

IQUDC34

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

Having both analog and digital interfacing along with multi-rate format conversion for 3G/HD/SD-SDI digital video signals gives the IQUDC34 a high level of flexibility and ability to handle a wide range of interfacing applications. Whether its decoding composite signals and embedding the associated analog audio, or receiving HD-SDI and de-embedding to AES, or analog audio for monitoring IQUDC34 can adapt, and using high quality motion adaptive de-interlacing and flexible scaling technology ensures that the conversion performance is first class.

IQUDC34 includes a frame synchronizer, capable of referencing to a SD bi-level or HD tri-level reference and a variable aspect ratio converter with 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, logo insertion and side-bar keying, and versions are available with SFP cages enabling fiber conversion or additional electrical outputs on HD-BNCs.

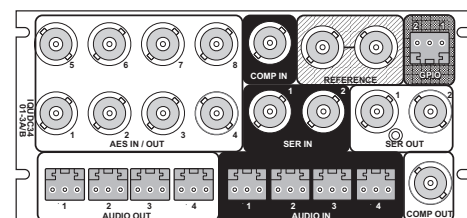
Features

- Wide range of I/O including SDI, CVBS, AES audio, analog audio and integrated Fiber support via SFP module
- High quality up, down and cross conversion 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 OP42/OP47/WST captions, VITC or SMPTE12M timecode translation, and Ancillary data bridge for 7 blocks of ANC data passing
- Additional processing options including; noise reduction (adaptive spatial and recursive), side-bar keying and linear or motion compensated frame rate conversion
- 8 AES audio I/O, balanced or unbalanced, two pairs of balanced analog audio inputs and outputs all available to/from any processed internal pair, and audio proc. features including: channel routing, gain, invert, delay and eight internal tone generators
- Processing for 16 channels of embedded audio present on the incoming SDI stream with no disturbance during video synchronizer frame wraps or drops
- 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
- In-built test pattern generator and 19 character scrolling caption generator
- 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

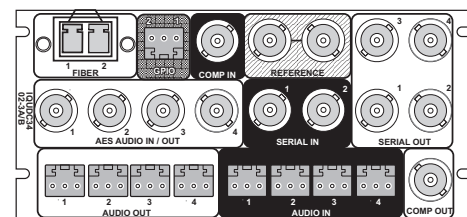
Why should you choose this module?

- It's ability to work with a wide range of analog and digital inputs along with high quality video conversion and frame synchronization makes the IQUDC34 an ideal interfacing module for mixed analog and digital systems
- Full RollCall and SNMP compatibility allows easy integration with SAM or third party network management systems providing an all-inclusive monitoring and control solution

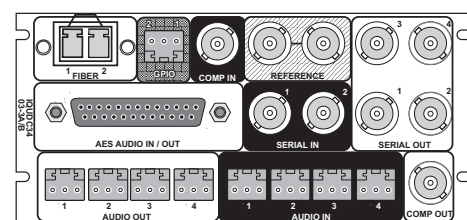
Inputs & Outputs - IQH3A/1A/3B enclosures



