MICROSENS

Fiber To The Office - future-proof networking infrastructure for modern office environments

MICROSENS fiber optic solutions -
intelligent, reliable, high-performance

MICROSENS

Dear Readers,

We are pleased that the publication of this brochure gives us the opportunity to introduce you to the many benefits of the well-proven Fiber To The Office concept. Increasing demand concerning reach and throughput changed the way CIOs and IT-administrators thought about their local area network. In the past, the LAN was accepted as a means to an end, but today companies are beginning to see it as a fundamental part of the whole. Future-readiness and accompanying energy and life cycle costs are becoming more and more important, parameters that the MICROSENS FTTO concept has optimized for years.

Now an independent study proves the significant cost advantages of Fiber To The Office for new installations and renovations in various sizes. As the detailed study shows, FTTO reduces the installation and purchase costs for the network infrastructure by up to 25 per cent and reduces maintenance costs as well. The study serves as a basis of decision-making for IT-managers and planners. A summary is available on the MICROSENS website. Please feel free to contact us, if you are interested in details concerning the various advantages of FTTO.

In this brochure, we also introduce the latest generation of the MICROSENS Micro Switches. The newly developed hardware and software platform now makes FTTO networks even more energy-efficient and powerful. By employing advanced semiconductor technology, our latest generation of Micro Switches saves up to 30 per cent more energy than previously available solutions. In addition, we were able to increase the computing power of our new devices even further. Therefore, customers gain complementary investment protection because new requirements, such as additional security features can be implemented more quickly now.

By implementing Linux as an operating system, we were able to reduce product development cycles for new network applications or specific customer requirements. This makes MICROSENS Fiber To The Office even more flexible.

On the following pages, you will learn more about how IT-decision-makers, planners and architects can realize future-proof network infrastructures for modern office environments with the fiber optic solutions from MICROSENS.

Best wishes,

Dipl.-Ing. Hannes Bauer
Technical Director and Founder of MICROSENS GmbH & Co. KG

FIBER TO THE OFFICE (FTTO)

future-proof, energy-efficient, economical

FTTO is a cost effective cabling infrastructure for modern office environments that combines the benefits of fiber optic and copper based technologies.

Fiber To The Office (FTTO) is a standard compliant and decentralised cabling concept for modern office environments. It combines the advantages of highly efficient fiber optic technology with the flexibility of twisted pair cabling. In contrast to the established structured cabling network (SCN), FTTO additionally employs future-proof fiber optic cables for riser cabling and horizontal wiring. Copper cabling only comes to play to connect terminal equipment like workstations, VoIP-Phones or IP-cameras. As a result, the MICROSENS FTTO switches offer rich power management functions like Power-over-Ethernet and energy-efficient Ethernet. With Fiber To The Office, enterprises profit from a highly cost effective networking infrastructure that offers flexibility, protects investments and reduces life cycle costs.

Investment protection through fiber optic cabling

Until a few years ago, the installation of fiber optic cabling in buildings was considered costly and complex. This picture has changed fundamentally in recent years especially because the production costs of copper cabling have increased enormously. Secondly, because the laying of modern Cat.7 cable became more and more time-consuming, due to the massive volumes of increased cable shielding. At the same time, the methods of fiber optic installation have become more efficient and are less costly today. So the overall cost situation has shifted much to the benefit of fiber optic cabling infrastructure. Nowadays, the purchase and installation costs for wiring with high fiber content are much lower, compared to the traditional structured cabling network (SCN). Additionally, the sustainability of fiber optic lines outperforms copper based cabling: while the standards for copper cabling change every ten years on the average, due to technological developments, the average expected service life of optical fiber cabling, in contrast, is many times longer.

