

IQSYN31

Dual 3G/HD/SD-SDI Frame Synchronizer with Embedded Audio Processing

Space-efficient frame synchronization for 3G/HD/SD-SDI signals with 16-channel embedded audio handling.

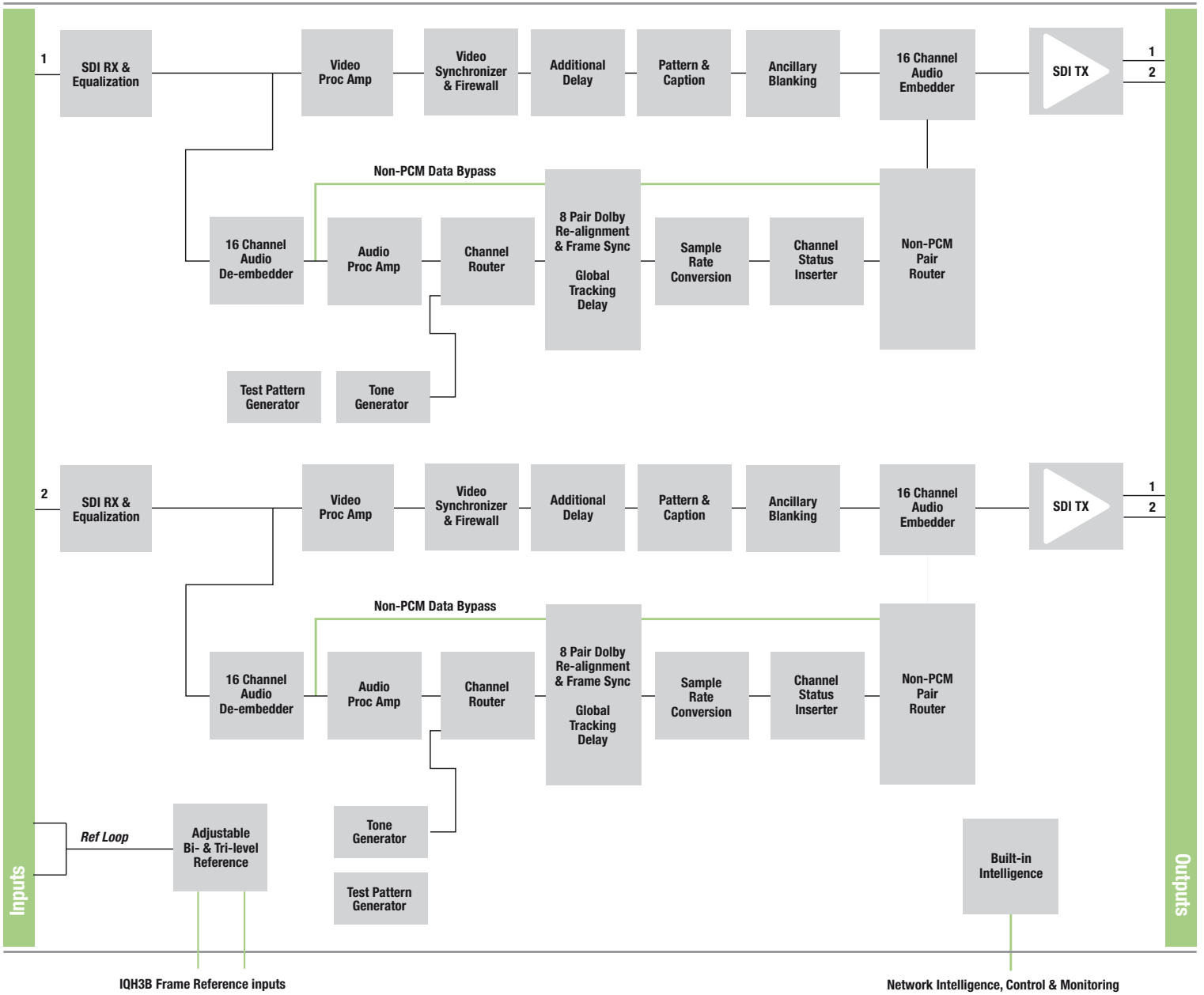
The IQSYN31 from Grass Valley provides frame synchronization for HD-SDI at 3 Gb/s or 1.5 Gb/s, or SD-SDI 270 Mb/s with 16-channel embedded audio processing. Enabling powerful processing features with a space-efficient two channels per card, the IQSYN31 is ideal for incoming line applications where space is at a premium. A video proc amp provides complete control over the video levels, and audio processing features include Dolby E auto-alignment, audio delay, gain, invert and channel level routing.

