

Densité MDX-3901

12G/3G/HD 16 Audio Channel AES/MADI Embedder/De-embedder

Audio embedding or de-embedding for 12G/Quad Link 3G/3G/HD SDI signals.

The MDX-3901 from Grass Valley is an advanced, high-quality audio processor, which can embed up to 16 audio channels from a selection between eight discrete AES and/or one MADI signal into 12G/Quad Link 3G/3G/HD SDI signals or de-embed up to 16 audio channels into eight AES and one MADI signal from a 12G/Quad Link 3G/3G/HD SDI signals.

When configured as an embedder, each AES input can accept different sample rates, or even asynchronous audio, and will be resampled at 48 kHz by a sample rate converter, which can be manually or automatically disabled in the presence of non-PCM audio. The MADI input supports a 64-channel payload at the industry standard 48 kHz sampling rate synchronized to the SDI signal. The MDX-3901 embedder can simultaneously process up to 16 channels of audio selected from 80 channels inputs — 16 from AES and 64 from MADI. Functions include channel shuffling, mixing and probing. Each channel can be delayed independently to correct any lip sync issues. All 16 audio channels can be mixed and shuffled to provide 16 channels for embedding in the SDI video output. A single-link video input will be distributed to outputs 1 & 2. When genlocked to the external reference input or through the frame reference using the internal URS signal, the MDX-3901 can handle video hot switches at the input without losing sync at the output. In the absence of a video input, the card can still output synchronous video and embed the discrete AES/MADI audio. The MDX-3901 can also embed linear timecode (LTC) as ancillary timecode (ATC) in 12G/Quad Link 3G/3G/HD.

When configured as a de-embedder, the MDX-3901 can simultaneously process up to 16 channels of audio from the embedded SDI input. Functions include channel shuffling, mixing and probing. Each channel can be delayed independently to correct any lip sync issues. All audio channels can be mixed and shuffled to provide 16 channels on the discrete AES outputs and on the first 16 channels of the MADI output. A single link video input will be distributed to outputs 1 & 2. When genlocked to the external reference input or through the frame reference using the internal URS signal, the MDX-3901 can handle video hot switches at the input without losing sync at the output. The MDX-3901 can de-embed ancillary timecode (ATC) in 12G/Quad Link 3G/3G/HD and provides a linear timecode output (LTC).

Fiber connectivity is offered with certain rear modules, making it ideal for longer cable lengths. The MDX-3901 provides user configurable fiber optic transceiver for bidirectional conversion of 12G, 3G and HD-SDI signals to 1310 nm optical signals. Ideal for mixed coax and fiber workflows, the MDX-3901 allows users to configure the inputs and outputs to match their infrastructure needs.

Based on the proven Densité modular framework of over 100 functional cards, the MDX-3901 provides a space-efficient audio embedding/de-embedding solution for 4K UHD production with the flexibility to configure up to 24 MDX-3901 modules per Densité 3+ FR4 frame. The MDX-3901 can be configured and monitored by the proven iControl system.

KEY FEATURES

- 12G/Quad Link 3G/3G/HD SDI inputs/outputs
- Supports 3 Gb/s level A (mapping 1) and level B
- Audio/video de-glitcher to handle video hot switch at the input
- Automatic detection of input video loss and switchover to local black or color bar for continuous audio/video output synchronization in embedder mode only
- Flexible HD/SD reference using the internal URS frame reference or a dedicated reference input
- Support of one SFP+ cage for SDI fiber I/O on selected rears:
 - 12G SFP and 3G SFP R, T, RT and TT models available
- LTC I/O embedding/de-embedding into/from ATC
- 8 AES3-id 75Ω, or AES3 110Ω, I/Os
- MADI I/O using dedicated connector
- 16 audio channels embedder/de-embedder
- 16 channels internal audio processing
- Full audio shuffling and mixing on a channel basis.
- Two slots rear (BNC connectors) in Densité 3 or 3+ frames
- One slot rear (HD-BNC connectors) available in Densité 3+ frames

SPECIFICATIONS

SDI (Inputs/Outputs)

Physical: 8 BNC or HD-BNC connectors: 4 in, 4 out

SDI Standard:

- SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
- SMPTE ST 424 (2.970, 2.970/1.001 Gb/s)
- SMPTE ST 2082-1:2015 (on in 1 and outs 1 & 2)

Supported Formats:

- HD: SMPTE ST 274: 1080i59.94, 1080i50
- HD: SMPTE ST 296: 720p59.94, 720p50
- 3G: SMPTE ST 425 level A (mapping 1), level B dual link: 1080p59.94, 1080p50
- 4K UHD: Quad Link 3 Gb/s SMPTE ST 425-5: 1080p59.94, 1080p50
- 12G: SMPTE ST 2082-10: 2160p59.94, 2160p50

