OPTOCORE

OPTOCORE CONNECTS EVERYTHING

The Fiber Infrastructure Solution for the Pro Audio Industry

PRODUCT OVERVIEW

OPTOCORE TIMELINE

1993 OPTOCORE Technology Patent
1996 Release of the first OPTOCORE products
2000 OPTOCORE becomes a network with digital connectivity
2002 OPTOCORE implemented by DiGiCo
2003 OPTOCORE GmbH incorporated
2008 The OPTOCORE network triples in size
2009 Introduction of the R-series hardware platform
2012 The capacity of OPTOCORE is doubled to 2Gb
2014 OPTOCORE devices implemented in DiGiCo fiber system
2014 Clear-Com OEMs OPTOCORE technology creating ProGrid series
2015 Launch of new M-Series MADI Switches

OPTOCORE COMPANY PROFILE

Over the past two decades OPTOCORE has been the most prominent provider of time critical, redundant audio, video and control infrastructure over fiber.

OPTOCORE networks are used in a wide variety of environments, including opening and closing ceremonies of the world's most important events, as well as an alternative to copper infrastructures in OB vans, stadiums, studios and theatres. OPTOCORE systems scale down to point to point portable stageboxes with mixing console integration.

OPTOCORE is based on the open AES3 and AES10 (MADI) standards providing transport, routing, format conversion as well as distribution of audio, video and control data with full management and diagnostic capabilities.

Development and manufacturing

All technologies and products are developed and maintained by an in house R&D team. The R&D department strives for efficient and elegant design of hardware, software and firmware, mindful of planet's resources.

All assembly, testing and burn-in of our products is performed at our manufacturing base in Munich, Germany.

Education and training

OPTOCORE has a deep commitment to training and education. OPTOCORE offers a series of training seminars to educate the industry about OPTOCORE network design and operation as well as give an introduction to the digital audio and fiber optics technology. OPTOCORE Certification Training (OCT) seminars are hosted regularly around the world.

OPTOCORE Certification Training (OCT) is eligible for InfoComm CTS renewal units.

The high bandwidth infrastructure

OPTOCORE is a high bandwidth network designed specifically to meet the requirements of professional audio and data. OPTOCORE offers a unique solution that is flexible and scalable, yet intuitive and easy to use. OPTOCORE is a modern replacement for traditional copper cable plants and manual patching.

Open platform – the Autobahn for your audio, video and control

OPTOCORE is an open platform. Designed to transparently transport and route industry standard signal formats such as MADI, AES/EBU as well as Ethernet, DMX, MIDI, RS-485/422 and CAN BUS.

OPTOCORE converges and simplifies any cabling and patching infrastructure.

OPTOCORE Features

- De-centralized audio, video and data routing
- High capacity
- Control transport
- Low latency
- Redundancy
- Integration options
- Optical isolation
- Low cost of ownership
- Future proof hardware and software
- Scalability
- Lossless long distance transmission

OPTOCORE TECHNICAL PARTNERS

Avid Audio
Snake protocol redundant fiber transport
Snake digital split and format conversion

Axys by Duran Audio
Card interface – DM1-TP
Analog, MADI and AES/EBU interfaces to feed the loudspeakers

BroaMan
BroaMan units equipped with OPTOCORE technology
Full system integration for professional video, audio and data
OPTOCORE adds intelligence, networking and control bit to BroaMan systems

Clear-Com
Intercom interfaces – X6R/V3R-FX-INTERCOM
Matrix – panels redundant fiber transport
Audio, data, video and intercom system integration

DiGiCo
Direct fiber connection with the OPTOCORE network
Analog, MADI and AES/EBU interfaces for Digico ring
OPTOCORE preamps as well as routing control from the console

Fohhn
Card Interface with FX fiber or TP Cat5 connectivity
Analog, MADI and AES/EBU interfaces to feed the loudspeakers

Lawo
Console – stagebox redundant fiber transport
Format conversion
OPTOCORE preamps control from the console

