BroaMan

Broadcast Manufactur

Case Study

Broadcast Studio

SVT – Swedish Television, Stockholm

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A well-known manufacturer of fibre based solutions for the audio industry has provided a complete SD/HD/3G-SDI video solution using the DiViNe (Digital Video Network) transport platform.

In 2011 representatives of Studio Hamburg MCI approached Marc Brunke's design team to come up with a video routing solution for the new studio facility at the Swedish Television (SVT).

Marc Brunke formed a new company, BroaMan GmbH, based on the experience gained from Optocore, which has traditionally provided optical fibre network solutions for the large-scale events industry, and went to work on a modular transport and routing system that lead to the creation of DiViNe - The Digital Video Network.

Using the DiViNe modules, BroaMan came up with a unique proposal consisting of four independently configured automatic routing systems using a modern, fibre-based video StageBox concept.

"The ability to do this had not existed previously," explained Marc Brunke, "The customer is not willing to pay extra for something he is not going to use. In this project the system has been entirely cost-optimised to the needs of the customer using the modular components of the DiViNe platform. Upon connection, the system discovers where the portable StageBox is connected and the central Video Router routes the assigned channels to the correct position."

The devices offer routing and signal repeating, as well as the ability to convert the signal from electrical (BNC) to optical (fibre). Every product was configured independently to offer the most suitable solution for the customer.

The Video Router

The first and the most powerful system is based around a centralized Video router with 8 portable StageBoxes that can be connected to any of the 32 wallboxes within the studio facility.

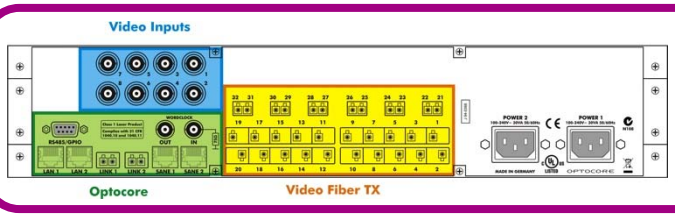
The central routing system is based on Route66 2RU frames:

- Four of the frames are configured as 3G-SDI to fibre converters with routing capabilities. Providing sends to the portable StageBoxes.
- One frame is configured as fibre to 3G-SDI converter with routing capabilities. Providing returns from the portable StageBoxes.
- One frame is configured as an OPTOCORE router. Providing management and discovery for the network.
- Two CWDM modules. Providing multiplexing to the 32 wallboxes within the studio.

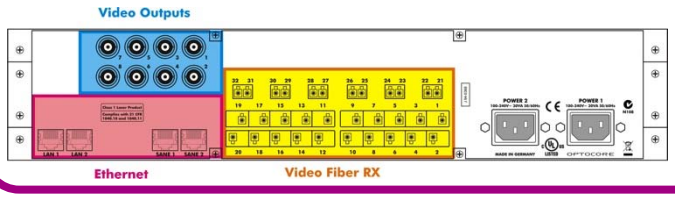
The routing is fully automatic and based on the assigned ID of the portable StageBox. It does not matter to which of the 32 wallboxes a StageBox is connected to. The router will automatically discover the StageBox and route the 4 3G-SDI sends, 1 3G-SDI return and RS422 serial control signals assigned to the portable StageBox to the wallbox.

System components

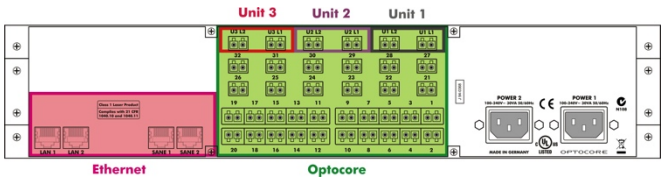
Video Router - 8 x 32 System



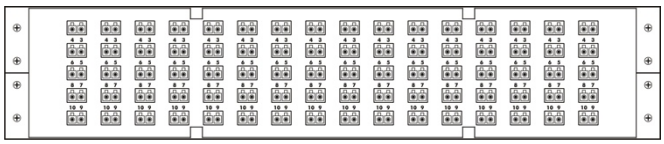
Route66 configured with
8 x 3G-SDI In
32 x Video Fibre TX
Optocore Module
Video Router Unit 1-4



