![BroaMan – Broadcast Manufacture logo]
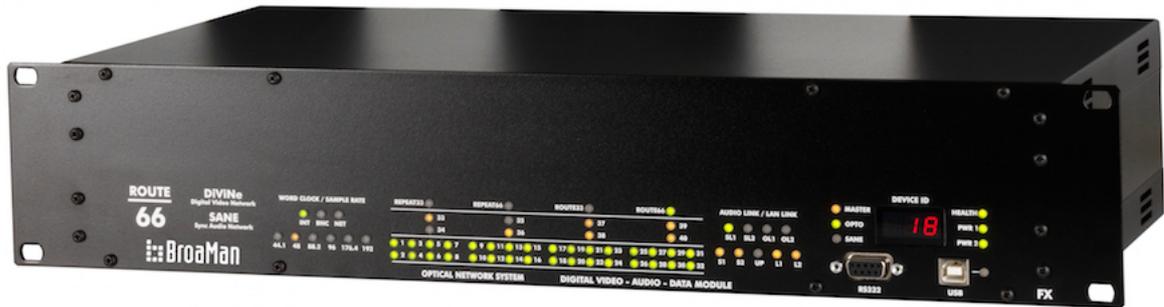
**Operating Manual for
DiViNe Route 66**

Digital Video Network device with Optocore and SANE

DiViNe – Digital Video Network
Operating Manual
Rev. 1.2

Important Safety Instructions

- **Please read this manual carefully.**

- **Please keep this operating manual in a safe place.**

- **Heed all warnings.**

- **Follow all instructions.**

- **This device may only be used in accordance to the information provided in this operating manual. Ensure that all recommendations, especially the safety recommendations as detailed in this operating manual, are followed before and during the usage of the device.**

- **Do not use this device near water, for example, in humid or damp rooms.**

- **Clean only with a dry cloth.**

- **Do not block or cover any ventilation slits. Install the device in accordance with the operating manual.**

- **Do not install or place the device near any heat source such as radiators, power-amplifiers, or any other heat producing equipment.**

- **Protect the power cord from being stepped on, crushed, pinched or damaged in any other way. Pay special attention to plugs and sockets of the device.**

- **Do not place this device on an unstable table, tripod, cart, etc. The device may fall, causing serious damage to the device.**

- **The device can be disconnected from the power supply by pulling the plug. These must be freely accessible at all times. The device should be disconnected during lightening storms or when unused for long periods of time.**

- **The device must be grounded; any disconnection of the grounding is not permitted.**

- **The internal components of the switched-mode power supplies operate at very high voltages. Coming into contact with them can lead to considerable electric shock, which may result in death.**

- **Only use attachments specified by the manufacturer.**

- **This device contains no user serviceable parts: only refer to authorised, qualified service personnel for any servicing.**

- **Your warranty will be voided if you tamper with the internal components.**

Purchaser Information

- **Operating Manual**

Please read this manual – if you call for technical support, we will assume that you have already done so. Study the operating manual carefully in order to familiarise yourself with the device and its operation. It contains vast amounts of information and tips for the proper use of the device.

It cannot be excluded that this operation manual may show typographical mistakes or misprints; it is however regularly revised.

Modifications, which serve the purpose of technical improvement of the device, may be carried out without prior notification.

- **Transport and Shipping**

Always ensure the careful handling of the device. If possible, transport or shipping should always occur in special, shock-absorbing transport cases. If these are not available, we recommend well-padded packaging such as the coated carton in which the device was delivered.

We strongly advise against the use of simple flight-cases without rack-in-rack mounting.

- **Environments**

This device can be used in E1, E2, E3, E4, or E5 environments (as listed below) according to the harmonised European standards EN55103-1 and EN55103-2 "Electromagnetic compatibility – Product family standard for audio, video and audio-visual and entertainment lighting control apparatus for professional use"

E1-Residental

E2-Commercial and light industrial

E3-Urban outdoors

E4-Controlled EMC environment e.g. broadcast and TV-studio

E5-Heavy industry

The product is intended for use in moderate climates.

