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IQSYN51
3G/HD/SD-SDI Frame Synchronizer with Advanced Audio Processing

Agile frame synchronization for 3G/HD/SD-SDI signals with 32-channel embedded audio processing.

The IQSYN51 from Grass Valley provides frame synchronization for HD-SDI at 3 Gb/s or 1.5 Gb/s, or SD-SDI 270 Mb/s with 32-channel embedded audio processing. Including two SDI inputs with clean-switching functionality, agile synchronization and flexible audio processing features the IQSYN51 is ideal for general incoming line applications. A video proc amp provides complete control over the video levels and RGB 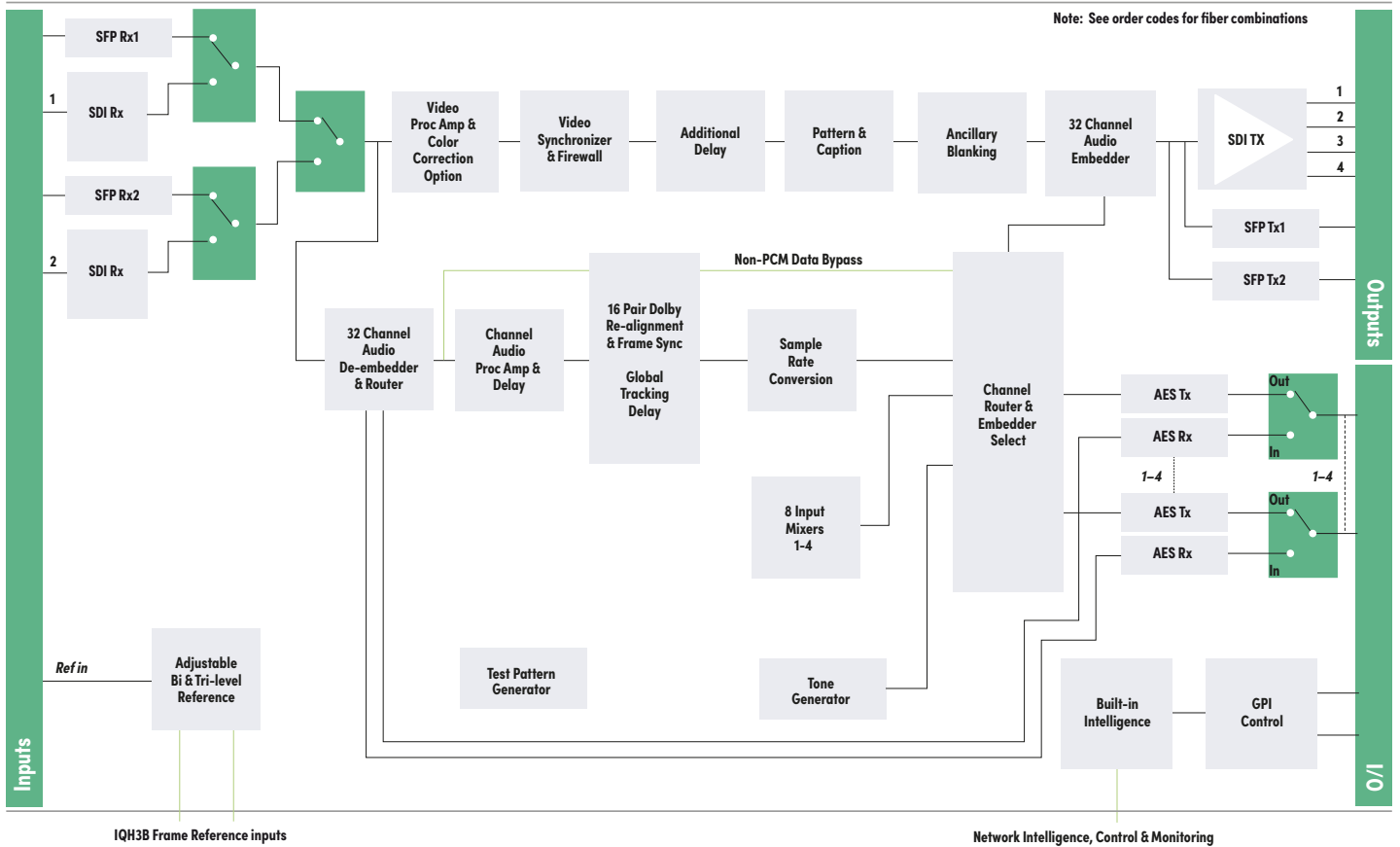gamut legalization, along with audio processing features including AES embedding and de-embedding, Dolby E auto-alignment, audio delay, gain, invert, channel level routing and mixing.

