic in metro regional and Long haul DWDM networks.

Configured with an ITU DWDM optic it can be connected directly to a DWDM Mux of an existing WDM system and transport additional data at 10G rate over an additional wavelength. The FEC reduces the number of transmission errors on noisy links and enables deployment of longer optical spans. Thus, it improves transport performance and drastically increases bandwidth capacity at low cost.

10G Transponder Module with 2x XFP

Description	Art.-No.
10G transponder with 3R regeneration, line port 1&2: 2x XFP slots	**MS430550M**
Tunable 10G transponder with 3R regeneration, line port 1: XFP slot, line port 2: Fixed Fiber Interface, x - FFI tunable option	**MS430551MT-x**
Tunable 10G transponder with FEC for 10G LAN or 10G WAN/OC-192/STM-64, line port 1: XFP slot, line port 2: Fixed Fiber Interface, x - FFI tunable option,	**MS430561MT-x**
10G regenerator with FEC for 10G LAN or 10G WAN/OC-192/STM-64, line port 1&2 Fixed Fiber Interface, x,y - FFI option	**MS430563M-xy**
10G transponder with NG FEC for 10G LAN or 10G WAN/OC-192/STM-64, line port 1: XFP slot, line port 2: Fixed Fiber Interface DWDM, x - FFI option, nn: channel #	**MS430565M-x-nn**

MICROSENS

Quadruple 4G Repeater

CWDM or DWDM

Quadruple 4G Repeater
4 GFC
GBE
GBE
STM-16
SDH
Up to 20 channels
in 2 HU Chassis
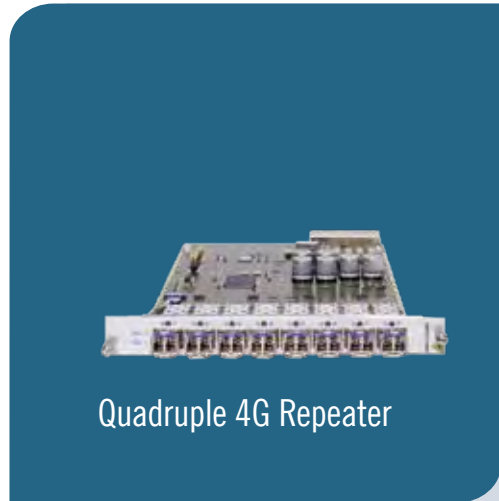
Quadruple 4G Repeater
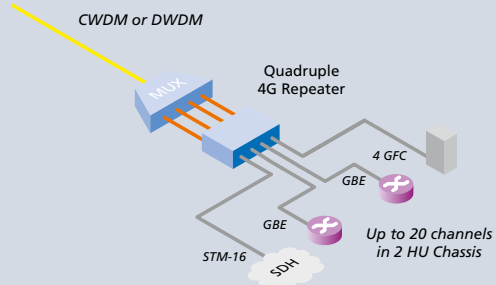
Benefits

▮ CWDM and DWDM transponder or repeater

▮ Support any protocol from 100 Mbps to 4 Gbps

▮ Highest density in a compact chassis: 20 WDM channels in 2 U

▮ Designed for high capacity applications that require high density and small rack space

▮ Software selectable data rates

▮ Ideal solution for edge, metro and regional optical networks

Description

The module has eight SFP slots that provide the highest port density on a single card. The eight ports of the Transponder are split to four pairs of access and line ports creating four WDM transponders on one card. By plugging an access SFP and a CWDM or DWDM SFP, each module can deliver four WDM channels.

Up to five modules can be installed in a MS430500M chassis providing 20 wavelengths in a 2 U shelf. All ports of the module support any protocol from 100 Mbps to 4 Gbps including Fast and Gigabit Ethernet, OC-3/12/48, STM-1/4/16, GBE, 1/2/4G Fibre Channel. It is ideal for sub 10G applications that require transport of multiple OC-48 and GBE traffic.

The Transponder is most commonly used as CWDM or DWDM transponder. It can also be used as a repeater in long haul networks. The module supports any SFP type and can reach distances of 100 km and beyond with 1550 nm or DWDM wavelength. Combined with MICROSENS amplifiers, SFP optics can have extended reach.

Metropolitan networks

Description	Art.-No.
Quadruple transponder unit (FE, 1 GBE, 1 GFC, 2 GFC, 4 GFC, 155 Mbps, 622 Mbps, 2.5 Gbps) with SFP line port A & B interfaces, local port 1..4: SFP slots	**MS430584M**

MICROSENS

2.7G 3R Repeater Module

Metro or Long-Haul

CWDM or DWDM

Low Bitrate
Transponders

STM-16   SDH

2GFC   GBE

2.7G 2R Repeater Module
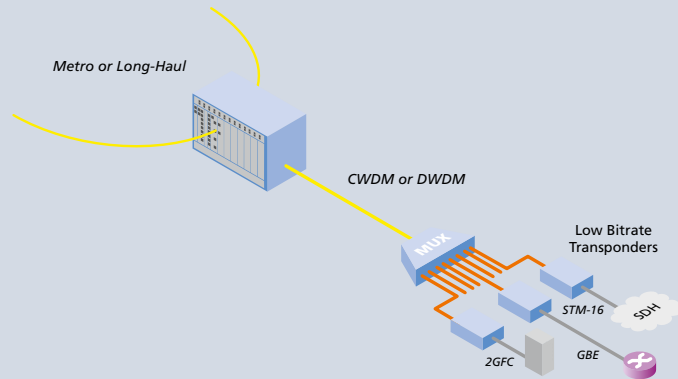
Benefits

▌ WDM transponder or repeater for any protocol from 100 Mbps to 2.7 Gbps

▌ Extremely flexible and scalable

▌ Software selectable data rates

▌ Full 3R (retime, reshape and ream-plificaton) signal regeneration

▌ Link distances up to 250 km without in-line amplifiers

▌ Ideal solution for metro, regional and long haul optical networks

▌ Designed for high capacity applications that require high density and small rack space

Description

The Transponder supports any transport protocol including Ethernet, SONET, SDH, or Storage on its ports. It can be used as a WDM transponder or as a repeater and regenerator. In a typical WDM transponder application it is configured with a short reach SFP on the client port and a CWDM/DWDM SFP on the line port. Plugged with 2 long haul WDM SFPs, the module can be used in regeneration sites of long haul networks.

The module supports any SFP type and can reach distances of 100 km and beyond with 1550 nm or DWDM wavelength. Combined with MICROSENS optical booster and pre-amplifier, SFP optics can achieve link distances of up to 250 km and up to 700 km with in-line amplifiers. Digital Diagnostics Management (DDM) is supported for both SFP interfaces.

Metropolitan networks
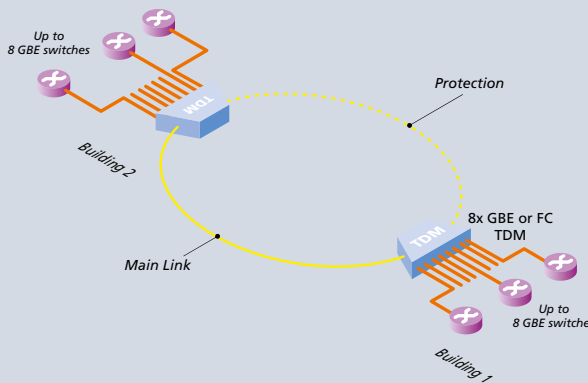
Description	Art.-No.
2.7G 3R retimer module (FE, 1 GBE, 1 GFC, 2 GFC, 155 Mbps, 622 Mbps, 2.5 Gbps) port 1&2: SFP slots	MS430580M

MICROSENS

10G 8x Gigabit TDM

8x GBE TDM Module

Benefits

▌ TDM aggregation up to 8x Gigabit Ethernet or 1G Fibre Channel

▌ Optional 1 +1 Line Protection

▌ Improved transmission performance by FEC

▌ Reducing the wavelengths in DWDM networks

▌ Increase transmission capacity of existing WDM network

▌ 10G transport modules are ideally suited for optical metropolitan, regional and long haul networks

▌ Increase in bandwidth capacity at low cost

Description

The 8 port Gigabit TDM aggregates via time-division multiplexing (TDM) up to eight channels into a 10G Gigabit data stream and supports both Gigabit Ethernet and 1G Fibre Channel. Thus the transmission capacity of a 10G system can be significantly increased and maximized.

The transmission on the line side can be achieved with standard XFP modules, or even with integrated DWDM Fixed Fiber Interfaces (FFI). For redundant or ring applications, the line interface can also be redundant. With the optional FEC-function (Forward Error Correction) great distances of 120 km and more can be achieved.

For the exchange of network management information, the module has an integrated 10 Mbps data channel (in-line remote management), which will be transferred without restriction of the eight 1 Gigabit channels and is used for the coupling of the management modules via Ethernet. In addition, this Ethernet channel may be used for service purposes.

10G GBE TDM with Line Protection

Description	Art.-No.
8x GBE/GFC on 10G, port 1..8: SFP-slot, line port: 1x XFP-slot	**MS430620M**
8x GBE/GFC on 10G, port 1..8: SFP-slot, line port: FFI B&W, x - FFI-option	**MS430624M-x**
8x GBE/GFC on 10G, port 1..8: SFP-slot, line port: FFI DWDM, x - FFI-option*	**MS430624M-x-nn**
8x h GBE/GFC on 10G with Line Protection, port 1..8: SFP-slot, line port 1/2: 2x FFI-DWDM, x/y - FFI-option*	**MS430624MP-xy-nnmm**
8x GBE/GFC on 10G with FEC, port 1..8: SFP-slot, line port: FFI B&W , x - FFI-option	**MS430627M-x**
8x GBE/GFC on 10G with FEC, port 1..8: SFP-slot, line port: FFI, x - FFI-option*	**MS430627M-x-nn**
8x GBE/GFC on 10G with FEC, port 1..8: SFP-slot, line port: tuneable FFI, x - FFI-option	**MS430627MT-x**

*nn – DWDM channel number.