IQUDC3401-3A3, IQUDC3401-3B3



IQUDC3402-3A3, IQUDC3402-3B3

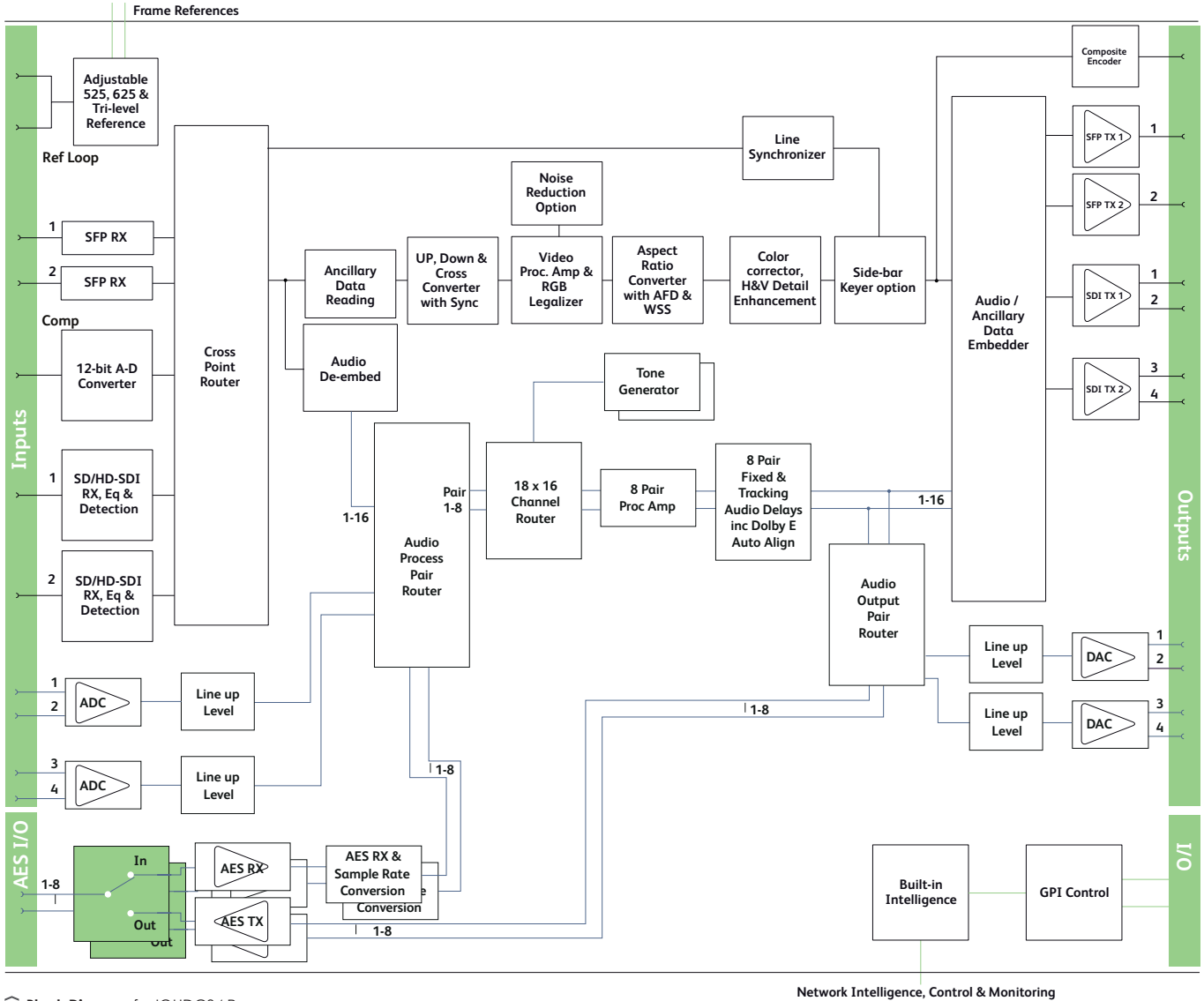


IQUDC3403-3A3, IQUDC3403-3B3

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

IQUDC34

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



Block Diagram for IQUDC34 Range

Network Intelligence, Control & Monitoring

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 Video inputs

1 x Composite; PAL, NTSC, NTSC-J, PAL-M, PAL-N,
 N4.4, SECAM with 12-bit resolution

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	LC singlemode
Standard	SMPTE 297-2006

Video Signal Outputs

SDI Outputs	up to 4
Output standard	625(576)/25i, 525(480)/29i 720 50/59p, 1080 50/59i 1080 50/59p level A/B
Analog Video Outputs	1 x Composite; PAL, NTSC, NTSC-J, PAL-M, PAL-N with 12-bit resolution

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**

Audio Signal Inputs/Outputs

AES/EBU I/O (software selectable)	8 Unbalanced (BNC) 8 Balanced (25D Type)
Balanced analog audio inputs	4 channels (Screw terminal connectors (ST))
Balanced analog audio outputs	4 channels (ST)

Control Interface

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

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

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

Analog Audio

Output Level adjustment	+12 dB to +24 dB (+18)
Input Headroom	+12 dB to +24 dB (+18)

Audio Routing

Processed pair 1-8	Disembled 1-8, AES 1-8, Analog 1-2
Embedded Output Channels 1-16	Processed pair 1-8, Tone, Silence
AES 1-8	Processed pair 1-8, Tone, Silence
Analog 1-2	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	100Hz to 10kHz in 100Hz steps
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Processing Functions

Ancillary Data	Pass/Strip
Freeze	On/Off
Legalizer	On/Off
Genlock	Reference lock (Ext, Int A, Int B), Input lock (same format), Free run
Memories	16 user memories
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

Technical Specification cont...