Cable length (Belden 1694A):

- HD: 250m (820 ft.) at 1.485 Gb/s
- 3G: 145m (475 ft.) at 2.970 Gb/s

Cable length (Belden 4794R cable):

- 12G: 50m (164 ft.) at 11.88 Gb/s

Return loss:

- >15 dB up to 1.5 GHz
- >10 dB from 1.5 GHz to 3 GHz
- >4 dB up to 11.88 Gb/s

Jitter:

- HD/SD: <0.2 UI (alignment jitter)
- 3G: <0.3 UI (alignment jitter)
- 12G: <0.3 UI (alignment jitter)

Audio Input or Output (8)

Sampling freq.:

- Input: 32 to 53 kHz
- Output: 48 kHz

Quantization:

- Input: up to 24 bits
- Output: 24 bits

AES3:

- Input Level: 0.3 to 7 Vp-p
- Output Level: 3.5 Vp-p
- Impedance: 110Ω balanced

AES3-id:

- Input Level: 0.3 to 2 Vp-p
- Output Level: 1.0 Vp-p
- Impedance: 75Ω

Return loss: 15 dB at 6 MHz

MADI (Input or Output)

Signal (1): AES10

Connector: BNC or HD-BNC

Impedance: 75Ω

Level: 0.6V

LTC (Input or Output)

Signal (1): SMPTE ST 12

Connector: BNC or HD-BNC

Impedance: <10 kΩ unbalanced

Input Level: 0.3 to 5 Vp-p

Output Level: 3 Vp-p

Reference Input

Signal (1): SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst

Optical

Signal: Refer to SFP module specifications.

Video Processing Performance

Signal path: 10 bits

Processing delay:

- Deglitcher OFF: <1.1 line or all format except 3G Level B
- Deglitcher ON: <1.6 line or all format except 3G Level B

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz, synchronous

Audio latency:

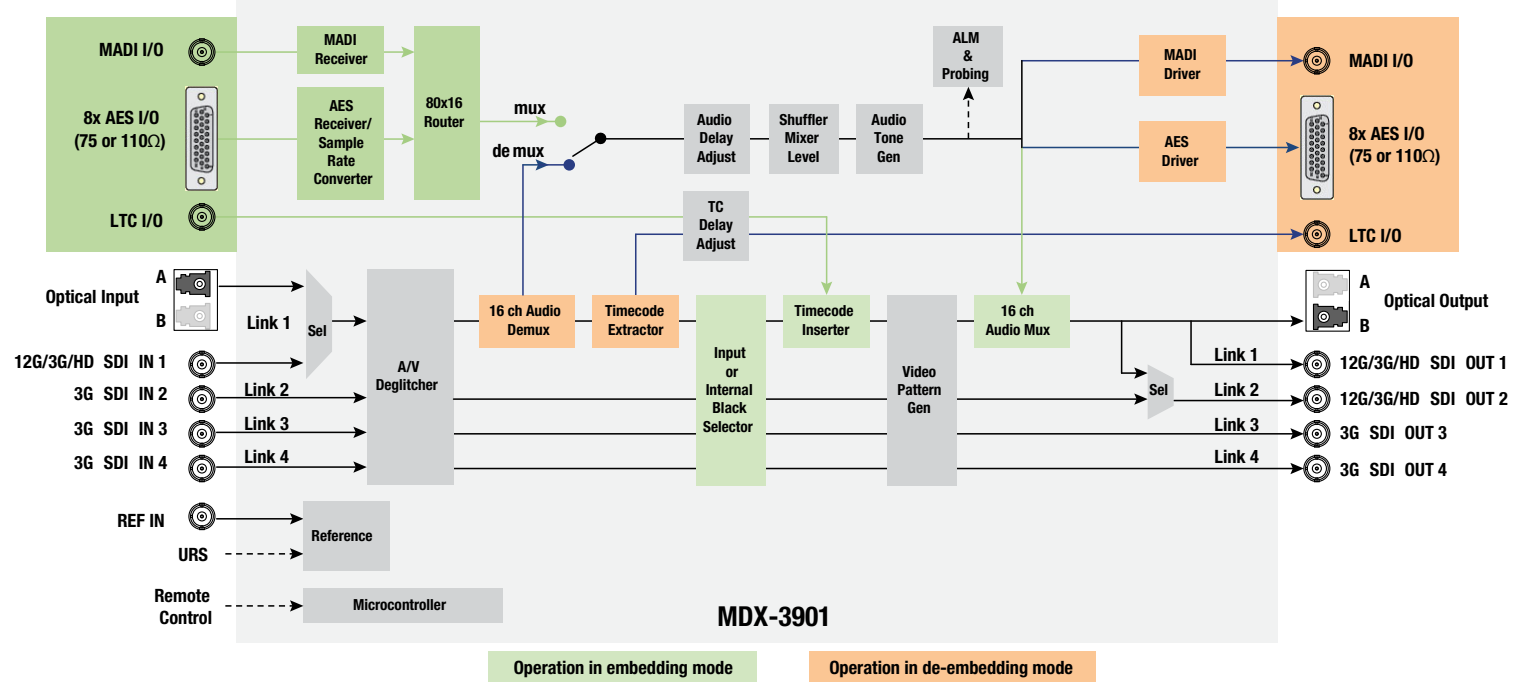
- Embedder: 2.27 ms w/SRC, 1.27 ms SRC off
- De-embedder: 1.83 ms