Metropolitan networks

System Catalog 1610

MICROSENS

10G 4 Port STM-16 TDM Module

4 Port STM-16 Module
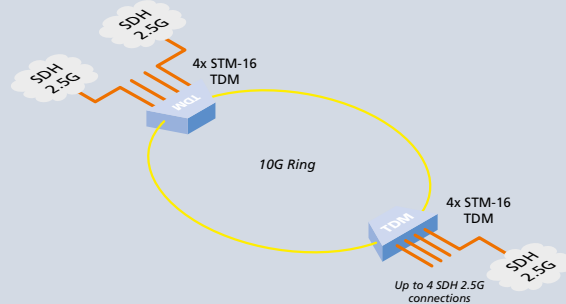
Benefits

▌ Aggregation of four OC- 48/STM-16 client ports on 10G line

▌ Optional 1 + 1 line protection

▌ Improve transport performance with FEC

▌ Reduce the number of wavelengths in DWDM networks

▌ Increase capacity to existing WDM networks

▌ Ideal solution for service providers looking to maximize their optical network

▌ Increases bandwidth capacity at low cost

Description

The module occupies two slots in the MICROSENS Chassis and utilizes Time Division Multiplexing (TDM) to aggregate and transport, cost effectively, four OC-48/STM-16 inputs over a 10G signal. The line bit rate can be G.709 or OC-192/ STM-64, standard SONET/SDH signal. MICROSENS G709 implementation includes a transport overhead (light wrapper) that provides operation, administration and maintenance capabilities and Forward Error Correction (FEC).

MICROSENS FEC reduces the number of transmission errors on noisy links and enables deployment of longer optical spans up to 270 km. The module can be used to aggregate four OC-48/STM-16 on one wavelength. This reduces the number of wavelengths needed and the cost of the entire network.

Further application of the module are DWDM long haul systems with 10G access interfaces or applications with costly interfaces with bit rates less than 10G.

Description	Art.-No.
TDM unit 4x STM-16 over 10G OTU2, line port: XFP slot	**MS430650M**
Tunable TDM unit 4x STM-16 over 10G OTU2, line port: FFI tunable, x- FFI option	**MS430551MT-x**
TDM unit 4x STM-16 over 10G OC192, line port: FFI DWDM, x- FFI option, nn: channel #	**MS430655M-x-nn**
Tunable Daisy Chain (Electrical ADM) TDM unit 4x STM-16 over 10G OC192, line port 1&2: FFI tunable, x- FFI option	**MS430656MT-x**

MICROSENS

10G 5 Port 2G Fibre Channel TDM

10G 5-Port 2G FC
TDM Module
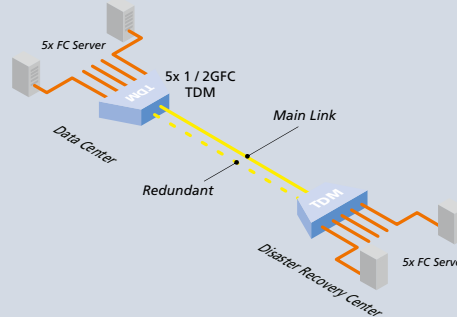
Benefits

▌ 2GFC SAN Interconnect

▌ Ideal solution for disaster recovery and high speed data mirroring

▌ Ultra low latency

▌ High reliability

▌ Extended distances

▌ Scalable bandwidth

Description

The most popular protocol used for SAN application is Fibre Channel. The GFC TDM module proposes a high capacity, low cost aggregation and transport solution for 5x 2GFC/GFC over an OC-192c/STM-64c optical signal.

The module includes advance management, product modularity, and high availability at a very attractive price. It is pluggable into the MICROSENS chassis. The 2 U chassis accepts up to 2 modules which allow the interconnection of up to 10 x 2GFC/GFC via 2x 10G between two data centres with the distance 80 km.

Description	Art.-No.
TDM unit 5x 2GFC over 10G, line port: XFP slot	**MS430670M**
TDM unit 5x 2GFC over 10G, line port: FFI B&W, x- FFI option	**MS430674M-x**
TDM unit 5x 2GFC over 10G, line port: FFI DWDM, x- FFI option, nn: channel #	**MS430674M-x-nn**
Tunable TDM unit 5x 2GFC over 10G, line port: FFI tunable, x- FFI option	**MS430674MT-x**

Metropolitan networks

MICROSENS

10G 4 HD-SDI Video TDM Module

**10G 4 HD-SDI
Video TDM Module**
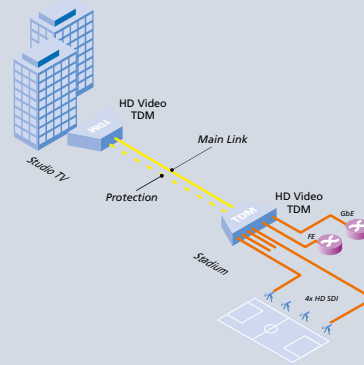
Benefits

▌ Aggregates up to four HD-SDI or
SD-SDI, one GBE and one FE and
transports them over 10 Gbps
wavelength

▌ Ideal for broadcast or professional
studio applications

▌ Cost-effective streaming of video
signals over fiber cables

▌ Optional 1+1 line protection

▌ Remote management with embedded
10 Mbps DCC

Description

The Video TDM module aggregates up to four HD-SDI or SD-SDI channels with
one GBE and one FE on one 10 Gbps wavelength. Multiple wavelengths can be
muxed together with WDM (Wave Division Multiplexing) and transported over
fiber. Each video port auto-senses between SDI, HD-SDI-PAL, HD-SDI-NTSC
signals and is individually configurable.

The Aggregation module eliminates the need for network edge elements such
as SDI encoders and ATM switches that are traditionally required for native
video transport. Furthermore, it simplifies the carrier network and reduces the
operational cost of managing new and complex network elements. The module
is hot-swappable and takes 3 slots in a MICROSENS chassis. On the Client side
it uses Coaxial BNC interfaces for SDI ports, a standard RJ-45 port for FE and
SFP for the GBE port.

Description	Art.-No.
TDM video unit 4 x HD- SDI/SDI/DVB-ASI + 1 GBE + 1FE on 10G, XFP line interface	**MS430650MV**
TDM video unit 4 x HD- SDI/SDI/DVB-ASI + 1 GBE + 1FE on 10G, FFI line interface	**MS430654MV-x**
TDM video unit 4 x HD- SDI/SDI/DVB-ASI + 1 GBE + 1FE on 10G, FFI line interface	**MS430654MV-x-nn**
TDM video unit 4 x HD- SDI/SDI/DVB-ASI + 1 GBE + 1FE on 10G, tunable FFI line interface	**MS430654MVT-x**

Metropolitan networks

System Catalog 1610

MICROSENS

1G 3x SD-SDI Video TDM Module

up to 24 Video Channels
over a single 10G lambda with protection

8x GBE
TDM

3x SD-SDI/DVB-ASI
TDM

Post Production Studio

Up to 3 Video Servers

SD-SDI Video TDM Module
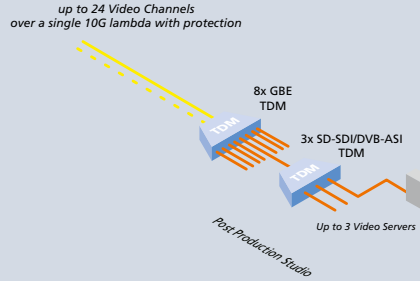
Benefits

▌ SDI Video aggregation and transport over optical network

▌ Long haul transport without signal degradation

▌ Add and drop or drop and continue for delivery to multiple sites with only a single wavelength

▌ Ideal solution for pre/post production video distribution

▌ Transport uncompressed digital video signals, regardless of format, over distances of up to 2000 km

Description

The module aggregates up to three uncompressed SD-SDI video signals or up to three DVB-ASI or any combination of them. Service Providers addressing the market for video distribution and Media companies wishing to transport multiple uncompressed SD-SDI or DVB-ASI signals between different sites using fiber optic are typical users of this module.

Uncompressed video is mainly used in pre- and post-production, editing and in broadcasts of live events. The key benefit of this module is elimination of the need for compressing video signals before transport which is important in applications where high video quality is required. Compression of video signals results in a loss of quality.

The MICROSENS solution allows customers to aggregate and transport a mix of video signals together with SONET/SDH/TDM and Ethernet traffic on a single wavelength. Using aggregation of multiple protocols reduces the number of wavelengths in the network and provides a lower cost compared to other alternatives.

Description	Art.-No.
TDM video unit 3x SD-SDI with 1.25 Gbps, SFP slots	MS430614MV

Metropolitan networks

MICROSENS

Other TDM Modules
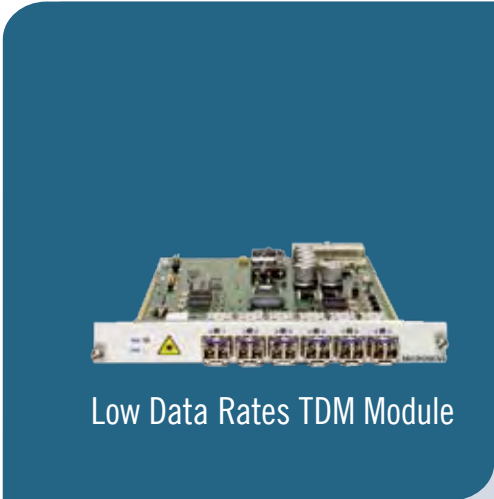
Low Data Rates TDM Module
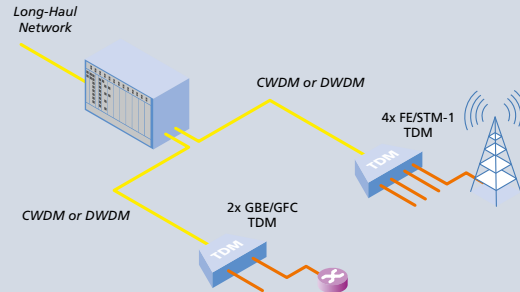
Benefits

▌ Optimal use of data rates with optical interfaces

▌ Standardised line signal for additional TDM cascading

▌ Optional 1 +1 line protection

▌ Optical interfaces with digital diagnostic information

▌ Easy setup (Plug & Play)

▌ Easy maintenance (hot swap)

Description

Through the use of TDM modules, transmission capacity of optical channels will be better utilized. This approach also applies to services with lower bandwidth than 10G. MICROSENS provides for the 10G Platform a 2-fold Gigabit TDM, with this two Gigabit Ethernet or Gigabit Fiber channel services can be aggregated to one optical OC-48/STM-16 channel.

With the TDM method, the two Gigabit channels remain isolated from each other, so that there is no access between the two services. For xWDM applications the line interface can be fitted directly with a „coloured" SFP transceiver. Optionally, the module is available with line protection functions and RMON.

This Gigabit TDM is also available as a double card with two Gigabit TDMs, which can achieve higher port densities. One module can generate two OC-48/STM-16 channels with 4 Gigabit services (Gigabit Ethernet or Gigabit Fiber Channel) in total.

