datasheet

Virtuoso
Media Function

Nevion Virtuoso

AUD-PROC-MADI-IP and AUD-AES3

Nevion Virtuoso's AUD-PROC-MADI-IP offers an attractive set of audio adaptation, processing and mixing functions for use in live audio production applications.

The AUD-PROC-MADI media function provides MADI and SMPTE 2110 and AES67 IP audio interfacing, monitoring, routing and processing of audio signals. The AUD-AES3 card and media function provides additional AES3 interfacing capability.

Four audio processor engines are available for flexible routing/mono shuffling and per-channel control of polarity, gain and delay. Each of the processing engines can also be configured as an audio summing matrix mixer with up to 512 cross-points.

The AUD-PROC-MADI-IP media functions runs on the Virtuoso HBR card and supports two 1/10 GigE ports for IP audio, with up to 128 input and 128 output streams, fully compliant to AES67 and ST2110-30/31. ST2022-7 is supported for all inputs.

The Audio Processor Media Function is optimized for high-speed processing to ensure that the end-to-end latency is kept at a minimum, making it well suited for any live production application.

Applications

- IP in the facilities infrastructure
- Outside broadcast
- Remote and distributed production
- In-house/campus media networks
- Audio over IP contribution and distribution

Key features

- Multi-standard audio connectivity
  - MADI/AES10 (optical and electrical)
  - AES3 (balanced and unbalanced)
  - IP Audio compliant with AES67 & ST2110
  - Any-to-any routing and conversion
- Audio processing
  - Audio routing/shuffling, delay and gain
  - Audio summing matrix mixer
- RTP/IP flow protection
  - SMPTE 2022-7 hitless/seamless protection
  - Alarm-based input switching
- Powerful control, monitoring and alarms
  - HTML5 web user interface and REST API
  - In-depth service monitoring with audio presence, peak level and silence detection

Nevion Virtuoso Audio Media Functions

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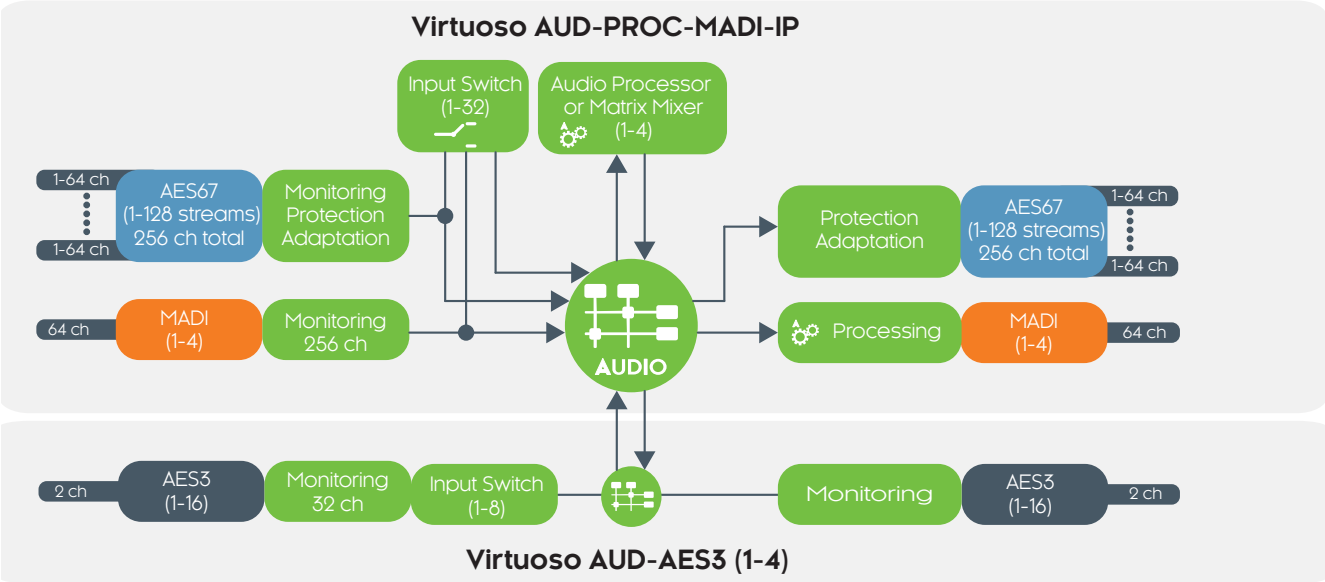

