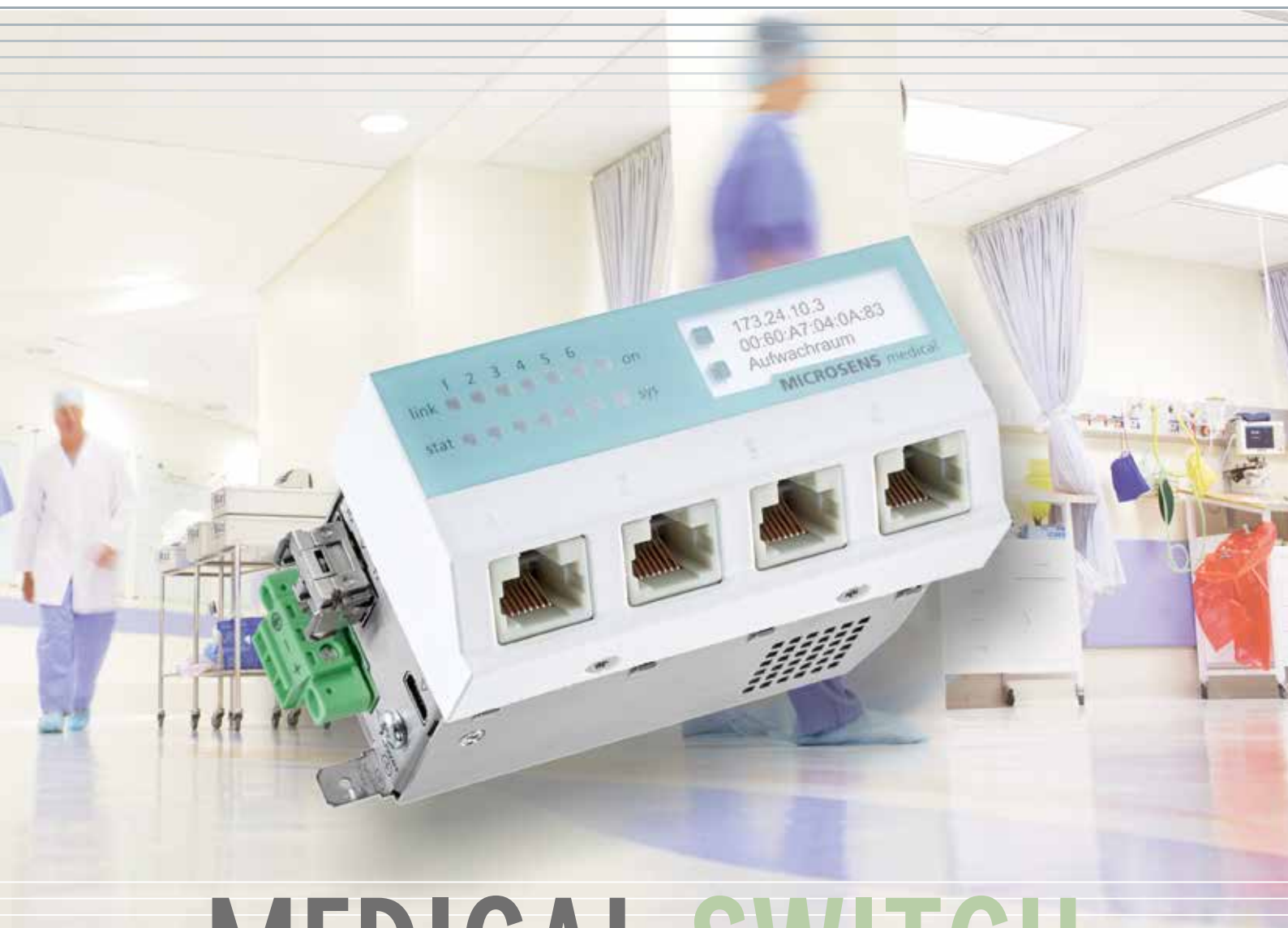


Economic Efficiency Maximum Performance Maximum Network
Compact Design High Economic Efficiency Maximum Performance
Availability Compact Design High Economic Efficiency Maximum
Network Availability Compact Design High Economic Efficiency