In an optional mode of operation of this dual module, a line protection function for one aggregated OC-48/STM-16 channel (two Gigabit services in, and 2x OC-48/STM-16 protected outgoing) can be realised. The dual card also includes an integrated 10 Mbps communications channel (DCC) for network management.

In another TDM module a 1 Gigabit Ethernet service can be generated from 4x Fast Ethernet, 4x OC-3/STM-1 or 1 x OC-12/STM-4. This signal at 1.25 Gbps corresponds to the characteristics of Gigabit Ethernet and can therefore again be combined with other modules of the 10G platform

MICROSENS

2 Port GBE
Multi functional TDM Module

▊ Ideal solution for service providers that offer GBE and OC-48 services

▊ Small footprint and very cost effective

▊ Fully compatible with SONET/SDH equipment

▊ Optional 1+1 protection

▊ Hot swappable SFP slots

▊ Long haul transport capabilities

▊ DCC for remote management

▊ 10 Mbps in-band data communication channel (DCC)

4 Port GBE
Multi functional TDM Module

▊ Designed for carrying Gigabit Ethernet or Fibre Channel traffic over SONET, SDH or WDM networks

▊ Optional 1 + 1 line protection

▊ Fully compatible with SONET/SDH equipment

▊ Complete performance monitoring and management

▊ Long haul transport capabilities

▊ Small footprint and very cost effective

▊ Ideal for SAN extension and DWDM/CWDM networks

4 Port STM-1
TDM Module

▊ OC-3/STM-1 aggregation

▊ Fully transparent transport of OC-3/STM-1 or OC-12/STM-4 client signals

▊ 1.25 Gbps line interface compatible with other client 1 GBE interfaces from 10G Platform family

▊ Ideal solution for wireless backhaul networks and ATM/GBE DSLAM backhouling

▊ Hot swappable local and line interfaces (SFP)

Description	Art.-No.
TDM module 2x GBE or GFC on OC-48/STM-16, port 1&2: SFP, line port: SFP slot	MS430605M
TDM module 2x GBE or GFC on OC-48/STM-16 with line protection, port 1&2: SFP, line port 1&2: SFP slots	MS430606MP
TDM module 2x GBE or GFC on OC-48/STM-16 with RMON, port 1&2: SFP, line port: SFP slot	MS430607M
Dual Gigabit TDM module 2x (2x GBE/GFC on 1x OC-48/ STM-16) or 2x GBE/GFC on 2x OC-48/STM-16 protected	MS430608M
Daisy Chain (electrical Add/Drop) TDM 4x Fast Ethernet/STM-1 or 1x STM-4 on 1.25 Gbps, SFP slots	MS430615M

Metropolitan networks

System Catalog 1610

MICROSENS

10G on 4x 2.5G Inverse Multiplexer

10G Inverse Multiplexer
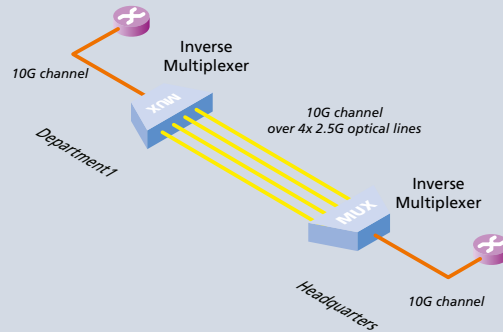
Benefits

▌ Transparent 10 GBE WAN or OC-192/STM-64 transport over 4x 2.5 Gbps optical lines

▌ Optional RMON on 10 GBE LAN client input and output signal

▌ Transmission of 10G traffic over performance limited fibers with high Polarization Mode Dispersion (PMD)

▌ Embedded DCC for remote management

▌ Utilize existing 2.5G DWDM optical transport equipment

Description

The MS430575M module is an inverse multiplexer that accepts 10 Gbps traffic (10GBE or OC-192/STM-64) on the client side and transmits that data over four 2.5 Gbps line ports. When transporting 10GBE LAN PHY traffic the Inverse Multiplexer can use one, two, three or four 2.5 Gbps line ports and implements flow control when less than four ports are used.

Using CWDM or DWDM SFPs the MICROSENS inverse multiplexer can send four 2.5 Gbps wavelengths over the same fiber. Thus enabling the transport of 10 Gbps traffic to long distances even when fiber characteristics does not allow standard 10G transport. It will allow carriers to provide 10 Gbps services even when their backbone is still at 2.5 Gbps.

Description	Art.-No.
10 GBE LAN / STM-64 inverse Mux with XFP Client & 4x SFP 2.5G line port interfaces	**MS430575M**

10G LAN/WAN Protocol Converter

10G Protocol Converter
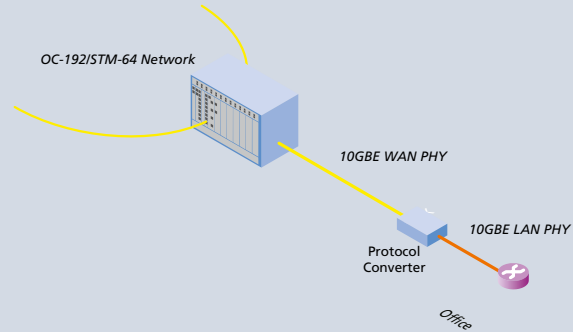
Benefits

▌ Connects 10G Ethernet equipment to OC-192/ STM-64 networks

▌ Cost-effective and flexible solution

▌ Avoids the use of expensive router interfaces

▌ Optional FFI interfaces for long-haul data transport

Description

The protocol converter converts between 10G LAN PHY and 10G WAN PHY and occupies two slots in the MICROSENS chassis. It is a cost-effective solution for connecting 10 Gigabit LAN switches to OC-192/STM-64 SONET/SDH and DWDM networks.

The protocol converter allows service providers to use their existing OC-192/ STM-64 networks for the transport of 10 Gigabit Ethernet signals. The 10GBE LAN payload from the access port is mapped into an OC-192/STM-64 framing format and is transported from the line port at wire speed.

Description	Art.-No.
10G transponder with protocol conversion, 10G LAN to 10G WAN, line port 1&2: 2x XFP slots	MS430570M
10G transponder with protocol conversion, 10G LAN to 10G WAN, line port 1: XFP slot, line port 2: Fixed Fiber Interface, x - FFI option	MS430571M-x
10G transponder with protocol conversion, 10G LAN to 10G WAN, line port 1: XFP slot, line port 2: Fixed Fiber Interface DWDM, x - FFI option, nn: channel #	MS430571M-x-nn
Tunable 10G transponder with protocol conversion, 10G LAN to 10G WAN, line port 1: XFP slot, line port 2: Fixed Fiber Interface, x - FFI tunable option	MS430571MT-x

Metropolitan networks

MICROSENS
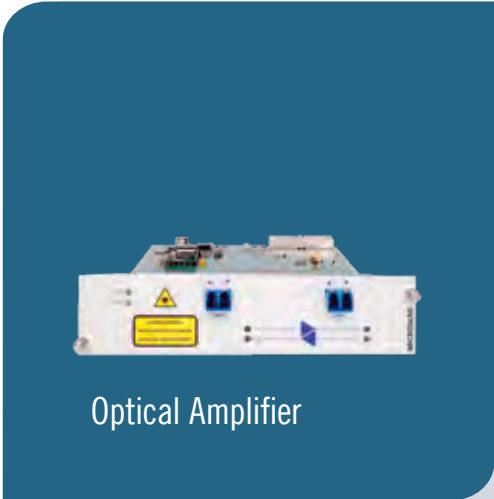
Optical Amplifier Modules
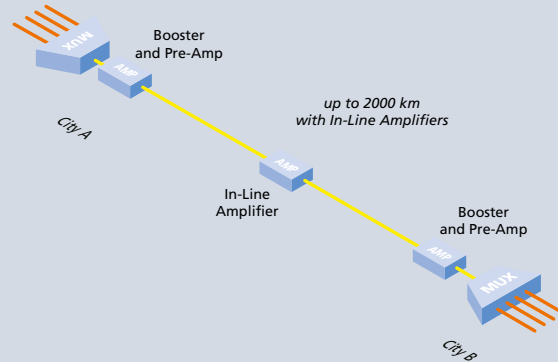
Optical Amplifier

Benefits

- ▌ Booster, inline and pre-amplifier

- ▌ Data rate independent

- ▌ Amplifies multiple wavelengths to several hundred km

- ▌ Low noise figure

- ▌ Easy-to-install and to configure (Plug-and-Play)

- ▌ Extending the transmission distance in optical and DWDM networks

Description

Optical amplifiers are essential components in metro, regional and long haul optical networks. The MICROSENS Optical Amplifier Modules allow optical signals to be transmitted over longer distances without the need for regeneration. They are designed simply and economically and can amplify multiple wavelengths to distances of several hundred km.

The module is an Erbium Doped Fiber Amplifier (EDFA) that is protocol and data rate independent. The module amplifies optical signals in uni or bi-directional mode and may be ordered as a booster or a booster/pre-amplifier. A third amplifier available from MICROSENS is the module which is used for inline amplification. It extends the distance in DWDM networks and in many cases eliminates the need for costly regeneration.

Description	Art.-No.
Optical booster 25 dB amplifier module, +20 dBm output power, for narrow band application	**MS430801M**
Optical booster 15 dB amplifier unit +17 dBm for WDM application with 1590 OSC A&D and external pump input for 20 dBm upgrade	**MS430860M**
Optical booster 15 dB & pre amplifier 29 dB unit +17 dBm for WDM application with 1590 OSC A&D and external pump input for 20 dBm upgrade	**MS430863M**
Optical line amplifier 29 dB unit +20 dBm for WDM application with 1590 OSC A&D and external pump input for 20 dBm upgrade	**MS430864M**
Optical pump module (3 dB) for 17 dBm amplifier upgrade (+20 dBm)	**MS430869M**

Metropolitan networks

System Catalog 1610

MICROSENS

MICROSENS
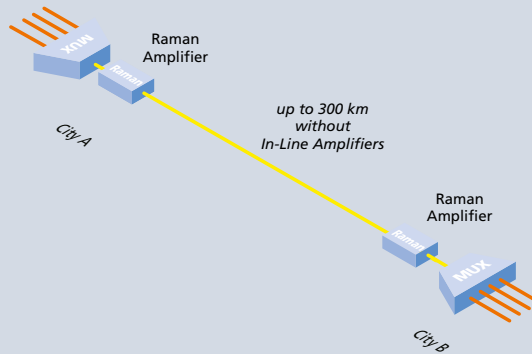
Raman Amplifier

10G Raman Amplifier

Benefits

▌ Up to 14 dB gain

▌ Fully independent rack mountable
1 U device

▌ Automatic shutdown and restart

▌ Remote software maintenance and
upgrade

▌ High-capacity for long-haul
transmission

▌ Elimination of intermediate
amplifier sites

Description

The Raman Amplifier uses enhanced Raman amplification to extend the span reach of optical DWDM networks. In addition, the module also improves the OSNR (optical signal to noise ratio). The Raman amplifier consists of two modules.

