

# IQMUX32

## Dual 3G/HD/SD-SDI Embedder for Four AES/EBU Audio Streams

Includes audio delay, gain, invert and channel level routing, with video delay and a video proc amp also included.

The IQMUX32 from Grass Valley is a dual 8-channel digital audio embedder for 3 Gb/s SDI, HD-SDI 1.5 Gb/s or SD-SDI 270 Mb/s signals. Audio processing features include audio delay, gain, invert and channel level routing, while video delay and a video proc amp are also included in the feature set.

### Why should I choose this module?

- Compact multichannel embedder for AES audio applications where space is at a premium, in OB environments for example
- Comprehensive AV solution for incoming lines with audio firewall, proc amp, shuffling, and delay
- Full RollCall and SNMP compatibility allows easy integration with Grass Valley or third-party network management systems, providing an all-inclusive monitoring and control solution

### KEY FEATURES

- Dual 8-channel 3G/HD/SD-SDI embedder capable of embedding asynchronous or synchronous AES inputs
- Standards supported:
  - 3G-SDI to SMPTE ST 424/425 level A & B compatible
  - HD-SDI to SMPTE ST 292/274/296
  - SD-SDI to SMPTE ST 259-C
- Handles up to 16 channels of embedded audio present on each SDI stream
- Channel-level (sub-frame) routing
- Audio proc amp features including independent gain, invert and mute control
- Embedding continues on loss of SDI input (silence)
- Auto mute on AES input error
- Adjustable delay for selected audio channels
- Any group of embedded audio may be passed unchanged, processed or blanked
- Embedded Dolby E support — pair routing and delay
- PCM and non-PCM detection and reporting
- Handles Dolby E and PCM audio present in the same group
- Able to pass all ancillary data without corruption incl. VANC metadata
- Independent HANC and VANC blanking control
- Input loss detection — default output of black/pattern/freeze
- Up to three frames of video delay and 2 seconds of audio delay per channel
- Video controls including video gain and offset
- Built-in test pattern and tone generators for each channel
- Up to two active HD/SD-SDI outputs per channel
- 16x user memories, save/recall/rename
- RollCall control and monitoring compatible

**SPECIFICATIONS**

**Inputs & Outputs**

**Signal Inputs**

SDI inputs: 1 per channel

Input 1 cable length:

- Up to 70m Belden 1694A @ 3 Gb/s
- Up to 160m Belden 1694A @ 1.5 Gb/s
- >350m Belden 1694A @ 270 Mb/s

Input 2 cable length:

- Up to 60m Belden 1694A @ 3 Gb/s
- Up to 100m Belden 1694A @ 1.5 Gb/s
- Up to 200m Belden 1694A @ 270 Mb/s

Unbalanced digital audio: 4x AES/EBU, AC3, Dolby E (BNC)

Balanced digital audio: 4x AES/EBU, AC3, Dolby E (25-way D-type)

**Signal Outputs**

SDI outputs: 2x per channel

**Controls**

**Indicators**

- Power: OK (Green)
- CPU running: OK (Green flashing)
- FPGA running: OK (Yellow flashing)
- Status:
  - OK (Green)
  - Warning (Yellow)
  - Error (Red)
- Input 1: OK (Green)
- Input 2: OK (Green)