Why should you choose this module?

- Compact multichannel synchronizer for lines-in applications where space is at a premium, in OB environments for example
- Agile video synchronization provides greater tolerance to mis-timed upstream SDI switching (up to ± 5 lines), ensuring disturbance-free picture output
- Advanced embedded audio processing features, such as Dolby E synchronization, provide ideal solutions for today's complex system requirements
- 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-channel 3G/HD/SD-SDI synchronizer with up to 3 frames of video delay per channel
- Processing for 16 channels of embedded audio present on each incoming SDI stream
- 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
- Loop-though reference capable of detecting and referencing to a bi-level or tri-level signal and selection from either external input directly or from internal IQH3B chassis reference bus
- Precision genlock adjustment allowing you to time any SDI signal accurately
- Agile, router switching tolerant synchronizer operation
- Firewall for video and processed PCM audio to provide a continuous uninterrupted output
- Audio proc amp features including channel-level (sub-frame) routing, adjustable delay, independent gain, invert and mute control
- Any group of embedded audio may be passed unchanged, processed or blanked
- Embedded Dolby E support — pair routing and Dolby E header alignment
- Handles Dolby E and PCM audio present in the same group
- Able to pass all ancillary data with independent HANC and VANC blanking control
- Input loss detection — default output of black/pattern/freeze
- Can be used as a video delay, up to 3 frames per channel
- Video proc amp controls including video gain, offset and hue
- In-built test pattern and tone generators for each channel
- 16x user memories, save/recall/rename
- RollCall control and monitoring compatible



Block Diagram for IQSYN3147-1B3

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

Analog reference:

- 1x analog reference with passive loop-through
- Black (HD tri-level and SD bi-level) and blackburst (SD bi-level)
- SD bi-level – RS170A
- HD tri-level – SMPTE ST 240, 274 and 296

Signal Outputs

SDI outputs: 2x per channel

Controls**Indicators**

Power: OK (Green)

CPU running: OK (Green flashing)

FPGA running: OK (Green flashing)

Status:

- OK (Green)
- Warning (Yellow)
- Error (Red)

Input 1: OK (Green)

Input 2: OK (Green)

Reference lock: OK or Cross-locking (Green), Std error (Green flashing)

Genlock & Video Delay

Genlock mode: Free-run, Lock to Reference, Lock to input

Genlock H-Phase: $\pm 0.5\text{H}$ in pixel clock stepsGenlock V-Phase: $\pm 0.5\text{F}$ in 1 line steps

Video H-Delay: 0 – 1 Line in pixel clock steps

Video V-Delay: 0 – 1 Frame in 1 line steps

Video Delay Frames: 0 - 3 F

Video Controls (per Channel)

Input Standard: 1125(1080)/50P (A & B), 1125(1080)/59P (A & B), 1125(1080)/29i, 1125(1080)/25i, 750(720)/59P, 750(720)/50P, 525(480)/29i, 625(576)/25i

Default Video Output

Type: Pattern, Freeze, Black

Standard: Last Known Good, 1125(1080)/50P (A & B), 1125(1080)/59P (A & B), 1125(1080)/29i, 1125(1080)/25i, 750(720)/59P, 750(720)/50P, 525(480)/29i, 625(576)/25i

Manual Freeze: On/Off

Freeze: Field/Frame

VANC data: Blank VANC

SD VANC data: Line blanking (23/336 in 625, 21,22, 283, 284 in 525)

HANC data: Blank HANC (Removes all HANC data, including audio)

