DATASHEET

IQDNC30

3G/HD-SDI Downconverter with Frame Synchronizer

The IQDNC30 provides multirate downconversion for 3G SDI, and HD-SDI digital video signals. Using high-quality motion adaptive de-interlacing and flexible scaling technology, the IQDNC30 is a broadcast-quality conversion module able to handle applications such as downconversion to maintain SD output feeds.

The IQDNC30 from Grass Valley includes a frame synchronizer capable of referencing to a SD bi-level or HD tri-level reference and a variable aspect ratio converter with frame accurate reading and writing of WSS, VI and 2016 AFD signaling. Audio handling includes audio channel routing, delay adjustment and level controls. 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?

- High-quality downconversion and frame synchronization allows multiformat working and provides integration with existing SD workflows
- Comprehensive audio processing functions allow complete control over embedded audio signals for applications where channel routing, gain control or delay is required
- 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

- High-quality downconversion for SDI video inputs including conversion aperture control
- 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 OP42/OP47/WST captions, VITC or SMPTE ST 12 timecode translation, and ancillary data bridge for 7 blocks of ANC data passing
- Built-in test pattern generator and 19-character scrolling caption generator
- Additional processing options including: noise reduction (adaptive spatial and recursive) and linear frame rate conversion
- 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
- Dolby E support — Detection of PCM/non-PCM audio to SMPTE ST 337/338, pair routing and Dolby E header re-alignment
- 16x user memories and 2 GPI/O ports
- GV Orbit control and monitoring compatible
- 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 50/59p1080 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 blackburst (SD bi-level)
- SD bi-level – RS170A
- HD tri-level – SMPTE ST 240, SMPTE ST 274

Video Signal Outputs

SDI outputs: Up to 5

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

Control Interface

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

Conversion Functions

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

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

Embedded audio: Enable/Blank

Embedded Audio Routing

Processed pair 1-8: Disembed 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

Dolby-E

Dolby-E Auto

Alignment: ±10 line offset in 1 line steps

Tone

Frequency: 100 Hz to 10 kHz in 100 Hz steps

Processing Functions

Ancillary data: Pass/Strip

Freeze: On/Off

Legalizer: On/Off

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

Pattern: Off, Black, Ramp, Bars

Caption: On/Off, Scrolling

Edit Caption: 19 characters available

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 Mt/s, 1.5 Gb/s) >-10 dB (3 Gb/s)

Output jitter: SD-SDI 0.2 UI (10 Hz)/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 blackburst (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

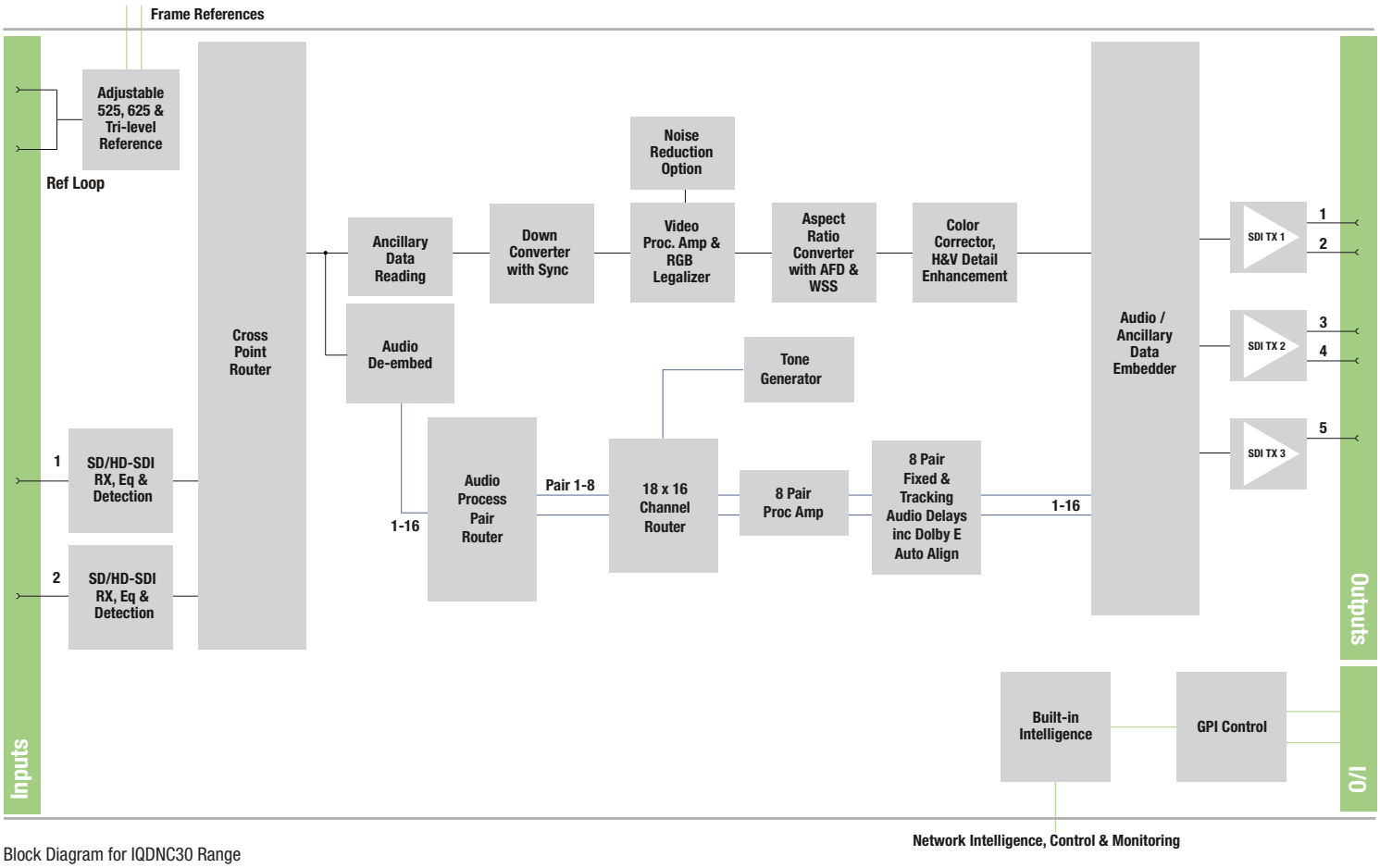
- HD: 24-bit synchronous 48 kHz to SMPTE ST 299
- SD: 20-bit synchronous 48 kHz to SMPTE ST 272-A

Power Consumption

Module power consumption: 13PR (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	✕	✕	✕	✕	✔	✕	✕	✕

Format Conversion I/O Grid

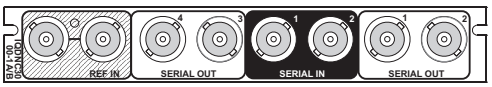


Block Diagram for IQDNC30 Range

ORDERING

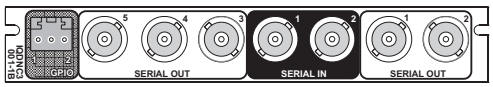
IQDNC3000-1B3

Downconverter. 2 SDI inputs, external reference loop & enclosure reference inputs, 4 SDI outputs



IQDNC3001-1B3

Downconverter. 2 SDI inputs, 5 SDI outputs, 2 GPI/Os, reference inputs from enclosure



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

Software Options

IQOPTM-NR

Software option to add noise reduction

IQOPTM-UDC

Software option for upgrade to up, down and cross conversion

IQOPTM-LC

Software option to upgrade with Linear frame rate conversion