MAP-3901

3G/HD/SD Metadata and Embedded Audio Processor

Sophisticated audio signal processing on a compact Densité 3 module.

The MAP-3901 from Grass Valley® is the latest generation metadata and audio processor in the Densité® family, offering sophisticated audio signal processing on a single 3 RU module. The powerful and versatile processing platform delivers significant value by simultaneously processing up to 56 channels of audio (16 channels of embedded audio from the video, plus others generated internally). Functions include dual downmixing, level control, channel shuffling/mixing and an on-board DSP engine that can run simultaneously with up to two optional Dolby-E decoders, four optional Dolby Digital & Digital Plus encoders, and two optional upmixers (2.0 to 5.1).
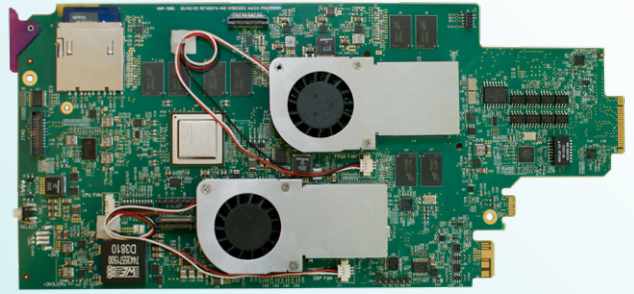
The card will pass and delay automatically all 56 internal audio channels to preserve lip sync between audio and video. Each channel can be delayed independently to correct any lip sync issues. All audio channels can be mixed and shuffled to provide 16 channels for embedding in the video output.

The card can be genlocked to an external reference or to the frame reference using the internal URS signal.

The card has a frame buffer (not a frame sync) which allows an increase in the video delay of up to 4.1 seconds in HD to compensate for the long audio processing delay required by some audio processing functions or for effective processing of incoming feeds — especially where there is a mix of short and long delay feeds, as is often the case when managing large live events.

Four audio metadata insertions in the VANC are possible from multiple sources, such as Dolby E decoders, embedded VANC streams or from the integrated metadata generators. All parameters in the metadata streams can be probed and monitored. Audio metadata (SMPTE 2020 method A or B) can be used to steer the behavior of the audio downmixers and the Dolby encoders.

The MAP-3901 has eight GPIOs that can be used as input or output for loading user presets.

The MAP-3901-3DRP-R and MAP-3901-3+SRP-R-D rear modules have a bypass relay that can be used to bypass the main input to the output if the card fails, loses power or if the card is removed.

Up to 10 MAP-3901 processors can be housed in the Densité 3 (3 RU) frame, and up to four MAP-3901 processors can be housed in the Densité 3+ FR1 (1 RU) for even greater space efficiency.

To broadcasters, the MAP-3901 means that the new generation of audio processing requirements can be achieved on a single module, while minimizing a facility's environmental footprint and improving scalability, flexibility and reliability.

Key Features

Video

- 3G/HD/SD support including 3 Gb/s level A (mapping 1) and level B
- Flexible SD/URS reference input
- Programmable audio/video delay of up to 4.1 seconds (124 frames) in HD
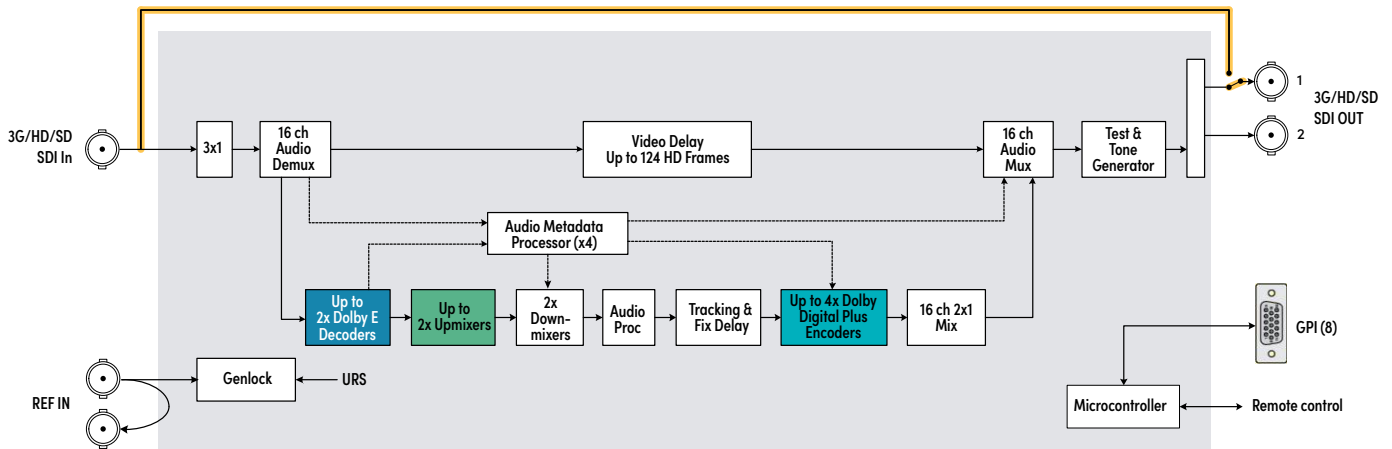- Bypass relay with MAP-3901-3DRP-R and MAP-3901-3+SRP-R-D rear modules

