

RAV2 Module

Software Manual



Version 2.8



RAV2 Module Software

Introduction

RAV2 is an audio network module for RAVENNA / AES67.

All functions of the device are accessible through a browser based interface (hmtl5 / javascript). The size of the window and the zoom level can be varied. The page is organized in tabs, pulldown menus or hyperlinks offer access to the values of a parameter. Some values use an input field (e.g. IP address).

SYNC			NETWORK		DEVICE		
PTP Ext	Clock master:	РТР ÷ 48 kHz ÷	Name:	RAV-SRC-IO	:UPD qmeT		Settings
U Ba	Sample rate: PTP state:	48 KHZ \$	NIC 1	A0-BB-3E-20-09-C4	Temp switch:	41 0	Load preset Save preset
	PTP jitter:	0.00 us	IP address:	192.168.72.82			Save presec
	PTP offset:	0.00 us	NIC 2				
	RTP state:			A0-BB-3E-20-09-C5			
	Audio engine:	RX state	IP address:	192.168.72.24			
		TX state	Sync:	internal			
			GMID:	A0-BB-3E-FF-FE-20-09-C4			
INPUT STREAMS				OUTPUT STREAMS			
01 -	8 ch 🦷 🤞	0 17 -	8 ch	01 RAV-SRC-IO_stream_1	In 17	RAV-SRC-IO_stream_17	8 Ch
02 -	8 ch 📃 🧕	18 -	8 ch	02 RAV-SRC-IO_stream_2	18	RAV-SRC-IO_stream_18	8 Ch
O3 -	8 ch 🗌	0) 19 -	8 ch	O3 RAV-SRC-IO_stream_3	① 19	RAV-SRC-IO_stream_19	8 Ch
04 -	8 ch 🗌 🧕	0 20 -	8 ch	04 RAV-SRC-IO_stream_4	20	RAV-SRC-IO_stream_20	8 Ch
05 -	8 ch 🔲 🧕	0) 21 -	8 ch	05 RAV-SRC-IO_stream_5	0 21	RAV-SRC-IO_stream_21	8 Ch
06 -	8 ch 🔲 🧕	0 22 -	8 ch	05 RAV-SRC-IO_stream_6		RAV-SRC-IO_stream_22	8 Ch
O7 -	8 ch 🔲 🧕	0 23 -	8 ch	07 RAV-SRC-IO_stream_7	23	RAV-SRC-IO_stream_23	8 Ch
OB -	8 ch 🚺	0 24 -	8 ch	08 RAV-SRC-IO_stream_8	24	RAV-SRC-IO_stream_24	8 Ch
O 09 -	8 ch 🔲 🧕	25 -	8 ch	09 RAV-SRC-IO_stream_9	25	RAV-SRC-IO_stream_25	8 Ch
10 -	8 ch 🧧	0 26 -	8 ch	I0 RAV-SRC-IO_stream_10		RAV-SRC-IO_stream_26	8 Ch
11 -	8 ch 🗌 🧕	0 27 -	8 ch	11 RAV-SRC-IO_stream_11	27	RAV-SRC-IO_stream_27	8 Ch
12 -	8 ch 🔲 🧕	0) 28 -	8 ch	12 RAV-SRC-IO_stream_12	28	RAV-SRC-IO_stream_28	8 Ch
13 -	8 ch 📃 🧕	b 29 -	8 ch	13 RAV-SRC-IO_stream_13	0 25	RAV-SRC-IO_stream_29	8 Ch
ال ا	8 ch 🔲 🧕	b) 30 •	8 ch	14 RAV-SRC-IO_stream_14	0 30	RAV-SRC-IO_stream_30	8 Ch
15 -	8 ch 🔲 🧕	0 31 -	8 ch	15 RAV-SRC-IO_stream_15	31	RAV-SRC-IO_stream_31	8 Ch
16 -	8 ch 🔲 🧕	0 32 -	8 ch	16 RAV-SRC-IO_stream_16	32	RAV-SRC-IO_stream_32	8 Ch

Connecting Audio Network

To access the control page:

- connect the network with one port
- enter http://<IP Address> (default IP @ PORT 1: 192.168.0.1) in the navigation bar of your browser

Two independent network interfaces (NICs) can be configured in the switch configuration. Port 1 is fixed assigned to NIC 1.

NOTE

If NIC 1 and NIC 2 are connected to the same switch, they must be configured to different subnets - see "Network Settings" on page 7.

Status - Overview

• DEVICE

The tab 'STATUS' is divided into several sections:

- SYNC monitoring sync state, clock selection, links to I/O settings
- NETWORK display network info, link to network settings
 - monitoring device info, link to device settings, phones level control
- INPUT STREAMS monitoring and control input streams, link to input stream settings
- OUTPUT STREAMS monitoring and control output streams, link to output stream settings

Hyperlinks open a popup window to adjust related settings. Most settings are updated immediately without further notification. To exit a popup window click the button in the top right corner.

Mouse overs are used to display further information (e.g. connection speed of network link).

NOTE

The web user interface updates itself when changes are applied by other instances (other browsers, external control commands).





Status - Sync

PTP Cock masterPTP 4 B HzSample rate:PTP date:PTP date:masterPTP fitter:0.00 usPTP offset0.00 usRTP date:0.00 usClock master0 (OFF)Pulldown menu to select clock source of the main frame (PTP, extern)Sample ratePulldown menu to adjust sample rate of the main frame (44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz).PTP stateState of PTP (Master / Slave).PTP jitterPTP-clock jitter per secondPTP offsetOffet relative to PTP-clock masterRTP stateState of module's audio engine - receiving RX stateQuido engine RX stateState of module's audio engine - sending of (blinking)Audio engine TX stateState of module's audio engine - sending of (blinking)Audio engine TX stateState of module's audio engine - sending of (blinking)Audio engine TX stateState of module's audio engine - sending of (blinking)Audio engine TX stateState of module's audio engine - sending of (blinking)Audio engine TX stateState of module's audio engine - sendin	SYNC					
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Audio engine RX stateState of module's audio engine- receiving 	PTP offset	Offet relati	ve to PTP-clock master			
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TX state (ON) = ok, sending data (blinking) = not all packets can be sent to the	Audio engine	State of m	odule's audio engine- sending			
-• (blinking) = not all packets can be sent to the						
network		- (blinking) = not all packets can be sent to the			
			network			

* Error: packet time stamps are out of bounds.

