BroaMan
Broadcast Manufactur

Operating Manual for
Repeat8-NANO

Small Converter Device

BROAMAN GmbH
Lohenstr. 8
82166 Munich-Gräfelfing
Germany

BROAMAN Repeat8-NANO
Operating Manual
Rev. 1.1

Page intentionally left blank.

Important Safety Instructions

- **Please read this operating 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 a source of heat such as: radiators, power-amplifiers, or any other heat-producing equipment.**

- **Protect the PSU 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 lightning storms or when unused for long periods of time.**

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

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

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

Owner 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. The operating manual contains important information on proper use of the device.

It cannot be guaranteed that this operating manual will not contain typographical mistakes or misprints. The operating manual is regularly revised and updated.

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

- **Transport and Shipping**

Always ensure careful handling of the device. The device should be transported and shipped in 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.

- **Operational Environment**

This device can be used in E1, E2, E3, E4, or E5 environments (as listed below) according to the harmonized 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 the use in moderate climate.

- **Ventilation**

Install the device in accordance to the operating manual. Allow for sufficient space around the units and make sure to allow for air circulation near device. Do not operate the device close to heat emitting equipment, such as power-amplifiers. Leave sufficient space (minimum ½ RU) between the device and any heat emitting devices housed in the same rack.

A BroaMan Repeat8-NANO devices can be stacked up to 4 devices when operating standard 5V PSU originally delivered by BroaMan. When 12V 3rd party PSU is used up to 2 devices can be stacked.

It is recommended to use Power Supply Unit delivered with the product. BroaMan takes no responsibility for incorrect generic PSU usage.

> **Please note:**
>
> Stack up to 4 devices with the original PSU (up to 2 devices with generic PSU).
>
> Ensure air circulation around the devices.

- **Water and Moisture etc.**

To prevent fire or shock hazard do not expose the device to 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: $0\degree$C …$60\degree$C ≡ $32\degree$F … $140\degree$F; ensure proper ventilation

  Storage temperature: $-20\degree$C …$60\degree$C ≡ $-4\degree$F … $140\degree$F

- **Power Supply**

  The device can be disconnected from the power supply by unplugging attached PSU from main. The PSU plug must be freely accessible at all times. The device should be disconnected during lightning storms or when the device is unused for a long period of time.

  > **Important:**
  > It is recommended due to heat emission to use attached dedicated 5V PSU.
  >
  > Device can be operated with a 12V PSU, however higher heat emission of a device will appear. Do not stack more then two devices when operating 12V.

  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.

  > **Important:**
  > A damaged PSU must be replaced immediately

  > **Important:**
  > Wrong **polarity** of PSU may damage device. Please refer to the drawing on device.

- **Fuse**

  There is no fuse in the device. The power supplies contain circuitry that protects the device from overload.

- **Lightning**

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

- **Eye Safety**

  This product is a Laser Class 1 product. It complies with IEC 60825-1, FDA 21 CFR 1040.10, and 1040.11.

- **Liquids with the device**

  Never spill liquid of any kind on the device.

- **Cables and Accessories**

  Only use attachments that are specified by the manufacturer of the device.

  Use high quality, properly terminated, cables to connect the device. The device should only be used with optical fibre cables that are specified for use with the devices' optical transceivers and within the specified power budget of the optical transceivers. When not in use, ensure that the optical connectors on the device and the optical fibre cables 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 of the device.

- **Servicing**

  Do not attempt to service the device by yourself.

  The device contains no user serviceable parts, components or controls. The operation of an opened device is not permitted. Such operation can lead to damage of the device's components due to lack of air-flow through the device.

  The device may not be serviced, altered or modified without authorization from Broaman or an Broaman authorized distributor / dealer. Only qualified service personnel may carry out repair and maintenance work on the device. The warranty of the device will be voided if any unauthorized maintenance or repair work has been carried out.

CE/FCC-ConformityThis document confirms that the product Repeat8-NANO 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 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 manufacturer 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, 01.09.2017

Marc Brunke

Page intentionally left blank.

Repeat8-NANO – Digital Video Converter

Table of Contents

Device Description

Congratulations on your purchase of a Repeat8-NANO - 3G-SDI and AES10/MADI electrical-optical-electrical converter. The Repeat8-NANO manual, accompanied with the device's will quickly demonstrate the advantages of the device and help ease your day to day workload in the broadcast and professional audio visual industry.

Repeat8-NANO is a series of electrical-optical and electrical-optical converters for 3G-SDI, AES10/MADI or other generic coax signals, converting between coaxial and optical connections.