- **Ventilation**

Do not block or cover any ventilation slits. Install the device in accordance with the operating manual. Leave sufficient ventilation space around the units (at least approx. 200 mm ≡ 7,87" free space behind the rear-panel) and care to allow free air movement near the ventilation-slits on both sides of the device. Keep the rear of the rack open during operation. Do not set up the device close to equipment producing a lot of heat, for example power-amplifiers. Leave enough space (minimum ½ RU) to any heat emitting device in the same rack. A Route 66 device may be placed on top or beneath other BroaMan products, without additional space.

- **Water and Moisture etc.**

To prevent fire or shock hazard do not expose the device to the effects of direct sunlight, dust, water, or rain during operation or storage.

- **Cleaning**

Only use a dry linen cloth to clean the device. If the unit is very dirty, moisten a cloth using a little water and a small amount of household detergent. Never use cleansing agents containing solvents to clean the device.

- **Operating and Storage Temperature**

Operating temperature: -20°C …50°C ≡ -4°F … 122°F; ensure proper ventilation

Storage temperature: -20°C …60°C ≡ -4°F … 140°F

- **Power Supply**

The device can be disconnected from the power supply by pulling the plug. These must be freely accessible at all times. The device should be disconnected during lightning storms or when unused for long periods of time. The switched-mode power supplies operate with very high voltages. Coming into contact with them can lead to considerable electric shock, which may result in death.

Never disconnect the main plug by pulling the cable, always pull the plug itself.

Power-supply cords should be routed in such a way that they are not likely to be walked on, crushed, pinched, or damaged in any other way. Pay special attention to the plugs and the sockets of the device.

Replace a damaged power cable immediately.

The device must be grounded; any disconnection of the grounding is not permitted. Always ensure the correct grounding of the device via the main plug. Never cover the grounding terminal of the plug by means of insulation material!

- **Fuse**

There exists no fuse inside the device. The power supplies are protected for overload conditions due to their circuitry.

- **Lightning**

For additional protection of this device during lightning storms, or when it is left unattended and unused for a long period of time, unplug the power cord. This will prevent damage to the device due to lightning and power line surges. Disconnection from the mains power supply can only be achieved by removing the plug from the mains socket.

- **Interference by means of external objects and/or liquids with the device**

Never push objects of any kind into the device through openings in the casing. They may come into contact with dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the device.

- **Cables and Accessories**

Only use attachments specified by the manufacturer.

Only use high quality cable to connect the device. For the optical data connection, you should exclusively use the specified optical waveguide cables. If not in use, ensure that the optical connectors of both the device and waveguide are covered with the provided caps.

Do not place this device on an unstable table, tripod, cart, etc. The device may fall, which can cause injury and serious damage to the device. Any mounting of the device should follow the manufacturer's instructions, and should use mounting accessories recommended by the manufacturer.

- **Servicing**

Do not attempt to service this device yourself.

This device contains no user serviceable parts: only refer to authorised, qualified service personnel for any servicing.

The opening of the device is not required for operation as there are no user serviceable components located inside the device. The operation of an opened device is not permitted. It can lead to damage of components due to the absence of required ventilation. The device may not be serviced, altered or modified without authorisation from BroaMan or an BroaMan authorised distributor / dealer. Only qualified service personnel may carry out repair and maintenance work. The warranty will be voided if unauthorised maintenance has occurred.