Possible reasons: stream offset may be too small or transmitter or receiver are not synced properly to the Grandmaster.

Hyperlinks:

• PTP / PTP state (p 5)

PTP Settings

TP Input:	NIC 1 & 2	¢
^o mode:	Multicast only	
lode:	auto	¢
rofile:	media E2E	÷

PTP Input	NIC selection for PTP clock input. 'NIC 1 & 2' means input redundancy.
IP Mode	PTP via multicast, unicast or in hybrid mode. *
Mode	PTP-clock master / slave configuration is auto negotiated between devices in the network. Module's master / slave state may change automatically.
Profile	PTP profile selection (default E2E, default P2P, media E2E, media P2P, customized)
Customized profile	Edit opens the tab 'ADVANCED' to adjust the custom profile.

See "Advanced- PTP Clock Setting" on page 31 for more details.



Status - Network

NET	WORK	
Na	me:	RAV-SRC-IO
\bigcirc	NIC 1	
	MAC address:	A0-BB-3E-20-09-C4
	IP address:	192.168.72.82
\bigcirc	NIC 2	
	MAC address:	A0-BB-3E-20-09-C5
	IP address:	192.168.72.24
Syr	nc:	internal
GN	1ID:	A0-BB-3E-FF-FE-20-09-C4
Syr	IP address: NIC 2 MAC address: IP address: nc:	192.168.72.82 A0-BB-3E-20-09-C5 192.168.72.24 internal

Name	Module's name in the network. Used e.g. for mDNS service. The name needs to be unique throughout the network.
NIC 1 / NIC 2	Monitoring state of network interface controller (OFF) = not connected (ON) = connected with the network
MAC address	Hardware identification of network interface controller.
IP address	IP address of device
Sync	Selected NIC for PTP sync
GMID	Grand Master ID (PTP)

Hyperlinks

• Name / IP address (p 7)

Mouse over:

- LED NIC 1- indicating link state and connection speed
- LED NIC 2- indicating link state and connection speed



ΝΟΤΕ

If NIC 1 and NIC 2 are connected to the same switch, they must be configured to different subnets - see "Network Settings" on page 7.

Network Settings

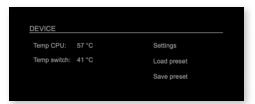
The two network interface controllers (NIC 1 / NIC 2) are configured individually.

NIC 1		NIC 2	
Dynamic IP address (IPv4):	•	Dynamic IP address (IPv4):	
Static IP address (IPv4):		Static IP address (IPv4):	•
IP address (IPv4):	192.168.72.82	IP address (IPv4):	169.254.61.155
Subnet mask (IPv4):	255.255.255.0	Subnet mask (IPv4):	255.255.0.0
Gateway (IPv4):	0.0.0.0	Gateway (IPv4):	0.0.0.0
DNS server (IPv4):	0.0.0.0	DNS server (IPv4):	0.0.0.0
Direct routing (multicast transfer on	ly):	Direct routing (multicast transfer on	y):
Host IP address 1:	172.44.56.12	Host IP address 1:	0.0.0.0
Host IP address 2:	0.0.0.0	Host IP address 2:	0.0.0.0
Host IP address 3:	0.0.0.0	Host IP address 3:	0.0.0.0
Host IP address 4:	0.0.0.0	Host IP address 4:	0.0.0.0
Host IP address 5:	0.0.0.0	Host IP address 5:	0.0.0.0
Host IP address 6:	0.0.0.0	Host IP address 6:	0.0.0.0
Host IP address 7:	0.0.0.0	Host IP address 7:	0.0.0
Host IP address 8:	0.0.0.0	Host IP address 8:	0.0.0.0
Host IP address 9:	0.0.0.0	Host IP address 9:	0.0.0
Host IP address 10:	0.0.0.0	Host IP address 10:	0.0.0.0

Device name	Input field - Module's name in the network. Used e.g. for mDNS service. The name needs to be unique throughout the network.
Dynamic IP address (IPv4)	Switch to enable the device's DHCP client. IP address is assigned by DHCP server. If no DHCP is available the IP address is determined via Zeroconf.
Static IP address (IPv4)	Switch to disable the device's DHCP client. Manual configuration of network parameters.
IP address (IPv4)	Module´s IP Address
Subnet mask (IPv4)	Module's subnet mask
Gateway (IPv4)	IP address of gateway
DNS server (IPv4)	IP address of DNS server
Apply	Button to confirm changes. Another popup window will appear to confirm a reboot of the module.
Direct routing	IP addresses of devices outside the subnet, to enable multicast traffic; e.g. Grandmaster or IGMP querier. Mark checkbox to activate.



Status - Device



Temp CPU	Display temperature of CPU core in degree Celsius. It may reach 95 °C without effecting the performance of the device.
Temp switch	Display temperature of network switch in degree Celsius
Settings	Opens a popup window to configure the device.
Load preset	Opens a dialog to store the device settings to a file. Filetype: .rps
Save preset	Opens a dialog to restore the device settings from a file. Filetype: .rps

Hyperlinks:

- Settings (p 8)
- Load preset (p 9)
- Save preset

Settings

SETTINGS		
oIP Module SW:	0.94	
AoIP Module HW:	0.29	
AoIP Module Update:	Update	
AoIP Module Reboot:	Reboot	
Language:	English	¢
Manufacturer Settings:	Reset	

AoIP Module SW	Module's software version. It is updated together with hardware version via network.
AoIP Module HW	Module's bitstream version. It is updated together with software version via network.
AoIP Module	Opens a dialog for selection of the update file - see
Update	"RAV2- Firmware Update" on page 43.
AoIP Module	Restart of the AoIP module. Confirmation required.
Reboot	Audio transmission will be interrupted.
Language	Menu language (english, german).
Manufacturer Settings	Restore device settings to factory defaults.
Reset	Confirmation required.

Load Preset



The device configuration can be stored to a single file (.rps).

Restoring the configuration a dialog prompts for selection of individual settings. This enhances flexibility at setup changes when a particular adjustment shall be preserved or just a single adjustment shall be restored.