Audio delay: Up to 2.7s (1 ms steps + 0 to 47 samples)

Tone generator: -18 dBFS 1 kHz sine wave interrupted on left channel (250 ms) per EBU R49

Electrical

Power: 13W max



ORDERING

Densité 3, or Densité 3+ Frame

MDX-3901
12G/3G/HD 16-channel AES/MADI Embedder/De-Embedder

MDX-3901-7-3DP-Q-F
Double rear panel, 75Ω, BNC and fiber option

MDX-3901-1-3DP-Q-F
Double rear panel, 110Ω, BNC and fiber option

MDX-3901-7-3+SRP-Q
Single rear panel for Densité 3+ frames, 75Ω, HD-BNC

MDX-3901-1-3+SRP-Q
Single rear panel for Densité 3+ frames, 110Ω, HD-BNC

Fiber Options

SFP-U-R-LC
12G Single Rx Fiber with LC/PC

SFP-U-RT-S13-LC
12G Dual Rx/Tx Fiber 1310 nm with LC/PC

SFP-U-T-S13-LC
12G Single Tx Fiber 1310 nm with LC/PC

SFP-U-TT-S13S13-LC
12G Dual Tx Fiber 1310 nm with LC/PC

SFP-R-LC
3G Single Rx Fiber with LC/PC

SFP-RT-S13-LC
3G Dual Rx/Tx Fiber 1310 nm with LC/PC

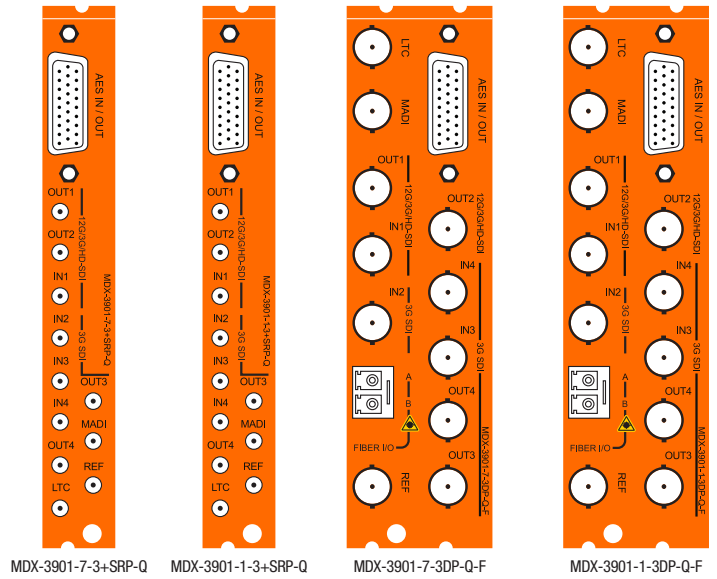
SFP-T-S13-LC
3G Single Tx Fiber cartridge at 1310 nm with LC/PC

SFP-TT-S13S13-LC
3G Dual Tx Fiber 1310 nm with LC/PC
Note: The MDX-3901 can also make use of SFP optical plug-in cartridges from the WDM and CWDM series. Other types of SFP optical plug-in cartridges may be available.