Initial cost and operating costs in balance

As independent studies from leading economic institutes indicate, FTTO provides enterprises with future-oriented, long-lasting IT networking infrastructures which involve technical as well as economic advantages. This applies to the costs for connected workplaces and for the combined life cycle cost resulting from energy consumption and maintenance. As FTTO eliminates the need of technical rooms on each floor, it saves valuable building space that can be used for commercial means. Furthermore, in the case of replacements of Ethernet equipments, the complete existing horizontal cabling in fiber optic technology can remain in the building. The decentralized approach of Fiber To The Office also avoids the occurrence of power -consuming climatisation hotspots within technical rooms that are caused by active network technology and UPS systems. The energy optimized MICROSENS FTTO Switches reduce the total power consumption of the active network technology. In addition, the centralized management system, MICROSENS Network Management Platform (NMP), including roll-out functions and mass configuration features, minimizes the efforts for network maintenance and ensures maximum uptime.
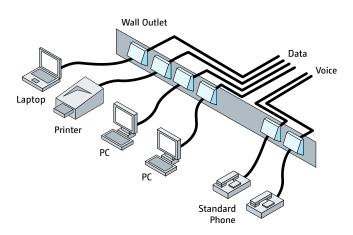
Whether new construction, expansion or renovation - FTTO is always the right concept

Due to the low volume of fiber optic cable routes, FTTO is the ideal solution for the renovation or expansion of existing IT networks. This is especially true for listed buildings because Fiber To The Office requires only minor changes to the building structure. By utilizing a wide range of available up- and downlink versions, the MICROSENS Micro Switches allow a gradual expansion of the port capacity of existing networks. Like that, selective extensions for individual buildings or floors can be implemented without long interruptions of daily operations.
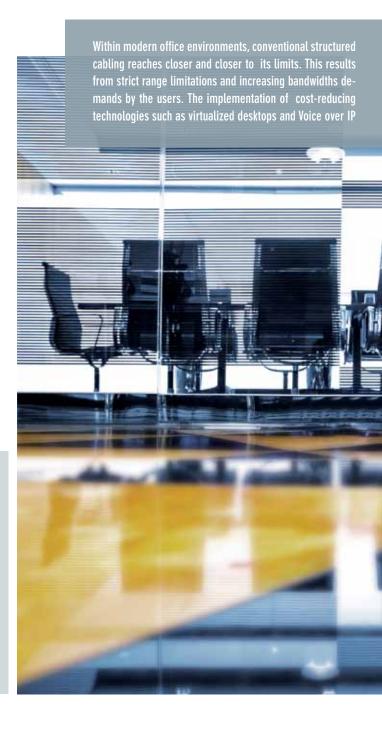
Planning future-oriented networks
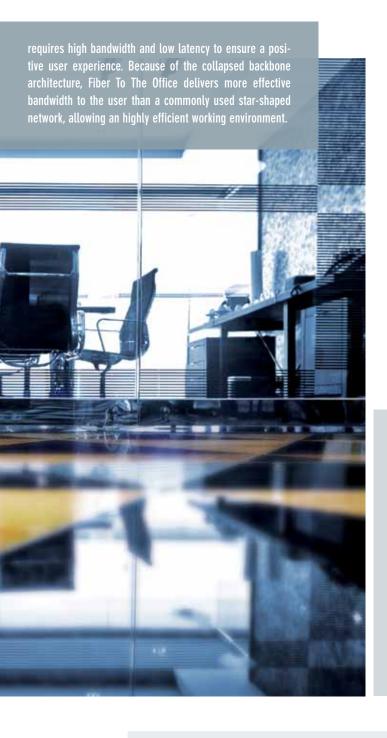## with Fiber To The Office

Structured Cabling Network (SCN)

The use of copper wiring for the horizontal cabling of a network holds a number of technical drawbacks, which have unfavourable effects to the building structure and the reliability of the network. Structured Cabling Networks need appropriate equipment rooms or distribution units with active network equipment on the floor level that serve as nodes used for the integration of workstations into the network. This has a negative impact on energy efficiency leading to increased fire load through cable bundles, wasting valuable building space that cannot be commercially used any longer.