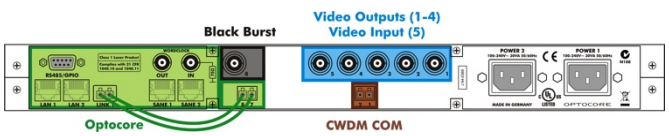
Route66 configured with
8 x 3G-SDI Out
32 x Video Fibre RX
Ethernet Module
Video Router Unit 5



Route66 configured with
38 x Optocore Fibre TRX
Ethernet Module
Video Router Unit 6



WDM configured with
16 x CWDM COM ports 5+1
Passive device
Video Router Unit 7-8



Repeat33 configured with
4 x 3G-SDI Out, 1 x BB
1 x 3G-SDI In
1 x CWDM port
Optocore Module
Video Router Stagebox 1-8

Detailed setup

DiViNe frame	Hardware Configuration	ID Number	Location	Function
Route66 2RU	8 x 3G-SDI IN 32 x fibre TX Optocore Module	11	Equipment Room	**Video Router** Channel 1 to StageBoxes 1-8
Route66 2RU	8 x 3G-SDI IN 32 x fibre TX Optocore Module	12	Equipment Room	**Video Router** Channel 2 to StageBoxes 1-8
Route66 2RU	8 x 3G-SDI IN 32 x fibre TX Optocore Module	13	Equipment Room	**Video Router** Channel 3 to StageBoxes 1-8
Route66 2RU	8 x 3G-SDI IN 32 x fibre TX Optocore Module	14	Equipment Room	**Video Router** Channel 4 to StageBoxes 1-8
Route66 2RU	8 x 3G-SDI OUT 32 x fibre RX Ethernet Module	15	Equipment Room	**Video Router** Return Channel 1 from StageBoxes 1-8
Route66 2RU	38 x fibre TRX Ethernet Module	16	Equipment Room	**Video Router** Optocore Router
WDM 2RU	CWDM 4+1 Duplex	no ID	Equipment Room	**Video Router** MUX/DEMUX, COM ports 1-16
WDM 2RU	CWDM 4+1 Duplex	no ID	Equipment Room	**Video Router** MUX/DEMUX, COM ports 17-32
Repeat33 1RU	4 x 3G-SDI OUT 1 x 3G-SDI IN 1 x Black Burst 1 x duplex fibre COM port Optocore Module	1-8	Portable	**Video StageBox**

The Camera and Ceiling Router

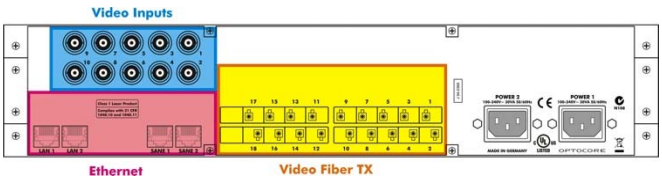
The second system consists of two Camera routers and one Ceiling router with 3G-SDI inputs and fibre transmitters, providing outputs to 15 portable StageBoxes.

Routing is controlled with the VSM controller provided by the company LSB. Integration with other controllers is optional.

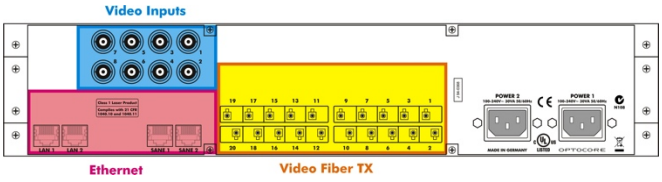
System components

Camera / Ceiling Router System

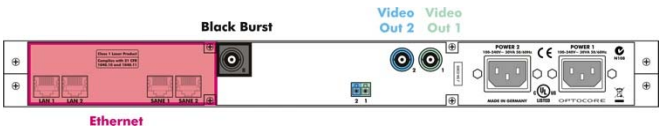
Route66 configured with
10 x 3G-SDI In
18 x Video Fibre TX
Ethernet Module
Camera Router 1-2



Route66 configured with
8 x 3G-SDI In
20 x Video Fibre TX
Ethernet Module
Ceiling Router