Status - Input Streams

INPUT STREAMS		
01 TV-MIX stereo	2 ch 🕨 🔘 17 -	8 ch
O 02 TV MIX Surround	6 ch 🕨 🔘 18 -	8 ch
03 Radio-Mix	2 ch 📔 🔘 19 -	8 ch
04 Multi-Track	32 ch 🕨 🔘 20 -	8 ch
05 -	8 ch 📄 🔘 21 -	8 ch
06 -	8 ch 🔘 22 -	8 ch
07 -	8 ch 🔲 🔘 23 -	8 ch
08 -	8 ch 🔲 🔘 24 -	8 ch
09 -	8 ch 🔲 🔘 25 -	8 ch
10 -	8 ch 🔲 🔘 26 -	8 ch
	8 ch 📃 🔘 27 -	8 ch
12 -	8 ch 🔲 🔘 28 -	8 ch
13 -	8 ch 🔘 29 -	8 ch
14 -	8 ch 🔘 30 -	8 ch
15 -	8 ch 📃 🔘 31 -	8 ch
16 -	8 ch 🔲 🔘 32 -	8 ch

The module can subscribe up to 32 streams. The overview displays the basic information of each stream. The input stream name can be set manually (discovery protocol: manually, see page p 19) overriding the SDP's stream name information.

A backup stream can be defined as source after an adjustable timeout. A central active / inactive switch allows to toggle the stream state of all input streams at once.

01 to 32	State of inco (OFF) (ON) (ON) (ON)	= =	ng streams stream not activated stream activated, receiving data stream activated, receiving data via one NIC only (input redundancy) stream activated, not receiving data (unicast, connection not established)
01 to 32 Name	Name of stream gathered from SDP or set manually in the stream settings dialog.		
01 to 32 xx ch	Number of a	aud	io channels transported by the stream

INPUT STREAMS			
01 TV-MIX stereo	2 ch 🕨 🌘) 17 -	8 ch
O 2 TV MIX Surround	6 ch 🕨 🔘) 18 -	8 ch
03 Radio-Mix	2 ch) 19 -	8 ch
04 Multi-Track	32 ch 🕨 🥘) 20 -	8 ch

01 to 32	Click to activate or deactivate single stream.
	= stream activated
	= stream deactivated
	= stream not active, defined as backup-stream
INPUT STREAMS	Click to activate or deactivate all streams.
	= activate all streams
	= deactivate all streams (requires confirmation)



Backup Streams

01 - INPUT STREAM SETTING	S	
Activate Stream:		
Stream Input:	NIC 1 & 2	\$
Backup Stream:	3	\$
Backup Stream Timeout:	1s	+

Example:

Backup stream (input 3) that will act as source in the audio matrix if the current session (input 1) fails. Switch-over occurs after the defined timeout (1s). Stream 3 is marked accordingly in the status view

INPUT STREAMS		
01 TV-MIX stereo	2 ch 🔘 17 -	8 ch
O 2 TV MIX Surround	6 ch 🕨 🔘 18 -	8 ch
03 Radio-Mix	2 ch 🕨 🔘 19 -	8 ch
04 Multi-Track	32 ch 🕨 🔘 20 -	8 ch

Input 1 failed and Input 3 becomes active after the timeout.



ΝΟΤΕ

In case the main input fails the main stream is stopped (IGMP LEAVE) before the backup stream is being activated. This behaviour ensures that the required network bandwidth does not increase in case of a failure.



Hyperlinks:

• Name (p 14)

Mouse over:

• LED- indicating stream state

NOTE



Source-Specific Multicast (SSM) support for IGMP v3, v2 and v1 (SSM via protocol only in IGMP v3, SSM via internal filtering is applied for IGMP v2 and v1) - see "Source Specific Multicast" on page 19.



Input Stream Settings

Activate Stream: Image: Constraint of the stream input: Stream Input: NIC 2 Backup Stream: disabled Backup Stream Timeout: 1s Stream name: Stage A Stream state: connected
Backup Stream Timeout: Stream name: Stream state: Stream state:
Backup Stream Timeout: 1s
Stream name: Stage A Stream state: connected
Stream state: connected
Stream state: connected
Stream state offset max (samples): 8 Stream state offset min (samples): 2
Stream state offset min (samples): 2 Stream state ip address src NIC 1 / NIC 2: -/ 239.69.1.2
Stream state connection lost (Events) NIC 1 / NIC 2: 0 / 0
Stream state packet lost (Events) NIC 1 / NIC 2: 0 / 0
Stream state wrong timestamp (Events) NIC 1 / NIC 2: 0 / 0
Offset fine:
Offset in samples: 128 (2.67 ms)
Start channel:
Discovery protocol: RTSP (RAVENNA Session)
Session NIC 1:
Session NIC 2:

Up to 32 input streams can be subscribed. Each stream is organized in a 'RAVENNA session' (SDP = Session Description Protocol) that describes the stream parameters (audio channels, audio format, etc.).

The stream settings allow to adjust the processing of the received audio data (offset, signal routing). The receiving of stream data starts once the stream has been enabled.

The settings displayed vary depending on the selected discovery protocol.

ΤΙΡ

A sample offset of at least doubled packet time (samples per frame) is recommended Example: Samples per frame = 16 (0.333 ms) \Rightarrow Offset \ge 32 (0.667 ms)

It may be helpful to alter the stream discovery protocol if an expected stream can't be discovered by the device.

Activate stream	Stores parameters and activates or deactivates the receiving of audio data. (Unicast: additionally the negotiation of the connection)
Stream input	Selects one or both NICs used for stream input. Both NICs means input redundancy.
Backup Stream	Selects a backup stream that will act as source in the audio matrix if the current session fails. Switch-over occurs after the defined timeout.
Backup Stream Timeout	Defines timeout [1 s to 120 s] before switch-over to backup stream.
Stream name	Name of stream gathered from SDP
Stream state	Information about stream state: connected not connected receiving data read successfull error
Stream state message	Status info related to stream state.
Stream state offset max	Measured value (maximum). A high value indicates that the media offset of the source might not match the adjusted media offset of the device.
Stream state offset min	Measured value (minimum). The offset should not become negative.
Stream state ip address src NIC 1 / NIC 2	Multicast address of input stream subscribed at NIC 1 / NIC 2. Unicast transmission: IP address of sender.
Stream state connection lost NIC 1 / NIC 2	counter indicates the number of incidents where the network connection was lost (link down)
Stream state packet lost (Events) NIC 1 / NIC 2	counter indicates the number of lost RTP packets
Stream state wrong timestamp (Events) NIC 1 / NIC 2	counter indicates the number of packets with invalid timestamp
Offset fine	Enables adjustment of offset in increments of one sample.
Offset in samples	Modules output delay of received audio data (input buffer).



