

NSA-002A

User Manual

A10



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.

Changes or modifications made to this equipment not expressly approved by Riedel may void the FCC authorization to operate this equipment.

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 communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



The device conforms to the following EU guidelines as attested by the CE mark.

- EMV (EMC) 2014/30/EU
- NSR (LVD) 2014/35/EU

Industry Canada: CAN ICES-3 (A)/NMB-3(A)
CAN ICES-3 (B)/NMB-3(B)

- Standards:
- EN 55032:2016-02
 - EN 55103-2:2010-07
 - EN 60950-1:2014-08
 - EN 62368-1:2016-05



Management
System
ISO 9001:2015



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NSA-002A User Manual

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1 Preface

Thank you for choosing a Riedel product.

This PDF document provides detailed information about the NSA-002A, pin outs, mechanical and electrical data.

This manual is available in additional formats:

CHM	"Compiled HTML Help" is the standard format for Windows online help and .Net applications
EPUB	"Electronic Publishing format" is a cross-platform e-book standard

For further information, please refer to the [Riedel Website](#) or contact your local distributor or the Riedel headquarters in Wuppertal.

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1.1 Information

Symbols

The following tables are used to indicate hazards and provide cautionary information in relation to the handling and use of the equipment.

Danger	
	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	The highlighted line indicates the activity to prevent the danger.

Warning	
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	The highlighted line indicates the activity to prevent the danger.

Caution	
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
	The highlighted line indicates the activity to prevent the danger.

	This text is for generally information. It indicates the activity for ease of work or for better understanding.
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1.2 Safety Instructions

Voltage

- The power cable should only be connected to a correctly grounded source.
- Do not use any adapters.
- Never bypass a ground contact.

Caution	
	• To shut down the unit completely, remove the power cord and both Ethernet cables. • Pour éteindre complètement l'appareil, débranchez le cordon d'alimentation et les deux câbles Ethernet.

Warning	
	• Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan. • Apparatet må tilkoples jordet stikkontakt. • Apparaten skall anslutas till jordat uttag. • Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.

Danger	
	To reduce the risk of electric shock do not remove cover or expose the products to rain or moisture.

Service

- All service has to be undertaken **only** by qualified Riedel service personnel.
- Do not plug in, turn on or attempt to operate an obviously damaged device.
- Never attempt to modify the equipment components for any reason.

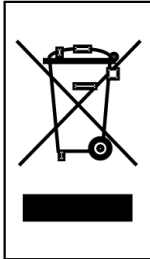
Caution	
	All adjustments have been done at the factory before the shipment of the devices. No maintenance is required and no user serviceable parts are inside the module.

Environment

- Never place the devices in areas of high dust particles or humidity.
- Be aware of the operating temperature of the systems (0°C – +50°C).
- Never place containers with any liquids on top of the devices.
- If the equipment has been exposed to a cold environment and transferred to a warm environment, condensation may form inside the housing. Wait at least 6 hours before applying any power to the equipment.

Disposal

Disposal of old Electrical & Electric Equipment (Applicable throughout the European Union and other European countries with separate collection programs).

	This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product please contact your local city office.
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2 About NSA-002A

The NSA-002A (**N**etwork-**S**tream-**A**dapter) is a device to convert analog audio signals to AES67 and vice versa. That means analog audio sources can be integrated into AES67 networks.

The power can be supplied by mains and via the AES67 network if it supports PoE functionality.

2.1 Product Elements

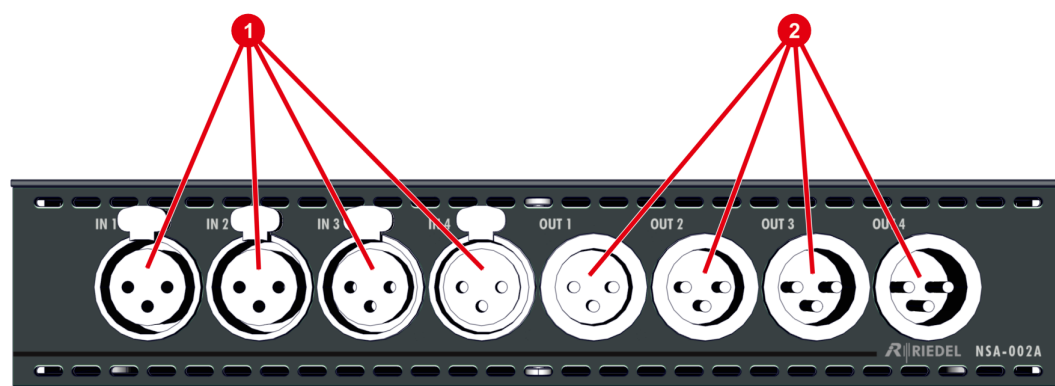


figure 1: NSA-002A (front)

