

OVERVIEW

OPTOCORE is a patented, synchronous, optical fibre network system specially designed to meet the requirements of the professional live audio, broadcast, studio, installation and video industries. The system offers a unique, flexible and scalable, dual redundant ring structure providing maximum safety in a user-friendly network with an exceptionally low latency time whilst using the least possible amount of optical fibres. Controlling and channel-routing is easily achieved from any point within the network by computer or media-access device.

OPTOCORE was developed for highest performance, professional audio and video applications requiring a wide dynamic range, negligible distortion and extremely low noise. Due to its multiple advantages, it can be used everywhere where high performance, high security networks are required.

OPTOCORE is conceived to transmit all pro-audio and video signal types, including a wide range of computer data types, in compliance with highest quality standards and state-of-the-art technology via high performance, high bandwidth optical fibre cables.

OPTOCORE was conceived and developed by Marc Brunke starting in 1993. Marc Brunke has worked in the field of communication electronics engineering since 1988.

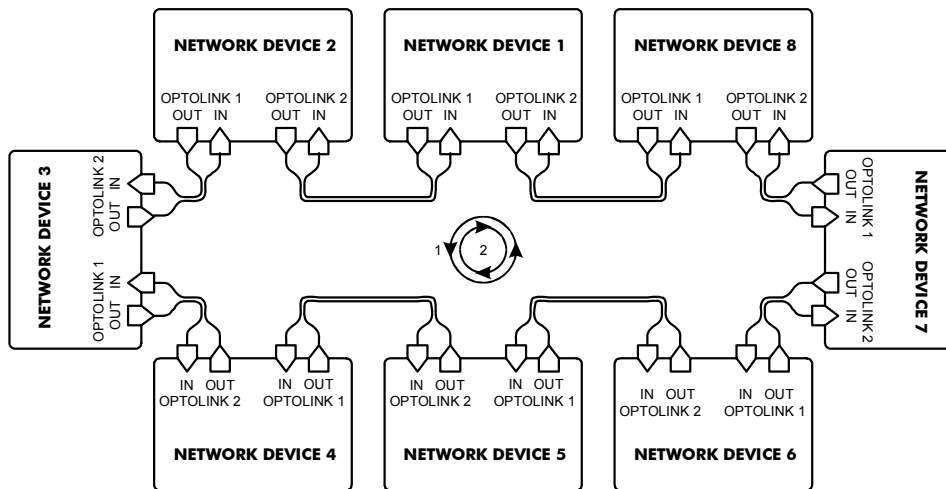
OPTOCORE has found many friends in the pro-audio industry since the launch of the first available systems in 1996.

OPTOCORE® is a registered trademark in Europe, USA and other countries.

OPTOCORE GmbH, based in Munich, supplies a range of OPTOCORE devices in various configurations. Furthermore we welcome OPTOCORE licensees to join the ever increasing OPTOCORE community and to share the multiple benefits of the OPTOCORE network platform. Detailed information on each device can be found in a separate brochure and at our web-site.

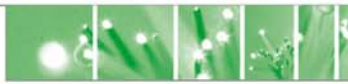
THE NETWORK

STRUCTURE. The OPTOCORE® OPTICAL DIGITAL NETWORK SYSTEM is a fully synchronous ring network featuring a second reverse redundant ring. The synchronous ring structure facilitates the transport of (synchronous) audio and video data whilst keeping latency to an absolute minimum. Alternatively, a network can be reduced to a point to point connection. The network is self-configuring and addressable using unique device IDs. Data flow between any two points in the network may be configured from any unit on the ring. Additionally, the excellent word clock capability of the system is available at all nodes on the ring.