Start channel	Assignment of first stream channel in the audio matrix. E.g. stream with two channels, starting at channel 3 is available at channel 3 & 4 of the routing matrix.
Discovery protocol	Connection protocol or manual setup. RTSP = Real Time Streaming Protocol SAP = Session Announcement Protocol
Session NIC 1	Selection of discovered streams at NIC 1
Session NIC 2	Selection of discovered streams at NIC 2

Stream Discovery in AoIP environments is a colorful mixture of different mechanisms. To serve a successful stream management RAV2 provides a bunch of options, not making operation easier but effective.

Discovery protocol: Session NIC 1:	RTSP (RAVENNA Session) ✓ NMOS SAP (Dante/AES67 Session) RTSP (RAVENNA URL)	•
Session NIC 2:	Manual configuration	Refresh

Discovery RTSP (Session)

Discovery protocol:	RTSP (RAVENNA Session)
Session NIC 1:	
Session NIC 2:	

Discovery RTSP (URL)

Discovery protocol:	RTSP (RAVENNA URL) +	
URL NIC 1:		
URL NIC 2:	rtsp://PRODIGY-RAV-IO-20079e.local:80/by-r	Receive SDP

URL	URL (Uniform Ressource Locator) of the session of
	the device that is serving streams.
	Examples:
	rtsp://192.168.74.44/by-id/1
	or
	rtsp://PRODIGY-RAV-IO.local:80/by-name/Stage_A
Receive SDP	Recalls the stream configuration of the defined session(s).

NOTE

In case the automatic stream announcement and discovery of RAVENNA streams fails or cannot be used in a given network, the stream's SDP file can also be obtained via an RTSP URL.



Discovery SAP

Diamana	CAD (Dente/AES67 Section)	
Discovery protocol:	SAP (Dante/AES67 Session)	Ŧ
Session NIC 1:	•	
Session NIC 2:	Stage A@NIC 2 🛟	

SAP is used in Dante environments.

Discovery NMOS

	÷	Discovery protocol:
		Session NIC 1:
Refresh	÷) 📃	Session NIC 2:
	Ĵ	Session NIC 2:

Session	[MAC Address of sender] stream name @NIC
Refresh	Initiates a scan for available streams.

NMOS is suited for use in SMPTE ST 2110 environments.

Manual Setup

Discovery protocol:	Manual configuration	+	
Stream name (manual):	Stage A		
Number of channels:	8	\$	
RTP payload ID:	98		
Audio format:	L24	•	
Media offset:	0		
NIC 1		— <u>NIC 2</u>	
Dst IP address:	239.1.0.1	Dst IP address:	239.69.1.1
SSM (Source Specific Multicast):		SSM (Source Specific Multicast):	
Src IP address:	0.0.0.0	Src IP address:	192.168.74
RTP dst port:	5004	RTP dst port:	5004
RTCP dst port:	5005	RTCP dst port:	5005

Stream name (manual)	Stream name for display in status view and matrix. Can be specified individually, different than the name gathered from the SDP.	
Number of channels	Number of audio channels in the stream	
RTP-Payload-ID	RTP-Payload-ID of the audio stream (Real-Time Transport Protocol). Describes the format of the transported content.	
Audio Format	Stream's audio format (L16 / L24 / L32 / AM824)	
Media Offset	Offset between stream's timestamp and PTP-clock	
Dst IP address	Multicast IP address of audio stream	
SSM	Activate Source Specific Multicast filter for this stream.*	
Src IP address	IP address of sending device.*	
RTP dst port	Stream's destination port for RTP	
RTCP dst port	Stream's destination port for RTCP (Real-Time Control Protocol)	

* An RTP packet contains the IP address of the sender (source IP) and the stream's multicast address (destination IP). With SSM activated the receiver only accepts RTP packets of a certain destination IP that are originated by a sender with the specified source IP.

NOTE

RTP Payload ID must match between sender and receiver.





OUTPUT STREAMS		
01 Stage-A	8 Ch 🕨 🔘 17	8 Ch
02 Stage-B	8 Ch 🕨 🍥 18	8 Ch
03 Stage-C	8 Ch 🕨 🔘 19	8 Ch
04	8 Ch 🔲 🔘 20	8 Ch
05	8 Ch 🔲 🔘 21	8 Ch
06	8 Ch 🔘 22	8 Ch
O7	8 Ch 🔳 🔘 23	8 Ch
08	8 Ch 🔳 🔘 24	8 Ch
O9	8 Ch 🔲 🔘 25	8 Ch
10	8 Ch 🔲 🔘 26	8 Ch
	8 Ch 🔲 🔘 27	8 Ch
12	8 Ch 🕘 28	8 Ch
	8 Ch 📃 🔘 29	8 Ch
14	8 Ch 🔵 30	8 Ch
15	8 Ch 📃 🔘 31	8 Ch
16	8 Ch 🕘 32	8 Ch

Status - Output Streams

The device can send up to 32 streams. The overview displays the basic information of each stream.

01 to 32	 State of outgoing streams (OFF) = stream not activated (ON) = stream activated, sending data (ON) = stream activated, stream output via both NICs selected, but one NIC is not linked to the network. 	
01 to 32 Name	Name of stream defined in the settings	
01 to 32 xx ch	Number of audio channels transported by the stream	
01 to 32	 Activate or deactivate stream. ► = stream activated ■ = stream deactivated 	
OUTPUT STREAMS	Click to activate or deactivate all streams. ► = activate all streams = deactivate all streams (requires confirmation)	

Hyperlinks:

• Name (p 22)

Mouse over:

• LED- indicating stream state

ΤΙΡ

AES67 Streams

To create output streams for interoperability in AES67 environments please consult the information document <u>Info- AES67 Streams</u>.

ΤΙΡ

SMPTE 2110-30 /-31 Streams To create output streams for interoperability in SMPTE ST 2110 environments please consult the information document <u>Info- ST2110-30 Streams</u>.

Both documents are available at <u>http://academy.directout.eu</u>.