Neumann.Berlin
AES-42 transport
Digital mic intergration

RTS
Intercom interfaces – X6R/V3R-FX-INTERCOM
Matrix – panels redundant fiber transport
Audio, data, video and intercom system integration

Solid State Logic
OPTOCORE preamps control from the console

Soundcraft
Console – stagebox redundant fiber transport
Format conversion
OPTOCORE preamps control from the console

Studer Professional Audio
Console – stagebox redundant fiber transport
Format conversion
OPTOCORE preamps control from the console

Yamaha Commercial Audio
Card interfaces – Y3R-TP, YG2, YS2
Console – stagebox redundant fiber transport
Format conversion
OPTOCORE preamps control from the console

OPTOCORE TOPOLOGY OPTIONS

The OPTOCORE fiber network is capable of:

- up to 1024 audio input channels
- UNLIMITED number of outputs
- 32 routable Serial channels
- Composite Video transport
- Fast Ethernet transport and switching
- up to 24 device networks, expandable to 216 devices using SANE

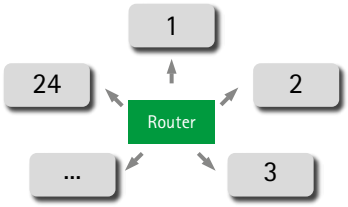
SANE Cat5 network is capable of:

- up to 64 audio input and output channels
- Fast Ethernet transport and switching

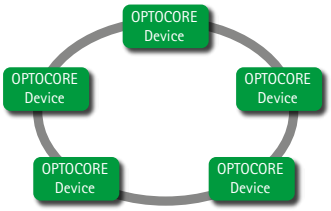
Point to Point Links

Daisy Chains

Star Topology



Ring Topology



OPTOCORE CAN CONNECT EVERYTHING

As an open standard platform Optocore provides universal connectivity to other third party devices. With its ability to transport audio, video, intercom, data over long distances via native fiber protocol, it guarantees the highest degree of flexibility and scalability in the industry.

Fiber
- fiber-based transport platform
- longest distances between the locations
- highest channel count
- point-to-point, star or ring topology
- hum-free environment
- light weight
- low cabling cost

Matrix
- 1024 inputs and unlimited outputs non-blocking matrix
- single-channel routing
- decentralized topology
- matrix crosspoints stored on each device indpendently
- multiple different I/O formats: MADI, AES/EBU, analog, intercom
- control from software or 3rd party equipment

Redundancy
- redundant fiber protocol
- redundant PSU
- redundant sync operation – Word Clock and Video Sync
- extremely fast, non-audible recovery after failure

Integration
- integration of audio, video, intercom, sync, serial and Ethernet data
- simple integration with the Open Standards and 3rd party products
- multiple technology partners
- preamp control from 90% of digital consoles – one stagebox for multiple different desks

State of art products
- designed, manufactured and tested in Germany
- over 20 years of experience with fiber technology and audio networks
- network invented for professional audio and video environments
- lowest, fixed latency on the market 41,6 µs
- low power consumption
- fan-less operation
- large product portfolio with MADI, AES/EBU, INTERCOM and ANALOG interfaces

OPTOCORE ANALOG CONNECTIVITY

X6R – 16 Channel Converter

V3R – 8 Channel Converter

The X6R and V3R platform allows customizable analog, digital and network connectivity utilizing state of the art circuitry for the highest sonic performance and ultimate reliability.

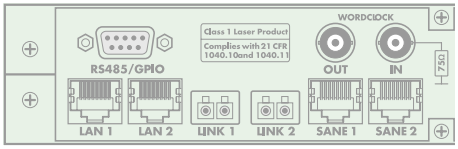
The devices are populated at the time of manufacturing with analog, digital and network options.