MICROSENS



MEDICAL SWITCH

 Made
 in
 Germany



TOP FEATURES

- Security for patients and medical facilities by means of four galvanically separated 10/100/1000 Mbps accesses with integrated network insulators
- Surpasses the strict requirements according to EN 60601-1 / IEC 60601-1 (min. 4 kV) for electrical medical devices
- Fulfills the strict requirements in terms of patient protection with 2 MOPP
- Optional external medical power supply with additional protection
- Maximum network availability due to two Gigabit uplinks
- Suitable for HL7 and HIPAA applications
- Maximum performance and fault tolerance due to robust electronics proven in practical application
- Robust plastic surface allows effective cleaning and disinfection, with antibacterial coating
- High economic efficiency proven by independent surveys
- Investment protection by means of high-performance, future-proof fiber optic lines

2 MOPP

According to EN 60601-1

Insulation > 4kV

MEDICAL SWITCH

High Performance — reliable — securer

With the Medical Switch, MICROSENS is setting new standards in terms of performance, reliability, and security for data networks in medical technology, hospitals, and medical practices. The device exceeds the strict stipulations in terms of electromagnetic compatibility, as well as the requirements of the Medical Products Law. The network accesses are decoupled galvanically by means of special insulators to protect patients and devices against fault currents from the network. For particularly high demands placed on network security in the medical environment, the Medical Switch offers extensive security features, which make sure that confidential data will actually remain confidential. The Medical Switch builds on the proven, decentralised network architecture. The economic efficiency of this architecture has been established through independent surveys and numerous projects.

Data Technology for the Medical Sector

Hospitals and medical practices make particularly high demands on data technology. IT-based diagnostics and treatment systems create huge data volumes which have to be transferred, analysed, processed, and stored. This data must be retrievable at any time; in cases of emergency as well as during the mobile rounds, which is becoming a conventional process to an ever-increasing degree. During patient monitoring, the data has to be captured reliably, be interpreted and forwarded. State-of-the-art technology ensures reliable operation in the field of medical and health care. E-health – computer-aided health care – has become a reality long since. Outside of the fields of diagnostics and treatment, the volume of the data to be transferred is also increasing. The operational processes in a modern hospital have to rely on state-of-the-art data technology if the ever-increasing demands for efficiency and cost effectiveness with a simultaneously growing level of health care are to be met successfully. This is valid both for the medical network and for the administration with its numerous office rooms. In addition, there are the increased demands in terms of convenience and entertainment on the part of the patients, who do not want give up on WLAN, IP-TV, Internet, and telephone in its usual quality.

„The network must be up and running!“

The data network belongs to the critical infrastructures which must not break down.

This requires reliable, robust devices and redundant connections for the purpose of increased fault tolerance. The fiber optic lines which connect the Medical Switch with the data network are insensitive to electromagnetic interferences and do not cause any problems with regards to potential equalisation by themselves. An optional second, redundant network connection enables the Medical Switch and all devices supplied by it to stay connected to the network even after the complete breakdown of a link – while keeping up the full performance at the same time! To attain an even higher fault tolerance, both fiber optic accesses can be connected with two different lines over separate routes.

Increased Security Requirements on the Medical Sector

Safety and protection of the patients are the top priority for medical devices.

The Medical Switch by MICROSENS exceeds the strict stipulations in terms of electromagnetic compatibility as well as the requirements of the Medical Products Law. Its connections are galvanically separated from the switch electronics and the data network cabling in order to protect patients against fault currents from the network.

The surface of the Medical Switch is made up of robust plastic and permits effective cleaning and disinfection. It is optionally available with an antibacterial coating. For particularly high demands made on network security in the medical environment, the Medical Switch offers extensive security features, which make sure that confidential data will actually remain confidential.