Within modern office environments, conventional structured cabling reaches closer and closer to its limits. This results from strict range limitations and increasing bandwidths demands by the users. The implementation of cost-reducing technologies such as virtualized desktops and Voice over IP
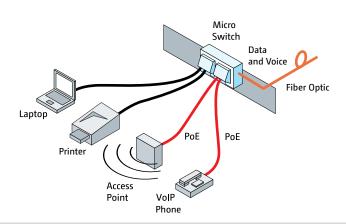
- Strict lengths limitations (max. 100 m)
- Many wiring cabinets for cable consolidation needed (could be more than 100 per floor), wasting valuable commercial space
- Thick cable trunks with high fire load and susceptibility to EMI (Electromagnetic Interference) can have negative impact on overall network reliability
- High demand for network hardware leading to low energy efficiency, high cost for cooling and maintenance and power resilience
- Limited average bandwidth per user. One Gigabit link is shared by up to 24/48 users
- Change of technology requires completely new horizontal cabling
- Easy implementation of Power-over-Ethernet resp. PoE+

Fiber To The Office - collapsed backbone architecture

FTTO uses standard compliant collapsed backbone architecture that employs fiber optic wiring for the horizontal cabling on the floor levels. The technical advantages of fiber optic technology, like extended network reach and immunity to electromagnetic interference, make it the ideal choice for the requirements of modern office spaces. FTTO saves costs for installation and IT operation and delivers higher availability and maximum bandwidth for seamless converged networks.

requires high bandwidth and low latency to ensure a positive user experience. Because of the collapsed backbone architecture, Fiber To The Office delivers more effective bandwidth to the user than a commonly used star-shaped network, allowing an highly efficient working environment.

- Almost no length limitations (typical several thousand meters for single mode fiber)
- No active equipment needed for signal conditioning within the networking path
- Gain of building space, open for commercial use
- Cable volume is reduced by 75 per cent, reduced fireload, high resistance to electromagnetic interference
- No additional cost for climatisation, uninterruptable power supply and access control
- High bandwidth per user. Only four users per FTTO Switch share one Gigabit link
- In case of technology change the floor cabling does not need to be renewed
- Integration of POE, Power-over-Ethernet (+) through the MICROSENS Micro Switches

MICROSENS Micro Switch
The key to more network efficiency

The MICROSENS Gigabit Ethernet Micro Switches are the key element of the highly efficient FTTO networking concept. The intelligent combination of fiber optic and copper uplink ports facilitates the various technical advantages of fiber optic lines for floor wiring. The latest generation of the Micro Switches combines intelligent design, energy efficiency and the latest security features.

Future-proof hardware and reduced energy consumption

The latest generation of the MICROSENS Micro Switches represents the culmination of many years of development, research and decades of experience. Developed and manufactured exclusively in Germany, these devices stand for power saving design, reliability and advanced network functions. Thanks to the newly developed hardware base, MICROSENS was able to increase network performance and to optimize security features. Compared to previous generations, the new hardware platform saves up to 30 per cent of energy costs by delivering increased computing power. The innovative firmware concept based on Linux also contributes to more flexibility in the implementation of current and future protocols and security requirements. Users profit from benefits like long-term safety and investment protection for their businesses.

Flexible configuration management with SD-card

Moreover, the configuration management has been further developed. In addition to supporting all important security management protocols such as SNMPv3/SSH/HTTPS, the latest generation of the Micro Switch is able to store configuration data directly on an SD memory card, secured against unauthorized access. By this means, commonly used configuration parameters can be transferred quickly and safely to other devices. In case of an equipment change, it is sufficient to exchange the memory card only, all important configuration settings, including the IP and MAC addresses will be accepted automatically. This speeds up the recovery of network availability and minimizes maintenance downtime.

Tamper-proof housing and quick installation

The MICROSENS Micro Switches are suitable for a wide range of installation scenarios, be it in the cable duct, floor box installation or under-desk installation. Thanks to bevelled edges, the switch mounting is easier. The compact, monolithic design brings about reliability and robustness to installation and operation. In addition, MICROSENS provides individual special editions with specific surfaces and body colours.