Network and Digital Connectivity Options:

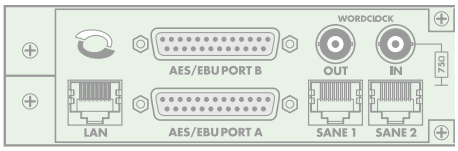
FX – The OPTOCORE fiber network module
allows the converter to be used as a part of a 24 device OPTOCORE redundant ring network.
4 Serial ports - Word Clock I/O - 2 LAN ports - 2 SANE/LAN ports

TP – The SANE Cat5 module
allows the converter to be used as a Cat5 expansion device for OPTOCORE FX devices or as a standalone analog – AES/EBU converter.
16 AES3 I/O - Word Clock I/O - 1 LAN port - 2 SANE/LAN ports

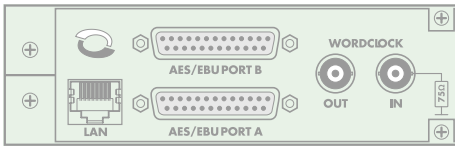
Converters
include AES3 ports for conversion to and from the analog inputs and/or outputs.
16 AES3 I/O - Word Clock I/O - 1 LAN port



FX – OPTOCORE fiber option



TP – SANE Cat5 option



Converter option

V3R Analog Connectivity – Euroblock

The X6R 16 channel converter can be populated with two 8 channel input or output modules for up to 16 inputs, 16 outputs or a mix of 8 inputs and outputs.

The V3R 8 channel converter can be populated with a single 8 channel input or output module.

Analog Devices:

X6R-16MI – 16 Mic Inputs
X6R-DualMI – 8 Dual-Mic Inputs
X6R-16LI – 16 Line Inputs
X6R-16LO – 16 Line Outputs
X6R-8MI/8LO – 8 Mic Inputs, 8 Line Outputs
X6R-8MI/8LI – 8 Mic Inputs, 8 Line Inputs
X6R-8LI/8LO – 8 Line Inputs, 8 Line Outputs

V3R-8MI – 8 Mic Inputs
V3R-8LI – 8 Line Inputs
V3R-8LO – 8 Line Outputs
The above connectivity combinations are available with **FX**, TP network modules; or as standalone **Converters**

X6R-FX-8AE/8MI – 8 AES I/O, 8 Mic Inputs
X6R-FX-8AE/8LI – 8 AES I/O, 8 Line Inputs
X6R-FX-8AE/8LO – 8 AES I/O, 8 Line Outputs

Connectivity Options:

MI – Microphone Inputs - 8 channel microphone preamp.
High quality 1dB analog gain step preamplifiers.

DualMI – Dual Microphone Inputs - 8 channel dual microphone preamp, for a total of 16 network inputs. Each input is fed to two microphone preamps that can be independently routed and controlled on the network.

LI – Line Level Inputs - 8 channel Line Level Input module.

LO – Line Level Outputs - 8 channel Line Level Output module.

AE – AES3 I/O - 16 channel AES3 switchable I/O module.
Available for FX devices in two hardware versions - with or without input Sample Rate Converters. Can be ordered in conjunction with analog input and output modules.

Redundant Power Supply, DC input and XLR panels are available as options.

OPTOCORE INTERCOM CONNECTIVITY

X6R-INTERCOM – 8 Intercom ports with control

V3R-INTERCOM – 4 Intercom ports with control

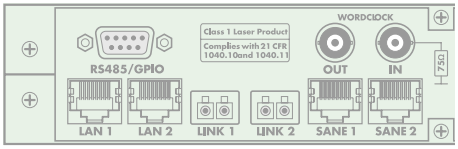
The X6R-INTERCOM and V3R-INTERCOM platform allows customizable intercom, control and network connectivity, utilizing state of the art analog and digital circuitry for ultimate reliability.

The devices are populated at the time of manufacturing with intercom, control and network options.