CE/FCC Conformity

This document confirms that the product Route66 bearing the CE (Communauté Européenne*)* label meets all requirements in the EMC directive 2004/108/EG laid down by the Member States Council for adjustment of legal requirements. Furthermore the product complies with the rules and regulations of the low-voltage directive 2006/95/EG and the Restriction of Hazardous Substances Recast Directive 2011/65/EU (RoHS 2). This product bearing the CE label complies with the following standards, ratified by CENELEC (Comité Européen de Normalisation Electrotechnique):

Electromagnetic compatibility – Product family standard for audio, video, audio-visual and

entertainment lighting control apparatus for professional use

EN 55103-1, Emission

EN 55103-2, Immunity

EN 60065, Safety requirements

FCC notice
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by Broadcast Manufactur GmbH and Clear-Com, LLC, an HME company could void the user's authority to operate this equipment.

Industry Canada Compliance Statement
This Class[A] digital device complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada
Cet appareil numérique de la class[A] est conforme à la norme NMB-003 du Canada.

The authorised declaration and compatibility certification lies with the manufacturer and can be viewed on request. Responsible as manufacturer is:

Broadcast Manufactur GmbH, Lohenstr. 8, 82166 Munich-Gräfelfing, Germany

Represented by Marc Brunke, Technical Director

N.B. The awarding of the CE label confirms the compliance with legal directives issued for the manufacture and marketing of electronic and electrical devices. As such the CE label is not a "seal of quality" but rather proof that the device bearing the CE label is conform with the electromagnetic compatibility standards laid down in the above named testing regulations.

Munich, 05.06.2014

Marc Brunke

DiViNe Route 66 – Digital Video Network with Optocore and SANE

Table of Contents

Device Description

Congratulations on your purchase of a DiViNe Route 66 - SD/HD/3G to fiber Video Router with Optocore and SANE. The Route 66 series manual will quickly demonstrate its advantages and help to ease your day to day workload in a professional audio visual environment.

DiViNe stands for Digital Video Network. It enables routing, repeating and transport of multiple professional video signals over fiber infrastructure. DiViNe enables also multiplexing and demultiplexing video – distributing high number of video channels through one cable.

DiViNe Route 66 is a customised product tailored to every single customer and project, which enables to send, receive, multiplex, demultiplex and convert professional video signal. Additionally Route 66 offers interfaces for well known Optocore and SANE audio and data networks. The device is configured by the manufacturer. Router offers routing, repeating and converts the signal from electrical (BNC) to optical (fiber). Every single Route 66 product is different and customised to meet even the most sophisticated requirements.

Route board is capable of handling up to 66 video channels.

Each Route66 is being delivered in 2RU frame which is equipped with up to 24 BNC ports for SD/HD/3G video, 20 duplex LC fiber ports, and additionally up to 36 simplex LC fiber ports..

Additionally Route 66 is equipped with standard FX board, known from Optocore R-Series product range. It enables transport of up to 1024 audio inputs (unlimited number of outputs) by redundant fiber LC links, 64 audio channels on Cat5-based SANE network, 4 RS485/422 channels, two LAN ports and synchronisation with the external devices by Word Clock input and output.

Route 66 can be also used as Optocore router, enabling a star topology for the ring-based Optocore concept.

Front panel remains the same for every single hardware configuration of the Route 66 product; however the back panel differs depending on the requirements. The concept layout remains the same for every use, but number of interfaces may be changed. Following chapter describes the meaning of all LEDs on front panel and the layout of interfaces in the back.