MICROSENS Micro Switch

�’	Monolithic body design without moving parts and fittings
�’	Tool-free mounting vertically or horizontally (45 mm x 45 mm snap-in)
�’	Tamper-proof housing according to protection class IP30
�’	Low power consumption optimized circuit design
�’	4x Gbps user ports, 1 Gbps fiber optic port (optional SFP slot), 1x Gbps downlink port
�’	Support of all current security protocols (Port-based security, 802.1x, RADIUS)
�’	Green Ethernet IEEE 802.3az, QoS (prioritization, DiffServ), VLAN (802.1q, 802.3ac), IGMP snooping, IPv4/v6-Dualstack
�’	Internal power supply with 230 VAC input, optional PoE version with 48 VDC input
�’	PoE+ functionality according to IEEE 802.3at-2009 on all TX-ports
�’	Central Management Software (MICROSENS NMP) with roll-out function
◢	Security protocols such as HTTPS, etc., SNMPv3, SSH
◢	LLDP auto-discovery and zero-touch

FTTO installation scenarios

Seamless integration into modern office environments

A high-performance networking infrastructure has become as important to a modern office environment as high-quality interiors and a high-class location. Fiber To The Office adds long-term value to commercial office space by providing one of the most important foundations of modern work environments: a high-performance and reliable network infrastructure.

Desktop installation with media pillar

High-class look in state-of-the-art design

The high-class surfaces and materials of the MICROSENS Micro Switches integrate seamlessly into the design of modern office environment. The switches offer an easy accessible port adjustment and can be mounted quickly and comfortably due to the optimized housing base. When designing the housing, loose parts and screw connections were waived intentionally in order to hinder burglary and vandalism in public areas. The new design concept accommodates the layout of modern office requirements and is available in the housing colours white, aluminium and anthracite.

Innovative installation concept

The Micro Switches are available in two different versions with optimized port arrangement for vertical or horizontal mounting. These compact devices can be easily mounted into cable ducts or floor boxes. In addition, the mechanical design allows, thanks to the standard 45x45 mm design, easy integration into high-quality docking stations, multimedia pillars or retractable desktop installations.

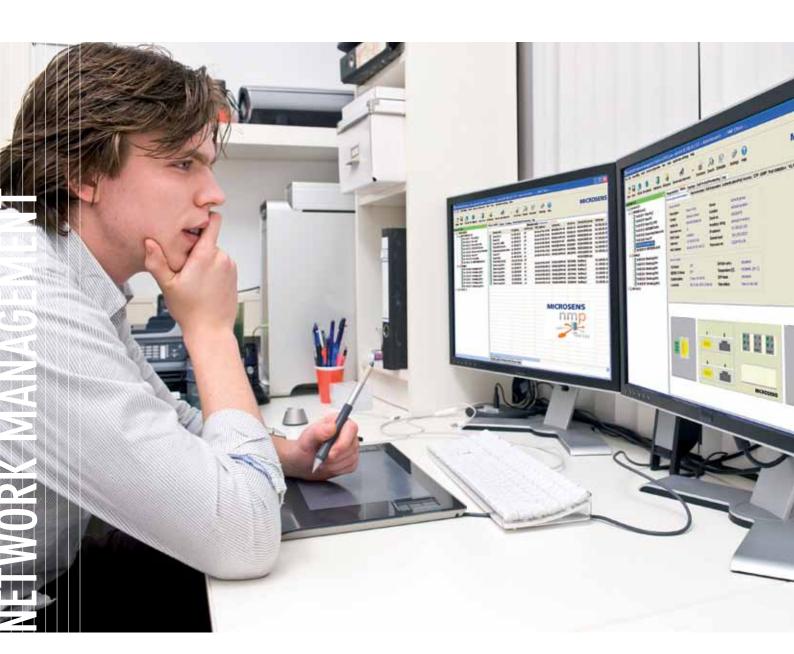|		
Floor tank installation	Desktop mounting	Cable trunk installation

Quick installation through standardized snap-in technology

Modern cabling concepts are distinguished primarily by their flexibility. With the 45x45-device design, MICROSENS provides the most compact installation solution for active network components. The Module Technology 45 is based on the basic dimensions of 45x45 mm. This design is distributed worldwide and allows the use of national and international installation systems. The main advantage of the modular system 45 is the cost reduction compared to traditional systems. As the components do not need to be fastened with screws, but can be easily inserted into equipment racks or installation boxes via snap-in, the installation costs are cut by approx. 50 per cent.

MICROSENS
Network Management Platform (NMP)
Easy administration of Fiber To The Office networks

Decentralized structures do not automatically involve higher expenses for maintenance and management of a network. The MICROSENS central management solution for FTTO networks „NMP" provides active support to administrators and IT-professionals. The functions of the software help in daily maintenance and administration tasks and create ideal conditions for an efficient implementation of IT-work processes.