Powerful audio processing

Nevion Virtuoso's Audio Processor media function has flexible audio interfacing with support for MADI/AES10 and IP audio compliant to AES67 and SMPTE ST 2110-30/31. In addition, AES3 interfacing is available via an AES3 digital audio adapter card.

The four internal 64-channel audio processors enable fully flexible audio routing (mono shuffling), per channel delay of up to 10 seconds, as well as audio level / gain control and polarity inversion. Similar processing is available on MADI outputs.

Audio matrix mixer

An audio processor can be configured as an audio summing matrix mixer with up to 512 crosspoints (depending on license S/M/L/XL). With support for gain/delay pre-processing of inputs as well as gain/polarity/mute control for every cross-point, the audio matrix mixer provides a powerful toolbox for a variety of audio summing and mix-minus audio mixer requirements in live production, remote production and MCR applications.

High density and flexibility

The Audio Processor Media Function running on an HBR accelerator handles up to 8 MADI streams; 2 inputs and 2 outputs with optical/electrical MADI SDPs, and 4 inputs and 4 outputs with Nevion breakout cables.

For IP audio, up to 128 input and 128 output AES67 / ST2110-30/31 streams are supported, with ST2022-7.

For pure ST2110 IP audio routing applications, each instance of the media function is equivalent to a 256x256 IP audio router.

Seamless IP Protection Switching

Transmitting the same RTP/IP stream across dual, fully diverse network links enables receivers/ decoders to utilize SMPTE ST 2022-7 Seamless IP Protection Switching (SIPS), which gives error-free transport even in case of severe packet loss or link outages as long as a packet arrives on either of the two network links. Support for ST 2022-7 requires the protection license.

Timing and sync

Precision Timing Protocol (PTP) provides accurate synchronization for IP audio, using IEEE 1588v2 profiles or SMPTE 2059-2. Locking to PTP/TAI ensures fully synchronous operation across any network and any distance. For IP audio in an AES67/SMPTE 2110 environment, playout can be receiver buffer-based on link-offset based. For wide-area network environments where PTP is not available, adaptive clock recovery is supported to enable point-to-point transport of MADI or IP audio streams.

Monitoring

The software supports in-depth audio service monitoring for up to 256 audio channels, with audio bars in the user interface as well as advanced template based monitoring and alarms. Template monitoring is configurable per audio channel with presence, peak level threshold and silence detection (requires the monitoring license).

Nevion Virtuoso AUD-PROC-MADI-IP

Audio formats

Digital Audio - MADI	MADI / AES10 optical SFP (1 in + 1 out) MADI / AES10 electrical SFP (2 in, 2 out) MADI electrical breakout cable (4 in, 4 out) Up to 64 audio mono channels per MADI.
Audio format	48 kHz, 24 or 32-bit
Audio over IP	AES67 up to 64 channels/stream SMPTE ST 2110-30 Level A, B, C SMPTE ST 2110-31 Level A, B, C
Max audio streams	128 input + 128 output (1-8 channels/stream) 4 input + 4 output (64 channels/stream)

Networking and Protection

Ethernet ports	2 x 10GBase-R (10 Gigabit Ethernet) 2 x 1GBase-X (1 Gigabit Ethernet) (future)
Protocols	RTP, UDP, IP, ICMP, ARP, IGMPv2/v3, Diffserv/ TOS, 802.1Q (VLAN tag), 802.1P (VLAN priority)
Max VLANs	Up to 128 VLANs per network interface
Link redundancy	SMPTE ST 2022-7 support for all IP audio input streams (optional licensed feature).
Max IP flows	2 IP input / 2 IP output per audio stream. Multicast IP destination address can only be used once per card for input/output.