Repeat8-NANO devices are populated with four coax ports which can carry 3G-SDI or AES10/MADI and SFP fibre optic transceivers (separate part). SFP modules can be easily populated after delivery.
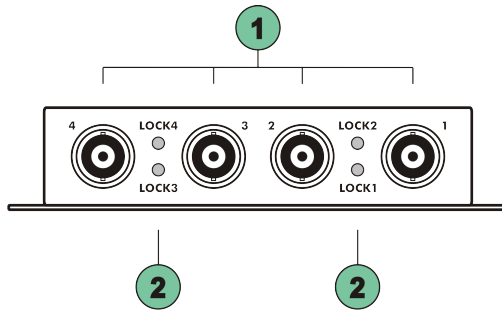
Repeat8-NANO devices are equipped with an external PSU with a DC output of 5V.
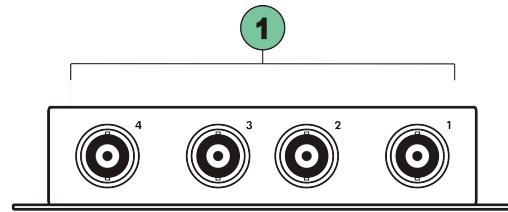
> **Please note:**
> Repeat8-NANO package does not include fiber optic transceivers. It is highly recommended to purchase transceivers from BroaMan.
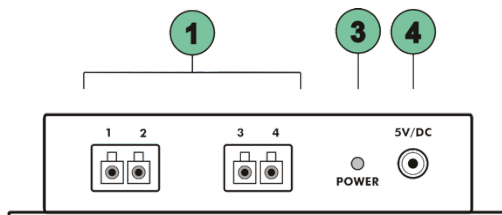
Front Panel

Repeat8-NANO-4IN

Repeat8-NANO 4OUT

1	**BNC:**	4 IN: 3G-SDI/MADI BNC Input connector
		4OUT: 3G-SDI BNC/MADI Output connector
2	**Input status LED:**	Signal indicator for channels 1-4:
		LED ON: Signal is present
		LED OFF: No signal is present

Rear Panel

Repeat8-NANO-4IN

Repeat8-NANO 4OUT
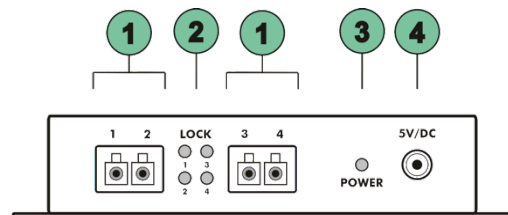
1	**Fiber ports 1-4:**	4IN: SFP dual Transmit Module LC Connector (Not included)
		4OUT: SFP dual Transmit Module LC Connector (Not included)
2	**Input status LED:**	Signal indicator for channels 1-4:
		LED ON: Signal is present
		LED OFF: No signal is present
3	**POWER:**	LED ON: Device is on
		LED OFF: Device is off
4	**DC POWER INPUT:**	5V DC power Input from external PSU (PSU Included in the package)
		Optionally: DC input 12V – please refer to page

Device Details

BNC Ports

Each of Repeat8-NANO is equipped witha high quality BNC connectors, providing 3G-SDI and AES10/MADI connectivity.

Each 3G-SDI video port is hardware fixed as:
• Input with equalizer and reclocker – Repeat8-NANO-**4IN**
• Output with a reclocker – Repeat8-NANO-**4OUT**

SFP Ports

Data from/to 3G-SDI or MADI coaxial interfaces are converted to/from the SFP (Small Form Pluggable) fiber ports.

Video Fiber SFP Ports are hardware fixed as:
• Input / Input – for Dual SFP RRX transmitting module (not included) – Repeat8-NANO-**4OUT**
• Output / Output – for Dual SFP TTX transmitting module (not included) – Repeat8-NANO-**4IN**

SFP ports are compliant with non-MSA transceivers.

Power Supply

The device is equipped with one power supply input and with an external 5V PSU

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

> **Please note:**
>
> To prevent electric shock, do not remove any covers or try to open a PSU.

Control

The Repeat8-NANO Series device is plug-and-play device that does not require any user control or configuration.

Connectors and Cables

3G-SDI and MADI Ports

Use 75 Ω coaxial cable with BNC connectors. Cables and connectors used should comply with 3G-SDI or AES10/MADI interconnection standards, depending of carried signal. The maximum cable length is dependent on the bandwidth of the signal (AES10/MADI, SD, HD or 3G), the specification of the cable and connectors.

Optical Connections

Each Repeat8-NANO Series device can be populated with two SFP fibre transceivers, each for duplex LC connection..Transceivers are hot-swappable.