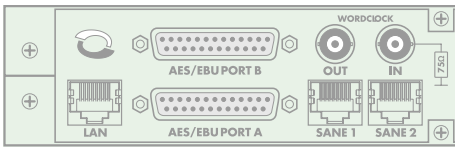
Network and Digital Connectivity Options:

FX – The OPTOCORE fiber network module
allows the intercom unit to be used as a part of a 24 device OPTOCORE redundant ring topology network.
4 Serial ports - Sync - 2 LAN ports - 2 SANE/LAN ports

TP – The SANE Cat5 module
allows the intercom unit to be used as a Cat5 expansion device for OPTOCORE FX devices or as a standalone analog - AES/EBU converter.
16 AES3 I/O - Word Clock I/O - 1 LAN port - 2 SANE/LAN ports



FX – OPTOCORE fiber option



TP – SANE Cat5 option

X6R-FX-Intercom-IC422/IC485/ICAES – Four-Wire or AES3 Intercom ports

V3R-FX-INTERCOM-IC444 – Line Level I/O, GPIO, DC

The X6R-INTERCOM can be populated with two 4 input/output intercom modules for up to 8 inputs/outputs, with an intercom specific control option.

The V3R-INTERCOM can be populated with a 4 input/output intercom module with an intercom specific control option.

Intercom Devices:

X6R-INTERCOM-IC422 – 8 Four Wire Clear-Com Matrix Ports
X6R-INTERCOM-IC485 – 8 Four Wire RTS Matrix Ports
X6R-INTERCOM-IC444 – 8 Line Level I/O and GPIO
X6R-INTERCOM-ICAES – 4 AES/EBU based Intercom four-wire ports

V3R-INTERCOM-IC422 – 4 Four Wire Clear-Com Matrix Ports
V3R-INTERCOM-IC485 – 4 Four Wire RTS Matrix Ports
V3R-INTERCOM-IC444 – 4 Line Level I/O and GPIO

The above combinations are available with FX and TP network modules.

For information about integration with a professional network for 3G/HD/SD-SDI video products please visit www.broaman.com

Connectivity Options:

IC422 – Clear-Com Four Wire Intercom Ports with Serial Control
4 Four Wire Clear-Com Ports with Line Level and RS422 Serial Inputs and Outputs for Clear-Com key panels, matrices and interfaces.

IC485 – RTS Four Wire Intercom Ports with Serial Control
4 Four Wire RTS Ports with Line Level and RS485 Serial Inputs and Outputs for RTS key panels, matrices and interfaces.

IC444 – Line Level Inputs and Outputs, GPIO and DC output
4 Line Level inputs and outputs with optically isolated General Purpose Inputs and relay switched General Purpose Outputs.
Auxiliary DC outputs to power external circuits.

ICAES – AES/EBU Intercom Ports
Four Ports for AES/EBU based intercom systems with fully 32 bit transparent AES3 input and output on a single RJ45 connector, allowing seamless integration with AES-based intercom systems.

Redundant Power Supply and DC input available as options.

OPTOCORE MADI CONNECTIVITY

M12

M12-OPT/BNC

M8-BNC

M-Series standalone optical/BNC MADI switches offer single-channel routing and bridging capabilities. They can be networked and integrated with the optical OPTOCORE® and Cat5 SANE digital network systems. Single unit provides up to eight duplex MADI ports, offering up to 512 input and 512 output digital audio channels.

The devices are designed and built utilizing state of the art digital circuitry for ultimate reliability and operational flexibility.

The M-Series are the perfect main MADI hub units for a wide range of professional audio devices with MADI inputs and outputs such as digital consoles, DAW, playback devices and professional broadcast units. The huge number of channels exchanged by one M-Series device makes it the ideal and the most cost effective interface for digital console systems as well as a perfect central device offering individual channel routing feature.

M12-OPT
8 x duplex optical MADI ports – 512 IN / 512 OUT
2 x high-speed uplinks for OPTOCORE®
2 x SANE ports for MADI Cat5, X6R/V3R/Y3R-TP or LAN connectivity

M12-BNC
8 x dual coaxial MADI ports – 512 IN / 512 OUT
2 x high-speed uplinks for OPTOCORE®
2 x SANE ports for MADI Cat5, X6R/V3R/Y3R-TP or LAN connectivity

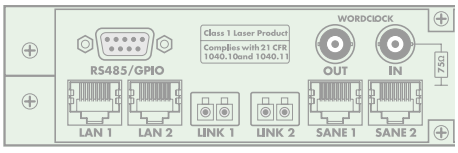
M12-OPT/BNC
4 x duplex optical MADI ports
4 x dual coaxial MADI ports
2 x high-speed uplinks for OPTOCORE®
2 x SANE ports for MADI Cat5, X6R/V3R/Y3R-TP or LAN connectivity