Audio processing

Processors	Audio Processor elements (1-4) MADI outputs (1-4)
Audio matrix	64 output channels per audio processor
Fade out/in	Configurable per matrix (slow/medium/fast)
Audio delay	Up to 10 seconds per channel, configurable in samples or milliseconds (0,1 ms steps)
Audio level/gain	Individual gain control per channel -80 dB to + 36 dB (0,1 dB steps)
Audio mute	Individual control per channel
Polarity invert	Individual control per channel

Timing and synchronization

Sync input format	PTP (IEEE 1588v2:2008)
PTP profile support	PTP default and media profile SMPTE ST 2059-2 PTP profile
PTP redundancy	Internal PTP failover in Virtuoso FA/MI
Media timing	SMPTE ST 2059-1, SMPTE ST 2110-10 AES67 Link Offset mode IP Receiver buffer with PTP fixed rate mode IP Receiver buffer with adaptive clock recovery for MADI over IP in WANs.

Monitoring

Audio bars for MADI, Audio Processor and IP audio inputs

Advanced audio monitoring license option, providing:
- Audio silence detection and alarm
- Audio peak level threshold detection and alarm
- Audio level stuck detection and alarm

Media Server Appliance support

Please refer to Nevion Virtuoso Platform datasheet for details.

Virtuoso FA	Supported in version 2.9 or higher
Virtuoso MI	Supported in version 1.2 or higher

Accelerator requirement

Accelerator	HBR Media Accelerator
Description	Multi-channel high bitrate Media Accelerator (HW module). 4x SFP+ ports that can accommodate a combination of 1GE/10GE SFP+ and MADI SFPs.
Product codes	VIRTUOSO-HW-HBR-SFP4 (24204)
SFP configuration	Port 1: MADI SFP Port 2: MADI SFP Port 3: 1GE / 10GE Port 4: 1GE / 10GE
Optical MADI SFPs	Single mode 1310nm (SFP-TR1-13T-LR) Multimode 850nm (SFP-TR1-850-SR) For more options please contact Nevion.
Electrical MADI SFPs	SFP-MADI-TRX-1-DIN (24686) SFP-MADI-TRX-1-HDBNC (24687) SFP-MADI-RX-2-HDBNC (24688) SFP-MADI-TX-2-HDBNC (24689)
Sync input format	PTP (IEEE 1588v2:2008, SMPTE ST2059)
Power consumption	Maximum 45W

Nevion Virtuoso AUD-AES3

Audio formats

Digital Audio - AES3	Up to 16 channels per AES3 card. Input/output direction is configurable on a port-by-port basis. Two audio mono channels per AES3.
Audio format	48 kHz, 24-bit linear PCM audio 32-bit transparent AES3
Input SRC	Asynchronous Sample Rate Conversion (ASRC) is a licensed option per AES3 input
ASRC ports	Available on input ports 1-8.
ASRC modes	On, Auto, Off
ASRC spec	Output frequency: 48kHz THD+N > 120dB Frequency range: 24kHz - 109 kHz Passband ripple < +/- 0.02dB Passband response edge: 21.7 Hz Stopband edge: 26.2 Hz Stopband response > 145 dB

Audio processing

Processors	Audio Processor elements (1-2)
Audio matrix	32 output channels per audio processor
Fade out/in	Configurable per matrix (slow/medium/fast)
Audio mute	Individual control per channel

Timing and synchronization

Sync input format	PTP (IEEE 1588v2:2008) via HBR10 in Virtuoso MI
PTP profile support	PTP default and media profile SMPTE ST 2059-2 PTP profile
PTP redundancy	Internal PTP failover in Virtuoso MI
Media timing	SMPTE ST 2059-1