NETWORK MANAGEMENT

Cost-effective IT-management

In addition to key figures such as system availability, recovery time, and energy efficiency, the service orientation within IT-management receives growing importance. However, the balance between service quality and personnel costs requires efficient operations and powerful tools to help administrators in their daily work. Therefore, MICROSENS provides its customers with reliable hardware solutions and the right software tools for easy integration. With the NMP-solution, network hardware and software constitute a perfectly balanced total solution that ensures high system availability, fast response times and efficient workflow. The graduated licensing model takes different network sizes and installation requirements into account: starting from pure client solutions, to powerful server-based versions, up to high availability solutions that provide easy management for several thousand devices.

Roll-out support and reduction of network recovery times

With NMP network, roll-outs are becoming an easy task. Different group-based master configurations can be distributed simply by MAC address or IP auto discovery. Time-scheduled firmware updates with version control facilitate repetitive tasks and reduce maintenance related downtimes. In addition, the exchange of equipment becomes very simple. The NMP software automatically recognizes similar devices and has the ability to restore configurations and firmware automatically. This process only requires the input of the old and new MAC address into a web-based interface - tasks that are easily manageable by anyone with very basic networking knowledge.

Redundant design, parallel access and automated documentation

The NMP-server allows concurrent access by up to 50 administrators with automatic detection of simultaneous configuration accesses to individual devices. Groups of devices, device configuration and topology information are all stored in the NMP-server, including the history of changes, available as SQL database with optional high-availability design. In order to document compliance policies, administrators also get a complete documentation of all the changes and configuration steps with exact assignment to the respective users.

MICROSENS Network Management Platform

- Monitors and manages all MICROSENS devices
  (FTTO switches, industrial Ethernet switches, 10G transmission platform)
- The web-based interface allows flexible access to client and server versions with redundant design, group-based user management and granular rights-management
- Dedicated control of access rights for employees and external contractors
- Autodiscovery, group-based firmware updates and roll-out function with automated distribution of master configurations and firmware versions
- Topology manager with import function for building plans and maps
- Monitoring of availability, port activity and temperature
- Automated alarms and reports
- Compatible with most major core systems and monitoring software

Centralized power supply concept
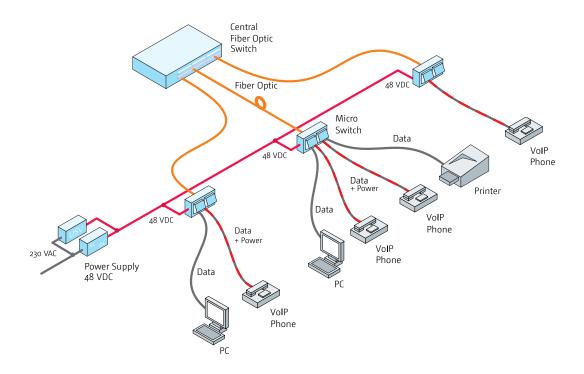
for Power-over-Ethernet applications

The power supply of network devices using Power-over-Ethernet offers significant advantages. With PoE technology, Access points for area-wide WLAN and VoIP phones can be powered very cost-effectively. For these applications, MICROSENS offers a central power supply concept that perfectly complements the PoE function of the Micro Switches. The central power supply provides redundancy and increases the overall availability. In order to reach maximum efficiency, the compact rectifier modules allow a very precise dimensioning of the required power load.

High energy efficiency

Centralized 48 VDC power supplies offer greater benefit compared to the use of separate power supplies. Their use is much more economical because the power output can be customized to the present needs, so that optimum efficiency is always ensured. This reduces power consumption and operating costs.

Redundancy concept with UPS

Another big advantage is the possibility to build up a fail-safe system with redundancy and additional battery backup (UPS). MICROSENS offers a very compact solution with high power density. Because of the wide operating temperature range, the devices need no extra air conditioning.

MICROSENS fiber optic solutions - intelligent, reliable, high-performance

MICROSENS

MICROSENS
fiber optic solutions
euromicron group

www.microsens.com/ftto