**Video Controls**

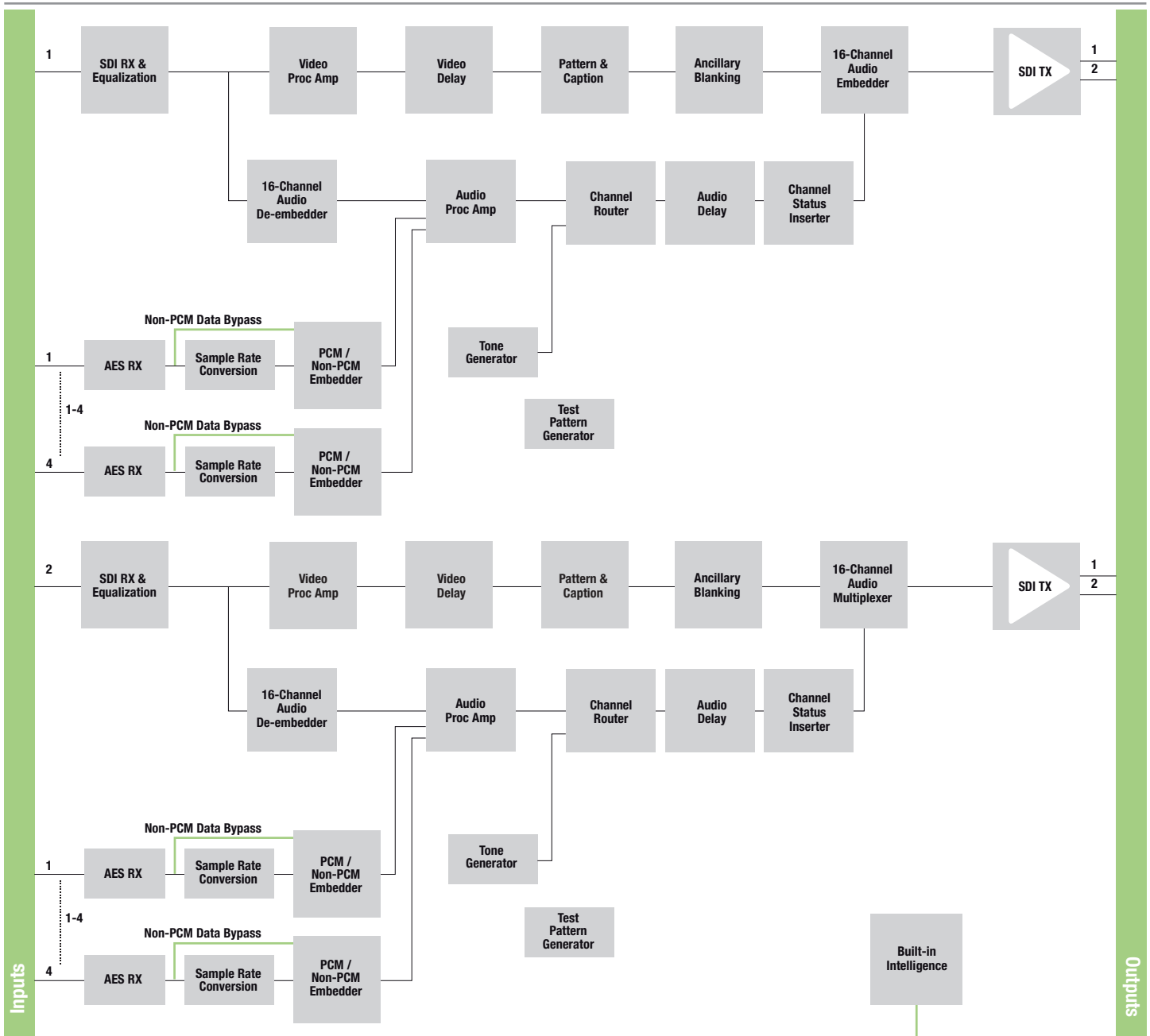
Input standards:

- 1125/1080p50 (A & B)
- 1125/1080p59.94 (A & B)
- 1125/1080i29.97, 1125/1080i25
- 750/720p59.94, 750/720p50
- 525/480i29.97, 625/576i25

Default video output type: Pattern, Freeze, Black

Default video output standards:

- Last Known Good
- 1125/1080p50 (A & B)
- 1125/1080p59.94 (A & B)
- 1125/1080i29.97, 1125/1080i25
- 750/720p59.94, 750/720p50
- 525/480i29.97, 625/576i25i



Block diagram for IQMUX3248-2B3.