Monitoring

Audio bars for AES3 input, AES3 output and Audio Processors

Advanced audio monitoring license option, providing:
- Audio silence detection and alarm
- Audio peak level threshold detection and alarm
- Audio level stuck detection and alarm

Media Server Appliance support

Virtuoso MI	Supported in version 1.2 or higher
Virtuoso FA	Not supported

Accelerator requirement

Description	Virtuoso AES3 adapter module with 16 AES3 inputs or outputs (direction configurable on a port by port basis). 4 GPIO (direction configurable on a port-by-port basis). DC-37 female connector (DC-37 cable not included). An HBR accelerator with AUD-PROC-MADI-IP software and licenses required for IP audio.
Product codes	VIRTUOSO-HW-AUD-AES3 (24772)
Number of ports	16 - configurable as input or output
Interface Type	AES3, 48kHz 24/32-bit
Power consumption	Maximum 20W
Breakout panels	VIRTUOSO-HW-AUD-BRK-BNC16 (24774) 1RU passive breakout panel for AES3 digital audio adapter with 16 unbalanced female BNC connectors (75 Ohm). DC-37 female connector (DC-37 cable included). VIRTUOSO-HW-AUD-BRK-XLR16 (24775) 1RU passive breakout panel for AES3 digital audio adapter with 8 male and 8 female XLR connectors. DC-37 female connector (DC-37 cable included).
Power consumption	Maximum 20W

Ordering Options

Virtuoso MI

VIRTUOSO-HW-HBR-SFP4	24204	Multi-channel high bitrate Media Accelerator (HW module). 4x SFP+ ports that can accommodate a combination of 10GE SFP+ and video SFPs. Additional licenses required for use with media adaptation/compression/processing/monitoring functions.
VIRTUOSO-HW-AUD-AES3	24772	Virtuoso AES3 adapter module with 16 AES3 inputs or outputs (direction configurable on a port by port basis). 4 GPIO (direction configurable on a port-by-port basis). DC-37 female connector (DC-37 cable not included). An HBR accelerator plus software licenses is required for IP audio i/o.
VIRTUOSO-HW-AUD-BRK-BNC16	24774	1RU passive breakout panel for AES3 digital audio adapter with 16 unbalanced female BNC connectors. DC-37 female connector (DC-37 cable included).
VIRTUOSO-HW-AUD-BRK-XLR16	24775	1RU passive breakout panel for AES3 or Analog audio adapter with 16 balanced XLR connector (8 male and 8 female). DC-37 female connector (DC-37 cable included).
VIR-MI-SW-AUD-PROC1	24714	License option enabling ST2110/AES67 IP audio adaptation, routing and processing, including flexible audio mono shuffling, gain and delay handling. Enables 1 MADI channel, and enables 64 input and 64 output mono audio channels on IP. Requires an HBR accelerator. Max 2 inputs and 2 outputs per HBR module for optical/electrical MADI/AES10. Maximum 256 input and 256 output audio mono channels on IP. Max 4 licenses per HBR.
VIR-MI-SW-AUD-PROC4	24715	License option enabling ST2110/AES67 IP audio adaptation, routing and processing, including flexible audio mono shuffling, gain and delay handling. Enables 4 MADI channels, and enables 64x4 = 256 input and 256 output mono audio channels on IP. Requires an HBR accelerator. Max 2 inputs and 2 outputs per HBR module for optical/electrical MADI/AES10. Maximum 256 input and 256 output audio mono channels on IP. Max 1 licenses per HBR.
VIR-MI-SW-AUD-PROC-PROT[1,4]	24716	License option enabling SMPTE 2022-7 Seamless IP Protection Switching (SIPS) for Audio IP inputs, up to 64 (PROT1 # 24716) or 256 (PROT4 # 24717) audio channels on IP in one or more ST2110/AES67 input streams.
VIR-MI-SW-AUD-PROC-MON[1,4]	24828	License option enabling audio monitoring features for up to 64 mono channels of audio (MON1 # 24828) or 256 mono channels (MON4 # 24829), including template monitoring per channel with presence, peak threshold and silence detection.
VIR-MI-SW-AUD-PROC-MIX-S1	24869	License option enabling a small 8x8 audio mixing matrix on one (1) Audio Processor. Summing of up to 8 input audio channels per output channel, with up to 8 output channels. Matrix size given by max product of 64 (e.g. 8x8 or 16x4). Requires AUD-PROC[1,4] license for MADI and/or IP audio interfacing. Maximum 32 MIX-S1 licenses per card.
VIR-MI-SW-AUD-PROC-MIX-M1	24870	License option enabling a medium 12x10 audio mixing matrix on one (1) Audio Processor. Summing of up to 12 input audio channels per output channel, with up to 10 output channels. Matrix size given by max product of 128 (e.g. 10x12 or 16x8). Requires AUD-PROC[1,4] license for MADI and/or IP audio interfacing. Maximum 16 MIX-M1 licenses per card.
VIR-MI-SW-AUD-PROC-MIX-L1	24871	License option enabling a large 16x16 audio mixing matrix on one (1) Audio Processor. Summing of up to 16 input audio channels per output channel, with up to 16 output channels. Matrix size given by max product of 256 (e.g. 16x16 or 32x8). Requires AUD-PROC[1,4] license for MADI and/or IP audio interfacing. Maximum 8 MIX-L1 licenses per card.
VIR-MI-SW-AUD-PROC-MIX-XL1	24872	License option enabling a X-large 24x20 audio mixing matrix on one (1) Audio Processor. Summing of up to 24 input audio channels per output channel, with up to 20 output channels. Matrix size given by max product of 512 (e.g. 24x20 or 64x8 or 8x64). Requires AUD-PROC[1,4] license for MADI and/or IP audio interfacing. Maximum 4 MIX-XL1 licenses per card.
VIR-MI-SW-AUD-AES-ASRC1	24886	License option enabling AES3 input ASRC (Asynchronous Sample Rate Conversion) for one (1) input signal. ASRC is needed in situations where the input signal has a different timing/ frequency compared to the output signal (e.g. ST2110-30 or AES67).
VIR-MI-SW-AUD-ISW1	24826	License option enabling one (1) alarm-based automatic input switch for Audio IP streams, with up to 4 inputs and 1 output. Licensed per switch. Up to 32 switches per card.