Front Panel

2RU frame
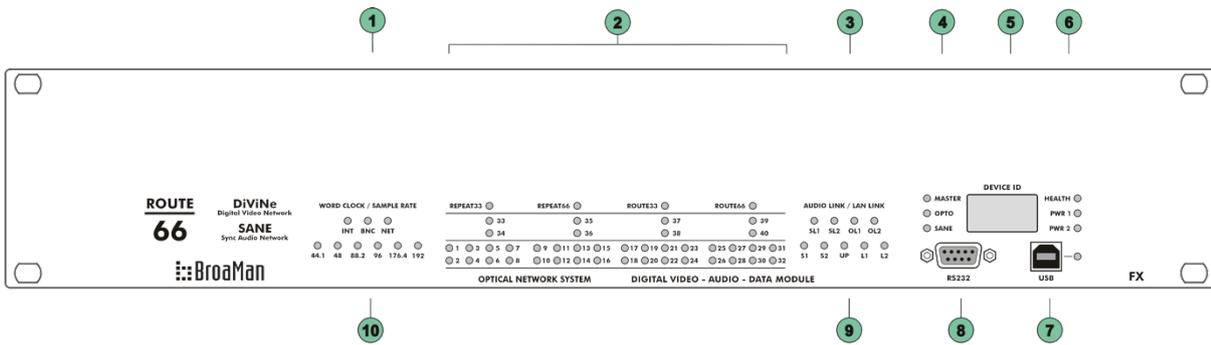
|		
1	**Word Clock LED:**	Indicates the selected word clock source: INT: Internal word clock BNC: External via BNC Input AES: External via AES
2	**Router status LED:**	Indicates that the device is set to work as: Repeat33: 33 video channel repeater Repeat66: 66 video channel repeater Route33: 33 video channel router Route66: 66 video channel router
	ACT LED	Signal status of channels 1-40: LED ON: Signal is present LED OFF: No signal is present
3	**AUDIO LINK:**	
	SL1:	Communication is established via SANE 1 (rear panel)
	SL2:	Communication is established via SANE 2 (rear panel)
	OL1:	Communication is established via Optocore LINK 1 (rear panel)
	OL2:	Communication is established via Optocore LINK 2 (rear panel)
4	**Master LED:**	Indicates the master unit
	OPTO LED:	Optocore communication is established
	SANE LED:	SANE communication is established
5	**Device ID Display:**	Indicates the identification number of the device
6	**HEALTH LED:**	Green: Power supply is correctly working, temperature is below the limit
	PWR 1 LED:	Power supply 1 is working correctly
	PWR 2 LED:	Power supply 2 is working correctly
7	**USB plug and LED:**	USB connection for remote control via PC Green: Indicates data activity

(8)   **RS232 plug:**   D-Sub-9 RS232 connection for remote control and update via PC

(9)   **LAN LINK:**

S1:	Ethernet communication is established via SANE 1 (rear panel)
S2:	Ethernet communication is established via SANE 2 (rear panel)
UP:	There is other device with physical Ethernet port enabled on the network
L1:	Ethernet communication is established via LAN 1 (rear panel)
L2:	Ethernet communication is established via LAN 2 (rear panel)

(10)   **POWER / MUTE**   Mic Card Phantom Power / Output Card Mute

(11)   **Sample rate LED:**   Yellow: 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz

