The IQDNC00 provides down conversion for 3Gbps SDI, and HD-SDI digital video signals. Using high quality motion adaptive de-interlacing and flexible scaling technology the IQDNC00 is a broadcast quality conversion module combining a large amount of video and audio processing features to provide a highly integrated space efficient package.

IQDNC00 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 is also comprehensively handled with audio channel routing, delay adjustment and level controls. Video metadata such as timecode, SMPTE2020 Dolby, 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 a series of hardware and software options is available to provide color correction for video, and advanced audio processing features such as Dolby E/D encoding or decoding, stereo to 5.1 upmixing and loudness processing using industry recognised technology from Linear Acoustic.

Features

- High quality downconversion for SDI video inputs
- Dual SDI inputs with auto switching on pre-defined input errors
- Frame synchronizer with HD Tri-sync / SD Bi-Level Reference Input, input loss detection and video delay up to 21 frames at 1080, 44 frames at 720 and 122 frames at 625
- Aspect ratio conversion including 9 preset ARC maps, up to 22 ARC memories, selectable border color and pan, tilt, size, and input 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 picture enhancement, RGB gamut legalization and noise reduction
- Metadata support - Closed caption passing or processing for CEA608/708 and OP42/OP47/WST captions, and VITC or RP188 timecode translation
- In-built test pattern generator and 2 x 16 character caption generator
- Processed and reclocked signal paths allow the selected SDI input to be converted or passed through at the same format
- 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, fixed and tracking delays, mixing, syncronizer wrap/drop processing and eight internal tone generators
- Dolby E support – Optional Dolby E/D decoding or encoding with both RS485 and SMPTE2020 metadata support, plus detection of PCM/non-PCM audio to SMPTE 337/338M, pair routing and Dolby E header alignment
- Advanced audio processing options from Linear Acoustic for stereo upmixing to 5.1 surround sound and loudness level measurement and control
- 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: PCM/non-PCM audio, input loss/freeze and reference loss

Order codes

IQDNC0054-2A3, IQDNC0054-2B3
3G/HD/SD-SDI Downconverter. 2 SDI inputs, reference loop, 4 selectable main or bypassed SDI outputs, 2 GPI/Os

Hardware and Software Options

IQOPTA-DBD Hardware option to add a single Dolby E/D decoder
IQOPTA-DBE-D Hardware option to add a single Dolby D encoder
IQOPTA-DBE-E Hardware option to add a single Dolby E encoder
IQOPTA-LOUD51 Software option to add Linear Accoustic AeroMax 5.1 loudness processing
IQOPTA-LOUDA2 Software option to add first channel of Linear Accoustic AeroMax 2.0 loudness processing
IQOPTA-LOUDB2 Software option to add second channel of Linear Accoustic AeroMax 2.0 loudness processing
IQOPTA-UPMIX Software option to add Linear Acoustic UPMAX stereo to 5.1 upmixing
IQOPTA-CC Software option to add color correction

For more details on enclosure types please refer to Frames & Hardware section.
Why should you choose this module?

- High quality video conversion and frame synchronization allows fully flexible multi-format working and provides a future proof migration path as digital workflows evolve
- Comprehensive audio processing functions allow complete control over embedded audio signals for applications where channel routing or mixing 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

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### Technical Specification

**Inputs & Outputs**

#### Video Signal Inputs

- SDI Inputs
  - Up to 80m Belden 1694A @ 3 Gbit/s
  - Up to 180m Belden 1694A @ 1.5 Gbit/s
  - >350m Belden 1694A @ 270 Mbit/s

- 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 and 296M

#### Video Signal Outputs

- SDI Outputs
  - x 4

#### Control Interface

- GPIO
  - 2 x Closing contact I/O interface (ST)

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![Format Conversion I/O Grid](image)

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**Block Diagram for IQDNC0054-2A3**
**Technical Specification cont...**

### Controls

**Genlock & Video Delay**
- **Genlock Mode**: Free-run, Lock to Reference, Lock to input
- **Genlock H-Phase**: ± 1 H in pixel clock steps
- **Genlock V-Phase**: ± 1 F 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 – 26 frames @ 1080 59p
  - 0 – 21 frames @ 1080 50p
  - 0 – 26 frames @ 1080 29f
  - 0 – 21 frames @ 1080 29i
  - 0 – 54 frames @ 720 59p
  - 0 – 44 frames @ 720 50p
  - 0 – 147 frames @ 525 29i
  - 0 – 122 frames @ 625 25i