M8-OPT
4 x duplex optical MADI ports – 256 IN / 256 OUT
2 x high-speed uplinks for OPTOCORE®
2 x SANE ports for MADI Cat5, X6R/V3R/Y3R-TP or LAN connectivity

M8-BNC
4 x dual coaxial MADI ports – 256 IN / 256 OUT
2 x high-speed uplinks for OPTOCORE®
2 x SANE ports for MADI Cat5, X6R/V3R/Y3R-TP or LAN connectivity

Network and Digital Connectivity Options:

FX – The OPTOCORE fiber network module
allows the MADI switches to be used as a part of a 24 device OPTOCORE redundant ring topology network.
4 Serial ports - Word Clock I/O - 2 LAN ports - 2 SANE/LAN ports



FX – OPTOCORE fiber option

OPTOCORE MADI CONNECTIVITY

DD2FR-FX – 2 Optical MADI Ports with analog video

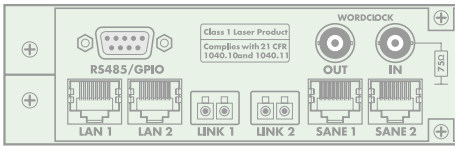
DD4MR-FX – 2 Coaxial MADI Ports with analog video

The DD2FR-FX and DD4MR-FX allow transparent, high capacity, open standard MADI connectivity to and from OPTOCORE networks.

The devices are designed and built utilizing state of the art digital circuitry for ultimate reliability and operational flexibility.

Network and Digital Connectivity Options:

FX – The OPTOCORE fiber network module
allows the converter to be used as a part of a 24 device OPTOCORE redundant ring topology network.
4 Serial ports - Word Clock I/O - 2 LAN ports - 2 SANE/LAN ports



FX – OPTOCORE fiber option

DD2FR-FX – 2 Optical MADI Ports with analog video

DD4MR-FX – 2 Coaxial MADI Ports with analog video

Connectivity Options:

DD2FR-FX
2 Optical 64 channel MADI ports.
Composite Video Input and Output.

DD4MR-FX

2 Coaxial 64 channel MADI ports.
Composite Video Input and Output.

Redundant Power Supplies supplied as standard.

DC input optionally available.

OPTOCORE AES/EBU CONNECTIVITY

DD32R – 64 Channel AES3 device

X6R – 16 Channel AES3 device

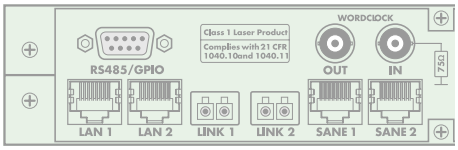
The DD32R-FX and X6R allow customizable AES3 digital and network connectivity.

The devices are populated at the time of manufacturing with connectivity and network options.

The devices are designed and built utilizing state of the art digital circuitry for ultimate reliability and operational flexibility.

Network and Digital Connectivity Options:

FX – The OPTOCORE fiber network module
allows the converter to be used as a part of a 24 device OPTOCORE redundant ring topology network.
4 Serial ports - Word Clock I/O - 2 LAN ports - 2 SANE/LAN ports



FX – OPTOCORE fiber option

DD32R-FX – AES Connectivity – 25DSub

X6R-FX – AES Connectivity – Euroblock

Connectivity Options:

DD32R-FX
32 AES3 pairs. Switchable as I/O in blocks of 4 pairs.
Composite Video Input and Output

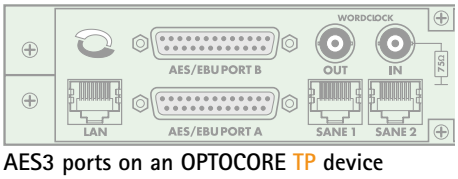
X6R-FX-16AE
8 AES3 pairs. Switchable as I/O in blocks of 4 pairs.