Repeat33 configured with
2 x 3G-SDI Out
2 x Video Fibre RX
Ethernet Module
Camera/Ceiling StageBox 1-15



Detailed setup

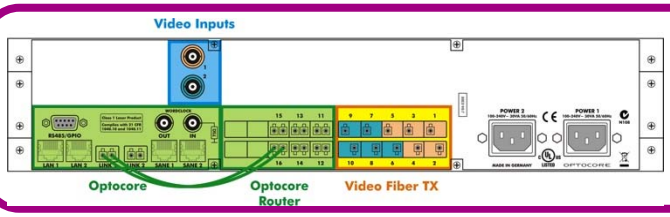
DiViNE frame	Hardware Configuration	ID Number	Location	Function
Route66 2RU	10 x 3G-SDI IN 18 x fibre TX Ethernet Module	17	Equipment Room	**Ceiling Router #1** VSM controlled 10 x 18 routing
Route66 2RU	10 x 3G-SDI IN 18 x fibre TX Ethernet Module	18	Equipment Room	**Ceiling Router #2** VSM controlled 10 x 18 routing
Route66 2RU	8 x 3G-SDI IN 20 x fibre TX Ethernet Module	19	Equipment Room	**Camera Router** VSM controlled 8 x 20 routing
Repeat33 1RU	2 x fibre RX 2 x 3G-SDI OUT 1 x Black Burst Ethernet Module	no ID	Portable	**15 x Camera/Ceiling StageBoxes**

The Light Car Router

The third system consists of one Light Car router based on a Route66 frame and one portable StageBox based on a Repeat33 frame. As in the Video router system, the Light Car router provides automatic routing. Video is routed together with the OPTOCORE stream from the centralized Route66 2RU frame.

Connection between the Light Car router and the portable StageBox is possible in five different locations using a 4 core fibre cable.

System components



Route66 configured with
2 x 3G-SDI In
10 x Video Fibre TX
Optocore 5-port Router
Light Car Router

Repeat33 configured with
2 x 3G-SDI Out
2 x Video Fibre RX
Optocore Frame
Light Car Stagebox

Light Car Router System

Detailed setup

DiViNE frame	Hardware Configuration	ID Number	Location	Function
Route66 2RU	2 x 3G-SDI IN 10 x fibre TX 6 x fibre TRX Optocore Module	20	Equipment Room	**Light Car Router** 2 x 5 automatic routing
Repeat33 1RU	2 x fibre RX 2 x 3G-SDI OUT 1 x Black Burst Optocore Module	no ID	Portable	**Light Car StageBox**

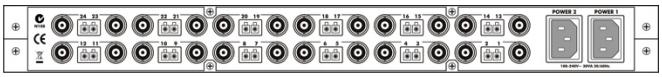
Electrical-Optical-Electrical converters

The fourth system consists of multiple Repeat48 devices that convert and distribute approximately 200 3G-SDI channels throughout the facility. Due to the modular design, each device provides a different number of I/O interfaces, adding flexibility to the overall system design.

System components

Standalone 3G-SDI to fibre converters

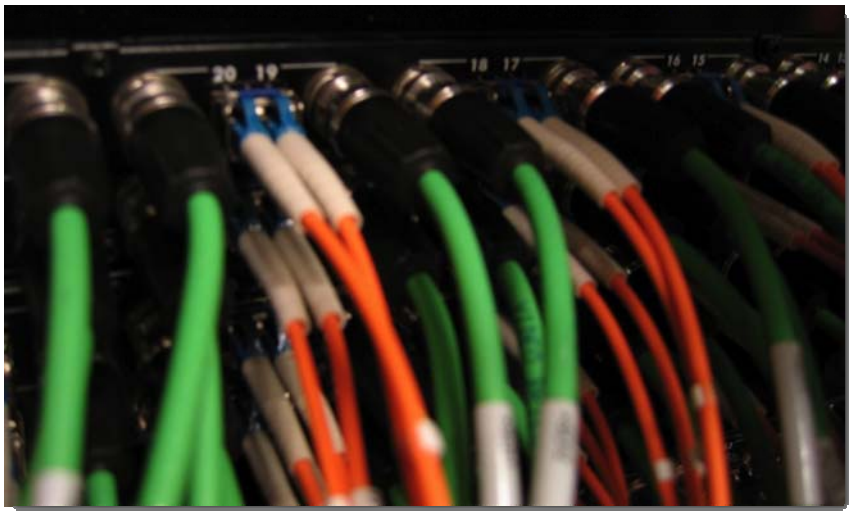
Repeat48 configured with
different number of dual
3G-SDI In – fibre TX and/or
3G-SDI Out – fibre RX
E-O-E converters 1-19



