

High Economic Efficiency Top-Level Quality Standards Highest Possible Flexibility Maximum Compatibility High Economic Efficiency Top-Level Quality Standards Highest Possible Flexibility Maximum Compatibility High Economic Efficiency

MICROSENS

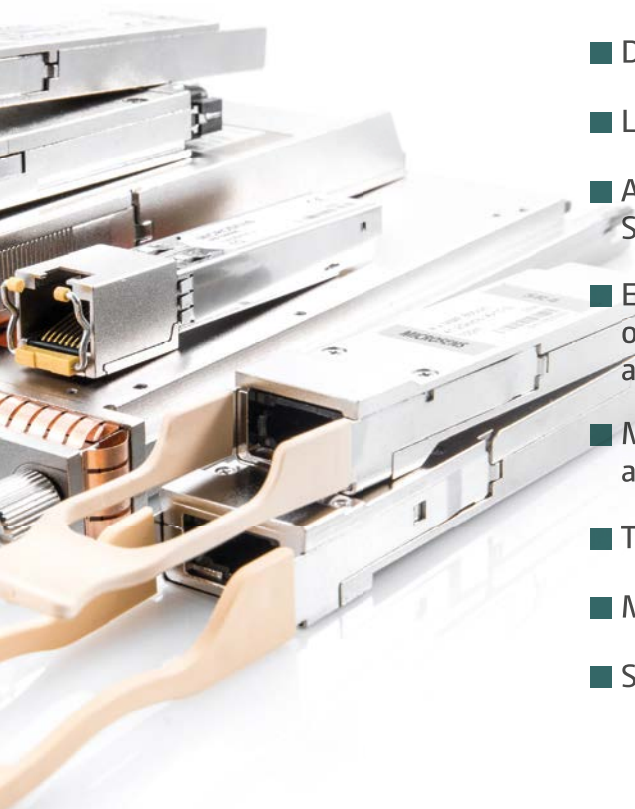


COMPATIBLE TRANSCEIVERS



YOUR BENEFITS

- Broad portfolio of universal transceivers: multimode, single mode, copper, CWDM, DWDM, tunable, BiDi (simplex), Direct Attach Cable (DAC), and many more
- Large selection of models: SFP, SFP+, XFP, QSFP+, QSFP28, CFP, CFP2, CFP4, and many more
- Data rates ranging from 100 Mbps to 100 Gbps
- Link lengths of up to 160 km
- All conventional protocols, such as Ethernet, Fibre Channel, SDH, SONET, SDI, CPRI, and many more
- Encoding to ensure compatibility with many manufacturers of active network components, such as Cisco, HP, Huawei and many more
- Multiple encoding possible for simpler provisioning and storage
- Top-level quality standards
- Many transceiver types available ex-store
- Savings of up to 80% per cent compared to manufacturer prices



COMPATIBLE TRANSCEIVERS

Manufacturer quality at a low price

Pluggable transceivers offer the highest possible flexibility in terms of design, configuration, and operation of modern data networks. They permit a demand-oriented extension of the connections and a simple technology change. Many manufacturers of active network components get themselves paid very well for those benefits, even though they frequently only purchase these transceivers themselves. Manufacturer-compatible transceivers of MICROSENS offer all benefits of pluggable transceivers at a particularly economically efficient price. They can be provided with specific manufacturer codes and can, thus, be reconfigured without problems in the case of a manufacturer exchange. Quality and economic efficiency with MICROSENS.

Flexibility by means of pluggable, modular transceivers

Only a few years ago, the standard procedure in telecommunications and data technology was to provide active network components with permanently assembled fiber optic ports. As a result, the ports of the devices were permanently bound to a predetermined technology. In the meantime, the major part of all active network components is equipped with modular transceiver slots, which can be provided with the most diverse transceivers for different access types. This offers the user a much higher flexibility when configuring the network. At the same time, the modular concept permits a more economically efficient operation by means of the demand-oriented extension of the fiber optic ports and a simple, stepwise technology change.