X6R-FX-16AE/SRC
8 AES3 pairs. Switchable as I/O in blocks of 4 pairs.
Inputs equipped with Sample Rate Converters.

X6R-FX-8AE/8MI or 8LI or 8 LO
8 AES3 pairs. Switchable as I/O in blocks of 4 pairs.
8 channel Microphone input, Line Level input/output module that can be used in place of 4 AES3 pairs.

All TP devices are equipped with 16 AES3 pairs assignable to the network, switchable as inputs or outputs in blocks of 4 pairs.

A redundant power supply (standard on DD32R-FX) and DC inputs are available as options.



AES3 ports on an OPTOCORE TP device

AES/EBU Devices:

DD32R-FX – 32 AES3 pairs, Composite Video I/O

X6R-FX-16AE – 8 AES3 pairs

X6R-FX-8AE/8MI – 4 AES pairs, 8 Mic Inputs

X6R-FX-8AE/8LI – 4 AES I/O, 8 Line Inputs

X6R-FX-8AE/8LO – 4 AES I/O, 8 Line Outputs

X6R-FX-16AE/SRC – 8 AES3 pairs with Sample Rate Converters

OPTOCORE INTERFACE CARDS

Y3R-TP – 16/16 Yamaha card

YG2 – 64/64 Yamaha master card

YS2 – 16/16 Yamaha slave card

The Y3R-TP Yamaha card with SANE allows CAT5 connection to an OPTOCORE FX or TP device.

The Y3R-TP card is capable of 16 inputs and outputs. Multiple cards can be daisy chained from a 64 channel input / 64 channel output SANE port on an OPTOCORE FX device.

The Y3R-TP card is capable of transporting and converting the Yamaha HA Remote protocol and Fast Ethernet.

The YG2 and YS2 Yamaha cards allow a redundant fiber connection of a Yamaha mixing console console to a 1Gbit OPTOCORE network.

The YG2 card is capable of 64 inputs and outputs and connection to multiple YS2 slave cards.

A YG2 card is capable of transporting and converting the Yamaha HA Remote protocol and Fast Ethernet.

OPTOCORE OEM MODULES

OPTOCORE is a worldwide known fiber technology provider. Our technology can be found in 3rd party equipment, which can be all integrated with the OPTOCORE products to create small or large digital fiber system.

Each **DiGiCo** console can be equipped with OPTOCORE card enabling fiber connectivity between DiGiCo components as well as OPTOCORE devices.

FOHHN column loudspeakers can be equipped with OPTOCORE or SANE card.

Duran Audio Axys column loudspeakers can be equipped with OPTOCORE or SANE card.

ProGrid system by Clear-Com is based entirely on OPTOCORE technology and design.

Fiber broadcast solutions from **BroaMan** utilise OPTOCORE technology.

MUX22 – all-in-one-box device from BroaMan portfolio is a hybrid solution which integrates professional video with OPTOCORE technology for intercom, AES/EBU, MADI, analog audio and data.

Route66 – the most powerful, flexible device allowing protocol independent routing up to 40 inputs and outputs. With unique feature of automatic fiber optic routing the most advanced device in the Broaman lineup.

For more information about BroaMan products please visit www.broaman.com

OPTOCORE ACCESSORIES

OptoCable 4/150

OptoCable 4/150

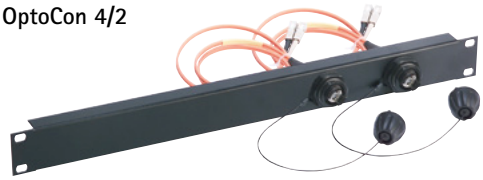
150m rugged environment cable mounted to Expanded Beam plugs on a special rubber cable drum OCD-R

OptoCon 4/1 – OptoCon 4/2

One or two expanded beam bulkheads mounted on a 1 U front panel
Each bulkhead is equipped with 2 lenses (maximum: 4)

OptoCon 4/1

OptoCon 4/2



Custom cables, connectors and accessories available upon request

OPTOCORE CONTROL SOFTWARE

The software enables complete control over an OPTOCORE network. It enables access to the patching matrix of all devices in the entire network and lets you remotely control and monitor connected devices, such as converter modules (gain setting, phantom power, input and output level readings).