Key Features

- 3G/HD/SD-SDI synchronizer with firewall for video and processed PCM audio to provide a continuous uninterrupted output, and additional video delay up to 30 frames at 1080, 60 frames at 720 and 120 frames at 625

- Agile, router switching tolerant synchronizer ensuring disturbance free picture output, with precision genlock adjustment allowing you to time any SDI signal to pixel accuracy with greater tolerance to mis-timed upstream SDI switching (up to ±10 lines adjustable)

- Dual SDI inputs with auto switching on predefined input errors, and embedded audio source selection from input 1 or 2

- Reference input capable of detecting and referencing to a bi-level or tri-level signal and selection from either external input directly or from internal IQH3B chassis reference bus

- Standards supported:
  - 3G-SDI to SMPTE ST 424/425 level A & B compatible
  - HD-SDI to SMPTE ST 292/274/296
  - SD-SDI to SMPTE ST 259-C
  - Fiber to SMPTE ST 297-2006C

- Able to pass all ancillary data with independent HANC and VANC blanking control (VANC blanking is input line selectable)

- Input loss detection — default output of black/pattern/freeze/mute, and input SDI CRC, EDH and ANC data checking and reporting

- Video proc amp controls including video gain, offset, hue, RGB gamut legalization and Y/C picture position adjustment

- Processing for 32 channels of embedded audio present on the incoming SDI stream including synchronizer tracking delay (with no disturbance during video synchronizer frame wraps or drops)

- Audio proc amp features including channel level (sub-frame) routing, channel adjustable delay up to 4.5s, independent gain, invert and mute control with audio V-fade on input loss, and 4x8 input audio mixers

- Any group of embedded audio may be passed unchanged, processed or blanked

- Embedded Dolby E support — pair routing and Dolby E header alignment

- Built-in test pattern generator, 2x64 character caption generator and audio tone generator

- 16x user memories, save/recall/rename, and up to 8 GPI/O ports

- Media Biometrics signature generation in VANC and over IP output — rear option

- Full GV Orbit compatibility provides an all-inclusive remote configuration, control and monitoring solution

- Up to 70 RollTrack destinations and triggers available for detected module states including input loss and reference loss

- Comprehensive SNMP support allows easy integration with third-party Network Management Systems

Options

- Up to 8 channel 3G/HD/SD-SDI re-embedder capable of embedding or de-embedding up to 4 AES signals (rear option)

- Single-mode fiber optic transmitter and receiver options — including SFP HDMI output version to provide a built-in local monitoring output — rear option