Fully compatible transceivers of MICROSENS for top-level economic efficiency

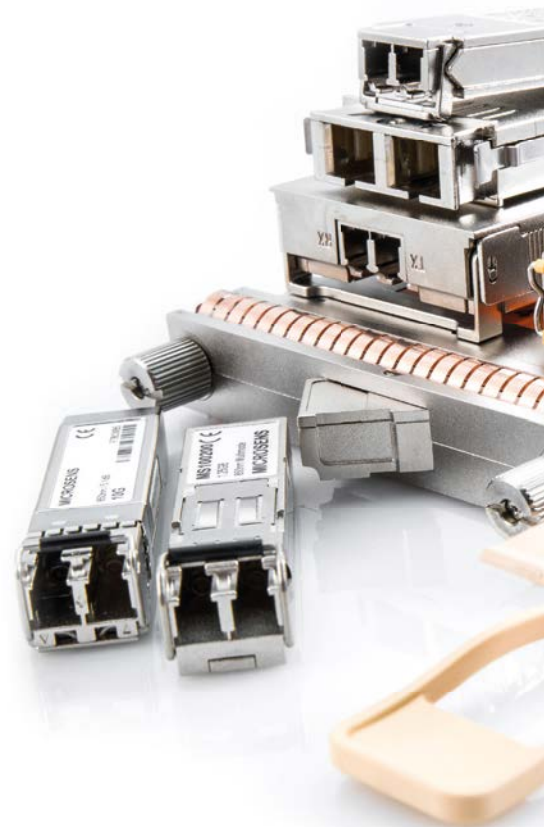
Only a few of the renowned manufacturers of active network components operating on a worldwide scale produce their transceivers themselves. Most of them buy them from specialised suppliers and offer them under their own brand name at high prices on the market. To ensure that the components of different manufacturers are compatible with each other, the technical requirements made on transceivers

were defined in the MSA Standard (Multi-Source Agreement). The users benefit from this standardisation to a considerable degree, since it offers the access to a much wider range of suppliers. The increased competition on the supplier market helps to reduce costs and to optimise the availability of the components. MICROSENS offers a comprehensive portfolio of transceivers for different media, data rates, transmission ranges, mechanical models, and protocols. The components fulfil the specifications of the MSA Standard. This means they are compatible with all devices which comply with this standard.

Saving budgets with manufacturer-specific transceivers of MICROSENS

Not all manufacturers of active network components follow up the idea of interoperability and provide their transceivers with special codes. The codes programmed in the transceivers are meant to ensure that the customers exclusively use the components of this manufacturer. As an innovative technology company, MICROSENS also offers transceivers with manufacturer-specific coding. This ensures that MICROSENS transceivers also work reliably in active components of manufacturers who do not face the market. These transceivers are more cost-effective than the solutions of the original manufacturers by a degree of 80%, much to the relief of the usually tight IT

budgets of many users. Since the special code is not permanently burnt in into the electronics of the transceiver, but only programmed in, transceivers of MICROSENS can be re-programmed on demand, which means they are also fully compatible with the devices of further manufacturers.



Multi-coding for higher flexibility and economic efficiency

Many networks are set up in heterogeneous mode, which means that they contain devices and components of different manufacturers. Transceivers of MICROSENS can simultaneously store several manufacturer-specific codes. Due to this multi-coding, the transceiver works in the original equipment of different manufacturers without the need of re-programming the transceiver. This reduces the effort for the procurement of transceivers considerably. The effort in terms of administration, storage, and not the least costs is lowered decisively.



MICROSENS PROGRAMMER



The MICROSENS Programmer enables system integrators and users to modify manufacturer-specific codes in transceivers quickly and simply on their own. If the manufacturer of the active network components is exchanged, the existing MICROSENS transceivers can continue to be used. The user benefits from a hitherto unreached flexibility and at the same time from top-level economic efficiency.

The Programmer also ensures low support costs for tunable DWDM transceivers, since only one transceiver type has to be kept in store. Its wavelength is configured according to demand with the help of the Programmer.

The Programmer is simply connected to the USB access of a PC or laptop computer with Internet connection. A special software is not required for this purpose. The Programmer is accessed via the Web browser.

COMPATIBLE TRANSCEIVERS

We provide compatible transceivers e.g. for the following manufacturers:

ADTRAN, ADVA, Alcatel-Lucent, Allied Telesis, Arista Networks, Arris, Aruba Networks, Avaya, Barracuda Networks, Blackbox, Bluecoat, Brocade, BTI Systems, Calix, Ceragon, Check Point, Chelsio, Ciena, Cisco Systems, Citrix Netscaler, Coriant, Cumulus Networks, Cyan, Default, Dell, D-LINK, ECI, Edge Core, EMC, Emulex, Enterasys, Ericsson, Evertz, Extreme, F5 Networks, FiberPlex, Fluke Networks, Fortinet, Fujitsu, Gigamon, Hirschmann, Hitachi, HP H3C, Huawei, IBM, Infinera, Intel, Ixia, Juniper, Keymile, Lenovo, Lynx, Marconi, Mellanox, MikroTik, Motorola, Moxa,

MRV, Myricom, Net Insight, NetApp, Netgear, NetOptics, Netscout, Netxen, Nokia Siemens Networks, Nortel/Juniper/NSN, Nutanix, Obsidian, OpenGear, Oracle, Orckit-Corrigent, Overture, Packetlight, Palo Alto Networks, Perle, ProfiTap, QLogic, Quanta, RAD, Radware, Raisecom, Redback, Riverstone, secunet, Siemens, Solarflare, SonicWALL, Sophos, Sorrento Networks, Sun, Supermicro, Symantec, Synology, Telco Systems, Transition Networks, Transmode, TRENDnet, Turriss Omnia, Ubiquiti Networks, VSS monitoring, WatchGuard, Wildpackets, Winyao, Zhone, Zyxel.