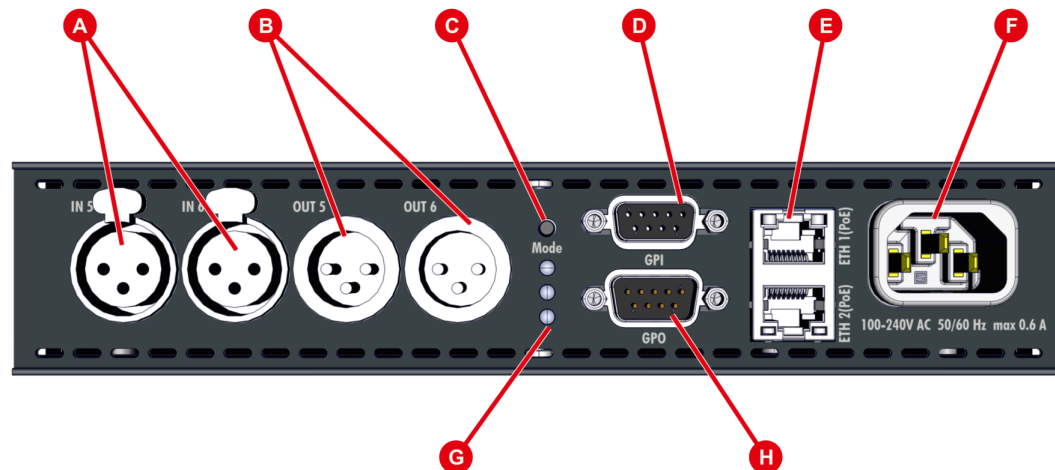


figure 2: NSA-002A (back)

1 A	Analog 4-wire inputs (XLR3)	6x
2 B	Analog 4-wire outputs (XLR3)	6x
C	Mode button	1x
D	GPI – inputs (D-Sub-9, female)	3x
E	Ethernet connectors (RJ45, PoE)	2x
F	Power supply (mains input)	1x
G	Status LEDs	3x
H	GPO – outputs (D-Sub-9, male)	3x

2.2 Status LEDs

G	Device mode (top)	blue	Bolero mode (plug-and-play mode for Bolero wireless intercom systems)	
		violet	Manual mode	
	State (middle)	Bolero plug & play mode	green	Connection OK
			green blinking	- Synchronization errors. (This may happen during the first 5 min.) - Check PTP settings. - Audio glitches may happen.
			red	Antenna not connected or not configured in Bolero web server.
			orange	All other cases.
		Manual mode	green	Connection OK or idle (not configured).
			green blinking	Connection configured but no data communication.
			red	Connection configured but mismatch between sender and receiver.
			orange	- Synchronization errors. (This may happen during the first 5 min.) - Check PTP settings. - Audio glitches may happen.
			off	All other cases.
	PTP Status (bottom)	green	PTP slave, PTP offset <1 µs	
		green blinking	PTP master	
		orange	PTP slave, PTP offset 1 ... 100 µs	
		orange blinking	PTP listening, Slave mode only	
		red	- Error - PTP offset >100 µs	
E	Network (left)	off	no connection	
		green	Ethernet connection ok	
	Activity (right)	off	no data transmission	
		green / yellow	blinking while data transmission	

2.3 Ports / Pinouts

In this chapter all Ports / Pinouts of the NSA-002A are shown.

Analog IN & Analog OUT Port

The analog inputs and outputs have following pinouts.

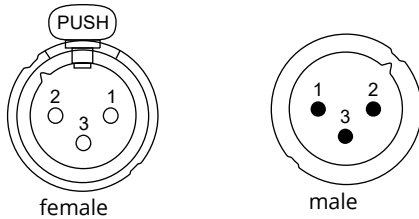


figure 3: Analog in/out port XLR-3 pinout

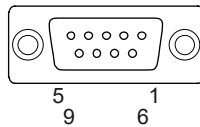
Pin	Signal
1	GND
2	Hot (+)
3	Cold (-)

female = inputs
male = outputs

- Nom. input/output level: +6 dBu
- Max. input/output level: +24 dBu

GPI port

The GPI input connector contains 3 single ports.



Pin	Signal
1	GP-IN1-P
2	GP-IN2-P
3	GP-IN3-P
4	GPI0 +5V
5	Chassis

Pin	Signal
6	GP-IN1-N
7	GP-IN2-N
8	GP-IN3-N
9	GND
Chassis	Chassis

Figure 4: GPI IN connector Sub-D-9 female pinout

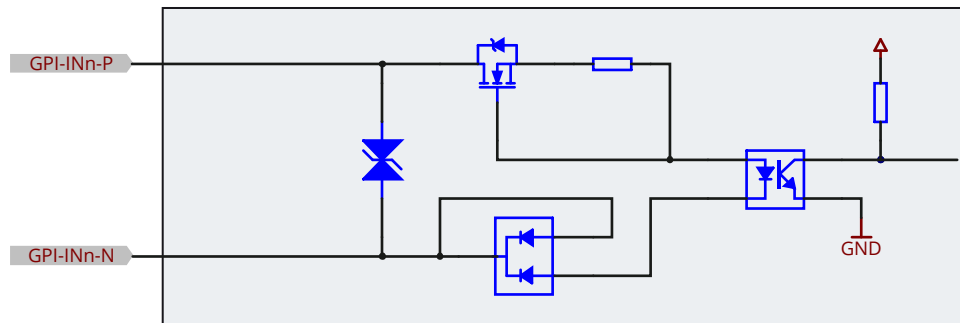
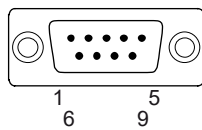


Figure 5: GPI IN connector schematic

- The input voltage range of the GPI inputs is +5 to +30 VDC (~5 mA current draw, internal optocouplers).
- The polarity of the inputs is important. The higher potential must be connected to "P" of each channel.
- The inputs are galvanically isolated.
- The "GPI0 +5V" output voltage drops when increasing the: 5V @ 0mA / 3.3V @ 50mA.
- The switching threshold is between 0.8 VDC and 2.0 VDC.