Rear Panel – 2RU frame
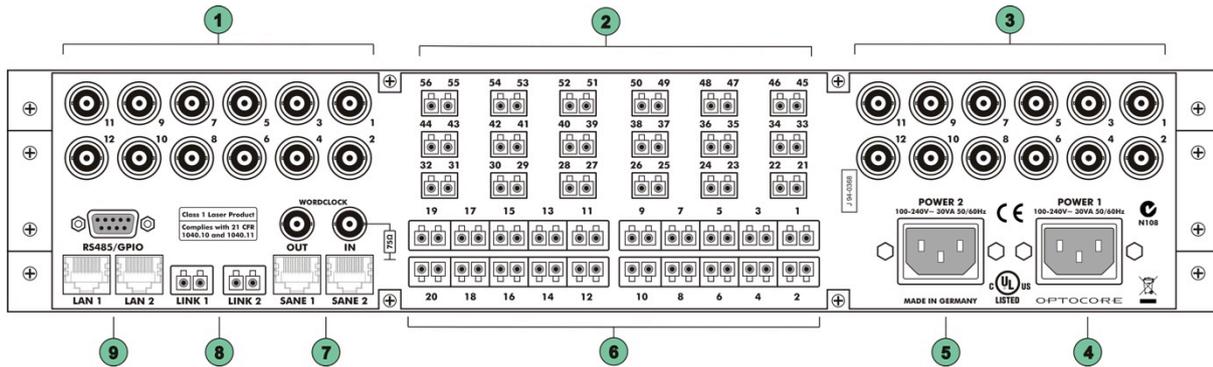
	1	Video ports 1-12:	Up to 12 SD/HD/3G Video ports configured by manufacturer as inputs or outputs
	2	Fiber ports 21-56:	Up to 36 fiber ports with TX or RX. Each port can be configured by manufacturer as transmitter/receiver of Video Link or Optocore Link for Optocore Router
	3	Video ports 13-24:	Up to 12 SD/HD/3G Video ports configured by manufacturer as inputs or outputs
	4	POWER 1:	Mains input for power supply 1 (100 … 240 V)
	5	POWER 2:	Mains input for power supply 2 (100 … 240 V)
	6	Fiber SFP ports 1-20:	Up to 20 user-changeable SFP fiber ports with TX and RX. Each port can be configured by manufacturer as Video Link or Optocore Link for Optocore Router
	7	Word Clock IN:	BNC Word clock input allows synchronization of Optocore devices to an external word clock source
		Word Clock OUT:	BNC Word clock output for synchronization of external devices
		SANE 1:	SANE RJ-45 interface for data transmission + 100 Mbit Ethernet
		SANE 2:	SANE RJ-45 interface for data transmission + 100 Mbit Ethernet
	8	LINK 1:	Full-duplex, full bandwidth LC-type optical interface for data transmission
		LINK 2:	Full-duplex, full bandwidth LC-type optical interface for data transmission
	9	RS485/GPIO plug:	D-Sub-9 RS485 AUXILIARY PORT for data transmission
		LAN 1:	100 Mbit RJ-45 Ethernet interface
		LAN 2:	100 Mbit RJ-45 Ethernet interface

Device Details

Video BNC Ports

Each of maximum twelve video I/O port is equipped with high quality BNC connector providing interface for SD/HD/3G. Each connector may represent input or output.

Video Fiber Ports

Video from/to SD/HD/3G is routed or repeated to fiber ports. Video fiber ports may be connected to CWDM module to multiplex/de-multiplex video together with audio. Each video port may be equipped with different wavelength, enabling MUX and DEMUX. Video Fiber Ports are configurable by manufacturer, can be used as TX or RX, depending on requirements. Also each port may be used as fiber link to the Optocore router.

Optocore Fiber Optic Connection

The OPTOCORE ® OPTICAL DIGITAL NETWORK SYSTEM uses a digital Time Division Multiplex technology (TDM) with a fiber channel based 8B10B-NRZI-coding. Static time slots guarantee the synchronous transmission of all channels at any time with no demand for dynamic bandwidth. All signals attached to the intercom, audio, video, word clock and auxiliary ports of the device are transmitted simultaneously on one fiber. The second fiber of one LINK-Interface is used to receive data. The second LINK-Interface has the same features as the first; therefore one of the LINK-Interfaces can always be used for redundancy.

SANE Ports

All FX units are equipped with two RJ45 200MBit SANE Ports for 64 channels synchronous audio + 100MBit Ethernet.

RS485 Auxiliary Ports

The auxiliary ports provide four RS485 interfaces to establish a maximum of four half-duplex or two full-duplex connections between the devices. A wide range of bi-directional and unidirectional standards can be connected, such as RS485, CAN-Bus (bi-directional), or RS422, DMX and MIDI (unidirectional). The interfaces will sense automatically whether they send or receive control data. OPTOCORE CONTROL software is used for setting the destination of each interface.

Word Clock

All units are equipped with a Word Clock IN and OUT. Word Clock is also transmitted via the fiber and SANE Ports. In network configurations no extra BNC cable is needed. The X6R/V3R-FX-INTERCOM units are equipped with an internal, high quality and extremely low jitter word clock. Any X6R/V3R-FX-INTERCOM can act as master to pass the word clock to further Optocore or SANE units or other devices. The word clock is available at the word clock OUT BNC-connector of this device. The Word Clock IN is terminated internally, so that no further external termination at the Word Clock Out is needed to avoid cable reflections.