Cost-effectiveness

Economically efficient solutions are in demand in order to cope with the cost pressure which is imposed on the health sector.

The Medical Switch of MICROSENS is built on the proven, decentralised network architecture. The economic efficiency of this architecture shows in independent surveys and numerous projects. Modern, decentralised networks based on high-performance optical fibers distinguish themselves through low installation costs (CAPEX) and particularly low operating costs (OPEX) from conventional networks with copper lines. A study



conducted by the independent company WIK Consult GmbH has shown, for instance, that decentralised data networks based on optical fiber already offer significant cost benefits with user numbers of 200 or more. With an increasing number of users, the cost benefits will be even more significant.

Isolating spacers between ports

Network isolators with 2 MOPP

Isolating device cover



MOPP – Means of Patient Protection

MOPP is a measure for the protection of a patient against electrical shock. This protection is achieved by means of constructive measures, such as the insulation of electrical and electronic devices. Here, one MOPP stands for a single insulation, two MOPPs for a double or enhanced insulation with a dielectric strength of 4,000 volts (4 kV). This has been defined in the international standard IEC 60601-1, which was adopted by the European Union as EN 60601-1.

TECHNICAL FEATURES

- 4x 10/100/1000 Mbps local ports
- 1x 100/1000 SFP slots for optical fiber and an RJ-45 port for copper data lines
- Optional version with 2x 100/1000 SFP slots for enhanced fault tolerance via redundancy, such as Dual Homing and ring structures
- Four integrated network insulators for safe operation
- Minimum dielectric strength of 4 kV and 2 MOPP according to EN 60601-1 / IEC 60601-1
- Galvanic protection against accidental contact through insulating plastics for the device cover and the coating of the RJ-45 ports
- ESD resistance according to EN 61000-4-2 / IEC 61000-4-2
- Permanent function monitoring and alarming in real time via app
- Suited for applications according to Health Level 7 (HL7) and Health Information Patient Accountability Act (HIPAA)
- Comfortable administration via Web, Telnet and SNMP interface, and MICROSENS NMP software; integration of/interface to already existing network management systems over SNMP
- Extensive options for the automation via a comprehensive command line interface and an integrated script language
- Firmware and configuration on the microSD card for shortest possible recovery times
- High security level due to the application of encrypted protocols, such as SSH and HTTPS
- Port security according to IEEE 802.1X, Radius, compatible to all conventional NAC solutions
- Power supply optionally with 230 VAC, optional DC version for the connection to an existing medical power supply (in preparation)
- High energy efficiency by means of the application of state-of-the-art chip technology, Energy-Efficient Ethernet (EEE)
- Fast, tool-less installation by means of snap-in assembly
- Internationally standardised 45 mm fitting dimension
- Integrated assembly in ceiling supply units

MEDICAL SWITCH

1 Gigabit copper ports (4x)

Four galvanically separated 10/100/1000 Mbps ports with integrated network insulators.

2 Gigabit uplink ports

One, optionally two Gigabit uplink ports for maximum network availability and fault tolerance, optionally with two SFP slots for purely fiber-optic-based networks or an SFP slot for optical fibers and an RJ-45 port for copper data lines.

3 Power supply connection

Power supply optionally with 230 VAC from the electrical mains, optional DC version for existing medical power supply.

4 Grounding terminal

Clamp for the connection to the earth potential.

5 Expansion port

Serial RS-232 console access for optional accessories, also configurable as RS-232 device server.

6 LED display

Open representation of all functions available across all devices: operational readiness, link status, data activity, booting process.

7 Reset and system button

Reset button for the reset of the switch or the loading of the configuration last stored (direct hardware function). System button for the selection of the IP configuration via the management or reset to the ex-factory settings.

