

# IQMUX31

## 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.

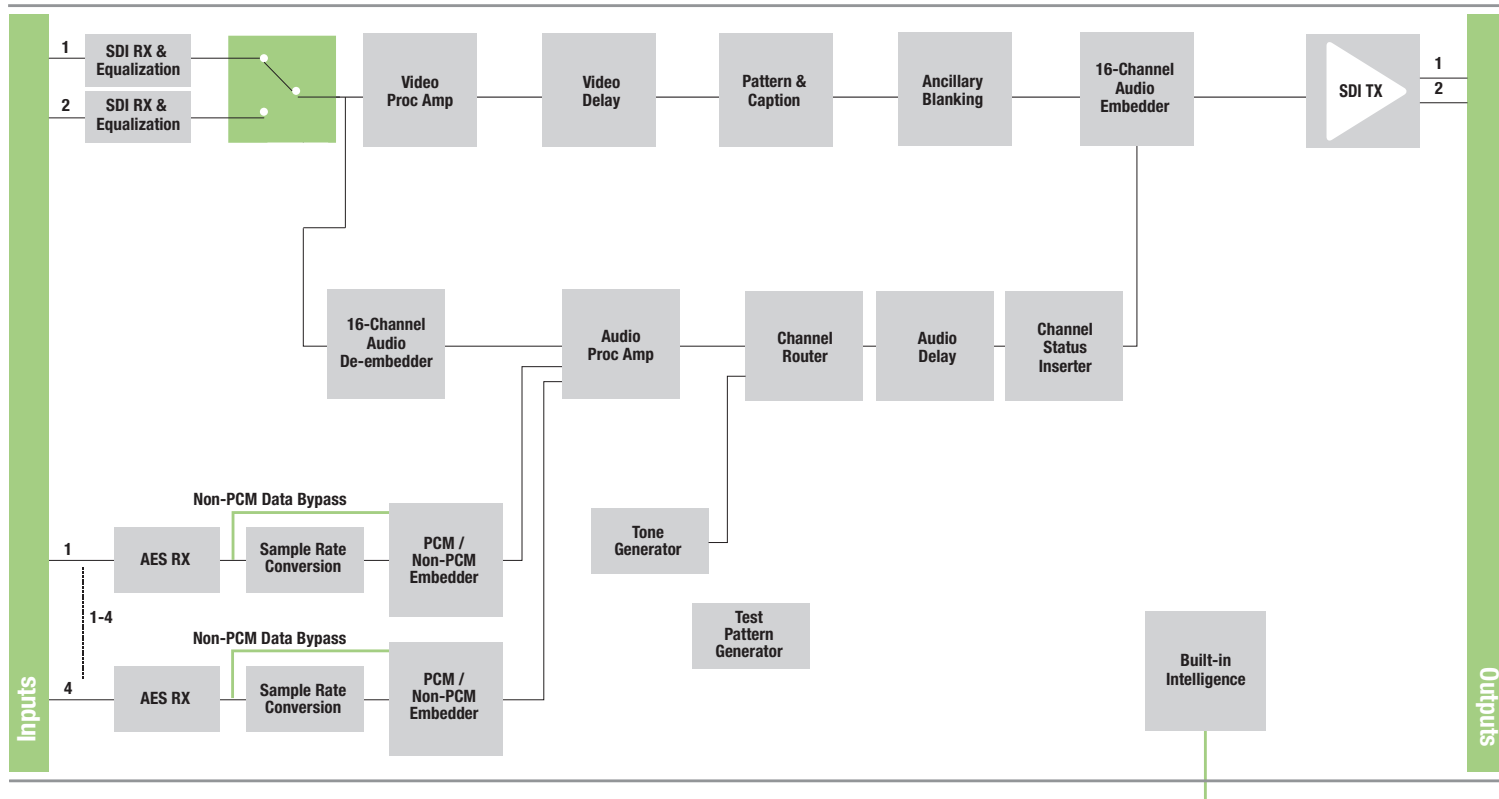
The IQMUX31 from Grass Valley provides 8-channel digital audio embedding for 3 Gb/s SDI, HD-SDI 1.5 Gb/s or SD-SDI 270 Mb/s signals. Audio processing features include audio delay, gain, invert and channel level routing, while video delay and a video proc amp are also included in the feature set. Ideal as a small scale digital ingest module where any digital audio source signal can be catered for, even combinations of embedded and external digital audio.