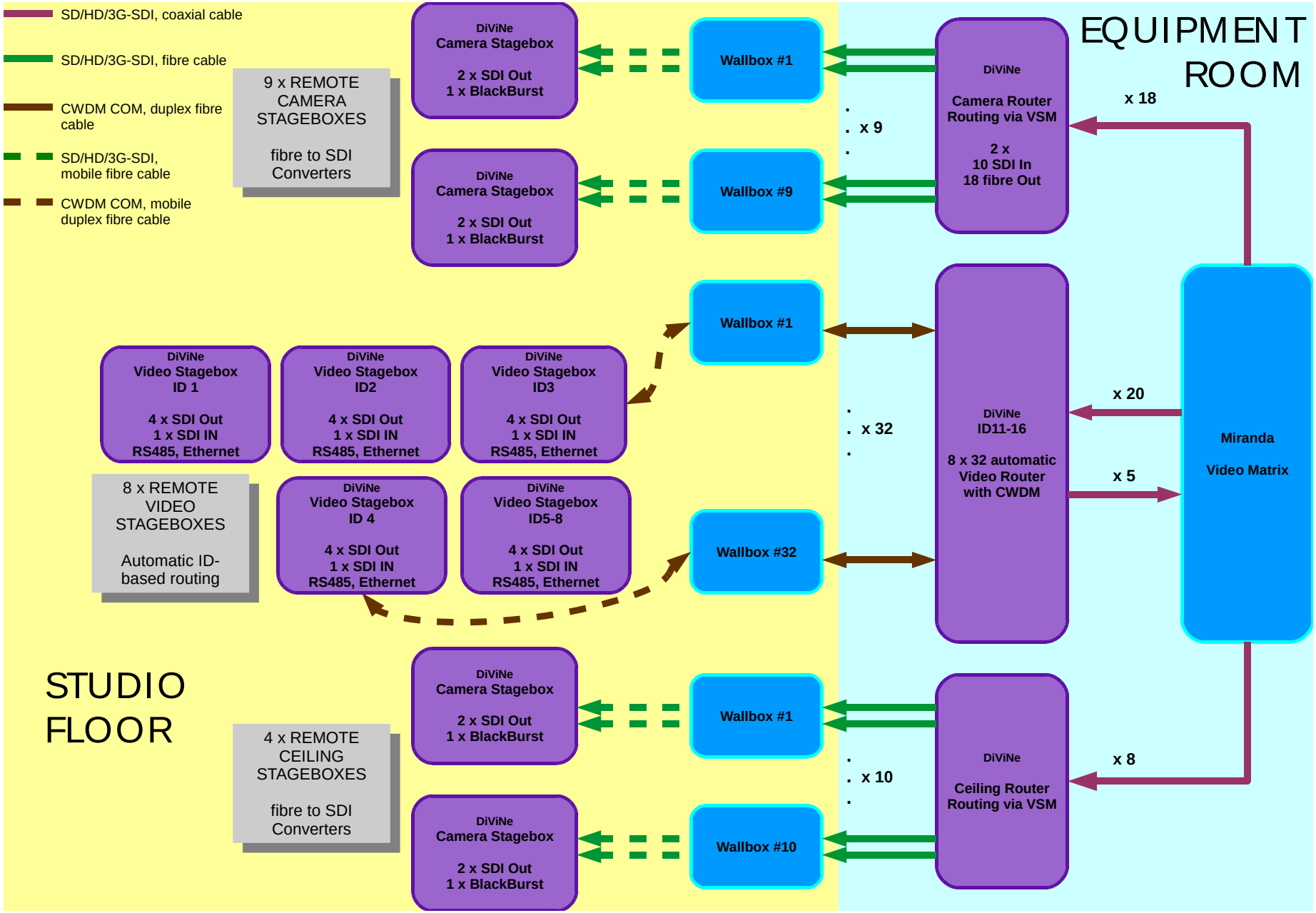
Detailed setup

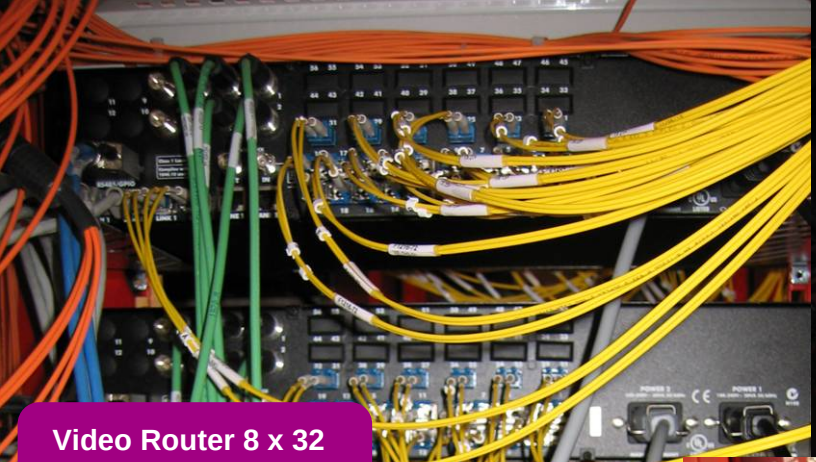
DiViNE frame	Hardware Configuration	Number of devices
Repeat48 1RU	2 x 3G-SDI IN, 2 x fibre TX 2 x 3G-SDI OUT, 2 x fibre RX	2
Repeat48 1RU	2 x 3G-SDI IN, 2 x fibre TX 4 x 3G-SDI OUT, 4 x fibre RX	1
Repeat48 1RU	8 x 3G-SDI OUT, 8 x fibre RX	1
Repeat48 1RU	24 x 3G-SDI IN 24 x fibre TX	6
Repeat48 1RU	18 x 3G-SDI IN 18 x fibre TX	1