OPTOCORE Control

The software allows the configuration of and access to the complete network, audio, data and video MATRIX, the naming and gain of all inputs, the configuration of the word clock, the provision of phantom power for all mic inputs, the storage and recall of the configuration set-up to/from PC hard disk, as well as the real-time level display of the individual channels.

Supervising the Network

Working in ON-LINE mode gives the possibility to control the complete network. Software automatically and in the real time alerts the system manager after every significant event, such as input clipping, fiber/CAT5 disconnection, RS232/USB/LAN connection status. A log window will automatically pop up on event, if desired.

Input-output, Matrix and Patch

Any input of the system can be routed to any output by means of the Matrix tab. One input can be routed to more than one output.

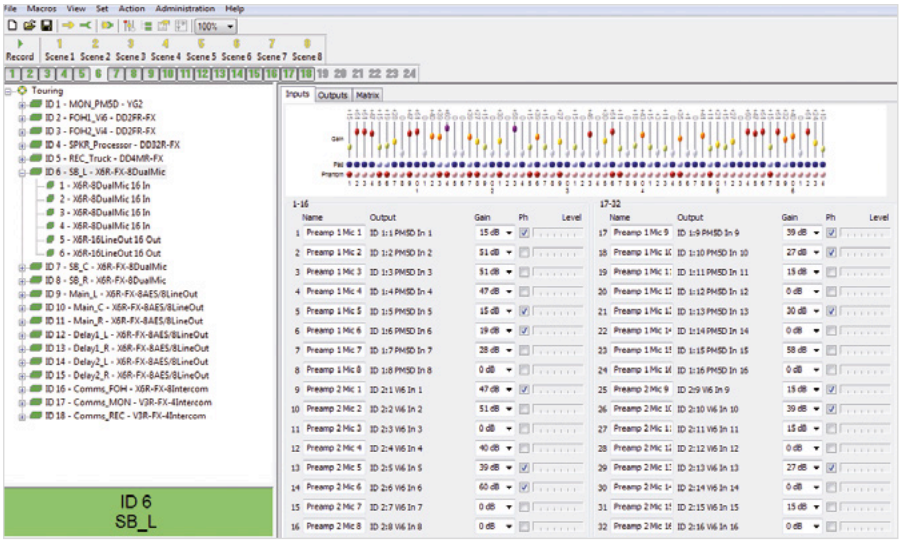
RS485 and Video Settings

RS485 and video patch is confirmed by the local setting window, locally or via the network.