Transmission Delay

The Optocore system delay including the matrix is fixed to 41,6 µs @ 48 kHz for all channels. The transport delay per Optocore unit (<200 ns) in the network is insignificant. The transmission delay is constant from any point to any point. Overall delay depends on converters and fiber cable length, with 'normal' cable lengths of <700 m it can also be considered as marginal.

Power Supply

The device is optionally equipped with two power inputs and power supply units. If one power supply fails, due to malfunction of the feeding power line or the power supply unit itself, the device will automatically switch over to the other power supply unit. In order to make the power supply redundant, both power inputs must be connected to the mains supply, if possible to different phases, power supply systems, or even better, one of them to an uninterrupted power supply (UPS).

The power supply units operate with mains voltage of 100 ... 240 V and frequency of 50 … 60 Hz. Thus the device can be used throughout the world without any modifications or transformers.

Be aware that the switched-mode power supplies operate with high voltages! Coming into contact with them can lead to considerable electric shock that may result in death! To prevent electric shocks do not remove any covers!

Control

Route66 device doesn't require any software to be fully operable. Each unit is set up by manufacturer according to the requirements and no further configuration is necessary. However it is possible to set routing via 3rd party platform like VSM. It is also possible to change RS485/422 setting and device ID with Optocore Control Software. The RS232, LAN or USB port enables the configuration of one unit attached directly to the PC. For further information please contact BroaMan Support team.

Connectors and Cables

Optical Connection

All optical interfaces are equipped with duplex LC connectors on commonly used SFP transceivers (please note that all SFP transceivers are build in one board, because high speed connections are required – it means that only some of the SFPs are user-changeable and the rest can be changed only by manufacturer). User can plug singlemode or multimode transceiver. Standard LC cables with two fibers can be used. Worst case reach is 700 m with multimode transceivers and a 50 μm fiber, whilst with monomode transceivers and a 9 μm fiber, up to 70 km are possible. For rugged applications e.g. touring and other temporary installations, HMA Expanded Beam Connectors mounted on 1 RU panel are available, along with matching, inter-connection cables transported on cable drums. (Please refer to Product Brochure available at www.BroaMan.com).

SD/HD/3G Ports

Coaxial 75 Ω cable with BNC connectors compliant with digital SD/HD/3G standard can be used. The maximum distance is 300 m.

SANE Ports

Use standard twisted-4-pair-cable (Cat-5, Cat-5e, Cat-6), with RJ-45 connectors. SANE technology utilises all 4 pairs of Cat-5 cable – two for standard Ethernet transmission, two for SANE.

Auxiliary Ports

According to the RS422/RS485 hardware standard, each channel requires a twisted pair. A common braided shield should enclose the pairs.

RS232-Connection

Shielded, standard RS232 cable is sufficient for the RS232 port.

Connector Hood Quality

Applied locking screws for the D-Sub-types must be acc. to 4-40 UNC. Care should be taken in selecting the right types of connector hoods in order to fulfil the requirements of EMI-radiation directives. Full metal connector hoods should be used, approved acc. to VDE 0871, FCC 20780 and EMC directive 2004/108/EG, providing a reduction > 40 dB on 30 MHz up to 1 GHz. The shielding harness of the cable should have complete contact to the connector hood.

USB-Connection

To the USB-port, use a standard PC/device cable.

LAN-Connection

Use standard twisted-pair-cable (Cat-5, Cat-6) with RJ-45 connector.

Word Clock-Connection

Use 75 Ω-coaxial-cable with BNC-connector.

Mains-Connection

Standard power cords with IEC C13 sockets can be used.