GPO port

The GPO output connector contains 3 single ports.



Pin	Signal
1	GP-OUT1-P
2	GP-OUT2-P
3	GP-OUT3-P
4	GPIO +5V
5	Chassis

Pin	Signal
6	GP-OUT1-N
7	GP-OUT2-N
8	GP-OUT3-N
9	GND
Chassis	Chassis

Figure 6: GPI OUT connector Sub-D-9 male pinout

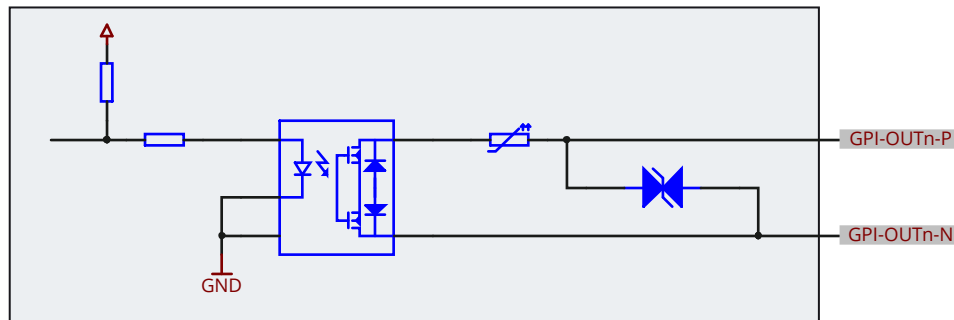


Figure 7: GPI OUT connector schematic

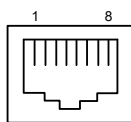
- The GPO output contact rating is 100 mA, 30 VDC maximum (protected by self-healing fuse).
- The polarity of the output has no preference.
- The outputs are galvanically isolated.
- The "GPIO +5V" output voltage drops when increasing the load: 5V @ 0mA / 3.3V @ 50mA.

ETH / PoE – ports

The AES67 ports are used to connect the AES67 network to the NSA-002A.

The AES67 ports are 1000Base-T compatible only.

Furthermore these ports can be used to power (PoE IEEE 802.3af) the NSA-002A.



Pin	Signal	PoE	Standard color
1	TxRx A +	DC +	orange/white
2	TxRx A -	DC +	orange
3	TxRx B +	DC -	green/white
4	TxRx C +	--	blue
5	TxRx C -	--	blue/white
6	TxRx B -	DC -	green
7	TxRx D +	--	brown/white
8	TxRx D -	--	brown

figure 8: ETH / PoE RJ-45 pinout (8P8C)

3 Getting started

3.1 Mounting Options

Two mounting options are available for the NSA-002A:

Bumper PSK-001

Stagebox Protection Kit

Rugged rubber corners to place or stack single devices.



figure 9: bumper-assembly

Caution



Do not use the screws without the rubber corners as they may damage the internal components. The maximum thread length of the screws inside the chassis must not exceed 6 mm.

Rack-Mount RMK-001

19" Rack Mount Kit

Rack mount kit for rack installation of one or two devices combined together.



figure 10: 19" rack assembly

3.2 Connecting Interfaces

- Connect your AES67 network with one of the two 'ETH' ports of the NSA-002A.



figure 11: connecting AES67 network

- Connect your analog audio inputs and outputs with the corresponding interface of the NSA-002A.

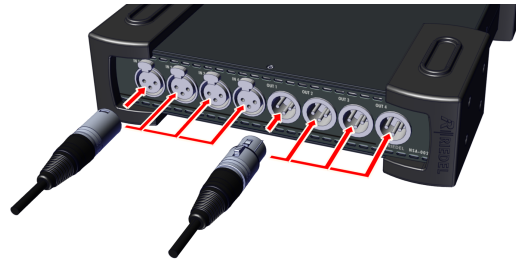


figure 12: connecting analog audio

3.3 Powering the Unit

The NSA can be powered in two ways:

- Via PoE, that is attached to one 'ETH' port.
- Via mains, that is attached to the mains input.



Both power sources can be attached simultaneously for redundancy reasons.

Caution



To shut down the unit completely, remove the power cord and both Ethernet cables.



figure 13: powering via PoE



figure 14: powering via mains

3.4 Operation Mode

The NSA-002A supports two operating modes:

- Bolero (plug-and-play mode for Bolero wireless intercom systems)
- Manual

The operation modes can be switched by pushing the mode button for more than 5 seconds.

The active mode is indicated by the upper device mode LED (blue: Bolero, violet: Manual).

	NSA-002A currently does not support the PTP hybrid mode offered by Director for panels. This could cause PTP traffic overload in networks with many PTP slaves. Riedel has successfully tested connecting NSA-002A into networks with up to 32 slaves, so this should be your maximum number of Artist AES67-108 cards, RSPs, NSAs or other 3rd party AES67 devices. To overcome this value, implementation of boundary clock switches is recommended.
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Bolero-Mode

The Bolero mode is used to easily adapt analog audio signals into Bolero networks.