Output Stream Settings

02 - OUTPUT STREAM SET	TINGS			
Activate Stream:				
Stream Output:	NIC 2	\$		
Stream name (ASCII):	Ambience	_		
RTSP URL (HTTP tunnel) (RTSP URL (HTTP tunnel) (DIGY-RAV-IO-20079e.local:80 DIGY-RAV-IO-20079e.local:80		
RTSP URL (by-name):		DIGY-RAV-IO-20079e.local.oc		
RTSP URL (by-id):	rtsp://PROI	DIGY-RAV-IO-20079e.local/by	/-ld/2	
SDP:	v=0 o=- 2 2482 s=Ambien t=0 0	2002937 IN IP4 192.168.74.4 ce	4	
		5004 RTP/AVP 98		
Unicast:				
RTP payload ID:	98			
Samples per Frame (packet tim	e): 45 (0.94 i	ms) 🗘		
Audio format:	AM824	÷		
Start channel:	9	÷		
Number of channels:	8	÷		
NIC 1		NIC 2		
RTP dst port: 5004		RTP dst port:	5004	
RTCP dst port: 5005		RTCP dst port:	5005	
Dst IP address (IPv4): 239.	39.1.3	Dst IP address (IPv4):	239.69.1.4	

Up to 32 output streams can be sent to the network. Each stream is organized in a session (SDP = Session Description Protocol) that describes the stream parameters (audio channels, audio format, etc.).

Each stream may be labelled with an individual stream name (ASCII) which is useful for enhanced comfort at organizing the setup.

The stream settings allow to adjust the processing of the sent audio data (blocks per frame, format, signal routing, ...). The sending of stream data starts once the stream has been enabled.

Once the stream is active, the SDP data is displayed and may be copied from the window or downloaded via http://<rav-io>/sdp.html?ID=<stream no.>.

Stores parameters and activates or deactivates the receiving of audio data. (Unicast: additionally the negotiation of the connection)
Selects one or both NICs used for stream output. Both NICs means output redundancy.
Individually defined name of an output stream. It is used in the URL which is indicated in different ways below.*
Current used RTSP-URL of stream with HTTP port used for RTSP, stream name or stream id.
Current used RTSP-URL of stream with stream name or stream id.
SDP data of the active stream.
If activated, the stream is sent in unicast mode.**
Stream's payload id
Number of blocks containing payload (audio) per ethernet frame - see packet time on p 14.
Stream's audio format (L16 / L24 / L32 / AM824) ***
Assignment of first stream channel from the audio matrix. E.g. stream with eight channels, starting at channel 3 is fed from channel 3 to 10 of the routing matrix.
Number of audio channels in the stream.
Stream's destination port for RTP
Stream's destination port for RTCP (Real-Time Control Protocol)
Stream's IP address for multicast (should be unique for each stream).

* Only ASCII characters are allowed.

- ** A unicast stream can only be received by one device. If a device is already receiving the stream, further connection calls by other clients are answered with ,service unavailable' (503). The release time after disconnect or interruption of the client's connection amounts to about 2 minutes.
- *** L16 = 16 bit audio / L24 = 24 bit audio / L32 = 32 bit audio / AM824 = standardized according to IEC 61883, allows AES3 transparent transmission (SMPTE ST 2110-31).



Advanced - Overview

STATUS ADVANCED	NMOS	LOGGING ABOUT	STATISTIC SWITCH		
	<u> </u>				
PTP SETTINGS		PTP UNICAST		PTP CLOCK SETTINGS	
PTP input:	NIC 2	Auto Detect GM:	on \$	No PTP switch 1 Gbit/s:	0 0
	Multicast \$	Grant duration (sec):	30	No PTP switch 100 MbR/s:	0 \$
Mode:	auto 🗘	Grandmaster IP:	0.0.0.0		
Profile:	media E2E 🛊			NETWORK ADVANCED SETTING	_
		CURRENT PTP MASTER Clock class:	248	IGMPINIC 1:	auto \$
PTP CURRENT SETTINGS		Accuracy:	254	IGMP NIC 2:	auto \$
		Clock domain:		TCP port HTTP:	80
Accuracy:	254	Priority 1:	64	TCP port RTSP:	554
Clock domain NIC 1:	0	Priority 2:	64	TTL RTP packets:	128
Clock domain NIC 2:	1	GMID:	A0-BB-3E-FF-FE-20-0B-86	DSCP RTP packets:	AF41 (0x22) \$
Priority 1:		Sync:	NIC 2	DSCP PTP packets:	CS6 (0x30) \$
Priority 2:		IPv4;	192.168.74.58	Multi stream rx:	yes ¢
Announce: Sync:	2 s (1) 125 ms (-3)			MDNS announcement: SAP announcement:	RX/TX ¢
Sync: Min delay request:	125 ms (-3) 1 s (0)	PTP STATISTIC			
Min delay request: Min pdelay request:	1 s (0) 1 s (0)	PTP state:	slave	Network settings;	Apply
		PTP jtter:			
Announce receipt timeout:		PTP offset:	-0.08 us		
One step clock:		PTP master to slave:	0s 4148ns		
Slave only:		PTP slave to master.	0s 4240ns		
Delay mechanism:		Ourrent PTP time (TAI):			
		Current PTP time (TAI) (RAW):	1839s 254134455ns		
PTP JITTER					
.4857 m +		the the second	undlij Austraanse van gestaal weer ook ook ook ook ook ook ook ook ook oo	ahamaanahaahaahaanad	hor maket in private O min

The tab 'ADVANCED' is divided into several sections:

- PTP SETTINGS definition of PTP source, mode and profile
- PTP PROFILE
 CURRENT
 SETTINGS
- CURRENT PTP
- MASTER
- PTP STATISTIC

PTP JITTER

- monitoring device's PTP state, jitter and delay
- PTP CLOCK SETTINGS definition of adaption algorithms to reduce jitter

- definition of a customized PTP profile

- monitoring PTP characteristics

- NETWORK ADVANCED
 SETTINGS
 - definition of network and QoS characteristics
 - graphical display of measured PTP jitter

Advanced - PTP Settings

PTP SETTINGS		
PTP Input:	NIC 2	\$
IP mode:	Multicast	\$
Mode:	auto	\$
Profile:	media E2E	\$

PTP Input	Selects one or both network ports used for PTP input. Both ports means input redundancy. *		
IP Mode	Multicast =	Sync messages and delay request are sent as multicast message to every node within the network.	
	Hybrid =	Sync messages are sent as multicast, delay requests are sent as unicast messages directly to the Grandmaster or Boundary Clock.**	
	Unicast =	Sync messages are sent as unicast, delay requests are sent as unicast messages directly to the Grandmaster or Boundary Clock.***	

- * Using redundant PTP-operation a switch-over is triggered not only at signal loss of the Grandmaster but depends on the quality of the PTP clock. Changes (e.g. clock class) are observed permanently and the algorithm decides for the best signal present.
- ** Hybrid Mode reduces the workload for all nodes in the network as they do not receive the (unnecessary) delay requests from other devices anymore.
- *** Unicast Mode may help when multicast routing is not possible within the network. As an opposite to the Hybrid Mode it increases the workload of the grandmaster since sync messages must be sent to each single slave individually.