### Why should you choose this module?

- Ideal as a general embedder for stereo, multichannel or Dolby E AES audio applications
- Full GV Orbit compatibility provides an all-inclusive remote configuration, control and monitoring solution
- Comprehensive SNMP support allows easy integration with third-party Network Management Systems

### KEY FEATURES

- 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 the incoming 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, delay and Dolby E header alignment
- PCM and non-PCM detection and reporting
- Handles Dolby E and PCM audio present in the same group
- Independent HANC and VANC blanking control
- Input loss detection — default output of black/pattern/freeze
- Up to 9 frames of video delay and 2 seconds of audio delay
- Transparent to all ancillary data incl. VANC metadata
- Video controls including video gain and offset
- Built-in test pattern generator and audio tone generator
- Two SDI inputs and two active HD/SD-SDI outputs
- 16x user memories, save/recall/rename
- GV Orbit control and monitoring compatible



Block diagram for IQMUX3147-1B3

Network Intelligence, Control & Monitoring

**SPECIFICATIONS**

**Inputs and Outputs**

**Signal Inputs**

SDI inputs: 2x  
 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 100m 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

**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, 625/576i25  
 Input select: Input 1, Input 2  
 Manual freeze: On/Off  
 Freeze: Field/Frame  
 Video delay frames: 0 – 9 F  
 VANC data: Blank VANC  
 SD VANC data: Line blanking (6 controls)  
 Proc. amp enable: On/Off  
 Black level: ±100 mV in steps of 0.8 mV  
 Hue adjust: ±180° in steps of 1°  
 Master video gain: ±6 dB in steps of 0.1 dB  
 Y-Gain: ±6 dB in steps of 0.1 dB  
 Cb/Cr gain: ±6 dB in steps of 0.1 dB

**Y/C timing:**

±8 pixels in 2 pixel steps (SD)  
 ±16 pixels in 2 pixel steps (HD/3G)  
 Picture position:  
 ±8 pixels in 2 pixel steps (SD)  
 ±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 4 source L/non-PCM: Dis-embed 1\_1 to 8\_2, AES 1 to 4, Tone, Silence  
 Pair 1 to 4 source R: Dis-embed 1\_1 to 8\_2, AES 1 to 4, Tone, Silence  
 Pair 1 to 4 stereo: Link channel pairs  
 Pair 1 to 4 polarity L/R: On/Off  
 Pair 1 to 4 Gain L/R: +12 dB to -72 dB in 0.1 dB steps  
 Pair 1 to 4 non-PCM: On/Off

**Processed Audio Delay Control**

Course manual delay: Up to 1.75s in 5 ms steps  
 Fine manual delay: ± 0.25s in 0.5 ms steps

**Dolby E**

Dolby E auto alignment: On/Off

## SPECIFICATIONS

## 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, Input Present, Input 1 Select, Input 2 Select, Input Loss, Output 525, Output 625, Output 720p, Output 1080i, Output 1080p, Output Freeze, Output Unfreeze, Output pattern on, Output pattern off, Output Caption on, Output Caption off, AES (Pairs 1-4) PCM, AES (Pairs 1-4) Data, AES (Pairs 1-4) DolbyE, AES (Pairs 1-4) V bit, AES (Pairs 1-4) Loss, Disemb (Pairs 1-8) PCM, Disemb (Pairs 1-8) Data, Disemb (Pairs 1-8) Dolby E, Disemb (Pairs 1-8) V bit, Disemb (Pairs 1-8) Loss 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/75Ω 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 μs

HD: 38 μs

3G-A: 19 μs

3G-B: 40 μs

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 μs

HD: 28 μs

3G-A: 15 μs

3G-B: 25 μs

## Digital Audio Input (Balanced)

Connector/format: 25-way D-type

Sample frequency: 25 – 96 kHz (48 kHz for reference)

Input cable length: >150 m of AES3 cable

Impedance: 110Ω

Standard: AES3, SMPTE ST 272-A-1994, SMPTE ST 299

## Digital Audio Input (Unbalanced)

Connector/format: BNC

Sample frequency: 25 – 96 kHz (48 kHz for reference)

Input cable length: >500 m of RG59 cable

Impedance: 75Ω

Standard: AES3id, SMPTE ST 272-A-1994, SMPTE ST 299

Output sampling: 48 kHz frame locked

## Power Consumption

Module power consumption: 8 PR (B Frames)

## ORDERING

## IQMUX3147-1B3

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



## IQMUX3149-1B3

3G/HD/SD-SDI 8-channel AES embedder. 2 SDI outputs, 4 balanced AES inputs.



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