Hardware Options
BOC-DA26-8BNC-1
75Ω digital audio breakout cable

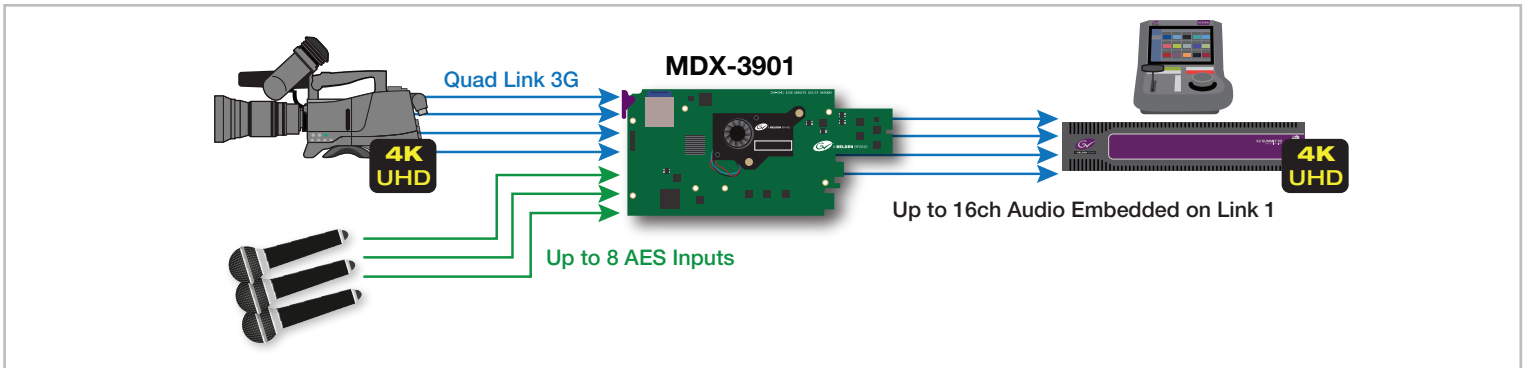
NSH26M
Terminal block adapter for HD-26 connections

Remote Control
iControl or iControl Solo (version 7.10 or higher required)

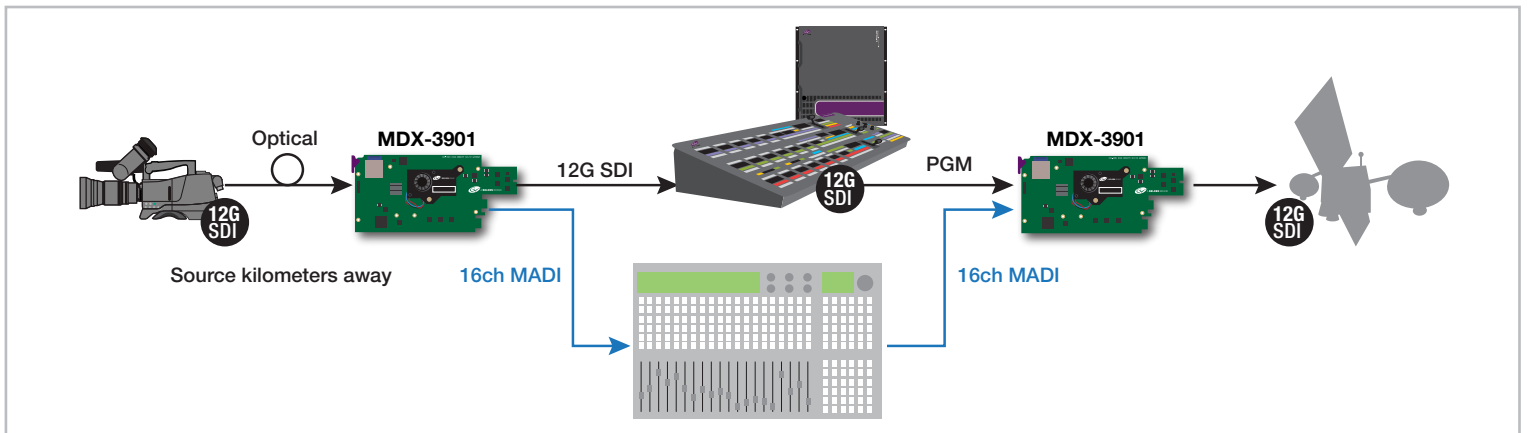


TYPICAL APPLICATIONS

AES embedding application in a Quad Link 4K UHD SDI production:



MADI De-Embedding & Embedding application in a 12G SDI production environment:



WWW.GRASSVALLEY.COM

Join the Conversation at **GrassValleyLive** on Facebook, Twitter, YouTube and **Grass Valley** on LinkedIn.



www.grassvalley.com/blog

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents.

Grass Valley®, GV® and the Grass Valley logo are trademarks or registered trademarks of Grass Valley USA, LLC, or its affiliated companies in the United States and other jurisdictions. Grass Valley products listed above are trademarks or registered trademarks of Grass Valley USA, LLC or its affiliated companies, and other parties may also have trademark rights in other terms used herein.

Copyright © 2019-2020 Grass Valley Canada. All rights reserved. Specifications subject to change without notice.