BENEFIT WITH DECENTRALISED DATA NETWORKS

High-performance networks based on fiber optic with decentralised architecture offer numerous benefits compared to conventional solutions

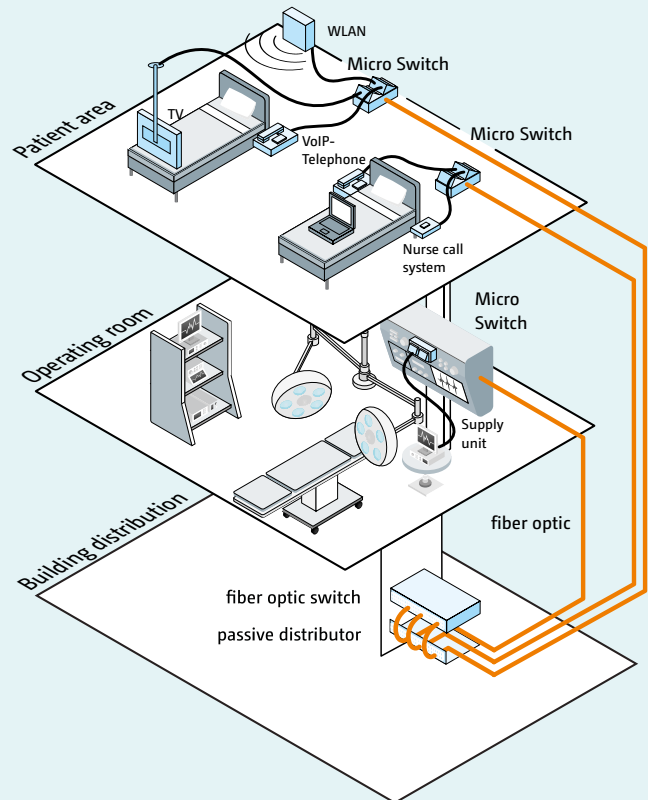
The concept of classic structured cabling with copper data lines is now more than 20 years old. Copper lines are limited to a length of 90 metres. Fiber optic lines are used for higher distances and for the interconnection of distribution units. What is more obvious than to take the fiber optic lines further to the user and to do completely without copper lines?

Fiber optic connections permit line lengths of up to 550 metres (multi-mode fibers) or 10 kilometres (mono-mode fibers). This allows the user to do without floor distribution units, which usually require their own technology rooms with air-conditioning and an uninterruptible power supply. As a rule, a single, centralised IT system room somewhere in the building, located where it is least in the way, will suffice. This is also possible beyond buildings – for instance in spacious clinic areas – which significantly simplifies the administration of the data network. Problems with grounding and potential equalisation, which may occur on copper lines, particularly in buildings that have grown over time, do not apply either with metal-free fiber optic lines, as they are usually applied in cabling for buildings.

Copper lines have a comparably large outer diameter which leads to thick line bundles and, thus, to high fire loads. Optical fibers are merely twice as thick as a human hair. They only require little space and lead to low fire loads.

Decentralised networks based on optical fiber are explicitly provided in the new versions of the corresponding cabling norms. The originate in the cabling of larger office buildings, which shaped their name: Fiber To The Office – in short: FTTO.

They have proved their worth for years in clinics, airports, power plants, and in security-critical applications. They are EMC-safe and as a matter of principle permit higher data rates in addition to larger line lengths. FTTO networks can even be expanded during operation and without any interruptions of the operation and offer network security with their numerous security features on the switches on-site precisely where it is required: at the outer edge of the network.



Labelling field

Removable labelling field, specially integrated into the device cover and, thus, protected in case of surface cleaning.

microSD card slot

The firmware and configuration data are stored on the microSD card. In the case of replacement, this ensures the shortest possible recovery times.

Gigabit downlink port

10/100/1000Bast-T port for the connection to a central network switch over copper lines or for cascading to a further Medical Micro-Switch.



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MICROSENS IS KNOWN COMPETENCE ON THE SECTOR OF ACTIVE FIBER OPTIC SOLUTIONS

For over 20 years, MICROSENS has been offering active fiber optic components for company networks, manufacturing plants, the industry, and access networks. Development and processing "Made in Germany" significantly contribute to product quality.



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