Proc amp enable: On/Off

Black Level: $\pm 100\text{ mV}$ in steps of 0.8 mVHue Adjust: $\pm 180^\circ$ in steps of 1° Master video gain: $\pm 6\text{ dB}$ in steps of 0.1 dBY-Gain: $\pm 6\text{ dB}$ in steps of 0.1 dBCb/Cr Gain: $\pm 6\text{ dB}$ 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 (per Channel)

Embedder assignment

Group 1 to 4 enable: On/Off

Pair 1 to 8 source L/non-PCM: Dis-embed 1_1 to 8_2, Tone, Silence

Pair 1 to 8 source R: Dis-embed 1_1 to 8_2, 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

Coarse manual delay: Up to 1.75s in 5 ms steps

Fine manual delay: $\pm 0.25\text{s}$ in 0.5 ms steps

Variable audio delay control source: Internal, Manual, RollTrack (14 to 17)

Dolby-E

Dolby-E auto alignment: On/Off

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 -80dB in steps of 1dB

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), Audio Delay (1&2), Input Present (1&2), Input Loss (1&2), Input Select (1&2), Output Rate/Std (1&2), Output Freeze (1&2), Output Unfreeze(1&2), Output Pattern On (1&2), Output Pattern Off (1&2), Output Black On (1&2), Output Black Off (1&2), Output Caption On (1&2), Output Caption Off (1&2), Inp1 Embedded Audio (Pairs 1-8) PCM, Inp1 Embedded Audio (Pairs 1-8) Non-PCM, Inp1 Embedded Audio (Pairs 1-8) Loss, Inp1 Embedded Audio (Pairs 1-8) V Bit, Reference OK & Loss, Inp2 Embedded Audio (Pairs 1-8) PCM, Inp2 Embedded Audio (Pairs 1-8) Non-PCM, Inp2 Embedded Audio (Pairs 1-8) Loss, Inp2 Embedded Audio (Pairs 1-8) V Bit

Information window: Video Input Status, Audio Input Status, Reference 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 Ω 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)

Reference source: External – HD tri-level/SD bi-level/input video syncs

Electrical:

- Black (HD tri-level and SD bi-level) and blackburst (SD bi-level)
- SD bi-level – RS170A
- HD tri-level – SMPTE ST 240, 274 and 296

Connector/format: BNC/75 Ω panel jack on standard IQ connector panel

Analog reference return loss:

- SD bi-level > 40 dB to 5.5 MHz
- HD tri-level > 35 dB to 30 MHz

Video standards:

- 1125(1080)/50p (A & B), 1125(1080)/59p (A & B)
- 750(720)/50p, 750(720)/59p
- 1125(1080)/25i, 1125(1080)/29i
- 625(576)/25i, 525(480)/29i

Minimum delay (reference lock or free run):

- SD: 67 μs
- HD: 28 μs
- 3G-A: 15 μs
- 3G-B: 25 μs

Typical delay (input lock):

- SD: 70 μs
- HD: 38 μs
- 3G-A: 19 μs
- 3G-B: 40 μs

Synchronizer hysteresis window: 5 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

Power Consumption

Module power consumption:

- 11W Max. (A Frames)
- 10.5 PR (B Frames)

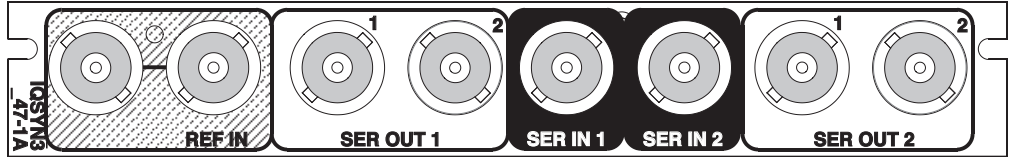
ORDERING**IQSYN3147-1A3**

Dual-channel 3G/HD/SD-SDI synchronizer with embedded audio processing. 2 outputs per input, reference loop-through.

IQSYN3147-1B3

Dual-channel 3G/HD/SD-SDI synchronizer with embedded audio processing. 2 outputs per input, external loop-through and internal frame reference selection.

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



GVB-2-0892A-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.

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., GVBB Holdings S.A.R.L. or Grass Valley Canada. Belden Inc., GVBB 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.