

IQUDC31

Dual Channel 3G/HD/SD-SDI Up, Down and Cross Converter

The IQUDC31 provides two channels of multi-rate format conversion for 3G/HD/SD-SDI digital video signals. Using high quality motion adaptive de-interlacing and flexible scaling technology the IQUDC31 is a broadcast quality conversion module ideal for space constrained installations, or for applications requiring simultaneous HD and SD output feeds.

IQUDC31 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 signalling. 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 and side-bar keying, and versions are available with SFP cages enabling fiber conversion, or additional electrical outputs on HD-BNCs.

Features

- High quality up, down and cross conversion 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 (signalling reading and writing) using ETSI WSS and AFD Video Index signaling (RP186, SMPTE 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 SMPTE12M timecode translation
- In-built test pattern generator and 19 character scrolling caption generator
- Additional processing options including: noise reduction (adaptive spatial and recursive), side-bar keying 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 337/338M, pair routing and Dolby E header re-alignment
- Integrated Fiber I/O support via SFP module
- 16 x user memories and 2 GPI/O ports
- RollCall control and monitoring compatible with standard logging and reporting features
- RollTrack triggers available for detected module states including: Input loss and reference loss

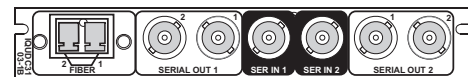
Why should you choose this module?

- With it's ability to provide outputs of different formats at independent aspect ratios, coupled with high quality video conversion and metadata handling, IQUDC31 allows fully flexible multi-format working in a compact and cost effective package
- 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 SAM or third party network management systems providing an all-inclusive monitoring and control solution

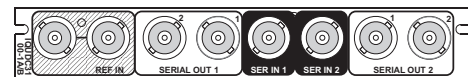
Inputs & Outputs - IQH3B enclosures



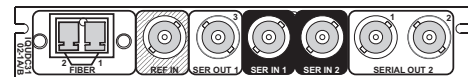
IQUDC3101-1B3



IQUDC3103-1B3



IQUDC3100-1B3

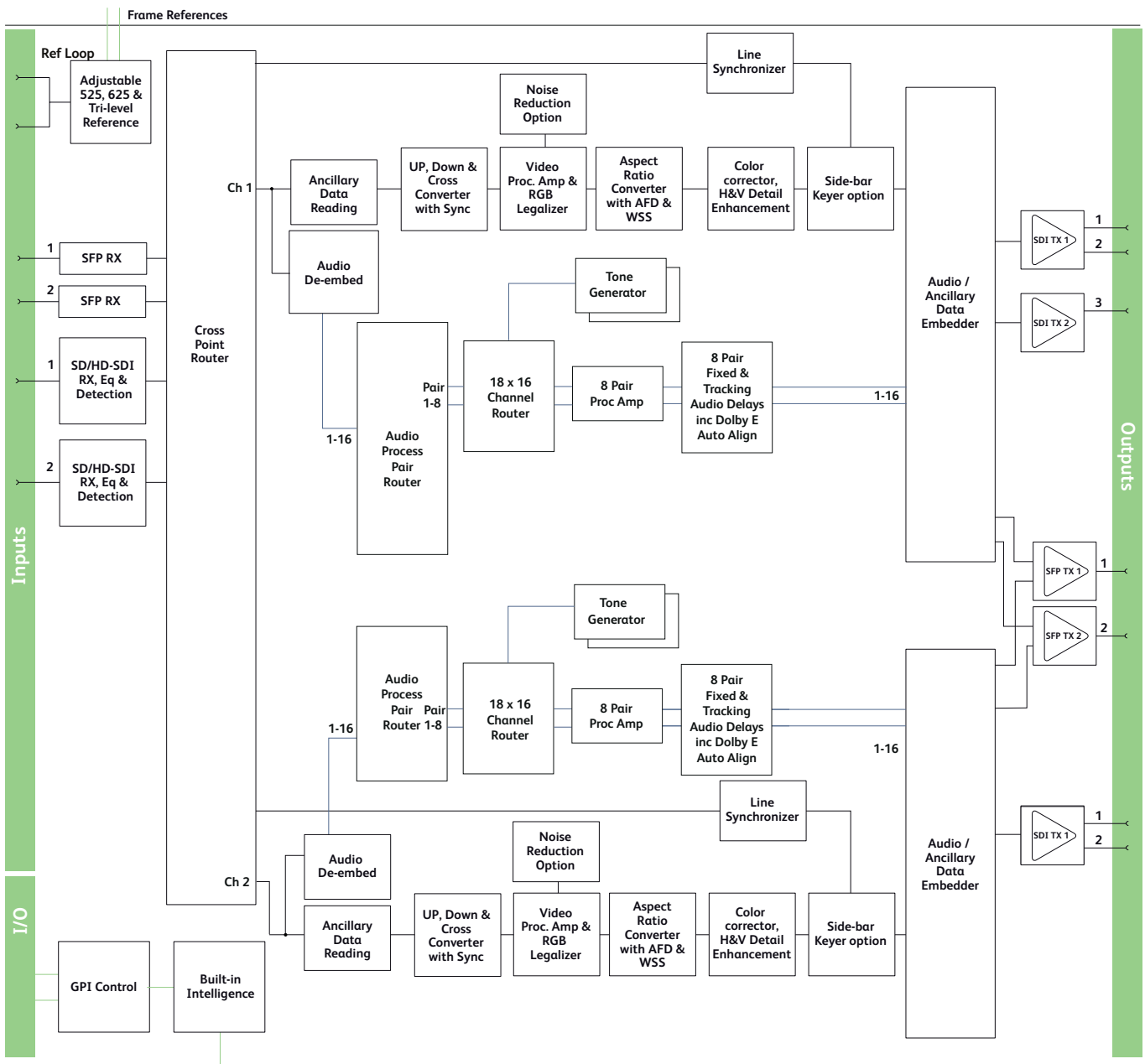


IQUDC3102-1B3

For more details on enclosure types please refer to datasheet IQH3B.