Connection Example

The example shows the connection between one Route66 and two Repeat48 units. Route66 is configured as 8 x 4 router, so it can send 8 SD/HD/3G video channels to two different locations. On each locations it is possible to connect Repet48WDM unit, which is equipped with two SD/HD/3G outputs, four inputs and two fiber optic tunnels for OPTOCORE® protocol transport. Connections between Route66 and both Repeat48WDM are done by fiber cables. Routing in Route66 platform may be set to the fixed layout or be controlled by user with a controlling software platform, like VSM.
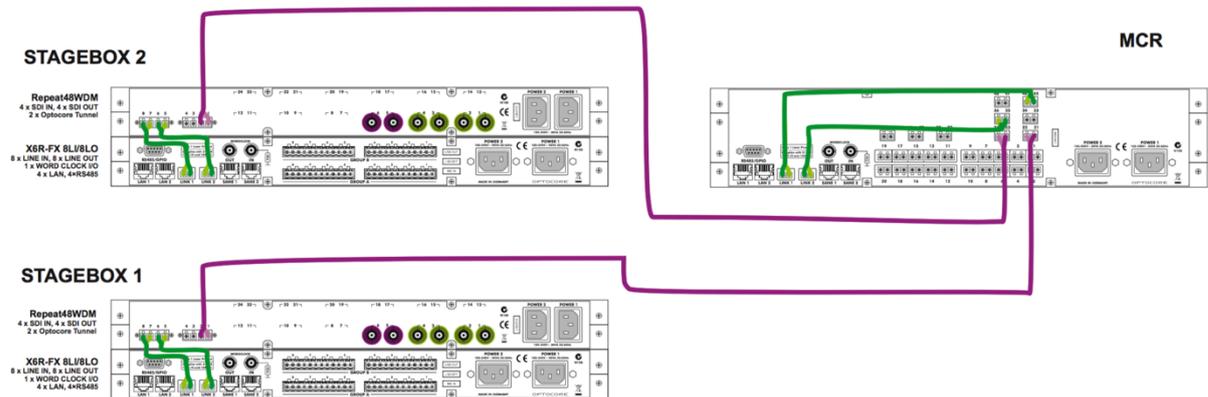

Fig. 1: Connection of one Route66 and two Repeat48WDM units.

Connection Tables

Pin-out	Auxiliary Ports 4 x RS485						
	Channel	RS485				GND	Please assure correct polarity "+" and "-" at both (!) sides / devices when connecting external equipment to the RS485 ports.
		1	2	3	4		
	Pin	+	1	2	3	4	5
		-	6	7	8	9	
D-Sub-9- female	**Error! Not a valid embedded object.**					Locking system acc. to 4-40 UNC	

Pin-out	RS232-Port						
	Channel	RS232		Internally bridged		Power		Use standard RS232 cable, male – female, to connect to PC
		RXD	TXD			+5VS	GND	
	Pin	3	2	1, 4, 6	7, 8	9	5	
D-Sub-9- female	**Error! Not a valid embedded object.**					Locking system acc. to 4-40 UNC		

Pin-out	USB-Port				
	Channel	USB			GND	**USB device-connector**
		VBUS	D -	D +		
	Pin	1	2	3	4	

Technical Specifications

Video	
Standards	SD, ED, HD, Dual Link, 3G
Complies with SMPTE	259M, 292M, 344M, 372M, 424M
Interface	SDI – Serial Digital Interface

Optical Connection	Complies with 21 CFR 1040.10 and 1040.11

SANE, LAN	Convention	
Audio	TIA - 568A/B, Optocore	200 Mbit/s
LAN	TIA - 568A/B, IEEE - 802.3	10/100 Mbit/s

Word clock	Hardware standard BNC - 75 Ω	
Data rate	Depending on selected sample rate	Up to 192 kHz
Impedance	Output	≤ 5 Ω
	Input	75 Ω
Drive level	Output	≥ 1 V_{pp}
Zero level	Referring to GND	+ 1.7 V
Sense level	Input	≥ 400 mV_{pp}