- Connect a NSA-002A direct or via switch to the AES67/Config port of the Bolero Antenna.
- One additional NSA-002A may daisy chained via the internal switch if the NSA-002A is directly connected to a Bolero Antenna.
- Max. twice as many NSA-002A as Bolero Antennas in the network, but not more than 10 NSA-002As.
- PC may connected to the second Ethernet port of the NSA-002A.
- Plug-and-play connection (no IP configuration required).
- Each NSA has six 4-wires and three GPIOs:
 - 6 Line in
 - 6 Line out
 - 3 GPIs
 - 3 GPOs
- The signals are available on each antenna.
- The Beltpacks can trigger GPIOs.
- Configuration via Bolero web interface.

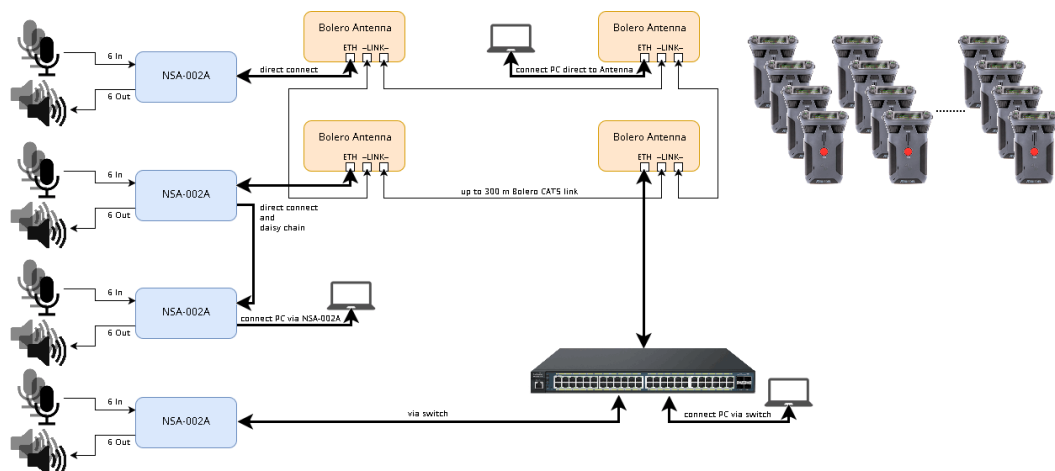


figure 15: Bolero-Mode

Manual-Mode

The Manual mode is used to easily adapt analog audio signals into any AES67 networks.

- Standalone operation as AES67 to analog converter
- Configuration via web interface
- Internal switch for daisy chaining
- Stream setup: 1 stream, 6 channels

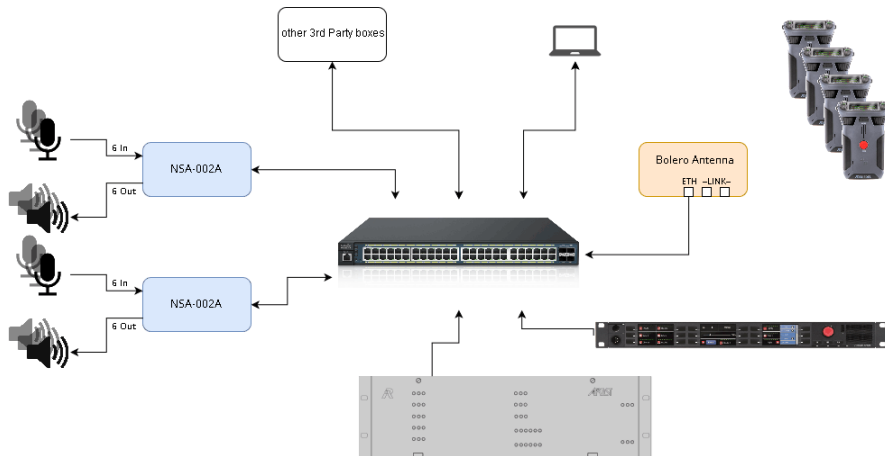


figure 16: Manual-Mode

4 Web Interface

The NSA-002A has no static IP address. The IP address can be determined by a Zeroconf browser (i.e. Riedel-NMOS-Explorer, see chapter [Riedel-NMOS-Explorer](#) in the appendix).

To access the NSA-002As web interface, open a web browser on your computer and point it to the IP address of the NSA-002A. The NSA-002A web interface appears:

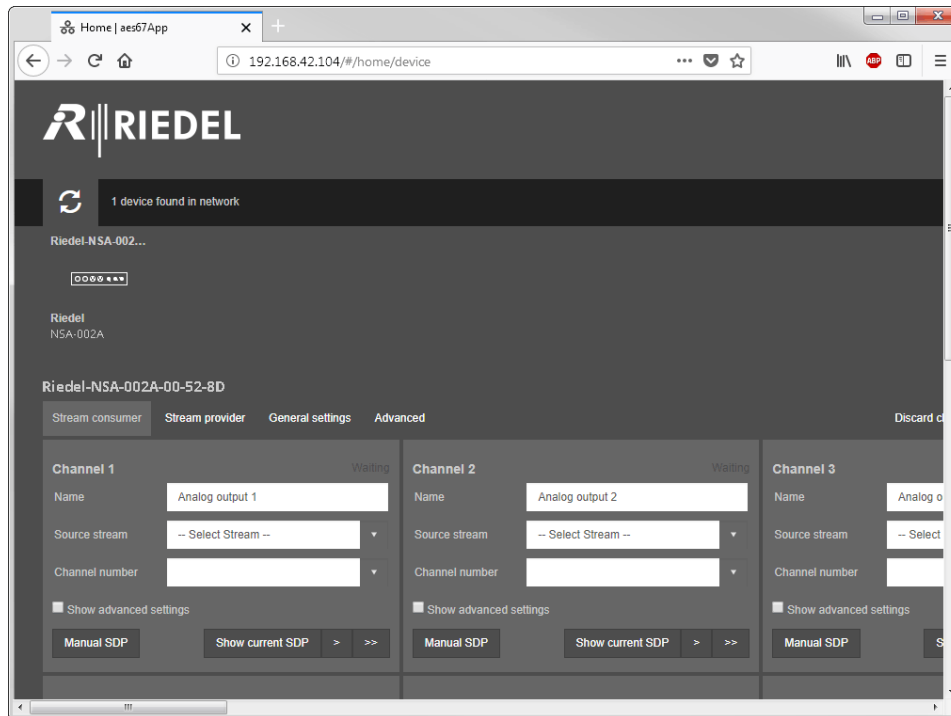


figure 17: NSA-002A web interface

When the user changed a parameter, the 'Apply all' button becomes active. After changing all desired parameters, the user can press this button to apply all changes. The 'Clear all' or 'Discard changes' button discards all changes and reloads the page.

4.1 Stream consumer

The tab **Stream consumer** allows configuring up to six streams to be received at the NSA-002A. Accepted are Ravenna streams, Dante-AES67 streams and manual configured streams via SDP. Each of the six XLR audio channels are configured in one "Channel". Hence, each interface is able to receive six different streams or a stream consisting of six channels is distributed to the six interfaces.

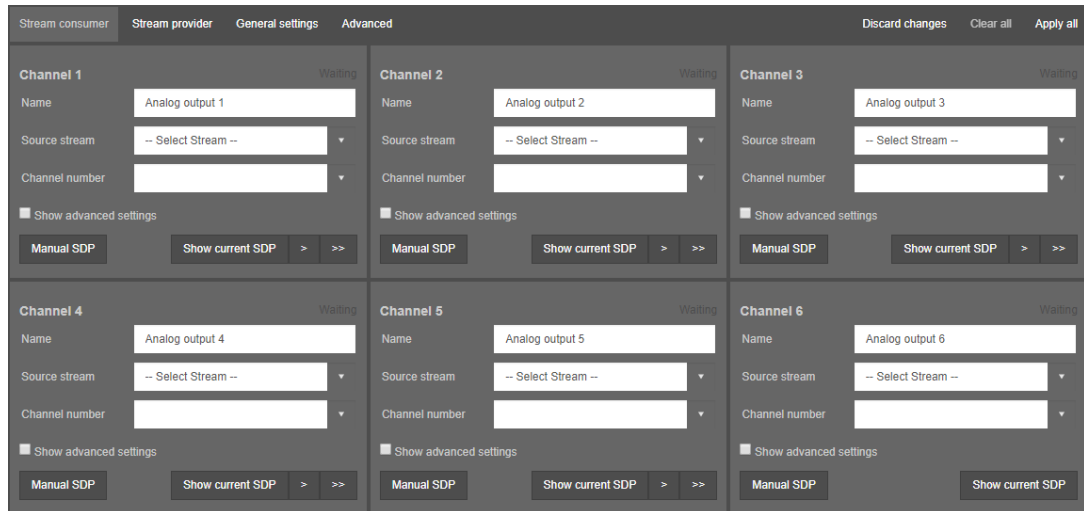


figure 18: NSA-002A web interface "Stream consumer"

Name	The name is entered if a Ravenna- or Dante-Stream is selected by discovery. The name can be assigned freely.
Source Stream	Table of all available Ravenna- or Dante-AES67-Streams.
Channel number	If a stream consists of multiple channels, this selection determines the channel that is output on the respective XLR output.
Show Advanced settings	Manuel path of the Bonjour streams.
Manual SDP	Opens a dialog to import a SDP of a 3rd-Party-Sender (i.e. Artist).
Status	Each channel shows its status next to the channel number:
IDLE	No stream is configured.
WAITING	Stream configured but not received.
RECEIVING MULTICAST SYNTONIZED	Configured multicast stream is received (without PTP synchronization).
RECEIVING UNICAST SYNTONIZED	Configured unicast stream is received (without PTP synchronization).
RECEIVING MULTICAST	Configured multicast stream is received.
RECEIVING UNICAST	Configured unicast stream is received.
RECEIVING NO_SYNC	Configured stream is received but the PTP synchronization is not valid.
RECEIVING TIME STAMP WARNING	Configured stream is received but the received packets differ more than one ms from the expected time.
DISABLED	The receiver is disabled to save resources.