SUPPORTED TRANSCEIVER TYPES



SFP (Small Form-Factor Pluggable)

SFP is the widest-spread format of pluggable transceivers. Typical data rates range from 100 Mbps to 4 Gbps. Usually, however, SFPs are used with data rates of 1 Gbps. Informally, SFPs are also referred to as Mini-GBICs, since they offer the data rate of the GBICs and have considerably smaller dimensions, at the same time. Typical communication protocols are: Fast Ethernet, Gigabit Ethernet, SONET, Fibre Channel and others.



SFP+ (Enhanced Small Form-Factor Pluggable)

As a further development of the SFPs, SFP+ transceivers support higher data rates, usually 10 Gbps. In terms of the exterior, SFP and SFP+ can only be distinguished by taking a look at the label. SFP and SFP+ are plug-compatible. SFP transceivers can also be operated at SFP+ slots of many active network components. Typical communication protocols are: 8G/10G/16G Fibre Channel, 10G Ethernet, SONET OC-192, SDH STM-64, OTN G.709 and CPRI wireless.



QSFP+/QSFP28 (Quad Small Form-Factor Pluggable)

QSFP+ transceivers transfer four channels in parallel with 10 Gbps each. The four channels can be combined to a 40 Gigabit Ethernet link. 100 Gigabit Ethernet links (4 x 28 Gbps) are possible with QSFP28. QSFP+ and QSFP28 are plug-compatible. QSFP+ transceivers can also be operated at QSFP28 slots of many active network components.



CFP/CFP2/CFP4 (C(entum) Form-Factor Pluggable)

CFP is gaining ground as a further transceiver format for connections with particularly high data rates of 100 Gbps. With an increasing “miniaturisation”, the mechanical dimensions could be halved (CFP2) or even be reduced to a quarter of the original CFP size (CFP4). Typical communication protocols are: 40G & 100G Ethernet, OC-768/STM-256, OTU3 and OTU4.



XFP (10 Gigabit Form-Factor Pluggable)

XFP transceivers were developed for data rates of 10 Gbps and were already introduced on the market prior to SFP+. XFPs are protocol-transparent. This means they are not pre-determined to be used for a specific network type, such as 10 Gigabit Ethernet. They are similar to SFP+ transceivers, but the two types are not compatible in terms of their plugs. Typical communication protocols are: 10G Ethernet, 10G Fibre Channel, SONET OC-192, SDH STM-64 and OTN G.709.



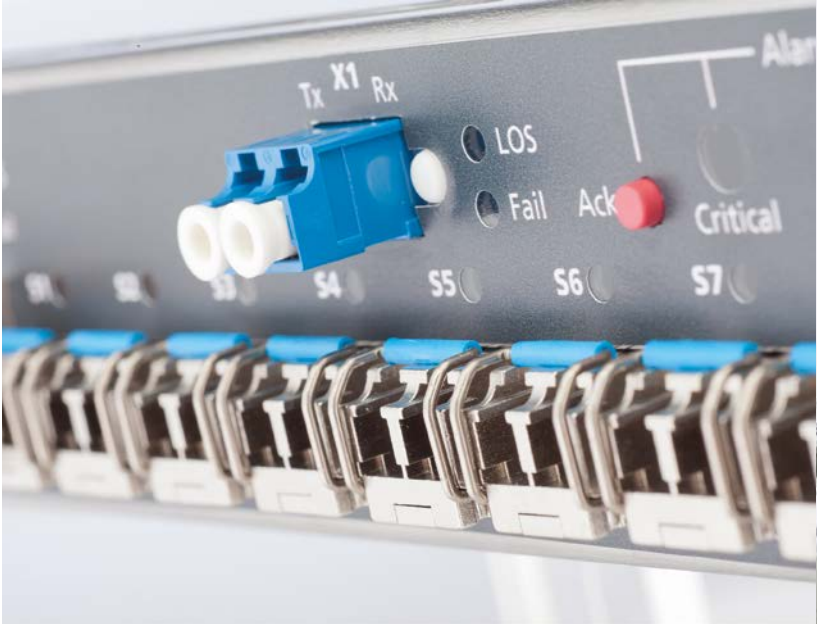
GBIC (Gigabit Interface Converter)

GBIC was one of the first formats for pluggable transceivers and was developed for data rates of 1 Gbps. Instead of purchasing active network components with a predefined number of fiber optic ports, the user has, thus, been enabled to retrofit them according to demand. GBICs were soon replaced by the considerably smaller SFP transceivers. Typical communication protocols are: Gigabit Ethernet and 1G Fibre Channel.

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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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