The dual pump model has a maximum output power of 27 dBm, while the triple pump model version offers a maximum output power of 28.5 dBm respectively. The amplifier includes an automatic eye safety mechanism that shuts down the amplifier or reduces the power within class 1M in case of fiber link interruption. This comprehensive safety mechanism is extremely important due to the high output power of the Raman Module.

Description	Art.-No.
Raman amplification pump unit with 2 pumps for 10 dB gain on G652 fiber	**MS430850M**
Raman amplification pump unit with 3 pumps for 14 dB gain on G652 fiber	**MS430851M**
Booster power extender 23 dBm	**MS430852M**
Booster power extender 25 dBm	**MS430853M**
Automatic power reduction for raman amplification device	**MS430854M**

Metropolitan networks

Passive Multiplexers, OADMs and Couplers

Passive Multiplexer
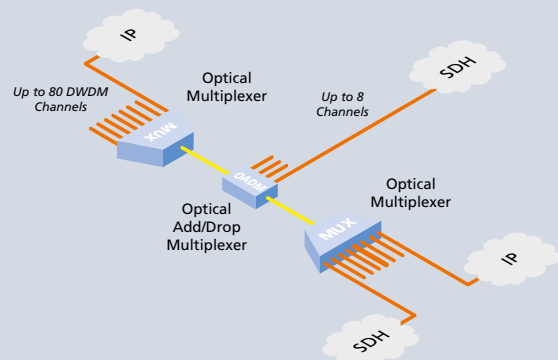
Benefits

▌ Passive interconnection of optical channels

▌ Designed as a module for 10G platform or external 19" rack

▌ Compact design with high port density

▌ High-quality and standardized connectors

▌ No power required

Description

For the combination (multiplex) and separation (demultiplexing) of optical channels with different wavelengths MICROSENS offers a myriad of passive components. This can be interpreted in the form of an insertion module for the integrated application within the 10G platform or as an external 19" unit.

Multiplexers and demultiplexers are available in versions with 2, 4, 8, 10, 32, 40 or 80 channels. Upon request, they can be equipped with one or two optional uplink ports, which enable Mux/DeMux units combining with each other or extend it later. A major advantage of the upgrade ports is that the development can take place during an ongoing data transmission.

At the interconnection of multiple sites, it is possible that not all the optical channels are needed in each location. In order to split off into the intermediate points along the fiber optic lines into individual channels, MICROSENS offers a range of Optical Add/Drop Multiplexers (OADMs). By selection, 1, 2, 4 or 8 wavelengths may be added (dropped) or be coupled (added) while all the other optical channels will be transmitted further. The add/drop function can be realized in one direction (unidirectional) or in both directions (bidirectional).

Other available passive components are optical couplers. With these devices a transmit channel (TX) can be summarized with a receive channel (RX) on one single fiber (simplex). Thus, it is possible a bi-directional service such as 10 Gigabit Ethernet or STM-64 to transfer on one single simplex fiber.

Metropolitan networks

System Catalog 1610

MICROSENS

Multiplexers

OADM Modules

Coupler

▌ Extension of the transmission capacity by combining multiple services

▌ Optimum matching to 10G Platform

▌ DWDM (Mux/DeMux) supporting 2 - 80 channels

▌ Upgrade port for cascading additional multiplexers

▌ Point to point, linear, ring, star and mesh topologies

▌ Standard compliant with ITU G.692.1

▌ Highest flexibility in the design of optical networks

▌ Decoupling of individual optical channels

▌ DWDM OADMs

▌ Versions for 1, 2, 4 and 8 channels available

▌ For one direction (unidirectional) or in both directions (bidirectional)

▌ Optional configurable while operation (ROADM, see page 166)

▌ Combination of the transmit (TX) and receive channel (RX) of one service.

▌ Cost Optimization of fiber (two services on one duplex optical fiber)

▌ For 1310 nm (2. optical window) and 1550 nm (3. optical window) available.

▌ Low attenuation or coupling losses.

Description	Art.-No.
4 channel blue band Mux (ch 45-47-49-51) / red band DeMux (ch 30-32-34-36)	**MS430720BR**
8 channel Mux/DeMux ch 44-51 with 2x upgrade port (1x blue; 1x red), 1 U 19" chassis	**MS430760B1**
20 channel Mux/DeMux (ch 30-39 & ch 40-49), 1 U 19" chassis	**MS430775B1R1**
4 channel add/drop module (uni-directional)	**MS430782M**
2 channel add/drop module (bi-directional)	**MS430791M**
8 channel add/drop module (bi-directional), 50 GHz	**MS430793M**
R1 subband (B1, R1, B2 or R2) add & drop module, (bi-directional)	**MS430795M**
Blue & red band coupler module	**MS430700**
Blue Mux & red DeMux band coupler module	**MS430700BR**
Red Mux & blue DeMux band coupler module with 1590-A/1510-D OSC A&D	**MS430702**

Metropolitan networks

MICROSENS

Reconfigurable OADM
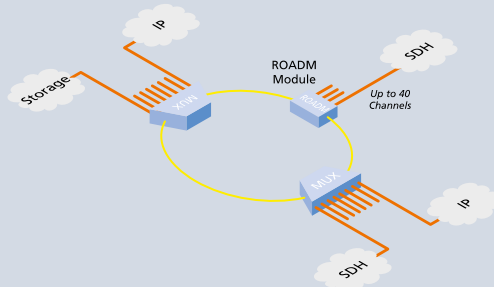
ROADM

Benefits

▌ Reconfigurable Optical Add/Drop Multiplexer (ROADM)

▌ 8 or 40 channels

▌ Cost effective, affordable and scalable optical networks

▌ Remote configuration and reconfiguration

▌ Ideal for service providers with different customer requirements

Description

ROADM technology offers service providers network flexibility without major up front planning or future reconstruction of the network to accommodate unforeseen service demand. In addition, ROADM technology holds a very promising future in the realization of all optical switching and protection.

In a ROADM network element, each ROADM component is used to add and drop channels from a single degree. The ROADM components are interconnected in order to allow channels to be connected from one degree to the other. Therefore ROADM modules have ports that allow optical interconnection as well as for the dropping of local channels.

Description	Art.-No.
8 channel single sided reconfigurable add & drop unit	MS430300M
Full 40 channel single sided reconfigurable add & drop unit	MS430301M

MICROSENS

Optical Dispersion Compensation
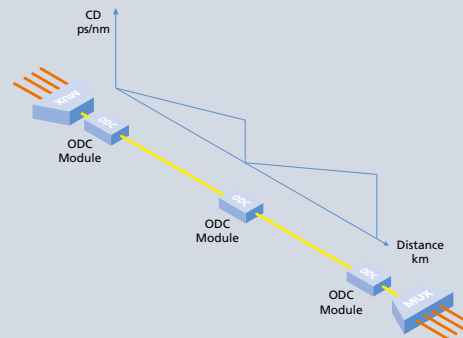
Benefits

▌ Chromatic dispersion compensator

▌ Internal or external use

▌ Dedicated rack mountable chassis for up to 2 external dispersion compensation modules

▌ Reduction of the optical network costs

▌ Compensation up to 120 km

Description

The ODC module fits to the MICROSENS chassis and it is a plug-in module offering chromatic dispersion compensation. MICROSENS offers a very wide range of modules that compensate chromatic dispersion of different distances (up to 120 km).

With the selection of the appropriate module a cost reduction of the network can be reached.

Description	Art.-No.
C-band 40 km Optical Dispersion Compensation module, continuous band	MS430920M-40
C-band 60 km Optical Dispersion Compensation module, continuous band	MS430920M-60
C-band 100 km Optical Dispersion Compensation module, continuous band	MS430920M-100
C-band 120 km Optical Dispersion Compensation module, continuous band	MS430920M-120
Rack mountable chassis for up to 2 dispersion compensation modules (1 U)	MS430999

Metropolitan networks

System Catalog 1610

MICROSENS

Fixed Fiber Interface (FFI)
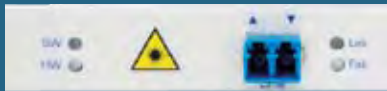
10G FFI

Benefits

▌ 10G interface

▌ 1550 nm, ITU recommanded DWDM wavelengths and tunable optics

▌ Up to 300 km without the need of mid-span (in-line) amplification or regeneration

▌ Lower requirements and cost for spare parts

▌ Tunable FFI supports full C-band (80 channels) with 50 GHz channel spacing

Description

The FFI is a special optical module designed by MICROSENS in order to achieve exceptional span distances without inline amplification. It is assembled on the PCB, is not pluggable and equipped with an LC connector which provides the same management information as XFPs. FFI interfaces can reach up to 300 km without the need of mid-span (in-line) amplification or regeneration (and only with the use of booster, preamps and Raman amplifiers).

The FFI optical interface is available with 1550 nm, ITU recommended DWDM wavelengths and tunable optics. MICROSENS new tunable optics simplify deployments and lower requirements as well as cost for spare parts and support full C-band (80 channels) with 50 GHz channel spacing. The tunable FFI can be assembled/integrated on all MICROSENS modules supporting a 10G interface.

Description	Art.-No.
10G Fixed Fiber Interface, 1550 nm 80 km LC connector	**option E**
10G Fixed Fiber Interface, DWDM 80 km LC connector	**option F**
Tunable 10G Fixed Fiber Interface, DWDM 60 km LC connector, for repeated link	**option T1**
Tunable 10G Fixed Fiber Interface, DWDM 80 km LC connector, for unrepeated link	**option T2**

* 60 km only with optional amplification.

Metropolitan networks

System Catalog 1610

MICROSENS

XFP Transceiver

XFP Transceiver

Benefits

▌ Pluggable fully transparent 10G interface

▌ 850 nm, 1310 nm, 1550 nm

▌ CWDM or DWDM wavelengths

▌ Distances of up to 80 km

▌ Ideal solution for DWDM applications

Description

XFP (Small Form Factor 10Gbps) Transceiver for data transmission with wavelengths according to ITU grid. The latest XFP transceivers from MICROSENS offer an optical transmission over multimode or single mode fiber. Depending on the model the transceiver can cover distances of up to 80 km. Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA.