4.2 Stream provider

The tab **Stream provide** allows configuring the stream to be transmitted.
The stream contains six channels with the signals of the analog XLR inputs 1-6.

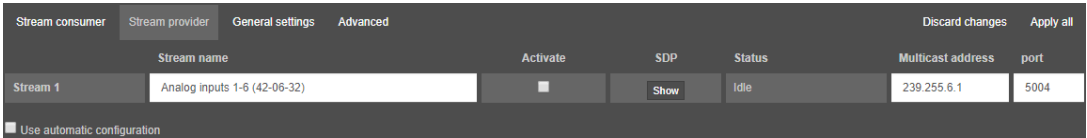


figure 19: NSA-002A web interface "Stream provider"

Stream name	Name of the streams.
Activate	Activates the respective stream (after clicking the "Apply all" button).
SDP	Shows the session descriptions.
Status	Shows the state of the respective channel (see Status in chapter ' Stream consumer ').
Multicast Address, Port	Fields for manual configuration of the multicast addresses and ports.
Use automatic configuration	If enabled, the multicast addresses of the streams are numbered consecutively in the the NSAs ZeroConf address range.

4.3 General settings

The tab **General settings** allows setting and reading of IP parameters and general device configurations.

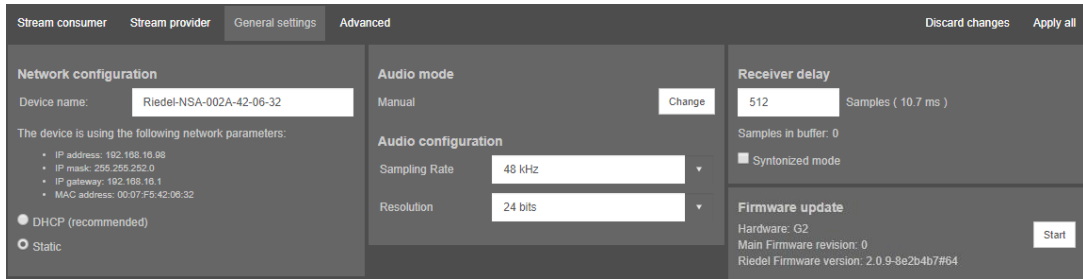
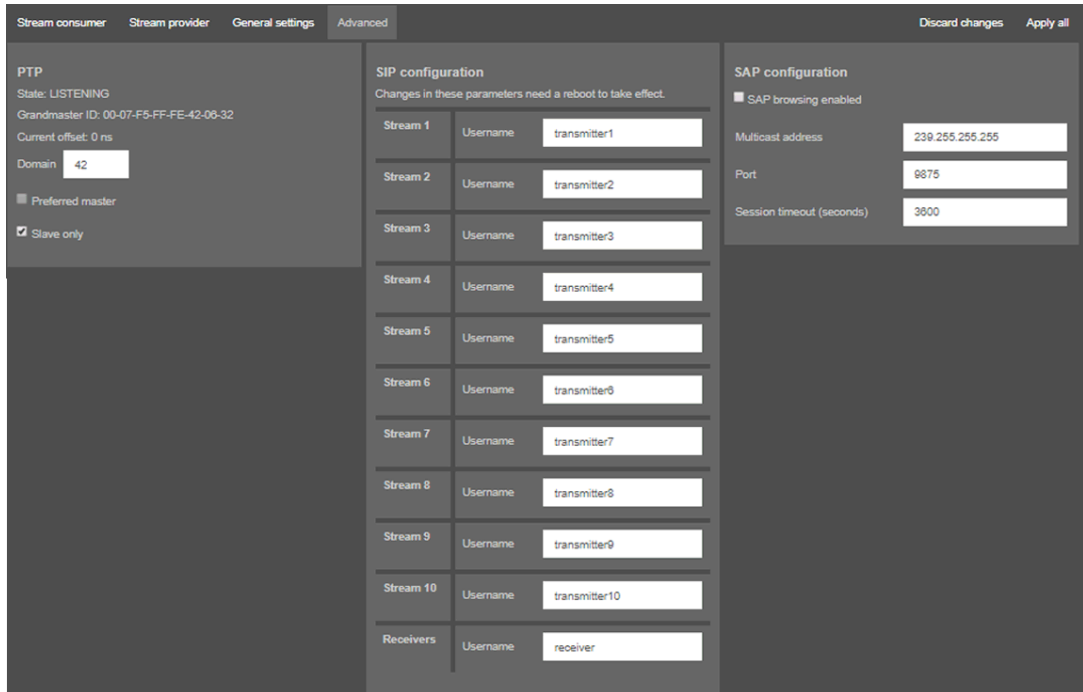


figure 20: NSA-002A web interface "General settings"

Network configuration	Device name		Name of the device.
	IP address	DHCP	The IP configuration is obtained from a DHCP server.
		Static	The user can provide the IP configuration manually.
Audio mode	Manual / Bolero		Toggles between Manual- and Bolero-Mode. Use the devices key to change the mode.
	Audio configuration	Sampling Rate	Fixed sample rate: 48 kHz.
		Resolution	Adjustable resolution: 24/16 bits
Receiver delay	Samples	Number of samples in the audio buffer.	
	Syntonized mode	In Synton mode audio packets without or with invalid PTP timestamps are processed and output, hence this mode can be used in networks without PTP synchronization.	
Firmware-Update	The NSA firmware can be updated through the web interface. To update the firmware press the start button and follow the instructions on the screen.		
	Furthermore, the hardware and firmware version of the device is displayed here.		
	Different firmware versions are required for the G1 and G2 hardware versions of the NSA-002A. The firmware update is only possible when the corresponding valid firmware version is selected.		
	NAS-002A Hardware		NAS-002A Firmware
	G1		1.2.0-2ea62f6#68
	G2		2.0.9-8e2b4b7#64

4.4 Advanced

The tab **Advanced** allows configuring PTP, SIP and SAP configurations.