Virtuoso FA

VIR-FA-SW-AUD-PROC1	24757	License option enabling ST2110/AES67 IP audio adaptation, routing and processing, including flexible audio mono shuffling, gain and delay handling. Enables 1 MADI channel, and enables 64 input and 64 output mono audio channels on IP. Requires an HBR accelerator. Max 2 inputs and 2 outputs per HBR module for optical/electrical MADI/AES10. Maximum 256 input and 256 output audio mono channels on IP. Max 4 licenses per HBR.
VIR-FA-SW-AUD-PROC4	24650	License option enabling ST2110/AES67 IP audio adaptation, routing and processing, including flexible audio mono shuffling, gain and delay handling. Enables 4 MADI channels, and enables 64x4 = 256 input and 256 output mono audio channels on IP. Requires an HBR accelerator. Max 2 inputs and 2 outputs per HBR module for optical/electrical MADI/AES10. Maximum 256 input and 256 output audio mono channels on IP. Max 1 licenses per HBR.
VIR-FA-SW-AUD-PROC-PROT[1,4]	24651	License option enabling SMPTE 2022-7 Seamless IP Protection Switching (SIPS) for Audio IP inputs, up to 64 (PROT1 # 24651) or 256 (PROT4 # 24758) audio channels on IP in one or more ST2110/AES67 input streams.
VIR-FA-SW-AUD-PROC-MON[1,4]	24830	License option enabling audio monitoring features for up to 64 mono channels of audio (MON1 # 24830) or 256 mono channels (MON4 # 24831), including template monitoring per channel with presence, peak threshold and silence detection.

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