PTP SETTINGS		
PTP Input:	NIC 2	¢
IP mode:	Multicast	ŧ
Mode:	auto	¢
Profile:	media E2E	\$

Mode	auto	 PTP-clock master / slave configuration is auto negotiated between devices in the network. Module's master / slave state may change automatically.
	slave only	 PTP-clock slave configuration is preferred. Module clocks to another device in the network
	preferred master	 PTP-clock master configuration is preferred. Module acts as network grandmaster. Priority values are adjusted automatically to ensure Grandmaster status. *
	master only	= PTP-clock master is forced. **
Profile		ed PTP profile (default E2E, default P2P, a P2P) or activates customized PTP profile.

- * If more than one device announces as PTP-clock master the network Grandmaster is determined following the Best Master Clock Algorithm (BMCA).
- ** 'Master only' configures the device to act as Unicast Grandmaster. This setting is available only with PTP Mode set to 'unicast'



NOTE

PTP profile ,customized' allows for individual adjustment of the PTP parameters. If profile is set to ,media' or ,default' the PTP parameters cannot be altered and are displayed only. Factory default setting is PTP Media Profile E2E.

Advanced - PTP Unicast

PTP UNICAST		_
Auto Detect GM:	on	\$
Grant duration (sec):	30	
Grandmaster IP:	0.0.00	

Auto Detect GM	 on = enables the automatic detection of the grandmaster * off = IP address of grandmaster needs to be defined manually
Grant duration (sec)	Time period during which the slave receives sync messages from the grandmaster.**
Grandmaster IP	IP address of the grandmaster. ***

- * 'Auto Detect GM' is a proprietary function and might not be supported by 3rd party GMs.
- ** Depending on the temporary workload of the grandmaster the negotiation may fail.
- *** This value is used only with 'Auto Detect GM' set to <off>.

About PTP Unicast

Since the BMCA is not available with PTP unicast, the PTP properties of the devices require some extra configuration.

Example:

Grandmaster	IP Mode Unicast, Mode Master only
Slave(s)	IP Mode Unicast, Mode Slave Only,
	Auto Detect GM ON, Grant Duration 30 sec



PTP CURRENT SETTINGS	
Clock class:	248
Accuracy:	254
Clock domain NIC 1:	0
Clock domain NIC 2:	1
Priority 1:	128
Priority 2:	128
Announce:	2 s (1)
Sync:	125 ms (-3)
Min delay request:	1 s (0)
Min pdelay request:	1 s (0)
Announce receipt timeout:	
One step clock:	no
Slave only:	no
Delay mechanism:	E2E

Advanced - PTP Profile Customized Settings

The settings become available with PTP profile set to 'customized'.

Clock class	PTP-clock's class according to IEEE 1588 [read only]
Accuracy	PTP-clock's accuracy according to IEEE 1588 [read only]
Clock domain NIC 1	PTP-clock's domain at NIC 1
Clock domain NIC 2	PTP-clock's domain at NIC 2
Priority 1	Priority setting for master announcement (the smaller the value the higher the priority)
Priority 2	If value 'Priority1' (and other PTP-clock parameters) of more than one device in the network match: Priority setting for master announcement (the smaller the value the higher the priority)
Announce	Intervall of sending announce-packets for auto- negotiation.
Sync	Intervall of sending sync-packets to the PTP-clock slaves in the network.
Min delay request	Intervall of sending End-To-End packets of PTP-clock slave to PTP-clock master. To determine the offset slave-to-master.
Min pdelay request	Intervall of sending Peer-To-Peer packets between two PTP-clocks. To determine the offset master-to- slave and slave-to-master.
Announce receipt timeout	Number of missed announce-packets (threshold) to reinitialize the negotiation of PTP-clock master.

One step clock	Timestamp of PTP-clock is integrated in PTP-sync- packets. No follow-up packets are sent. No = Two step clock is used
Slave only	Yes = PTP-clock is always slave.
Delay mechanism	E2E - Offset slave-to-master is determined by End-To- End packets.P2P - Offset master-to-slave and slave-to-master is determined by Peer-To-Peer packets.

Advanced - Current PTP Master

CURRENT PTP MASTER	
Clock class:	248
Accuracy:	254
Clock domain:	
Priority 1:	64
Priority 2:	64
GMID:	A0-BB-3E-FF-FE-20-0B-86
Sync:	NIC 2
IPv4:	192.168.74.58

Monitoring display only.

Clock class	PTP-clock's class according to IEEE 1588
Accuracy	PTP-clock's accuracy according to IEEE 1588
Clock domain	PTP-clock's domain at selected NIC
Priority 1	Priority setting for master announcement (the smaller the value the higher the priority)
Priority 2	If value 'Priority1' (and other PTP-clock parameters) of more than one device in the network match: Priority setting for master announcement (the smaller the value the higher the priority)
GMID	ID of current Grandmaster
Sync	Selected NIC for PTP clock
IPv4	IP address of Grandmaster



Advanced - PTP Statistic

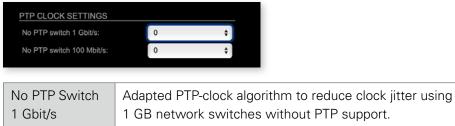
PTP STATISTIC	
PTP state:	slave
PTP jitter:	0.46 us
PTP offset:	-0.08 us
PTP master to slave:	0s 4148ns
PTP slave to master:	0s 4240ns
Current PTP time (TAI):	1970-01-01 00:30:39
Current PTP time (TAI) (RAW):	1839s 254134455ns

Monitoring display only.