Description	Art.-No.
XFP multiprotocol 10.5 Gbps pluggable transceiver, single mode 1310 nm LC 10 km	**MS100411D**
XFP multiprotocol 10 Gbps pluggable transceiver, single mode 1550 nm LC 40 km	**MS100420D**
XFP multiprotocol 10 Gbps pluggable transceiver, single mode 1550 nm LC 80 km	**MS100430D**
XFP multiprotocol 10 Gbps DWDM transceiver, DWDM single mode LC 15 dB / 40 km, nn: ITU C-band channel 17-61	**MS100422D-nn**
XFP multiprotocol 10Gbps DWDM transceiver, DWDM single mode LC 23 dB / 80 km, nn: ITU C-band channel 17-61	**MS100432D-nn**

Metropolitan networks

System Catalog 1610

Network Management
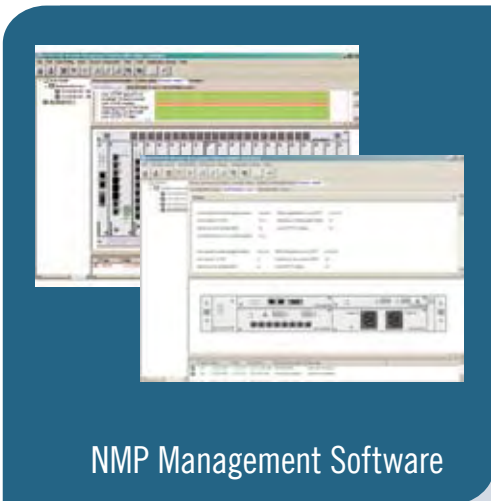
NMP Management Software
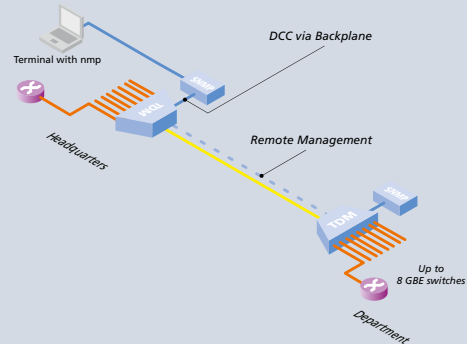
Benefits

▌ Network remote configuration

▌ Performance monitoring and reporting

▌ Optimal coordination of software and hardware

Description

The network management platform (NMP) is a universal tool, which allows monitoring and configuring all network devices of MICROSENS. The software provides an easy to use graphical interface and several intelligent functions which supports the administrators in his daily work. The network management tool is working with device lists, which allow grouping the devices in a tree structure. Depending on the organisation structure it is possible that one device can belong to one or several groups. Therefore settings can be made globally and be assigned to multiple devices simultaneously.

All MICROSENS devices are automatically detected by the discovery function. Even devices without IP-address are listed and can be configured. The enhanced SNMP functions allow managing all devices from the Enterprise Networks, Industrial Solutions, Enterprise Access and Metro Networks with the same tool. Furthermore the new management platform has an integrated topology manager. With this devices can be placed graphically on any map and can be connected together. With this it is possible to monitor also individual ports and their connections beside the standard operation parameters.

The MICROSENS 10G Platform can be managed through SNMP or the MICROSENS Network Management Platform (NMP), which includes java-based GUI Terminal. The management card has two Ethernet ports and one local RS232 port and is hot swappable. The CLI is an intuitive Command Line Interface with embedded help and automatic completion allowing complete management of the network element (administration, alarms, configuration, monitoring, Inventory). The CLI can be accessed locally through an RS232 port for initial configuration or through a management network via an SSH connection.

The OSC Transponder is an Ethernet switch with three ports. The Ethernet Switch has three electrical ports. The first one is connected to the backplane connector to communicate with the MGNT board through the backplane. The two other ports are connected to the two SFP interfaces which perform the Electrical to Optical conversion.

MICROSENS

NMP (Software)

Management Module

OSC Transponder

▌ Graphical User Interface (GUI) for the detailed device status information

▌ Logical structuring of the network due to the definition of device groups

▌ Integrated SNMP receiver for active monitoring of devices

▌ Automatic firmware update of device groups

▌ Topology manager for a quick assignment of events

▌ Two Ethernet ports

▌ One integrated serial port (RS232)

▌ Access to all manageable modules via SNMP

▌ Integrated MICROSENS Network Management Platform (NMP)

▌ Private MIBs

▌ Transport Optical Supervision Channel (OSC)

▌ Ethernet Switch with optical interfaces

▌ Backplane connection to the MGNT board

▌ Two filters and SFP interfaces

▌ Ideal solution for transport Optical Supervision Channel to the amplification nodes

Description	Art.-No.
NMP Professional - management software with 1 year update licence	MS200160-1
NMP Professional - additional update licence for n-years	MS200161-n
NMP Standard - management software with 1 year update licence	MS200162-1
NMP Standard - additional update licence for n-years	MS200163-n
NMP Server - management software with 1 year update licence, incl. 5 clients	MS200164-1
NMP Server - additional update licence for n-years	MS200165-n
NMP Server - additional client access licences for n-clients	MS200166-Cn
Management module, 1x RJ-45 Ethernet, 1x SUB D-9	MS430520M
Webmanagement server (1x per management module)	MS430520M-W
Optical Supervision Channel TX/RX module	MS430890M
Optical Supervision Channel insertion/extraction unit 1590 nm	MS430798M
Optical Supervision Channel insertion/extraction unit 1510 nm	MS430799M

Metropolitan networks

System Catalog 1610

MICROSENS

Metropolitan networks

xWDM-Platform

CWDM or DWDM Systems from MICROSENS ensure the highest possible bandwidth with optimal utilization of fiber optic lines.

The xWDM systems of MICROSENS (Wavelength Division Multiplexing) allow users with a wide range of networks extending to cost-effective capacity expansion of the existing fiber optic lines. With the use of CWDM technology (Coarse WDM) a parallel transmission of multiple services is possible, so that, e. g. both storage and local IP networks can be linked via the same fiber.

With this system data rates of up to 2.5 Gbps per channel can be supported. For the optimized utilization two Gigabit Ethernet channels can be combined to one optical channel with 2.5 Gbps. For storage applications up to 4 Gbps (4G Fiber Channel) can be transmitted via an optical channel. The CWDM technology provides up to 16 channels in the final stage.

Key factors for successful state-of-the-art networks are the simplicity and high flexibility.

- Simple and flexible scalable system
- City and regional networks
  for distances of up to 120 km
- Compact design with up to 4 U
- Up to 16 CWDM channels 2.5 and 4 Gbps
- Combination of 2x Gigabit Ethernet via
  one wavelength (TDM)

IP

SDH

Storage

Metro Ring
xWDM

MUX

DWDM

MUX

Full 3R
regeneration

3R

MUX

8 CWDM Channels
via simplex fiber

MUX

High
density

Reduce
the number
of wavelengths

TDM

IP

Multifunctional
devices

SDH

Storage

Metropolitan networks

MICROSENS
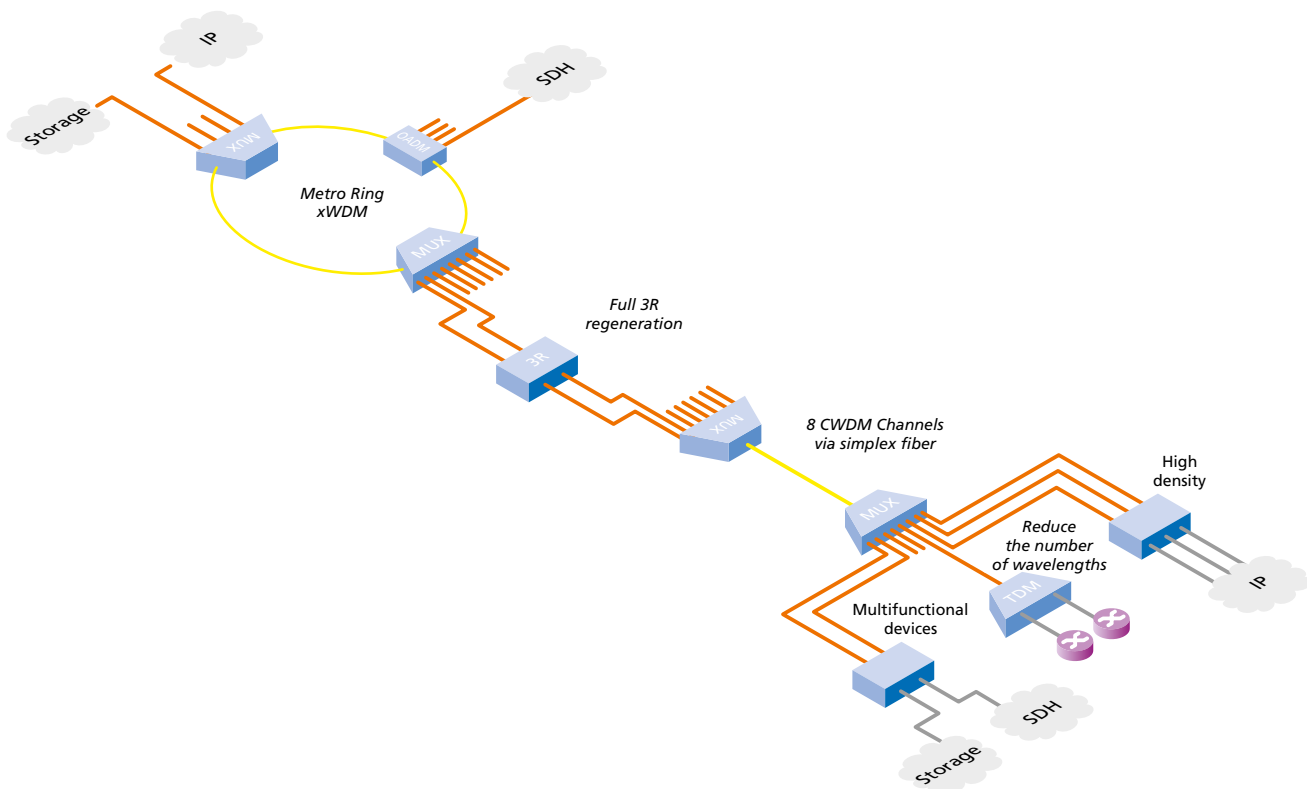
Metropolitan Networks – xWDM Systems

MICROSENS

xWDM Systems
Product Overview

**Multi functional
xWDM-System**
8-channel CWDM/
DWDM 1 U system.

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Modular xWDM-System
19" chassis with 3 and
4 U, power supplies, covers;
management and other
asseccories.

