

# IQDNC34

## Dual-channel 3G/HD-SDI Downconverter with SD-SDI and Analog Outputs

With both SDI and analog audio/video standard definition outputs, this is the perfect solution for signal monitoring.

The IQDNC34 from Grass Valley provides two channels of multirate down-conversion for 3 Gb/s SDI, and HD-SDI digital video signals along with both composite and analog audio outputs suitable for monitoring applications where space is of the essence.

IQDNC34 includes frame synchronizers, capable of referencing to a SD bi-level or HD tri-level reference and independent variable aspect ratio converters with frame accurate reading and writing of WSS, VI and 2016 AFD signaling. Audio handling includes audio channel routing, delay adjustment and level controls with audio monitoring outputs selectable from either video channel. Video metadata such as timecode, closed captions and teletext captions can also be passed through the module or processed according to the required output standard.

To allow the module to be further tailored to system requirements software options are available to provide noise reduction.

### Why should you choose this module?

- Including composite video and analog audio outputs along with the SDI and embedded audio outputs enables the IQDNC34 to downconvert HD signals for the main signal chain, and provide a monitoring output for built-in QC
- Comprehensive audio processing functions allow complete control over embedded audio signals for applications where channel routing, gain control or delay is required
- 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

- High-quality downconversion for SDI video inputs with composite 12-bit encoded and analog audio monitoring outputs
- Frame synchronizer with HD tri-sync/SD bi-level reference input and input loss detection
- Aspect ratio conversion including preset ARC maps relative to conversion modes, selectable pan, tilt, aspect, size, and output crop adjustments
- Aspect ratio control (signaling reading and writing) using ETSI WSS and AFD Video Index signaling (RP186, SMPTE ST 2016)
- Video proc. features include: gain, offset, hue, horizontal and vertical picture enhancement, and RGB gamut legalization
- Metadata support – Closed caption passing or processing for CEA608/708, and WST/OP42 and OP47 teletext captions, and VITC or SMPTE ST 12 timecode translation
- Built-in test pattern generator
- Additional processing options including noise reduction (adaptive spatial and recursive)
- Processing for 16 channels of embedded audio present on the incoming SDI stream with no disturbance during video synchronizer frame wraps or drops
- Audio proc. features including: channel routing, gain, invert, delay and tone generator
- Non-PCM processing features pair level routing and delay compensation. Dolby-E data is passed with a delay to match the video and with co-timed audio frame drop or repeat
- Integrated SFP module supports Fiber or HD-BNC I/O, and HDMI output
- 16x user memories
- RollCall control and monitoring compatible with standard logging and reporting features
- RollTrack triggers available for detected module states including input loss and reference loss

## SPECIFICATIONS

### Inputs & Outputs

#### Video Signal Inputs

SDI inputs: 2x

Input cable length: Up to 80m Belden 1694A @ 3 Gb/s

Up to 120m Belden 1694A @ 1.5 Gb/s

100m typical (with output set to 1080p rates), Belden 1694A @ 270 Mb/s

Input standard (auto detect):

625(576)/25i, 525(480)/29i

720 50/59p/1080 50/59i

1080 50/59p level A/B

1080 25/29psf

Analog reference:

1x analog reference with passive loop-through

Black (HD tri-level and SD bi-level) and Black Burst (SD bi-level)

SD bi-level – RS170A

HD tri-level – SMPTE ST 240, SMPTE ST 274

#### Video Signal Outputs

SDI outputs: Up to 5 (3 from Channel 1, 2 from Channel 2)

Output standard: 625(576)/25i, 525(480)/29i

Composite outputs: Up to 2 per channel

Output standard: 625(576)/25i, 525(480)/29i

#### Audio Signal Outputs

Analog audio outputs: Up to 4 channels (selectable from either video channel)

#### Control Interface

GPI: 2x Closing contact I/O interface (ST) (rear panel dependent)

#### Conversion Functions (per channel)

Modes:

Down conversion

Aspect ratio conversion synchronization

Conversion processing:

Still process: Detects still images and applies an aperture with full (progressive) vertical frequency response

Enhanced still: Adds field motion detection to still process.

Prevents artifacts on moving repetitive patterns

Aspect ratio conversion: AFD (SMPTE ST 2016), VI (RP186), WSS (L23) (manual or auto)

SD input format: Normal 4:3, Anamorphic 16:9, Letterbox 14:9, Letterbox 16:9

SD output format: Normal 4:3, Anamorphic 16:9, Letterbox 14:9, Letterbox 16:9

Metadata:

Closed caption CE608 <> CE708

Timecode conversions

Teletext subtitles WST/RDD8 conversion

#### Audio Functions

Analog audio: Four channels (two pairs) of analog outputs, separately assignable to any processing channel

Headroom: +24 dBu, balanced connection

Level adjustment: +12 dB to +24 dB (+18)

#### Analog Audio Routing

Output Pair 1-2: Select from configured embedded audio output pairs (Ch1: 1-8, Ch2: 1-8)

#### Audio Functions (per channel)

Embedded audio:

16-channel embedded audio processing

PCM audio processing includes channel level gain and delay compensation, as well as channel level routing with L/R swap and phase invert feature

Non-PCM processing features pair level routing and delay compensation. Dolby E data is passed with a delay to match the video and with co-timed audio frame drop or repeat

Enable/Blank

#### Embedded Audio Routing

Processed pair 1-8: Disembled 1-8

Output Channels 1-16: Processed pair 1-8, Tone, Silence

#### Processed Audio Control

Invert phase channels: 1-16

Pair 1 to 8 Gain L/R: +18 dB to -18 dB in 0.1 dB steps

Pair 1-8 Manual Delay: -40 to +200 ms in 1 ms steps

Global Manual Delay: -40 to +200 ms in 1 ms steps

#### Tone

Frequency: 100 Hz to 10 kHz in 100 Hz steps

#### Processing Functions (per channel)

Ancillary data: Pass/Strip

Freeze: On/Off

Legalizer: On/Off

Genlock: Reference lock, Input lock (same format), Free run

Pattern: Off, Black, Ramp, Bars

#### Proc amp

Black Level: +100 to -100 mV (0) in 0.8 mV steps

Contrast: -6 dB to +6 dB (0) in 0.2 dB steps

Saturation: -6 dB to +6 dB (0) in 0.2 dB steps

Y Gamma: 0.4 to 1.7 (1) in 0.1 steps

YC Offset: -20 to 20 (0) in 2 Luma pixel steps

Note: Defaults shown in brackets

#### Enhancement

Nonlinear enhancer:

Frequency band selection: Low, Med, High

Four preset enhancement modes: Low, Med, High, Super

Manual enhancement mode with H Gain and H Noise rejection levels

#### Conversion Aperture

Vertical:

Frequency Band Selection: Low, Med, High

Five vertical preset enhancement levels: Soft 2, Soft 1, Normal, Sharp 1, Sharp 2

Horizontal:

Five horizontal preset sharpness levels: Low 2, Low 1, Normal, High 1, High 2

Five horizontal preset detail levels: Soft 2, Soft 1, Normal, Sharp 1, Sharp 2

#### Other Controls

GPI input low/high select: Black, Freeze, Pattern, User Memories 1-16

GPI output: Source Black, Freeze, Pattern

User memories: 16x Save, Recall, Rename

Memory naming: User configurable naming of memories 1 – 16

RollTrack index: Up to 50 RollTrack destinations

RollTrack sources: Unused, Input Present (1&2), Input Loss (1&2), Reference OK & Loss

Information window: Video 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

Module information: Reports following module information – software version, serial number, rear panel ID, frame slot

#### 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

**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 (10H z) / 0.2 UI (1 kHz)

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

#### Electrical:

Black (HD tri-level and SD bi-level) and Black Burst (SD bi-level)

SD bi-level – RS170A

HD Tri-level – SMPTE ST 240 and SMPTE ST 274

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

#### Embedded audio handling

HD – 24-bit synchronous 48 kHz to SMPTE ST 299

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

#### Power Consumption

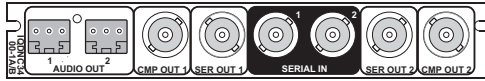
**Module power consumption:** 14.5 PR (B Frames)

Map of input to output standards		Output								
		25		50		29.97		59.94		
		576i	1080i	720P	1080P	480i	1080i	720P	1080P	
Input	25	576i	✓	×	×	×	×	×	×	×
		1080i	✓	×	×	×	×	×	×	×
	50	720P	✓	×	×	×	×	×	×	×
		1080P	✓	×	×	×	×	×	×	×
	29.97	480i	×	×	×	×	✓	×	×	×
		1080i	×	×	×	×	✓	×	×	×
	59.94	720P	×	×	×	×	✓	×	×	×
		1080P	×	×	×	×	✓	×	×	×

ORDERING

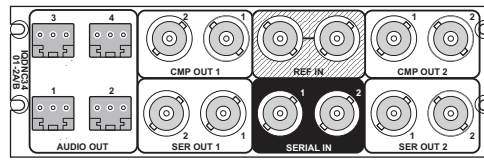
**IQDNC3400-1B3**

Dual-channel downconverter with analog I/O. 2 SDI inputs, reference inputs from enclosure, 1 SDI outputs per channel, 1 composite output per channel, 2 analog audio outputs



**IQDNC3401-2B3**

Dual-channel downconverter with analog I/O. 2 SDI inputs, external reference loop & enclosure reference inputs, 2 SDI outputs per channel, 2 composite output per channel, 4 analog audio outputs  
For more details on enclosure types please refer to the IQ Modular Enclosures datasheet.



**Software Options**

- IQOPTM-2NR** – Software option to add noise reduction on both channels
  - IQOPTM-2LC** – Software option to upgrade with linear frame rate conversion on both channels
  - IQOPTM-UDC** – Software option for upgrade to up, down and cross conversion for one processing channel
- Note:** Single channel licenses can also be loaded



Block Diagram for IQDNC34 Range



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