DiViNE frame	Hardware Configuration	Number of devices
Repeat48 1RU	18 x 3G-SDI OUT 18 x fibre RX	2
Repeat48 1RU	16 x 3G-SDI OUT 16 x fibre RX	4
Repeat48 1RU	14 x 3G-SDI OUT 14 x fibre RX	1
Repeat48 1RU	22 x 3G-SDI OUT 22 x fibre OUT	6



System diagram





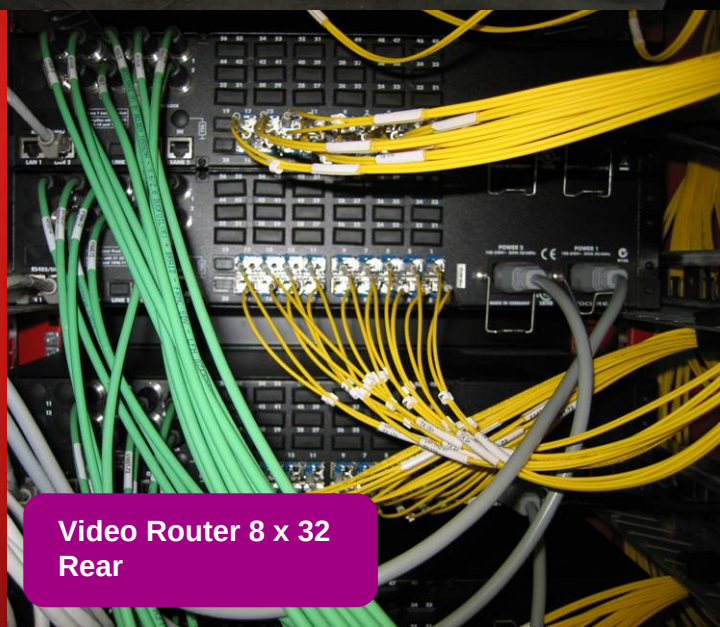
Video Router 8 x 32
Rear

Repeat48 E-O-E
Converter Rear

Video Router 8 x 32
Route66 Front

Video Router 8 x 32
Front

Camera/Ceiling Stagebox
Front



Video Router 8 x 32
Rear