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Active Converter Module
Crossbar Module,
3-port GBE Converter,
2x GBE TDM.

180

**CWDM/DWDM
SFP-Transceiver**
Up to 2.7 Gbps,
multiprotocol,
distances up to 120 km.

182

Passive Modules
Passive multiplexers,
OADMs, circulator
line protection.

184

Line Protection
Line Protection Module for
redundant data transmis-
sion.

186

Network Management
NMP Network
Management Platform.

187
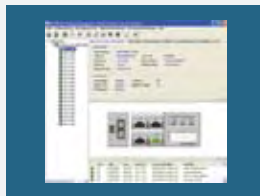
TDM-Systems
Gigabit Ethernet Mux
and E1-IP-Mux.

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Metropolitan networks

MICROSENS

Multi functional xWDM System

Multifunctional
xWDM System

Up to 8x CWDM
Channels

Protection

Up to 80 km

Multifunctional
xWDM System

Main Link

Storage

IP

SDH

Protocol transparent
up to 2.5 Gbps

Multi functional xWDM System
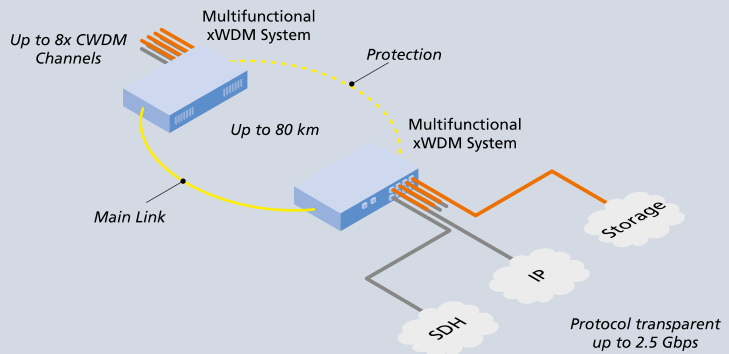
Benefits

▌ Low entry costs due to CWDM tech-
nology according to ITU G.694.2

▌ Low initial costs – pay-as-you-grow

▌ Protocol transparent for applications
up to 2.5 Gbps

▌ Optimized design, up to 80 km

▌ Point-to-point, linear add-/drop- and
ring structures

▌ Optional line-, channel- and system-
protection

IBM System Storage Proven

Description

This system combines the cost attractiveness of CWDM technology efficiently with the high channel density of a DWDM solution. The MICROSENS system now offers a soft migration by combining CWDM and DWDM technologies intelligently. In its basic stage, the current system offers up to 8 CWDM channels. When capacities need to be expanded, each individual CWDM channel can be expanded by up to 8 DWDM channels, allowing the implementation of up to 64 optical channels in the maximum stage.

This multiplexer has been designed into an extremely compact 19" chassis with an 1 U form factor. The basic system allows transferring up to 8 data channels at a transfer rate of 2.5 Gbps each in protocol transparent mode. All the usual protocols such as Fast Ethernet, ATM OC-3/OC-12/OC-48, Gigabit Ethernet, ESCON, FICON, and Fibre Channel are supported.

Its optimized design provides an optical budget of 24 dB, thus making transfer distances of at least 80 km possible. Given its modular design, the system can be configured for a wide range of applications.

MICROSENS

Chassis / Power supply

Active, local interfaces

Active line interfaces

Passive, optical modules

Line interfaces

Description	Art.-No.
Chassis /Power Supply	
1 U, 19" chassis as the basic unit, local connections in the form of SFP-slot, host of 2x power supply modules, integrated SNMP/Web/Telnet- management, relay contact	MS419850
Power supply module for 1 U basic device, 1x 100…240 VAC	MS419840
Power supply module for 1 U basic device, 1x 48 VDC	MS419844
Active Local Interfaces (SFP-Transceiver), external Connections	
Gigabit Ethernet / Fibre Channel	
SFP, 850 nm multimode LC-connector, max. 1.25 Gbps	MS100200D
SFP, 1310 nm single mode LC-connector, max. 1.25 Gbps, 10 km	MS100210D
1G/2G Fibre Channel, Gigabit Ethernet	
SFP, 850 nm multimode LC-connector, max. 1.25 Gbps	MS100240D
SFP, 1310 nm single mode LC-connector, max. 1.25 Gbps, 10 km	MS100241D
Fast Ethernet/STM-1	
SFP, 1310 nm multimode LC-connector, max. 155 Mbps	MS100193
Multirate STM-4/STM-16	
SFP, 1310 nm single mode LC-Connector, max. 2.488 Gbps, short reach 2 km	MS100250
SFP, 1310 nm single mode LC-Connector, max. 2.488 Gbps, intermediate reach 15 km	MS100260
SFP, 1550 nm single mode LC-Connector, max. 2.488 Gbps, intermediate reach 15 km	MS100270
Active Line Interfaces (GBIC-Transceiver), internal Connection	
1G CWDM GBIC, min. 30 dB for Fast/Gigabit Ethernet, STM-1/STM-4, ESCON, 1G Fibre Channel CWDM (ww = wavelength 1470, 1490, 1510, 1530, 1550, 1570, 1590 or 1610 nm)	MS100150-ww
2.5G CWDM GBIC, min. 30 dB for Fast/Gigabit Ethernet, STM-1/STM-4/STM-16, ESCON, 1G/2G Fibre Channel CWDM (ww = wavelength 1470, 1490, 1510, 1530, 1550, 1570, 1590 or 1610 nm)	MS100160-ww
Passive Optical Modules	
8-channel CWDM Mux/DeMux (standard)	MS419810-22
1-channel CWDM add/drop Mux/DeMux, uni-directional	MS418400-ww
2-channel CWDM add/drop Mux/DeMux, bi-directional; n = channel number	MS419814-nn
4-channel CWDM add/drop Mux/DeMux, bi-directional; n = channel number	MS419815-nnnn
Line Interfaces	
Line interface SC/APC duplex (standard)	MS419821
Line interface SC/APC simplex	MS419823
Line protection 2x SC/APC duplex	MS419829
Line interface add/drop (west/east), 2x LC duplex	MS419834

Metropolitan networks

Modular xWDM System – Chassis Types

28 Slot Carrier Chassis, 4 U

14 Slot Enterprise Chassis, 3 U

Benefits

- Free admission and a combination of all application modules

- Optional redundant power supplies, mixed operation AC /DC possible

- Functional modules administered via optional management module (1 module per chassis)

- Exchangeable fan modules

- „Hot swap" of module

- Management software NMP

- 28 module slots (14 on the front side, 14 on the back side)

- Power supply via optional central power supply; redundant at twice the dimensioning

- Optional field replaceable fan modules

- By use from 2 power supplies and 2 fan modules space for 18 functional modules

- 14 module slots on the front side

- With low installation depth also suitable for small distributors

- Power supply via optional central power supply unit; redundant at twice the dimensioning

- Field replaceable fan module on the back side

- With one power supply utilisation of up to 12 insertions modules

Description	Art.-No.
28 slot carrier chassis, 19", 4 U, without power supply and fan	MS416010M
14 slot chassis, 19", 3 U, without power supply, with one fan module	MS416001M
Power supply unit, 100..230 VAC 90 watt, manageable (2 slots needed)	MS416004M
Power supply unit, 48 VDC, manageable (2 slots needed)	MS416005M
Power supply unit, 24 VDC, manageable (2 slots needed)	MS416005M-24
Fan module for carrier chassis (MS416010M) (3 slots needed)	MS416040M
Management module SNMP/Web/Telnet (1 slot needed)	MS416020-B
NMP Standard – management software with 1 year update licence	MS200162-1

3 Slot Enterprise Chassis, 1 U

1 and 2 Slot Desktop Chassis

Accessories

- 3 module slots, horizontal installation
- Compact design, 1 U
- Integrated power supply, all three module slots are available for insertion modules
- Optional versions with redundant power supplies

- Single and dual slot variants
- Integrated or external power supplies
- With the dual slot variant manageable applications are realizable
- Optional wall mountable

- Management module for SNMP/ Web/Telnet
- Blind covers for unused module slots
- Compatible with NMP Management Software

Description	Art.-No.
3 slot enterprise chassis, 19", 1 U, incl. integrated 230 VAC power supply	**MS416006M**
3 slot enterprise chassis, 19", 1 U, incl. redundant power supply 2x 230 VAC	**MS416007M**
2 slot desktop chassis with integrated 230 VAC power supply	**MS417051M**
2 slot desktop chassis with external plug-in power supply	**MS417041M**
1 slot desktop chassis with integrated 230 VAC power supply	**MS417021**
1 slot desktop chassis with external plug-in power supply	**MS417001**
Wall mounting kit for desktop chassis	**MS417001-WH**
Blind cover for one not used module slot	**MS416100**

Metropolitan networks

System Catalog 1610

Active Converter Modules

Up to 16 CWDM Channels
Up to 120 km

3 Port Gigabit
Transponder

2x GbE TDM

Double
Transponders

MUX

TDM

IP

SDH

Storage
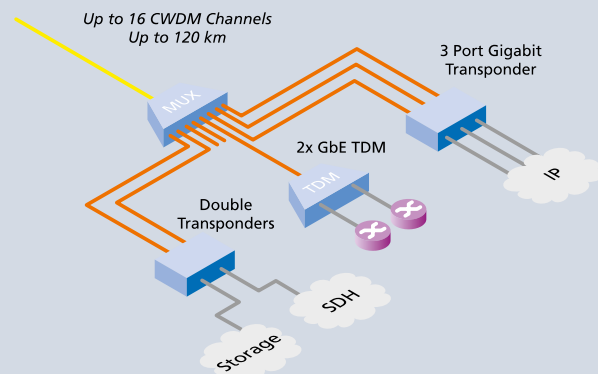
Benefits

▌ Conversion of local services to CWDM wavelengths

▌ Fully transparent, bi-directional coupling

▌ Optimal exploitation of optical chanals with Gigabit Ethernet

▌ Data rates from 100 Mbps up to 2.7 Gbps

▌ 1:1 or 1:n connections

Description

The 4 Channel Optical Crossbar Transponder Module supports any transport protocol from 50 Mbps up to 2.7 Gbps on any of its ports. It can be used as a WDM transponder or as a regenerator. The double transponder has got installed four modular SFP modules instead of fixed optical transceivers. The use of pluggable optical transceivers (SFPs) offers the highest flexibility for the implementation of different transmission distances. By using SFPs with digital diagnostics interface it is possible to monitor the status information of the SFP via the chassis management. It is possible to read information such as wavelength, optical transmit and receive power etc.

