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 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

- 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
- GV Orbit control and monitoring compatible
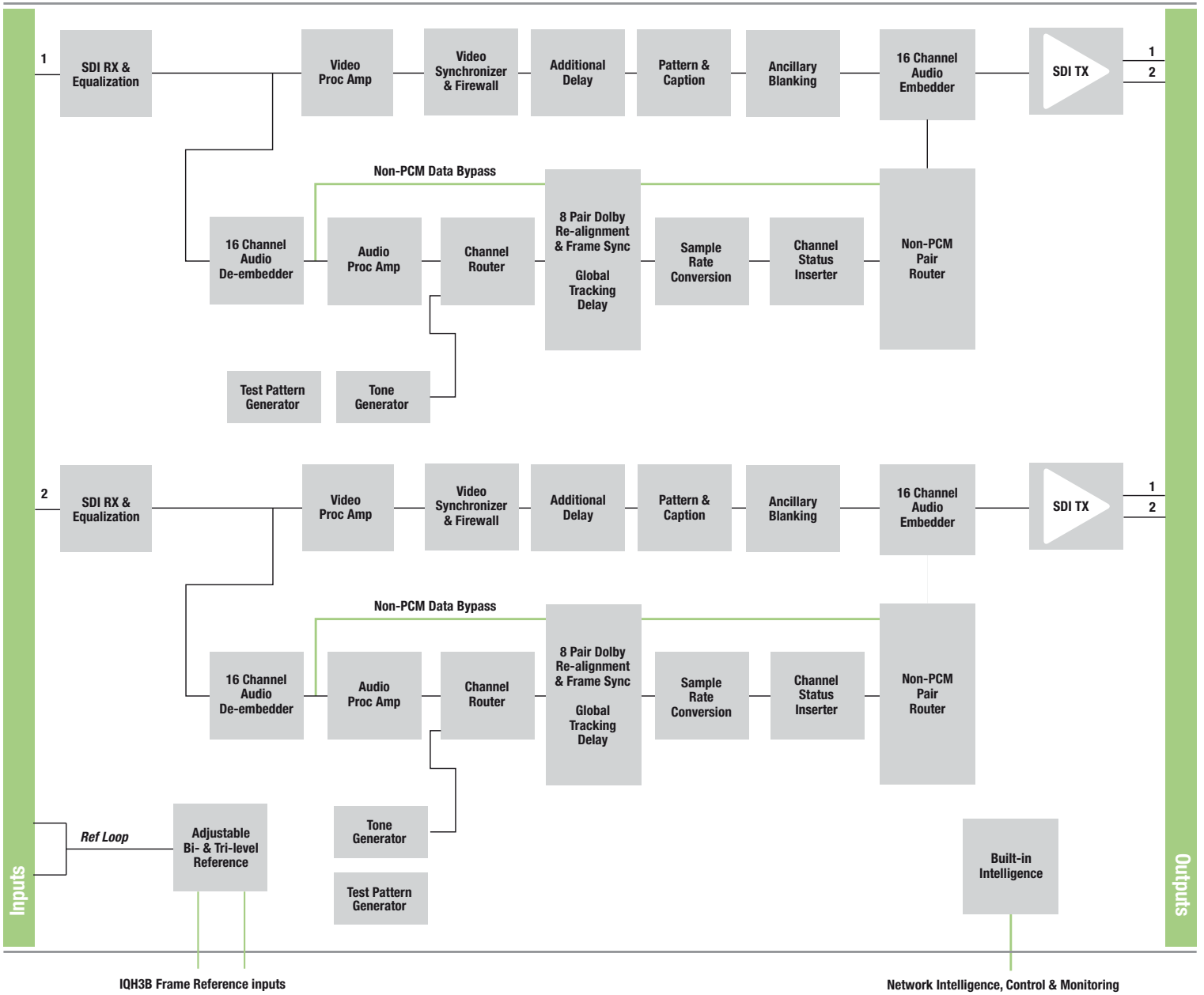
Block Diagram for IQSYN3147-1B3

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: ± 0.5H in pixel clock steps

Genlock V-Phase: ± 0.5F 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: ±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 (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: ±0.25s 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/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)

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/75Ω 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.

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