Remote Control	Convention	
RS232	EIA / TIA - 232	57 600 Baud
USB	USB 2.0 - Device	12 Mbit/s
LAN	IEEE - 802.3	10/100 Mbit/s

Power supply	
Type	Switch-mode, universal input
Mains voltage	100 … 240 V
Frequency	50 … 60 Hz
Power consumption	Depending on device, 32VA - Max
Security classification	Class 1: basic insulation, connected to the protective grounding conductor
Security regulations	Harmonised European standard EN60065
Mains connector	acc. to IEC-950
Cooling	Passive, via surface and ventilation-slits on both sides

Dimensions and Weight

Front panel: width   483 mm / 19 inch
                     height 88 mm / 3.46 inch (2RU frame), 44 mm / 1.73 inch (1RU frame),
                     depth   200 mm / 7.87 inch

Rear panel: width   438 mm / 17.25 inch

Weight

Dependent on components and port configuration of each specific device.

Modifications that serve the purpose of technical improvement of the device may be carried out without prior notification.

Warranty and Liability

Summary of Warranty

BroaMan Route 66 unit warranty covers against defects in material and workmanship for 60 months.

This warranty covers the original purchaser only and is not transferable. Valid evidence of warranty is the official BroaMan invoice issued by the distributor / dealer.

BroaMan will, at its discretion, repair or replace a defective product, providing that the defect has occurred under normal operating conditions.

This warranty does not cover damage from acts of God, accident, abuse, neglect, contamination, unauthorised modification or misuse, operation outside of the environmental specifications for the product, improper site preparation or maintenance, or abnormal conditions of handling. This would include over-voltage failures, and conditions outside of the products specified ratings, problems with buyer-supplied software or interfacing, or normal wear and tear of mechanical components. BroaMan or its distributor / dealer will acknowledge the evaluation of warranty after inspection.

Devices on which the Serial Number has been removed or defaced are not eligible for warranty service.

Failure to properly package and protect the product during shipping may void this warranty.

How to Obtain Warranty Service

To return a defective product, please contact your distributor / dealer. Our website: http://www.BroaMan.com/ provides a complete list of BroaMan distributors / dealers.

Always ensure the careful handling of the device. If possible, these devices should always be transported or shipped in special, shock-absorbing transport cases. If these are not available, we recommend well-padded packaging such as the coated carton in which the device was delivered.

We strongly advise not to use simple flight-cases without rack-in-rack mounting.

Declaration of Liability

BroaMan accepts no liability for damage caused to other devices through operation of the Route 66 device.

BroaMan is not liable for any damage caused by shipping accidents, misuse, abuse, operation with incorrect AC voltage, operation with faulty peripheral equipment, or improper or careless installation of the device.

BroaMan accepts no claims for compensation whatsoever (e.g. cancellation of events).

Shipping Contents

Route 66 is a part of the ordered system. Each Route 66 package should consist of:

- 1 Route 66 unit
- 2 power cables

Any additionally purchased equipment such as optical wave-guide cables in required lengths, D-Sub cables and adapters, RS232 cables, and international electric cables which have been supplied on your request and your purchase order, cannot be listed above.

Additionally for each DiViNe system there is a System Manual available.

Please note that due to the Ecology reason standard shipment **does not** contain printed copy of User Manual. All latest BROAMAN user manuals can be downloaded from the website:

http://www.broaman.com/index.php/support-downloads

Printed version of User Manual is available on a special demand. Please contact *support@broaman.com* if printed version is required.

BroaMan

Company Information

Mailing Address:

BROAMAN GmbH
Lohenstr. 8
D-82166 Munich-Gräfelfing
Germany

Telephone:

+49 – (0)89 – 8999640

Facsimile:

+49 – (0)89 – 89996455

Internet:
www.BroaMan.com

Email:
inquiry@broadcastmanufactur.com