The 3 port Gigabit Transponder Module can be used effectively in optical multiplexing (xWDM) applications for economical conversion of Gigabit Ethernet Twisted Pair ports to coloured optical channels (CWDM or DWDM). High bandwidth of Gigabit Ethernet combined with high density of the Transponder Module ports offers significant advantages and lowers significantly active equipment costs. The Gigabit connections are configured automatically with the Auto Negotiation protocol with transparent forwarding.

With the Gigabit Ethernet TDM Module it is possible to double the capacity of fiber channels. With the time division multiplex (TDM) technology two optical Gigabit Ethernet data streams (2x 1.25 Gbps 1000Base-X) are combined to one optical channel (1x 2.5 Gbps). This aggregation is completely transparent for each Gigabit Ethernet channel. Switching features such as VLANs, stacked VLANs, flow control, buffer management etc. are not affected. The Gigabit Ethernet TDM is equipped with SFP slots for modularity of the optical interface. For xWDM applications the line interface can be equipped with a coloured SFP transceiver.

Metropolitan networks

System Catalog 1610

4 Channel Optical Crossbar Module   3 Port Gigabit Converter Module   Gigabit Ethernet TDM Module

- Long distance transmission

- Full 3R regeneration

- Data rates up to 2,7 Gbps

- Protocol-transparent operation

- Software selectable protocol

- Wide range of additional function-
  alities

- Optional channel protection

- Ideal solution for xWDM networks
  and broadcast applications

- Designed for high port density
  applications that require small
  rack space

- Flexibility because of modular plug-
  gable SFPs

- 3x 1000Base-T onto 3x 1000Base-X

- Ideal solution for metro optical
  networks

- TDM for 2x Gigabit Ethernet

- Efficient use of fiber capacity

- Cost reduction for long haul
  applications

- Simple increase of existing
  transmission capacities

Description	Art.-No.
Crossbar Module	
4 channel optical crossbar + wide range retimer module 50 Mbps..2.7 Gbps, manageable (2R transparent, 3R: Fast Ethernet, Gigabit Ethernet, 1x/2x Fibre Channel, STM-1/4/16),	**MS416453MR**
3 Port Gigabit Ethernet Converter Module	
3x Gigabit Ethernet converter, 3x 1000T RJ-45 to 1000X SFP, manageable	**MS416195M**
2x Gigabit Ethernet TDM Module	
Gigabit Ethernet TDM module, 2x 1.25 Gbps (SFP) on line interface 1x 2.5 Gbps (SFP), manageable	**MS416440M**
Blind cover plate for unused TDM ports in adapter chassis	**MS416048**
Adapter chassis for 2 TDM modules, width 6 slots, height 3 U, 6 slots needed	**MS416049**

Metropolitan networks

System Catalog 1610

MICROSENS

CWDM SFP Transceivers

CWDM SFP Transceiver

Benefits

▌ Multirate transceiver for data rates of up to 4 Gbps

▌ CWDM wavelength according to ITU G.694.2

▌ Supports all requirements for storage networks

▌ Compliant to SONET specification

▌ High flexibility (hot swap)

▌ Long distances

Description

The use of the CWDM technology (CWDM – Coarse Wavelength Division Multiplexing) allows an efficient use of existing fiber connections by utilising an active wavelength multiplexing. Different wavelengths of the light are used in order to realize a parallel transmission of multiple channels.

The latest SFP transceivers from MICROSENS offer a transparent optical data transmission of different protocols via single mode fiber by using a specific CWDM wavelength. The use of modern laser technology combined with a high sensitivity receiver offers a protocol transparent data transmission for data rates from 100 Mbps up to 4 Gbps. The SFP transceivers are giving a highest flexibility in terms of the network configuration, because they can be installed during operation (hot swap).

Description	Art.-No.
Gigabit Ethernet/Gigabit Fibre Channel	
CWDM line interface max. 1.25 Gbps for Gigabit Ethernet & Fibre Channel, min. 19 dB budget	MS100206D-ww
CWDM line interface max. 1.25 Gbps for Gigabit Ethernet & Fibre Channel, min. 24 dB budget	MS100207D-ww
CWDM line interface max. 1.25 Gbps for Gigabit Ethernet & Fibre Channel, min. 32 dB budget	MS100208D-ww
Multirate 100 Mbps..2.67 Gbps	
CWDM-SFP multirate max. 2.7 Gbps, ww: CWDM wavelength, LC-connector, min. 29 dB	MS100272D-ww
CWDM-SFP multirate with extended range (low dispersion) max. 2.67 Gbps, ww: CWDM wavelength, LC-connector, min. 32 dB	MS100274D-ww
1x/2x/4x Fibre Channel	
SFP Pluggable transceiver 1x/2x/4x Fibre Channel, min. 17 dB budget	MS100380D-ww
SFP Pluggable transceiver 1x/2x/4x Fibre Channel, min. 24 dB budget	MS100388D-ww

ww - wavelengths: 47-1471 nm, 49-1491 nm, 51-1511 nm, 53-1531 nm, 55-1551 nm, 57-1571 nm, 59-1591 nm, 61-1611 nm. Channel 27 (1271 nm) to 45 (1451 nm) on request.

MICROSENS

DWDM SFP Transceivers

DWDM SFP Transceiver

Benefits

▌ Optional multirate interface

▌ DWDM wavelength according to ITU grid

▌ Data rates up to 4 Gbps

▌ Distances up to 120 km

▌ High flexibility (hot swap)

▌ Ideal for metropolitan networks

Description

DWDM SFP is used in DWDM SONET/SDH, Gigabit Ethernet and Fibre Channel applications. The MICROSENS DWDM SFPs support operation with 100 GHz channels. The latest SFP transceiver offers a transparent optical data transmission of different protocols via single mode fiber.

MICROSENS offers the standard DWDM SFP modules - multirate up to 2.7 Gbps, and a special SFP dedicated to Fibre Channel applications (1/2/4G FC). All these DWDM SFPs are equipped with a diagnostic function, which enables the user to monitor the working status and parameters of the transceiver.

Description	Art.-No.
DWDM multirate line interface 100 Mbps..2.7 Gbps, single mode DWDM Laser, nn: ITU C-band channel 17-60, LC connector, min. 28 dB Budget	**MS100320D-nn**
DWDM multirate line interface 100 Mbps..2.7 Gbps, single mode DWDM Laser, nn: ITU C-band channel 17-60, LC connector, min. 120 km	**MS100321D-nn**
SFP pluggable transceiver 1x/2x/4x Fibre Channel, DWDM single mode, nn: ITU C-band channel 17-60, min. 18 dB/10 km, LC	**MS100390D-nn**
SFP pluggable transceiver 1x/2x/4x Fibre Channel, DWDM single mode, nn: ITU C-band channel 17-60, min. 24 dB/40 km, LC	**MS100391D-nn**
SFP pluggable transceiver 1x/2x/4x Fibre Channel, DWDM single mode, nn: ITU C-band channel 17-60, min. 80 km, LC	**MS100392D-nn**

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Passive Multiplexers, OADMs and Circulator
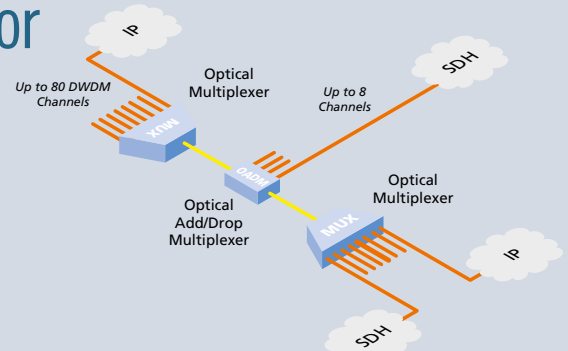
Benefits

▌ Passive interconnection of optical channels

▌ Design as module for the xWDM platform

▌ Standard complying with CWDM-standard ITU G.694.2

▌ Compact assembly with high density

▌ High-quality and standardized connectors

▌ With 8° angled for the line side

▌ No power required

Description

By using passive multiplexers such as the passive 8-channel CWDM Mux/DeMux, several optical channels of different wavelengths can be combined, which will allow multiple services to be transmitted together via fiber without interference. What makes this possible is the fact that different light colours (wavelengths) do not affect each other on the fiber. For transmission, light colours are multiplexed onto a fiber by using a wavelength specific filter (multiplexing). At the other (receiving) end of the line, the wavelengths are divided again, or rather, demultiplexed. The passive multiplexer and demultiplexer modules are working with the CWDM grid according ITU G.694.2 standard. Using WDM as transmission technology, network operators can build an infrastructure that may be expanded depending on need. In addition, the capacities in all sub areas of the network are expandable. This represents an advantage which no other technology can provide. Using passive multiplexers is of interest for cable network operators, too. This technology allows providing additional services such as combining bi-directional data services with uni-directional TV transmission without any problems, while using the existing infrastructure.

OADM Modules offer Add and Drop functionality of 1, 2 or 4 CWDM channels while passing through all other optical signals. This means that specific channels can be dropped at intermediate sites along the fiber in order to provide connectivity to that site without the need to DeMux all the other channels on the fiber. Some modules offer an additional expansion or Optical Service Channel (OSC) interface. Planning xWDM network with OADM modules provides users with the flexibility to drop individual wavelengths in a single sided direction or a dual sided one.

With the Gigabit Ethernet TDM Module it is possible to double the capacity for Gigabit Ethernet. With the time division multiplex (TDM) technology two Gigabit Ethernet data streams (2x 1.25 Gbps 1000Base-X) are combined to one optical channel (1x 2.5 Gbps). This aggregation is completely transparent for each Gigabit Ethernet channel. Switch features such as VLANs, Stacked VLANs, Flow Control, buffer management etc. are not affected. The Gigabit Ethernet TDM is equipped with SFP slots for modularity of the optical interface. For xWDM applications the line interface can be equipped with a coloured SFP transceiver.