Network Intelligence, Control & Monitoring

**SPECIFICATIONS (CONT.)**

Manual freeze: On/Off  
 Freeze: Field/Frame  
 Video delay frames: 0 – 3 F  
 VANC data: Blank VANC  
 SD VANC data: Line blanking (6 controls)  
 Proc amp enable: On/Off  
 Black level:  $\pm 100$  mV in steps of 0.8 mV  
 Hue adjust:  $\pm 180^\circ$  in steps of  $1^\circ$   
 Master video gain:  $\pm 6$  dB in steps of 0.1 dB  
 Y-Gain:  $\pm 6$  dB in steps of 0.1 dB  
 Cb/Cr gain:  $\pm 6$  dB in steps of 0.1 dB  
 Y/C timing:  
 $\pm 8$  pixels in 2 pixel steps (SD)  
 $\pm 16$  pixels in 2 pixel steps (HD/3G)  
 Picture position:  
 $\pm 8$  pixels in 2 pixel steps (SD)  
 $\pm 16$  pixels in 2 pixel steps (HD/3G)  
 Pattern on: On/Off  
 Pattern select: 75% Color Bars, Black  
 Caption on: On/Off  
 Edit caption: 19 characters available

**Audio Controls****Embedder Assignment**

Group 1 to 4 enable: On/Off  
 Pair 1 to 8 source L/non-PCM: Dis-embed 1\_1 to 8\_2, AES 1 to 4, Tone, Silence  
 Pair 1 to 8 source R: Dis-embed 1\_1 to 8\_2, AES 1 to 4, Tone, Silence  
 Pair 1 to 8 stereo: Link channel pairs  
 Pair 1 to 8 polarity L/R: On/Off  
 Pair 1 to 8 gain L/R: +12 dB to -72 dB in 0.1 dB steps  
 Pair 1 to 8 non-PCM: On/Off

**Processed Audio Delay Control**

Course manual delay: Up to 1.75s in 5 ms steps  
 Fine manual delay:  $\pm 0.25$ s in 0.5 ms steps

**Tone**

Frequency L/R: 100 Hz to 10 kHz in 100 Hz steps  
 Channel ident: On/Off  
 HANC data: Blank HANC (Removes all HANC data. Note audio removed when embedders disabled)

**Audio Monitoring**

Silence detect: 0 to -80 dB in steps of 1 dB  
 Signal overload detect: 0 to -80 dB in steps of 1 dB  
 Warning timer: 1 to 20 seconds in steps of 1 second

**Other Controls**

User memories: 16x Save, Recall, Rename  
 Memory naming: User configurable naming of memories 1 – 16  
 RollTrack Sources:

Unused, Video Delay (1&2), Input Present (1&2), Input Loss (1&2), Output 525 (1&2), Output 625 (1&2), Output 720p (1&2), Output 1080i (1&2), Output 1080p (1&2), Output Freeze (1&2), Output Unfreeze (1&2), Output pattern on (1&2), Output pattern off (1&2), Output Caption on (1&2), Output Caption off (1&2), AES (Pairs 1-4) PCM (1&2), AES (Pairs 1-4) Data (1&2), AES (Pairs 1-4) Dolby E (1&2), AES (Pairs 1-4) V bit (1&2), AES (Pairs 1-4) Loss (1&2), Disemb (Pairs 1-8) PCM (1&2), Disemb (Pairs 1-8) Data (1&2), Disemb (Pairs 1-8) Dolby E (1&2), Disemb (Pairs 1-8) V bit (1&2), Disemb (Pairs 1-8) Loss (1&2)

Information window: Video Input Status, Audio Input Status

Factory default: Resets all module settings to factory specified default values and clears memories

Default settings: Resets all module settings to factory specified defaults but does not clear memories

Restart: Software restart of the module

Module information:

Reports following module information: Software version, Serial number, Build number, KOS version, Firmware version, PCB version

**General Specifications**

Electrical:

3 Gb/s SDI, SMPTE ST 424  
 1.5 Gb/s HD-SDI, SMPTE ST 292  
 270 Mb/s SDI, SMPTE ST 259-C/DVB-ASI

Connector/format: BNC/75 $\Omega$  panel jack on standard IQ connector panel

Return loss:

>-15 dB (270 Mb/s, 1.5 Gb/s)  
 >-10 dB (3 Gb/s)

Output jitter:

SD-SDI 0.2 UI (10 Hz) / 0.2 UI (1 kHz)  
 3G/HD-SDI 1.0 UI (10 Hz) / 0.2 UI (100 kHz)

Video standards:

1125/1080p50 (A & B), 1125/1080p59.94 (A & B)  
 750/720p50, 750/720p59.94  
 1125/1080i25, 1125/1080i29.97  
 625/576i25, 525/480i29.97

Typical video delay:

SD: 70  $\mu$ s  
 HD: 38  $\mu$ s  
 3G-A: 19  $\mu$ s  
 3G-B: 40  $\mu$ s

Embedded audio handling:

HD – 24-bit synchronous 48 kHz to SMPTE ST 299  
 SD – 20-bit synchronous 48 kHz to SMPTE ST 272-A

Embedded audio delay:

Minimum (PCM) 2 ms  
 Maximum (non-PCM)  
 SD: 67  $\mu$ s  
 HD: 28  $\mu$ s  
 3G-A: 15  $\mu$ s  
 3G-B: 25  $\mu$ s

**Digital Audio Input (Balanced)**

Connector/format: 25-way D-type  
 Sample frequency: 25 – 96 kHz (48 kHz for reference)  
 Input cable length: >150m of AES3 cable  
 Impedance: 110 $\Omega$

**Digital Audio Input (Unbalanced)**

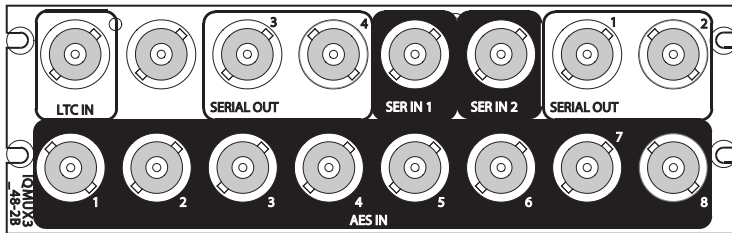
Connector/format: BNC  
 Sample frequency: 25 – 96 kHz (48 kHz for reference)  
 Input cable length: >500m of RG59 cable  
 Impedance: 75 $\Omega$   
 Standard: AES3-1992, SMPTE ST 272-A-1994, SMPTE ST 299  
 Output sampling: 48 kHz frame locked

**Power Consumption**

Module power consumption: 10 PR (B Frames)

**ORDERING****IQMUX3248-2B3**

3G/HD/SD-SDI dual 8-channel AES embedder. 2 SDI outputs per input, 4 unbalanced AES inputs per channel.

**IQMUX3249-1B3**

3G/HD/SD-SDI dual 8-channel AES embedder. 1 SDI output per input, 4 balanced AES inputs per channel.



For more details on enclosure types please refer to the IQ Modular Enclosures datasheet.

GVB-2-0798A-EN-DS



WWW.GRASSVALLEY.COM

Join the Conversation at **GrassValleyLive** on Facebook, Twitter, YouTube and **Grass Valley - A Belden Brand** 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](http://www.grassvalley.com/patents).

Belden®, Belden Sending All The Right Signals®, the Belden logo, Grass Valley®, GV® and the Grass Valley logo are trademarks or registered trademarks of Belden Inc. or its affiliated companies in the United States and other jurisdictions. Grass Valley products listed above are trademarks or registered trademarks of Belden Inc., GVBH Holdings S.A.R.L. or Grass Valley Canada. Belden Inc., GVBH Holdings S.A.R.L., Grass Valley Canada and other parties may also have trademark rights in other terms used herein.

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