PTP state	Information about current PTP-clock state: intialize error deactivated receiving data pre master master passive not calibrated slave
PTP jitter	PTP-clock jitter in microseconds (µs)
PTP offset	Offset relative to PTP-clock master
PTP master to slave	Absolute offset master-to-slave in nanoseconds
PTP slave to master	Absolute offset slave-to-master in nanoseconds
Current PTP time (TAI):	Date and time information from GPS source*
Current PTP time (TAI) (RAW):	RAW TAI from GPS source*

* Temps Atomique International- if no GPS source is available for PTP timestamping,the date / time display starts at 1970-01-01 / 00:00:00 after every reboot of the device.

Advanced - PTP Clock Setting



1 Gbit/s	1 GB network switches without PTP support.
	Max. number of 1 Gbit/s switches: less than 10
No PTP Switch	Adapted PTP-clock algorithm to reduce clock jitter using
100 Mbit/s	100 MB network switches without PTP support.
	Max. number of 100 Mbit/s switches: 1



Advanced - Network Advanced Settings

NETWORK ADVANCED SETTINGS				
IGMP NIC 1:	auto 🗘			
IGMP NIC 2:	auto 🗘			
TCP port HTTP:	80			
TCP port RTSP:	554			
TTL RTP packets:	128			
DSCP RTP packets:	AF41 (0x22) \$			
DSCP PTP packets:	CS6 (0x30) \$			
Multi stream rx:	yes 🛟			
MDNS announcement:	RX/TX ‡			
SAP announcement:	RX/TX 🛟			
Network settings:	Apply			

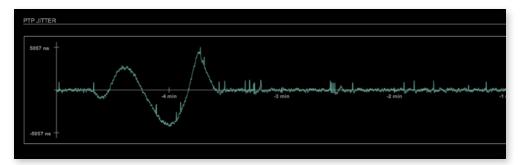
IGMP NIC 1	Definition or auto-select of IGMP version used to connect to a multicast router at NIC 1.
IGMP NIC 2	Definition or auto-select of IGMP version used to connect to a multicast router at NIC 2
TCP port HTTP	TCP port for HTTP
TCP port RTSP	TCP port for RTSP
TTL RTP packets	Time-To-Live of RTP packets - default: 128
DSCP RTP packets	DSCP marking of QoS of RTP packets - default: AF41
DSCP PTP packets	DSCP marking for QoS of PTP packets - default: CS6*
Multi stream rx	If activated, the device allows to subscribe to the same multicast stream more than one time - default: off
MDNS announcement	Announcement of streams via MDNS can be controlled to optimize network traffic or CPU load. Values: Off, RX, TX or RX/TX **
SAP announcement	Announcement of streams via SAP can be controlled to optimize network traffic or CPU load. Values: Off, RX , TX or RX/TX **
Network settings Apply	Confirms and saves changes being made. Reboot required.

- * AES67 specifies EF, but some implementations use EF for Audio streaming. To avoid overlapping of RTP and PTP packets in the same queue CS6 has been chosen as default.
- ** RX = receive, TX = transmit, RX/TX = receive and transmit

NOTE

Source-Specific Multicast (SSM) support for IGMP v3, v2 and v1 (SSM via protocol only in IGMP v3, SSM via internal filtering is applied for IGMP v2 and v1) - see "Source Specific Multicast" on page 19.

Advanced - PTP Jitter



Graphical display of measured PTP jitter.

NOTE

An error message next to Jitter measurement is displayed if delay requests are not being answered by Grandmaster.



NMOS - Overview

STATUS ADVANC	NMOS	LOGGING ABOUT	STATISTIC	SWITCH	
NIC1		NIC2		ADDITIONAL SETTINGS	
NMOS port:	3210	NMOS port:	3212	Disable stream during config:	
Searche mode NMOS registry: Multicast:		Searche mode NMOS registry: Multicast:		Seed id: Generate new seed id:	e6358465-5b74-4508-ad07-852dac4f7796 Generate
Unicast: Registry domain name	D:	Unicast: Registry domain name:			
Manually:		Manually:			
Registry IP address:	0.0.0.0	Registry IP address:	0.0.0.0		
Registry port:	3210	Registry port:	3210		
	v1.3 \$	Version:	v1.3 0		
		Settings (NIC1 + NIC2):	Apply		
		Manufacturer Settings NMOS Ports	Reset		

NMOS provides a family of specifications related to networked media for professional applications. It is produced by the Advanced Media Workflow Association (AMWA).

Support for NMOS is introduced with the AoIP Module version SW 0.17 / HW 0.46 according to the specifications:

- IS-04 Discovery & Registration
- IS-05 Device Connection Management

IS-04 allows control and monitoring applications to find the resources on a network. Resources include Nodes, Devices, Senders, Receivers, Sources, Flows...

IS-05 provides a transport-independent way of connecting Media Nodes.

More information: https://specs.amwa.tv/nmos/

NMOS port - NIC1 & NIC2

The port entries for NIC1 and NIC2 are pre-configured by default. Modifications are possible but not necessary.

NIC1		NIC2	
NMOS port: 3210		NMOS port:	3212
NMOS port (NIC1 + NIC2)	Port address. F	leboot required a	fter modification.

Search mode NMOS registry

Searche mode NMOS registry: Multicast:		Searche mode NMOS registry: Multicast:	
Unicast: Registry domain name:		Unicast: Registry domain name:	
Manually:		Manually:	
Registry IP address:	0.0.0.0	Registry IP address:	0.0.0.0
Registry port:	3210	Registry port:	3210
Version:	v1.3 \$	Version:	v1.3 \$

Multicast	use mDNS to determine and connect to the registry server
Unicast	use DNS-SD to connect to the registry server
Registry domain name	DNS resolvable domain name of the registry server
Manually	
Registry IP address	
Registry port	
Version	Support of NMOS API version



NMOS - Additional Settings

d6368ef8-5b74-4508-ad07-652dac4f7796
Generate

Disable stream during config	Automatically disable and re-enable streams when settings are changed via NMOS (recommended)
Seed id	Unique identifier, subordered entities are derived from the seed id.
Generate new seed id Generate	Generates a new unique identifier. Reboot required.

NMOS uses a logical data model based on the JT-NM Reference Architecture to add identity, relationships and time-based information to content and broadcast equipment. Hierarchical relationships group related entities, with each entity having its own identifier.

The identifiers are persistent across restarts of the device in order to make them useful over a period of time longer than a single production deployment.

New identifiers may be generated manually if required.