OPTOCORE network showing ring connection and redundant ring

DATA DELAY. The intrinsic signal delay of an OPTOCORE channel through the fibre is extremely small and is dominated by the necessary converting times. All data streams transmitted through similar channel types will appear at all outputs on a network at the same time. Transmission delay is negligible amounting to <200ns for each unit attached to the network. With OPTOCORE transmission there is no summing of delay throughout the units in a network. The processing of AD converted audio signals causes typically a delay of $39/F_S$ and the processing of DA converted audio signals causes typically a delay of $28/F_S$ (F_S = sample frequency). For synchronisation purposes and data re-arrangement another maximum of $2/F_S$ of delay needs to be calculated. The result is a delay of only $69/F_S$ from “analog to digital to light to digital and back to analog”, which calculates to a maximum of 1.44ms @ $F_S=48kHz$ and 0.72ms @ $F_S=96kHz$.



DATA RATES. Maximum data transfer rates at 1Gbps in terms of digital audio are 512 channels @ 48kHz sample rate in each direction within a point to point connection, respectively ≥ 512 channels in a network, depending on the configuration.

NETWORK SECURITY. OPTOCORE network devices include the possibility of connecting a second redundant optical fibre ring and incorporate dual power supplies ensuring maximum system safety with extremely fast, inaudible switching. In the unlikely case of a unit failure, the ring can be closed for the time needed for its replacement simply by connecting its in and out fibre with the help of an adapter.

OPTICAL CONNECTION. The optical data-transmission guarantees an absolute interference-insensitive transmission of audio, video and data signals over great distances, and that with a fraction of the cable weight used in conventional copper-cored systems. Due to the nature of operation, devices on a network are totally electrically isolated from each other. All signal transmissions supported by the OPTOCORE® OPTICAL DIGITAL NETWORK SYSTEM are relayed via a single, 2 pair optical fibre per network ring. Worst case transmission-reach is 700m in multi-mode using a 50 μ m fibre, whilst in single-mode and using a 9 μ m fibre, up to 70km is possible. The dual, 1Gbps full-bandwidth optical interfaces are of the SC-type which are absolutely reliable for installations. For more rugged applications e.g. mobile usage, expanded beam connectors mounted on 1U panels are available, along with matching, inter-connection cables transported on cable drums.

CONTROL FACILITIES. Controlling of all devices is achieved from any point within a network via computer using the OPTOCORE remote control software or a media-access device through the SubD9 connected RS232 input. The USB-port (through a USB device connector) is also for designed for remote controlling and will soon be enabled. The routing and naming of all in- and output channels by means of matrix visualisation, the activating/deactivating and the level metering of any in- and output channel as well as the storage and recall of the configuration set-up to/from PC hard-disk is thus provided.

UPGRADING. All OPTOCORE devices feature fully re-programmable FPGAs, DSPs and microprocessors. Firmware and software update releases can be downloaded from the web site and transferred to the devices in a matter of mouse clicks.

HARDWARE. Products include OPTOCORE NETWORK DEVICES, with high speed redundant optical interfaces and dual power supplies, OPTOCORE CONVERTER DEVICES, which can be connected to the NETWORK DEVICES or used as stand-alone high performance converters, and OPTOCORE ACCESSORIES including various fibre cable solutions.

OPTOCORE FEATURES:

- Ring topology using the least amount of fibres (as opposed to star network systems)
- Built-in system safety due to the employment of a second, redundant reverse loop
- Synchronous design to match the synchronous nature of audio and video data
- Synchronous design keeping latency extremely low: about $\leq 41\mu$ s (!) between any points in the network
- Redundant power supplies in all network modules
- Fast, virtually noiseless, redundant switchover
- Synchronous design with the advantage of excellent word clock transfer with extremely low jitter
- Total configuration from any point in the network via computer
- User-scalability with devices of varying size
- Absolute interference-insensitive transmission of audio, video and data signals over great distances
- Electrical isolation. Network devices in the same rack only share the same housing potential (PE)

APPLICATIONS:

- Professional audio industry
- Concerts, Touring
- Broadcast and Outside Broadcast Vehicles
- Studio
- Film, TV
- Installation
- Alarm systems
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Optocore can be used everywhere where high performance, high security, audio-, video- und data- transmission is required

- over long distances
- using lightweight cables
- with electrical isolation
- with highest security
- in optical-fibre equipped buildings
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The principle of bundling professional audio and video signals on fibre-optic cables is internationally protected by patents. Further patents are pending.