**Dolby E auto line select**: Std, user select
**Dolby E auto align**: On/Off

### Video Controls

**Input Select**: Input 1, Input 2
**Input Backup Enable**: On/Off
**Priority**: None, Master (Input 1), Backup (Input 2)
**Change-over Parameters**:
- Carrier Loss, Standard mismatch, CRC and ANC Error, Embedded audio loss
- **Change-over Time Delay**: 0s to 10s
- **Reversion Delay**: 0 to 100s
**Down Conversion**: 1080p, 1080i, 720p, SD

**Default Video Output Type**: Pattern, Freeze, Black
**Pattern Select**: 100% Color Bars, 75% Color Bars, SMPTE Bars, Tartan Bars, Black, Pluge, Ramp, H Sweep, Pulse & Bar, Multi-burst
**Output Routing**: Processed, Reclocked Bypass
**Output Mode**: Input, Black, Freeze, Pattern
**Colorimetry**: Auto, None, Rec601, BT709
**H Enhance Frequency**: Off, Low, Medium, High
**H Enhance Presets**: Low, Medium, High, Super, Custom
**Borders**: R/G/B 0-255 in steps of 1
- **Border Adjust**: Left, Right, Top, Bottom
- **RGB Legalizer**: 700 mV, 721 mV, 735 mV, 746 mV
- **Black Level**: ±200 mV in steps of 1 mV
- **Hue Adjust**: ±180° in steps of 1°
- **Master Video Gain**: ±6 to -120 dB
- **Y-Gain**: ±6 to -120 dB
- **Cb/Cr Gain**: ±6 to -120 dB
- **Caption Enable**: On/Off
- **Edit Caption**: 16 characters
- **Caption Adjust**: X, Y, Size, Position
- **Metadata support**: Closed Captions CC608-708, compatibility bytes, WST-OP47, VITC-ATC

### Aspect Ratio Conversion

**Signalling type**: WS3 (ETSI or AFD), V6 (SMPTE or AFD), SMPTE 2016
**Select from 9 standard preset conversions**:
- Full Frame
- Box 16:9 top > 16:9
- Box 14:9 top > 16:9
- Box 16:9 > 16:9
- Box 4:3 > 4:3
- Box 4:3 > 16:9
- 16:9 > box 4:3
- 4:3 box 14:9 > 16:9
- 16:9 box 14:9 > 4:3

**Display Memories**: 32 User configurable ARC display memories
**Size**: 60% to 150% in 0.1% steps.
**Aspect**: 60% to 200% in 0.1% steps.
**Pan / Tilt**: ±75% in 0.1% steps
**Input crop**: Left / Right / Top / Bottom

### Audio Controls

**Audio In - Embedded**
- **Audio In-Disembed Pairs**: 1-8
- **Channel 1 – 16 Mute**: On/Off
- **Channel 1 – 16 Polarity Inv**: On/Off
- **Channel 1 – 16 Gain**: +12 dB to -80 dB in 0.1 dB steps
- **Pair 1 – 8 Stereo**: Link channel pairs

**Audio Out - Embedded**
- **Audio Out-embed Pairs**: 1-8
- **Channel 1 – 16 Mute**: On/Off
- **Channel 1 – 16 Gain**: +12 dB to -80 dB in 0.1 dB steps
- **Pair 1 – 8 Stereo**: Link channel pairs

**Audio Routing**
- **Input routing Bus 1-8**: Disembed 1-8, Dolby Decoder 1-5
- **Output routing embed 1-8**: Bus 1-8, Mixers 1-4, Downmixer 1-2, silence, Tones 1-8, Upmix*, Loudness*, Dolby Encoder 1-5

* Indicates optional feature

### Audio Setup Controls – Bus 1-8

- **Delay Add-in Bulk, Kolltrack, current video**: On/Off
- **Bulk Manual Delay**: -520ms to +2s in 0.17ms steps
- **Coarse Manual Pair Delay**: ±1.995s in 1ms steps
- **Fine Manual Delay**: ±5ms in 0.02ms steps
- **Fast or smooth delay limit**: 5ms to 80ms
- **Silence Detect**: -2dBFS to -128dBFS in steps of 1dB
- **Signal Overload Detect**: -1dBFS to -127dBFS in steps of 1dB
- **Warning Timer**: 1 to 20 seconds in steps of 1 second
- **Tone Frequency 1-8**: 100Hz to 16kHz in 100Hz steps