The screenshot shows the 'Advanced' configuration tab with three main sections:

- PTP configuration:**
 - State: LISTENING
 - Grandmaster ID: 00-07-F5-FF-FE-42-06-32
 - Current offset: 0 ns
 - Domain: 42
 - ☐ Preferred master
 - ☒ Slave only
- SIP configuration:**
 - Changes in these parameters need a reboot to take effect.
 - Streams 1-10: Each has a 'Username' field with values 'transmitter1' through 'transmitter10'.
 - Receivers: Username field with value 'receiver'.
- SAP configuration:**
 - ☒ SAP browsing enabled
 - Multicast address: 239.255.255.255
 - Port: 9875
 - Session timeout (seconds): 3600

Buttons at the top right: 'Discard changes' and 'Apply all'.

figure 21: NSA-002A web interface "Advanced"

PTP	State	Shows the PTP-state, grandmaster and the current clock offset.
	Domain	Allows entering a PTP-domain. A PTP device is configured to work exclusively in one domain. Messages with a different domain number are mandatory ignored. By using different PTP domains, different timing systems can work independently in the same network without influencing each other.
	Preferred master	Sets the PTP-priority 1 and 2 to the value "20".
	Slave only	Blocks the device to be used as synchronization master.
SIP configuration	Allows setting the SIP username if SIP connections are desired.	
SAP configuration	SAP browsing enabled	Shows also Dante-AES67-Streams in the Stream consumer tab.
	Multicast Address, Port, Session Timeout	Specific configuration of the SAP-announcements.

5 Appendix

5.1 Technical Drawing

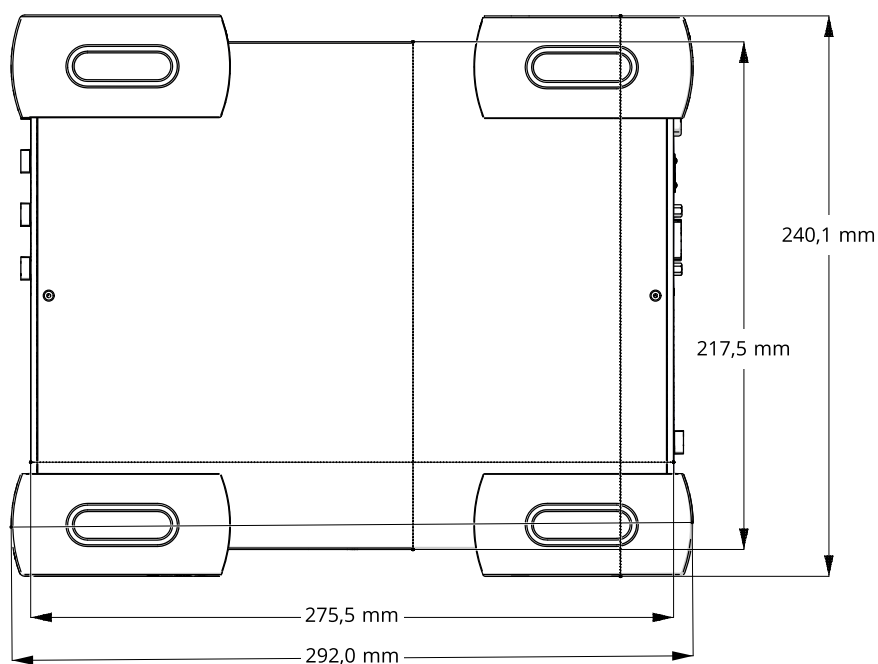


figure 22: NSA-002A (top)

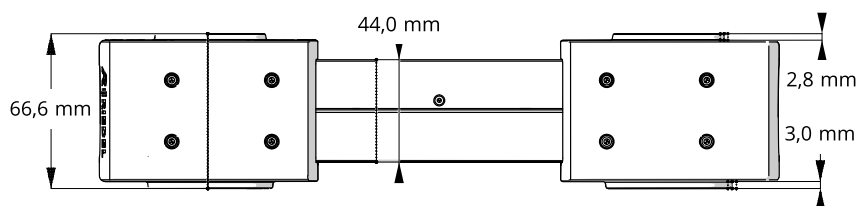


figure 23: NSA-002A (side)