IQUDC31

Dual Channel 3G/HD/SD-SDI Up, Down and Cross Converter



Network Intelligence, Control & Monitoring

Note: Number of inputs and outputs depends on SFP and rear panel type

Block Diagram for IQUDC31 Range

Technical Specification

Inputs & Outputs

Video Signal Inputs

SDI Inputs 2x
 Input Cable Length Up to 80m Belden 1694A @ 3 Gbit/s
 Up to 120m Belden 1694A @ 1.5 Gbit/s
 100m typical (with output set to 1080p rates),
 Belden 1694A @ 270 Mbit/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

1 x 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 240M, 274M

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

Technical Specification cont...

Fiber Signal Input

Inputs	Up to 2
Optical	3 GBit/s HD-SDI, 1.485 GBit/s HD-SDI or 270 Mbit/s SD-SDI
Connector / Format Standard	LC singlemode SMPTE 297-2006

Video Signal Outputs

SDI Outputs	up to 5 (3 from Channel 1, 2 from Channel 2)
Output standard	625(576)/25i, 525(480)/29i 720 50/59p, 1080 50/59i 1080 50/59p level A/B

Fiber Signal Output

Optical	3 GBit/s HD-SDI, 1.485 Gbit/s HD-SDI or 270 Mbit/s SD-SDI
Connector / Format	LC singlemode
Conforms to	SMPTE 297-2006
Outputs	Up to 2

***Note: Optical I/O and control dependant on type of SFP module fitted**

Control Interface

GPI	2 x Closing contact I/O interface (ST) (rear panel dependant)
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Conversion Functions (per channel)

Modes	Up, down, and cross 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 (manual or auto)	AFD (SMPTE 2016), VI (RP186), WSS (L23)
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 (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
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
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Tone

Frequency	100Hz to 10kHz in 100Hz steps
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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
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
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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	16 x Save, Recall, Rename
Memory Naming	User configurable naming of memories 1 – 16
RollTrack Index	Up to 50 RollTrack destinations
Optical Logging*	Tx Laser Bias High Warning Tx Power Low Warning Tx Power High Warning
Laser Wavelength	Input 1 (2) Rx Power High Warning Input 1 (2) Rx Power Low Warning Input 1 (2) Rx Power Measurement
RollTrack Sources	Unused, Input Present (1&2, Fiber 1 & 2), Input Loss (1&2, Fiber 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

Technical Specification cont...

Specifications

Electrical	3Gbit/s SDI, SMPTE 424M 1.5Gbit/s HD-SDI, SMPTE 292M 270 Mbit/s SDI, SMPTE 259M-C
Connector / Format	BNC/ 75ohm panel jack on standard IQ connector panel
Return loss	>-15dB (270Mbit/s, 1.5Gbit/s) >-10dB (3Gbit/s)
Output Jitter	SD-SDI 0.2 UI (10Hz) / 0.2 UI (1KHz), 3G/HD-SDI 1.0 UI (10Hz) / 0.2 UI (100KHz)
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 Tr-level – SMPTE 240M and 274M
Connector / Format	BNC/75 ohm panel jack on standard IQ connector panel

Optical 1310 nm Tx

Wavelength	1310 nm
Spectral width (FWHM)	>1.5 nm (typ)
Output power	0 to -5 dBm typical (-2 dBm typical)
Extinction ratio	>7.5:1 (typ)

Optical Rx

Input wavelength range	Min. 1260 nm, Max. 1620 nm
Optical power input range	> -0 dBm, < -20 dBm
Link distance	Up to 30 Km

Embedded audio handling

HD - 24-bit synchronous 48 kHz to SMPTE 299M,
SD - 20-bit synchronous 48 kHz to SMPTE 272M-A

Power Consumption

Module Power Consumption with Fiber
16PR (B frames)

Ordering Information

Order codes for IQH3B enclosures

IQUDC3100-1B3

Dual channel up, down and cross converter. 2 SDI inputs, external reference loop & enclosure reference inputs, 4 SDI outputs

IQUDC3101-1B3

Dual channel up, down and cross converter. 2 SDI inputs, 5 SDI outputs, 2 GPI/Os, reference inputs from enclosure

IQUDC3102-1B3

Dual channel up, down and cross converter. 2 SDI inputs, external reference input & enclosure reference inputs, 3 SDI outputs, single SFP cage

IQUDC3103-1B3

Dual channel up, down and cross converter. 2 SDI inputs, 4 SDI outputs, single SFP cage, reference inputs from enclosure

For more details on enclosure types please refer to datasheet IQH3B

Software Options

IQOPTM-2NR - Software option to add noise reduction on both processing channels

IQOPTM-2SBK - Software option to add side-bar keying on both processing channels

IQOPTM-LC - Software option to upgrade with Linear frame rate conversion

SFP options

FC1-13T1 - Single 1310nm fiber Tx

FC1-13T2 - Dual 1310nm fiber Tx

FC1-15T1 - Single 1550nm fiber Tx

FC1-15T2 - Dual 1550nm fiber Tx

FC1-R1 - Single fiber Rx

FC1-R2 - Dual fiber Rx

FC1-13TR - Fiber transceiver 1310nmTx/Rx

FC1-HDBT2 - HD-BNC Dual Tx

FC1-HDBR2 - HD-BNC Dual Rx

Fiber CWDM Tx - Wavelengths available on request

Note: SFP type must be ordered in addition to the module.