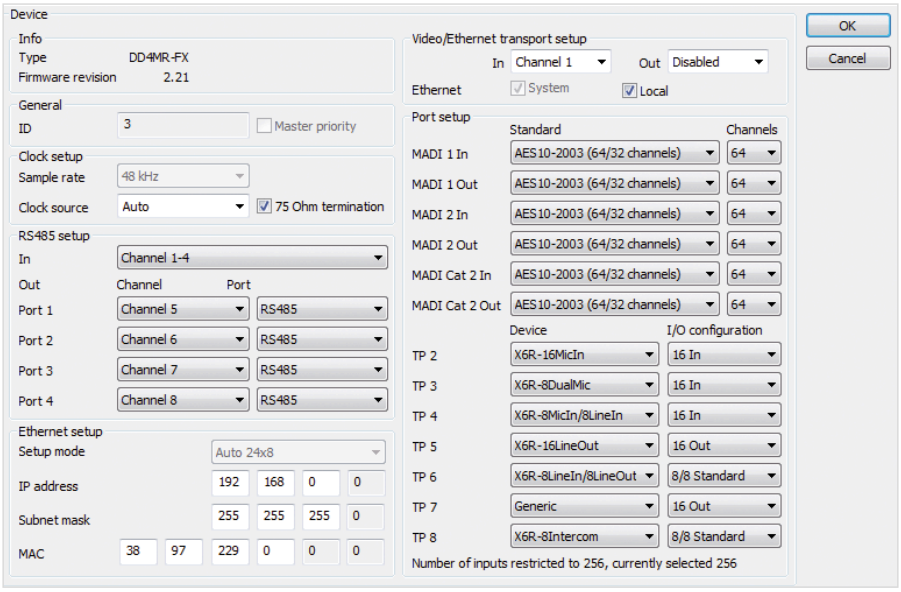
Specials

The OPTOCORE control protocol can be used by interested manufacturers or customers to control OPTOCORE devices directly from hardware other than a computer (mixing desks, media controller, control boxes, etc.). This is currently being implemented by various manufacturers, including DiGiCo®, Soundcraft, LAWO, Solid State Logic and Yamaha®, allowing gain/phantom control of analog OPTOCORE devices (X6, X6R, V3R) directly from their digital consoles.
OPTOCORE Control software can be downloaded free of charge from the OPTOCORE Website.

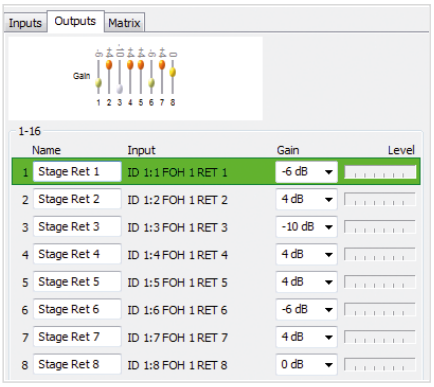
OPTOCORE Control Software – Input Tab



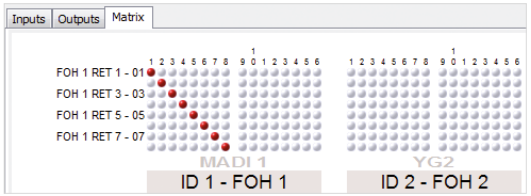
Local Settings



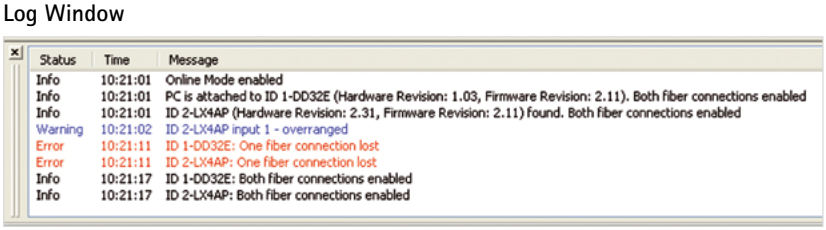
Output Tab



Patching Matrix



Log Window



SELECTED OPTOCORE SYSTEMS IN OPERATION

Broadcast

NRK – Norway
SIS Live – UK
Arena TV – UK
BBC – UK
NBC Studios – USA
Mediaset OB Van 27 – Italy
Coronation Street - UK
Videohouse – Belgium
SR – Germany

Installations

Cirque du Soleil Michael Jackson the ONE - Las Vegas, Nevada, USA
Royal Opera House – Muscat, Oman
Hard Rock Live - Biloxi, Mississippi, USA
National Theatre - London, UK
Komische Oper - Berlin, Germany
Moscow Art Theatre - Moscow, Russia
New Zealand Parliament - Wellington, New Zealand
Olympic Stadium - Berlin, Germany
Pittsburgh Hockey Arena, Consol Energy Center - Pittsburgh, Pennsylvania, USA

Live sound and events

2015 South East Asia Games – Singapore
2015 European Games – Baku, Azerbaijan
2014 Winter Olympic Games - Sochi, Russia
2012 Summer Olympic Games - London, UK
2008 Summer Olympic Games, – Beijing, China
2004 Summer Olympic Games, – Athens, Greece
Kuwait 50th Constitution Day - Kuwait City, Kuwait
Coldplay "Mylo Xyloto" World Tour
Grammy Awards – Los Angeles, USA

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