Optical Logging*	Tx Laser Bias High Warning Tx Power Low Warning Tx Power High Warning 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, CVBS, Fiber 1 & 2) , Input Loss (1&2, CVBS, Fiber 1 & 2), Reference OK & Loss
Information Window Factory Default	Video Input Status, Reference Status 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 , Licensed options

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

Digital Audio Input (Unbalanced)

Connector/Format	BNC
Sample Frequency	PCM: 25 – 96 kHz; Non-PCM: 48 kHz
Input Cable Length	>500 m of RG59 cable
Impedance	75 Ohms
Standard	AES3id

Digital Audio Input (Balanced)

Connector/Format	25Way-D
Sample Frequency	PCM: 25 – 96 kHz; Non-PCM: 48 kHz
Input Cable Length	>150 m of AES3 cable
Impedance	110 Ohms
Standard	AES3

Digital Audio Output (Unbalanced)

Connector/Format	BNC
Level	1 V p-p typical into 75 Ohms
Standard	AES3id

Digital Audio Output (Balanced)

Connector/Format	25Way-D
Level	3 V p-p typical into 110 Ohms
Standard	AES3

Analog Audio Input (Balanced)

Connector/Format	Screw Terminals (ST)
Analog Input Impedance	10 k Ohms
Frequency Response	20 Hz to 20 kHz (+/- 0.1 dB)
Distortion (THD+N)	Better than -97 dB at -1 dBFS / 1 kHz
Headroom	Adjustable +12 dBu to +24 dBu in 1dB steps

Analog Audio Outputs (Balanced)

Connector/Format	Screw Terminals (ST)
Frequency Response	20 Hz to 20 kHz (+/- 0.1 dB)
Output Level	Adjustable +12 dBu to +24 dBu in 1dB steps
Output Impedance	~25 Ohms
THD+N	Better than -97 dB at +23 dBu / 1 kHz

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)
Link distance	Up to 30 Km @ 270Mbit/s Up to 21 Km @ 1.5Gbit/s Up to 10 Km @ 3Gbit/s

Optical 1550 nm Tx

Wavelength	1550 nm
Spectral width (FWHM)	1 nm
Output power	4 to 0 dBm
Extinction ratio	>7.5:1 (typ)
Link distance	Up to 50 Km @ 270Mbit/s, 1.5Gbit/s or 3Gbit/s

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

Power Consumption

Module Power Consumption with Fiber	21.5W (A frames) 21.5PR (B Frames)
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Ordering Information

Order codes for IQH3B enclosures

IQUDC3401-3B3

Universal up, down and cross converter. 2 SDI inputs, 1 composite input, 4 analog audio inputs, External & Frame reference inputs, 2 SDI outputs, 1 composite output, 8 unbalanced AES inputs or outputs, 4 analog audio outputs, 2 x GPI

IQUDC3402-3B3

Universal up, down and cross converter. 2 SDI inputs, 1 composite input, 4 analog audio inputs, External & Frame reference inputs, 4 SDI outputs, 1 composite output, 4 unbalanced AES inputs or outputs, 4 analog audio outputs, 2 x GPI, 1 Fiber SFP cage. Includes rear but not SFP module

IQUDC3403-3B3

Universal up, down and cross converter. 2 SDI inputs, 1 composite input, 4 analog audio inputs, External & Frame reference inputs, 4 SDI outputs, 1 composite output, 8 balanced AES inputs or outputs, 4 analog audio outputs, 2 x GPI, 1 Fiber SFP cage. Includes rear but not SFP module

Order codes for IQH3A/1A enclosures

IQUDC3401-3A3

Universal up, down and cross converter. 2 SDI inputs, 1 composite input, 4 analog audio inputs, reference loop, 2 SDI outputs, 1 composite output, 8 unbalanced AES inputs or outputs, 4 analog audio outputs, 2 x GPI

IQUDC3402-3A3

Universal up, down and cross converter. 2 SDI inputs, 1 composite input, 4 analog audio inputs, reference loop, 4 SDI outputs, 1 composite output, 4 unbalanced AES inputs or outputs, 4 analog audio outputs, 2 x GPI, 1 Fiber SFP cage. Includes rear but not SFP module

IQUDC3403-3A3

Universal up, down and cross converter. 2 SDI inputs, 1 composite input, 4 analog audio inputs, reference loop, 4 SDI outputs, 1 composite output, 8 balanced AES inputs or outputs, 4 analog audio outputs, 2 x GPI, 1 Fiber SFP cage. Includes rear but not SFP module

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

Software Options

IQOPTM-NR - Software option to add noise reduction

IQOPTM-SBK - Software option to add side-bar keying

IQOPTM-MC - Software option to upgrade with motion compensated frame rate conversion

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

IQOPTM-LOG - Software option to add Logo insertion

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.