Metadata

- Four audio metadata insertion and extraction (SMPTE ST 2020 Method A or B)

Audio

- Full audio shuffling and mixing per channel basis
- 56 channels internal audio processing
- 2 audio 5.1 surround downmix to Lt/Rt or Lo/Ro

- Audio delay adjustments of up to 2 seconds to compensate for lip sync
- Up to 2 optional Dolby E decoders
- Up to 2 optional stereo to 5.1 upmixers
- Up to 4 optional Dolby Digital and Digital Plus Encoders

MAP-3901 Functional Block Diagram

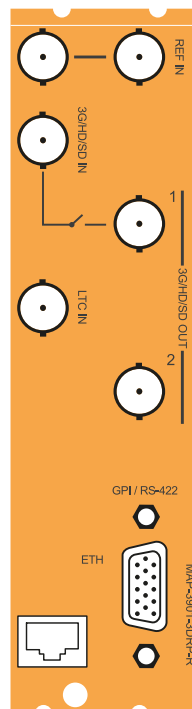Options (hardward and software)

- With -R Rear Modules
- MAP-3901-OPT-UPMIX
- MAP-3901-OPT-DED
- MAP-3901-OPT-DDE

MAP-3901-3+SRP-R-D   MAP-3901-3DRP-R

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Specifications

Video Input/Output

Signal (1):
- SMPTE ST 259-C (270 Mb/s)
- SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
- SMPTE ST 424 (2.970, 2.970/1.001 Gb/s)

Supported formats:
- SD: 480i59.94, 576i50
- HD: SMPTE ST 274: 1080i59.94, 1080i50
- HD: SMPTE ST 296: 720p59.94, 720p50
- 3G: SMPTE ST 425 level A (mapping 1), level B:1080p59.94, 1080p50 (dual link)

Cable length*:
- 325m (1,066 ft.) Belden 1694A at 270 Mb/s
- 180m (590 ft.) Belden 1694A at 1.485 Gb/s
- 90m (295 ft.) Belden 1694A at 2.970 Gb/s

Return loss:
- OUT 1: > 8 dB up to 3 GHz
- OUT 2: > 15 dB up to 1.5 GHz
  > 10 dB at 3 GHz

Jitter:
- HD/SD: <0.2 UI (alignment jitter)
- 3G: <0.4 UI (alignment jitter)

Reference Input

Signal:
- SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst
- SMPTE ST 274 SMPTE ST 296 tri-level sync

Return loss: >27 dB up to 5.75 MHz

LTC

Not used

GPIO

Signal (8): Opto-isolated, common ground
Direction: Bidirectional
Connector: DE15

RS-422/ETH

Not used

Video Processing Performance

Signal path: 10 bits minimum
Processing delay: 1 interlaced frame (33 ms @59.94 Hz or 40 ms @50 Hz)
Additional delay: (HD) Up to 4.1 seconds frames upon user selection

Audio Processing Performance

Quantization: 24 bits
Sampling: 48 kHz, synchronous
Number of channels: 56
Frequency response: ±0.02 dB (20 Hz to 20 kHz)
SNR: 123 dB (A weighted)
THD + N: -138 dB (20 Hz to 20 kHz)
Audio latency: Delay depending on processing options
Audio delay: Up to 2s (1 ms steps) in addition to programmed video delay

Electrical

Power: 25W max.

* Cable length will be reduced when using the output protected by the bypass relay on rears MAP-3901-3DRP-R and MAP-3901-3+SRP-R-D.

Ordering

Densité 3 frame	Description
MAP-3901	3G/HD/SD metadata and embedded audio processor
MAP-3901-3DRP-R	Double Rear panel with BNC and bypass relay
MAP-3901-3+SRP-R-D	Single Rear panel with Din and bypass relay for Densité 3+ frame

Options (Software)	Description
MAP-3901-OPT-DED-1	Single Dolby E decoding option
MAP-3901-OPT-DED-2	Dual Dolby E decoding option
MAP-3901-OPT-DDE-1	Single Dolby Digital Plus encoding option
MAP-3901-OPT-DDE-2	Dual Dolby Digital Plus encoding option
MAP-3901-OPT-DDE-3	Triple Dolby Digital Plus encoding option
MAP-3901-OPT-DDE-4	Quadruple Dolby Digital Plus encoding option
MAP-3901-OPT-UPMIX-1	Single Stereo to 5.1 Surround upmix option
MAP-3901-OPT-UPMIX-2	Dual Stereo to 5.1 Surround upmix option
Remote control	GV Orbit, iControl, iControl Solo

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