Fiber cable type depends on the transceiver used.

> **Please note:**
> SFP fibre transceivers are application specific and must match the coaxial interface
>
> Please contact the BroaMan technical support team for further information.

For portable applications, such as touring and other temporary installations, ruggedized HMA Expanded Beam Connectors, mounted on 1 RU panels and portable cables on cable drums are available.
Please refer to the Product Brochure available at **www.BroaMan.com**.

Power Connection

For DC connection use dedicated included PSU with connectors and maintain polarity.

Technical Specifications

Video	
Standards	SD, ED, HD, Dual Link, 3G
Complies with SMPTE	292M, 295M, 297M, 305M, 310M, 424M,
Compliant to	DVBASI, MADI
Interface	SDI – Serial Digital Interface

SFP	Complies with non-MSA
Recommended transceivers	SM320S31TTCD - 3G Dual TT module for Repeat8-NANO-4IN
	SM340SWRRCD - 3G Dual RR module for Repeat8-NANO-4OUT

Power Supply	
Type	External PSU
Mains voltage	100… 240 V
Frequency	50 60 Hz
Output voltage	5V
Output current	1A
Power consumption	5 W

Dimensions and Weight

Mechanical Data	
Dimensions (L x D x H)	112mm x 113mm x 20mm
Dimensions (L x D x H) without mounting plate	97mm x 113mm x 20mm

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

Warranty and Liability

Summary of Warranty

Broaman Repeat8-NANO device is warranted against defects in material and workmanship for 24 months (2 years) from the date of purchase. This warranty does not include mechanical damages caused by misuse. This warranty covers the original registered purchaser only and is not transferable. This warranty does not apply to devices, which have been purchased in used condition or demonstrator equipment.

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, misuse, or 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 customer-supplied software or interfacing, or normal wear and tear of mechanical components. BROAMAN will acknowledge the evaluation of warranty after inspection.

Not covered by this warranty are defects arising from electromagnetic or electrical interferences, deficiency, excess, or surge of electrical supply, air conditioning, or humidity. This also includes repairs made necessary by dirt, abrasion, moisture, rust, corrosion, or similar conditions.

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

BROAMAN devices contain no user-serviceable components: refer to qualified service personnel for repair or upgrade. The warranty will be void if you tamper with internal components. Please address any questions or inquiries to BROAMAN or your distributor/dealer.

For a full warranty conditions refer to the Warranty Card attached to every Broaman device with a first shipment.

How to Obtain Warranty Service

When discovering a problem with an BROAMAN device, you should contact either Broaman directly or a dealer/distributor to determine and confirm a hardware fault. If it is a software issue the hardware must not be returned to BROAMAN, BROAMAN will issue a support ticket in this case.

If hardware service is required within the warranty period, take the equipment, along with warranty card, to the nearest authorised BROAMAN dealer/distributor. The dealer/distributor will make sure that the device is serviced according to the terms of warranty by BROAMAN or an authorised service centre.

If the equipment needs to be returned directly to BROAMAN, first contact support@broaman.com.

BROAMAN requires the serial number of the equipment intended for return, as well as a short description of the problem. If possible, you should also provide us a phone number where you can be reached during regular working hours. To return a defective product, please contact your distributor / dealer. Our web site: **http://www.broaman.com/** provides a complete list of Broaman distributors / dealers.

Make sure the equipment being returned is packed carefully to protect it from damage during shipment. BROAMAN requires that shipments are pre-paid and insured – unless specifically authorized in advance.

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 Repeat8-NANO 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.

Neither BROAMAN nor anyone involved in the production of the equipment shall be liable for any indirect, special, disciplinary, consequential, or incidental damages arising out of the use or inability to use this equipment even if BROAMAN has been advised of the possibility of such damages. In no event shall the liability of BROAMAN exceed the purchase price of any defective equipment.*Broaman accepts no claims for compensation whatsoever (e.g. cancellation of events).*

Package Contents

Repeat8-NANO is a part of the ordered system. Each Repeat8-NANO package consists of:

- 1 Repeat8-NANO unit

- 1 External DC5V PSU

Any additionally purchased equipment such as SFP Transceivers, optical fibre cables in required lengths, which have been supplied on your request and your purchase order, cannot be listed above.

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.broadcastmanufactur.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.

Contact Information

Mailing Address:

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

Telephone:

+49 – (0)89 – 89996460

Facsimile:

+49 – (0)89 – 89996455

Internet:
www.BroaMan.com

Email:
inquiry@broadcastmanufactur.com