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Logging

	STATUS	ADVANCED	NMOS	LOGGING	BOUT STAT	ISTIC	SWITCH			
EVERTINAS MORE 1 MORE 1 MORE 1 R2322 Nove 1 TC/: Nove 2 MALE Nove 2 NCD 2 NCD 2 NCD 2 NCD 2										
LOG SETTINGS BASE None I PS332 None I TCP: None I DNS: None I Nuldi: None I RTCP: None I	LOG MESSAG	ES								
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BASE None Cone MONE R5232 None TCP: None C DNS: None C MONE RTCP: None C RTCP: None C C RTCP: None C									Save log Clear log Scroll k	ock
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DNS: None 3 NMOS None 3 PTCP: None 3			MDNS:	None	R	5282: N	one \$	TCP:	None \$	
FLASH: None C BAP: None C Log lovit Level C	DNS:	None \$	NMOS:	None d	R R	TGP: N				
	FLASH:	None \$		None	s)s/	AP: N	one \$	Log level:	Level 0 \$	

The tab 'LOGGING' displays logging depending on the 'Log Settings'. The logging can be enabled individually for different protocols, each of with an adjustable filter. An adjustable log level specifies the information detail of each entry.

To save a log the content of the view can be copied and pasted to a text document.

Log Level

0	log data
1	level and log data
2	protocol, level and log data
3	protocol, process-id of requesting process, process-id of running process, level and log data
4	protocol, process-id of requesting process, process-id of running process, level, processor time in ticks and log data
5	protocol, process-id of requesting process, process-id of running process, level, processor time in ticks, file name and line and log data

Protocol Types

ARP	Address Resolution Protocol
BASE	Basic operation of module
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
FLASH	Process for updating the module
IGMP	Internet Group Management Protocol
MDNS	Multicast Domain Name System
NMOS	Network Media Open Specification
PTP	Precision Time Protocol
RS232	Serial Protocol
RTCP	Real Time Control Protocol
SAP	Session Announcement Protocol
ТСР	Transmission Control Protocol
Zeroconf	Zero Configuration Protocol

Log Filter

NONE	logging disabled
ERROR	error occurred
WARNING	warnings- condition that may lead to unwanted behavior or an error
INFO 1	log info* + warning + error
INFO 2	log info* + warning + error
INFO 3	log info* + warning + error
INFO 4	log info* + warning + error

 * increasing amount of log info starting from ,INFO 1'

Log Operation

Save log	Downloads the current log entries to a text-file (log.txt).
Clear log	Deletes all log entries without further prompt.
Scroll lock	Interrupts automatic scrolling of the list view to allow copying the content to a text file via copy & paste. If scrolling is stopped for a longer period of time the display may not list all entries.



Statistic

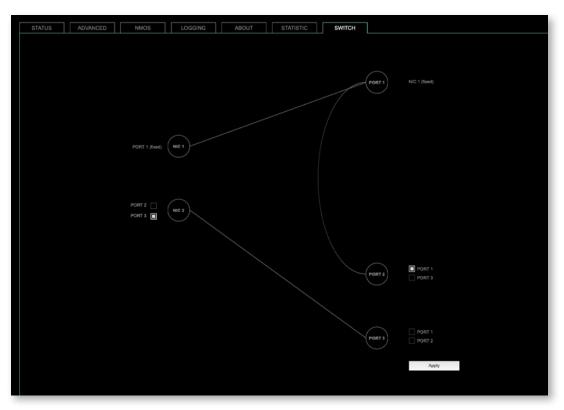


The tab 'STATISTIC' displays an overview of the CPU load of the particular processes, an error counter and a monitor display to indicate the incoming (RX) and outgoing (TX) network traffic on both network ports individually.

Details	Displays a list of input streams and related events (connection lost, packet lost, wrong timestamp) of received audio packets.
Reset	Resets the packet statistic

See "Protocol Types" on page 39.

Switch



Two independent network interfaces (NICs) can be configured in the switch configuration.

- Port 1 is fixed assigned to NIC 1.
- The other ports can be assigned to either NIC 1 or NIC 2

NOTE

If you want to use a port that is not assigned to a NIC e.g. to patch the device's management port (MGMT) into the audio network, you can link it to one of the audio ports.

NOTE

To access the module's control page it is required to connect the management network to one of the ports that is directly attached to a NIC - see next page.

To give the very best PTP synchronisation performance, the switch incorporates advanced timestamping between the external PORTS and the internal NICs. As a consequence, the on-board switch cannot be used to connect other PTP devices via a single shared connection to the wider network.

Please connect all other PTP devices directly to your system's network switch.



Tools

STATUS ADVANCED NMOS LOGO	ING ABOUT STATISTIC	SWITCH TOOLS	
PING			
IP address (IPv4): 192.168.72.26			
Interface: NIC 1 NIC 2 Output			
PING 192.168.72.26 (192.168.72.26): 56 data bytes			
64 bytes from 192.168.72.26: seq=0 til=64 time=0.416 ms			
64 bytes from 192.168.72.26: seq=1 ttl=64 time=0.358 ms			
64 bytes from 192.168.72.26: seq=2 ttl=64 time=0.401 ms			
64 bytes from 192.168.72.26: seq=3 ttl=64 time=0.306 ms			
192.168.72.26 ping statistics			
4 packets transmitted, 4 packets received, 0% packet loss			
round-trip minlavg/max = 0.306/0.370/0.416 ms			
Send ping:	Start		

The tab 'TOOLS' offers a generator to ping any IP address (IPv4) from either NIC 1 or NIC 2. The result is displayed at the 'Output'.

IP address (IPv4)	Enter IP address (IPv4) to be pinged
Interface	Select NIC 1 or NIC 2
Start	Sends ping to the specified IP address from selected NIC.

RAV2 - Firmware Update

The RAV2 module is updated via network.

Open the control page of the module and navigate to the tab STATUS and click SETTINGS in the top right corner (p 8).

ETTINGS			
AoIP Module SW:	0.94		
oIP Module HW:	0.29		
AoIP Module Update:	Update	•	
oIP Module Reboot:	Reboo	t	
.anguage:	English	\$	
Manufacturer Settings:	Reset	Reset	

Click 'Update' and browse to the update file after unzipping first. Example: rav_io_hw_0_29_sw_0_94.update

Follow the instructions displayed.

WARNING!



It is strongly recommended to backup the device configuration (Save Preset) before running any update.