### Dolby Decoder

- **Decoder Source**: Disembed 1-8
- **Detection Mode**: Auto, dolby E, Dolby D, Mute
- **AES Channel Select**: Channel 1, 2
- **PCM Latency**: Single Frame, Minimum
- **Dolby D listening mode**: Full, EX, Stereo, Phantom, Stereo, Mono
- **Dolby D Dynamic Range**: Line, RF, Bypass
- **Metadata Program**: 1, 2
- **Input Metadata**: RS-485, SMPTE 2020
## Technical Specification cont...

### Dolby Encoder
- **Encoder Source**: Bus 1-8, Upmix*/Loudness*, Silence
- **Metadata Source**: Prog 1-8, Internal
- **Internal Metadata Control**: Program Descriptor, Dialog Norm, Audio Production Information, Extended BS1, BS2, Internal Config, Bitstream Mode, RF Mode, Line Mode, Surround Mode, Mix Level (Surround, Centre, LtRt, LoRo), Internal Config setting (e.g. 5.1v2)
- **Mode**: Encode, Pass through
- **Bit Depth**: Dolby D - 32 bit, 16 bit
- **Dolby E** - 20 bit, 16 bit
- **SRC**: Enable, Disable
- **Stream Number**: 0-6

### Audio Mixers
- **Mixer Select**: 1-4, Downmix 1-2
- **Source Select**: Bus 1-8, Silence, Tones 1-8
- **Source Gain**: 12dB to -80dB in 0.1dB steps
- **Mixer 1-4 invert**: On/Off
- **Mixer 1-4, Downmix 1-2 Mute**: On/Off
- **Downmix Configuration**: LoRo, 4 level selections

### Other Controls
- **GPI Input High/Low Select**: Input 1-2, Black, Freeze, Pattern, User Memories 1-16, ARC Display Memories 1-32
- **GPI Level Invert**: High/Low
- **GPI Output Source**: Current Input OK, Input 1-2 OK, Input 1-2 Selected, Black, Freeze, Pattern, No User Memories Selected, User Memories 1-16, No ARC Display Memories Selected, ARC Display Memories 1-32
- **RS-485 Port**: Output Dolby decoder, Output SMPTE 2020 Disembed, Input
- **SMPTE 2020 embedder**: Dolby decoder, RS-485 Port, SMPTE 2020 Disembed
- **User Memories**: Save/Recall/Rename
- **Memory Naming**: User configurable naming of Memories 1 – 16
- **Information Window**: Video Input Status, Audio Input Status, EDH/CRC & ANC Status
- **EDH/CRC Reset**: Resets all EDH/CRC counts
- **RollTrack index**: Allows up to 70 destinations
- **RollTrack Sources**: Unused, Video Delay, Audio Delay, Input Present (1-2), Input Loss (1-2), Output Std, Input selected (1-2), Output Black, Freeze or Pattern on, Output Black, Freeze or Pattern off, Output Caption on, Output Caption off, Embedded Audio (Pairs 1-8) PCM, Embedded Audio (Pairs 1-8) Non-PCM, Embedded Audio (Pairs 1-8) Loss, Reference OK & Loss, Dolby Decoder Input Type, Encoder active/pass-through, Dolby Metadata valid/missing
- **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 user memories
- **Restart**: Software reset of module

### Module Information
- **Reports**: Product Name, Software version, Serial number, Build number, KOS version, PCB version, Licensed Options
- **Input Names**: 19 Character editable name

### Specifications
- **Electrical**: 3Gbit/s SDI, SMPTE 424M 1.5Gbit/s HD-SDI, SMPTE 292M 270 Mbit/s SDI, SMPTE 259M-C / DVB-ASI
- **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, 274M and 296M
- **Connector / Format**: BNC/75 ohm 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, 1125(1080)/59p, 750(720)/50p, 750(720)/59p, 1125(1080)/25i, 1125(1080)/25p, 1125(1080)/25psf, 1125(1080)/29i, 625(576)/25i, 525(480)/25i, 525(480)/29i
- **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**: 23.5 W Max (A Frames)
- **22 PR (B Frames)
- **Note**: Dolby option adds 2.5W (PR)