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MICROSENS

**8 Channel CWDM
Mux/DeMux Module**

**Optical Add/Drop
Mux (OADM) Module**

Circulator (WDM Coupler) Module

▌ Multiplying transmission capacities

▌ Combining different services on one fiber link

▌ Optimised optical construction for maximum distances

▌ Highest flexibility due to combination with active MICROSENS modules and CWDM option

▌ No power supply needed

▌ Optional 1310 nm "Express Channel" or "Expansion Channel"

▌ Optical Add/Drop of 1, 2 or 4 channels

▌ Uni-directional or bi-directional

▌ Optional "Express Channel"

▌ Protocol and data rate transparent

▌ Extremely flexible solution

▌ Transmission on one single fiber

▌ Minimalizing OPEX

▌ Doubling the capacity of existing fiber infrastructure

▌ Allowing to transmit new services on existing fibers

Description	Mux	DeMux
Passive Multiplexers		
4 channel CWDM-Mux/DeMux (1470, 1490, 1510 and 1530 nm), local: 4x SC/PC simplex, line: 1x SC/APC simplex	MS416408M-22	MS416409M-22
8 channel CWDM-Mux/DeMux (1470 - 1610 nm), local: 8x SC/PC simplex, line: 1x SC/APC simplex (standard)	MS416410M-22	MS416411M-22
8+1 channel CWDM-Mux/DeMux (1310 and 8x CWDM 1470 – 1610 nm), local: 8x SC/PC simplex, line/express: 2x SC/APC simplex (standard)	MS416412M-22	MS416413M-22
8+1 channel CWDM-Mux/DeMux (bandfilter 1310 – 1450 nm, and 8x CWDM 1470 – 1610 nm local: 8x SC/PC simplex, line/filter: 2x SC/APC simplex (standard)	MS416414M-22	MS416413M-22
8 channel CWDM-Mux/DeMux (1310 - 1450 nm), local: 8x SC/PC simplex, line: 1x SC/APC simplex (standard)	MS416416M-22	MS416417M-22
Add/Drop Multiplexer	**Uni-directional**	**Bi-directional**
1 channel Add/Drop Mux+Demux CWDM, local: 2x/4x SC/PC simplex, line (east/west): 4x SC/APC simplex ww = wavelength of the optical channels	MS416400M-ww	MS416402M-ww
2 channel Add/Drop Mux+Demux CWDM, local: 4x/8x SC/PC simplex, line (east/west): 4x SC/APC simplex n = number of the optical channel (nn = 2 optical channels)	MS416404M-nn	MS416405M-ww
4 channel Add/Drop Mux+Demux CWDM, local: 8x/16x SC/PC simplex, line (east/west): 4x SC/APC simplex n = number of the optical channel (nnnn = 4 optical channels)	MS416407M-nnnn	MS416408M-nnnn
Circulator	**Single**	**Dual**
Direct WDM coupling module, 1470..1610 nm Single mode, local: SC/PC-duplex, line: SC/APC-simplex	MS418360M	MS418361M

Metropolitan networks

Line Protection Module

10G Line Protection
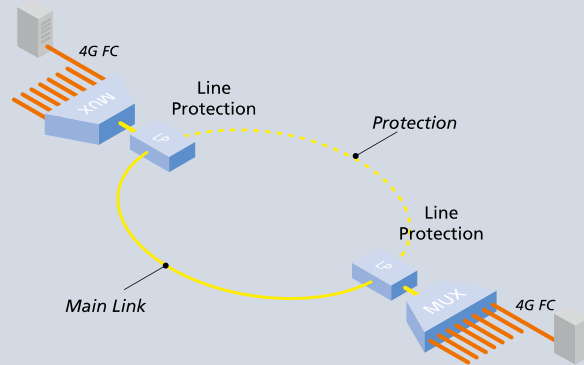
Benefits

▌ Permits the redundant connection on two duplex fiber paths

▌ Highest availability

▌ The receive side decides which line to use

▌ Very fast switching; less than 25 ms

▌ Ideal solution for high availability data links of service providers and data centres

Description

The line protection module is used to protect a system from failures that appear on the fiber connecting two CWDM systems. The protection is accomplished by connecting two duplex fibers between the CWDM systems. If one duplex fiber is cut, the Line Protection Module switches over to the backup line in less than 25 ms.

The transmit side of the module sends the information on both duplex lines. The receive side of the module decides which line to use. The algorithm used for decision is configurable by using the management console. Three different modes for decision are available.

Description	Art.-No.
Line protection module	MS418829

MICROSENS

NMP – Network Management

Benefits

▌ Graphical visualisation of the device condition and detailed status information at a glance

▌ Automatic detection of all manageable MICROSENS devices in the network

▌ Logical structuring of the network by definition of device groups

▌ Integrated SNMP trap receiver for the active monitoring of devices

▌ Simultaneous configuration of complete groups or all devices

▌ Automatic firmware update of device groups

Description

The Network Management Platform (NMP) is a universal tool which can configure and monitor all the network components from MICROSENS. The administrator is considerably relieved of daily tasks by a clearly arranged graphic display and intelligent automatisms.

The Network Management Tool works on the basis of a tree structure which enables network components to be grouped with the aid of equipment lists. The equipment can be allocated to either one or more groups depending on the organizational structure in order to simultaneously allot the settings of multiple devices.

MICROSENS components are automatically recognized by the automatic discovery function. This also applies to components which do not yet have an IP configuration. Using extended SNMP functions, all equipment families from the areas of Enterprise Networks, Industrial Solutions, Enterprise Access and Metro Networks can be administrated via a common tool.

Licenses are required for the operation of NMP software. The license is a multi-user license with unlimited validity. Future versions can also be directly included with an optional additional package.

Description	Art.-No.
NMP Professional - management software with 1 year update licence	**MS200160-1**
NMP Professional - additional update licence for n-years	**MS200161-n**
NMP Standard - management software with 1 year update licence	**MS200162-1**
NMP Standard - additional update licence for n-years	**MS200163-n**
NMP Server - management software with 1 year update licence, incl. 5 clients	**MS200164-1**
NMP Server - additional update licence for n-years	**MS200165-n**
NMP Server - additional client access licences for n-clients	**MS200166-Cn**

Metropolitan networks

MICROSENS

19"Gigabit Ethernet TDM

GBE TDM Mux

Benefits

▌ TDM multiplexing of up to 8 x E1/T1 or 1 x E3/DS3 plus one Gigabit Ethernet transparent via fiber optics

▌ 4 x 10/100/1000Base-T integrated Ethernet switch VLAN and QoS support, bandwidth limitation

▌ Redundant SFP module slot on the fiber side for use with SM, MM or WDM/CWDM transceivers

▌ Optimal expandability due to pluggable transceivers

▌ Onboard management via VT100-CLI, SNMP and Telnet

Description

The MICROSENS Gigabit TDM is an Ethernet time division multiplexer that facilitates the transmission of voice and data at the same time. It connects one Gigabit Ethernet at full wirespeed and up to eight E1/T1 or one E3/DS3 connection over one 1.25 Gbps fiber optical link. Additional formerly required leased lines for voice can be fully substituted.

The main advantage of the multiplexer is the increasement of the capacity of existing fiber infrastructure, by bundling several services on one fiber link. Resulting from the power supply redundancy concept and the two mutually back-up fiber optic connectors to the link, a very high reliability is being achieved. Because of this, with MICROSENS Gigabit TDM devices, Carriers/Providers can offer highly available access solutions with low cost-to-performance ratio.

MICROSENS Gigabit TDM devices can be used as an extension of MICROSENS CWDM systems for further increasing bandwidth requirements resulted from rising amount of transferred data. By implementing the cost efficient CWDM technology MICROSENS offers in its modular WDM systems an optimal scalability together with lower initial costs. With this technology MICROSENS offers the possibility to cover data transmission rate of min. 20 Gbps on standard optical fibers. The onboard device management in the multiplexer supports SNMP. Alternatively a locally Telnet service is available for the control of all device functions.

Description	Art.-No.
4 x E1/T1 switchable, 4 x 10/100/1000Base-T, 2x GBE SFP slot, 1x 100–240 V, euro plug	**MS419781-1**
4 x E1/T1 switchable, 4 x 10/100/1000Base-T, 2x GBE SFP slot, 1x 48 VDC	**MS419781-3**
8 x E1/T1 switchable, 4 x 10/100/1000Base-T, 2x GBE SFP slot, 1x 100–240 V, euro plug	**MS419782-1**
8 x E1/T1 switchable, 4 x 10/100/1000Base-T, 2x GBE SFP slot, 1x 48 VDC	**MS419782-3**
1 x E3/DS3 switchable, 4 x 10/100/1000Base-T, 2x GBE SFP slot, 1x 100–240 V, euro plug	**MS419783-1**
1 x E3/DS3 switchable, 4 x 10/100/1000Base-T, 2x GBE SFP slot, 1x 48 VDC	**MS419783-3**

MICROSENS

19"E1/IP–Multiplexer
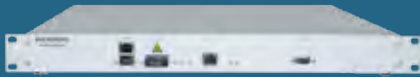
E1/IP Mux

Benefits

▌ Multiplexing of up to 4 x E1/T1 (structured/ unstructured) or 4 x RS530 (X.21, V.24, V.35, V.36) over IP networks

▌ Data rate from 56/64 kbps up to 1544/2048 Mbps

▌ Additional Ethernet interface for cascading or for connecting a local network

▌ Optional fiber optic interface

▌ Available as 4-channel multiplexer or single channel end-point unit (converter)

▌ Fully transparent to all signaling and protocols

▌ Integrated management

▌ Power supply 100-240 VAC or -48 VDC

Description

Ethernet, MPLS and IP are changing the economics of data services delivery, bringing simplicity with lower cost to both carrier and enterprise users. The E1/IP-Multiplexer takes advantage of this infrastructure to help carriers deliver high revenue leased line services such as E1/T1 as well as serial interfaces like V.24, V.35, X21 and RS530.

The E1/IP-Multiplexer also is ideal for the enterprise looking to reduce network expenses without compromising features of their existing PBX and TDM equipment. This evolutionary approach maximizes investment protection by running all TDM traffic – irrespective of protocols or signaling – transparently over Ethernet/MPLS/IP networks.

Description	Art.-No.
1x E1/T1 2x 10/100Base-T , 1 – 1x 100-240 V, euro plug	**MS419761-1**
1x E1/T1 2x 10/100Base-T , 1x 48 VDC	**MS419761-3**
1x RS530, 2x 10/100Base-T , 1x 100-240 V, euro plug	**MS419766-1**
4x E1/T1, 2x 10/100Base-T, 1x 100-240 V, euro plug	**MS419771-1**
4x RS530, 2x 10/100Base-T, 1x 100-240 V, euro plug	**MS419776-1**

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-L = Length in meters, -ww = Wavelength (CWDM), -nn = Channel number (DWDM)

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-L = Length in meters, -ww = Wavelength (CWDM), -nn = Channel number (DWDM)

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