5.2 Technical Specifications

Type	NSA-002A (Network Stream Adapter)		
Amount of analog breakouts	6x input, 6x output		
Analog audio line input/output	balanced		
Nom. input/output level	+6 dBu		
Max. input/output level	+24 dBu		
Input impedance	10 kΩ		
Output impedance	<200 Ω		
Min. load Impedance	2 kΩ		
Frequency response	20 Hz ... 20 kHz	-0.5 dB	
Signal to noise ratio (SNR)	>100 dB	@ +24 dBu	
Crosstalk	<-110 dB	@ 1 kHz	adjacent channels
Total harmonic distortion (THD&N)	typ. 0.008 %	@ +6 dBu	
Resolution	24 bit		
GPI input	3x Galvanically isolated opto-coupler inputs		
	Isolation voltage	100 VDC	
	Max. voltage	30 VDC	
	Input current	5 mA @ 5 VDC	
	Switching threshold	off: <0.8 VDC, on: >2.0 VDC	
GPO output	3x Galvanically isolated solid-state relay outputs		
	Isolation voltage	100 VDC	
	Max. voltage	30 VDC	
	Max. current	100 mA	
Power supply	Mains	100 ... 240 V, 50/60 Hz, max. 0.6 A inrush current	
	PoE IEEE 802.3af type 1	42 ... 57 V	
Power consumption	Mains	<25 W / <85 BTU/hr	
	PoE class 3	<12.95 W / <44.19 BTU/hr	
Dimensions (with bumpers)	Width	218 mm / 8.6" (242 mm / 9.5")	
	Height	45 mm / 1.8" (65 mm / 2.6")	
	Depth	276 mm / 10.9" (293 mm / 11.5")	
Weight (with bumpers)	1770 g (2250 g)		
Operating Environment	Temperature	0° ... +50°C	
	Humidity	20 % ... 90 % rel. (non-condensing)	
	Max. Altitude	3000 m AMSL	

5.3 Riedel-NMOS-Explorer

The NMOS Explorer is a tool to discover, manage and connect IP Media devices following AMWA IS-04 and IS-05. It allows IS-04 discovery in registered mode (default) and peer to peer discovery, when no registry is available. IS-05 parameters can be read and set individually, so it can also be used to connect senders and receivers. By offering an import/export SDP option, the NMOS Explorer can also be used to connect devices that do not support IS-04/05, but can exchange SDP objects.

Download the NMOS-Explorer from the [Riedel website](#) and install it on your windows PC.

➤ After starting the NMOS-Explorer:

1. Select the index '**Bonjour**'.
2. If necessary, select your network adaptor in the field '**Network Interface**' that is attached to the NSAs network. Limit the amount of results by entering 'http' in the field '**Service Type**' and 'NSA' in the field '**Service Name**'.
3. Click on the magnifier. All found devices will be listed. The NSAs announce themselves with the name "Riedel-NSA-002A-xx-xx-xx". The last three places represents the NSA's MAC address.
4. Double-clicking a device will open the web interface. The devices IP address is displayed by opening the respective tree structure.

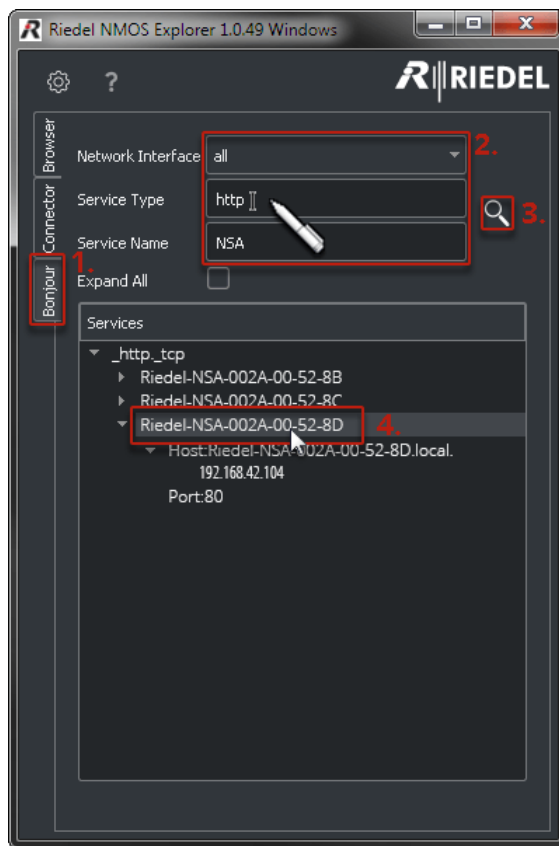


figure 24: NMOS-Explorer

5.4 Service

If you have any further questions, we offer comprehensive customer service options for this product including:

- Telephone Service
- Email Service
- Fax Service
- Configuration Support
- Trainings
- Repair

Your primary point of contact for any service issues is your local dealer.

In addition, Riedel Customer Service in Wuppertal, Germany is also available to assist you.

Telephone: +49 (0) 202 292 9400
(Monday - Friday, 8am – 5pm, Central European Time)

Fax: +49 (0) 202 292 9419

Or use the contact form on our website:

www.riedel.net > Services > Support

For repairs, please contact your local dealer. Your dealer will be able to help process your repair as fast as possible and/or arrange for the delivery of spare parts.

The address for repairs sent directly to Riedel Communications GmbH is:

Riedel Communications GmbH & Co. KG
- Repairs -
Uellendahler Str. 353
D-42109 Wuppertal
Germany

Please add a completed repair form to all your repairs.

The form can be found at the Riedel website:

www.riedel.net > Services > Repairs

5.5 Notes

Notes

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