- Color corrector software option

Inputs

SFP Rx1
SDI Rx — 1
SFP Rx2
SDI Rx — 2

Ref in

Adjustable Bi & Tri-level Reference

Video Proc Amp & Color Correction Option

Video Synchronizer & Firewall

Additional Delay

Pattern & Caption

Ancillary Blanking

32 Channel Audio Embedder

SDI TX

Note: See order codes for fiber combinations

Outputs — 1 2 3 4

SFP Tx1
SFP Tx2

32 Channel Audio De-embedder & Router

Channel Audio Proc Amp & Delay

16 Pair Dolby Re-alignment & Frame Sync / Global Tracking Delay

Non-PCM Data Bypass

Sample Rate Conversion

Channel Router & Embedder Select

AES Tx
AES Rx

Out / In 1–4   1–4

AES Tx
AES Rx

Out / In

8 Input Mixers 1-4

Test Pattern Generator

Tone Generator

Built-in Intelligence

GPI Control

I/O

IQH3B Frame Reference inputs

Network Intelligence, Control & Monitoring

Block Diagram for IQSYN51 range

Specifications

Inputs & Outputs

Video Standards Supported

1125 (1080)/50p (A & B), 1125 (1080)/59p (A & B), 1125 (1080)/60p (A & B), 1125 (1080)/25p,1125 (1080)/24p, 750 (720)/50p, 750 (720)/59p, 750 (720)/60p, 750 (720)/30p, 750 (720)/23p, 750 (720)/24p, 750 (720)/25p, 750 (720)/29p, (1035)/29i, (1035)/30i, 1125 (1080)/25i, 1125 (1080)/29i, 1125 (1080)/23p, 1125 (1080)/23sF,1125 (1080)/24sF, 625 (576)/25i, 525 (480)/29i

Signal Inputs

SDI inputs: 2x

Input 1 cable length:
— Up to 70m Belden 1694A @ 3 Gb/s
— Up to 160m Belden 1694A @ 1.5 Gb/s
— >350m Belden 1694A @ 270 Mb/s

Input 2 cable length:
— Up to 60m Belden 1694A @ 3 Gb/s
— Up to 100m Belden 1694A @ 1.5 Gb/s
— Up to 100m Belden 1694A @ 270 Mb/s

Analog reference:
— 1x analog reference 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 and SMPTE ST 296

Unbalanced digital audio: 4 x AES/EBU, AC3, Dolby E (BNC)

Balanced digital audio: 4 x AES/EBU, AC3, Dolby E (25-way D-Type)

Fiber Signal Input

Inputs:
— Up to 2
— Optical 3 Gb/s HD-SDI, 1.485 Gb/s HD-SDI or 270 Mb/s SD-SDI

Connector/format: LC singlemode
Standard: SMPTE ST 297-2006

Signal Outputs

SDI outputs: x4

Unbalanced digital audio: 4 x AES/EBU, AC3, Dolby E (BNC)

Balanced digital audio: 4 x AES/EBU, AC3, Dolby E (25-way D-Type

Fiber Signal Output

Outputs:
— Up to 2
— Optical 3 Gb/s HD-SDI, 1.485 Gb/s HD-SDI or 270 Mb/s SD-SDI

Connector/format: LC singlemode
Standard: SMPTE ST 297-2006

Control Interface

GPI I/O: 8x closing contact via BNC

Controls

Indicators

Power: OK (green)
CPU: Running (green flashing)
FPGA running: OK (green flashing)
Status: OK (green), Warning (yellow), Error (red)
Input 1: OK (green), Fail (red)
Input 2: OK (green), Fail (red)
Rx 1: OK (green), Fail (red)
Rx 2: OK (green), Fail (red)

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 – 14 frames @ 1080 50/59p level B
— 0 – 30 frames @ 1080 50/59p level A
— 0 – 30 frames @ 1080 23/24/25/29/30p
— 0 – 30 frames @ 1080 25/29/30i
— 0 – 60 frames @ 720 50/59/60p
— 0 – 30 frames @ 720 23/24/25/29/30p
— 0 – 120 frames @ 525 29i
— 0 – 120 frames @ 625 25i

Specifications (cont.)

Dolby E auto line select: Std, user select

Dolby E auto align: On/Off

Video Controls

Default video output type: Input, Mute, TPG (Pattern, Captions, Tone), Black

Default video output standard: Last Known Good, 1125 (1080)/50P, 1125 (1080)/59P, 1125 (1080)/29i, 1125 (1080)/25i, 750 (720)/59P, 750 (720)/50P, 525 (480)/29i, 625 (576)/25i, Mute, Pattern

Valid input standard, freeze detector, black detector

Change-over parameters: No SDI lock, CRC (EDH) error

Switch delay: Video 0s to 600s (reversion) and 0fr to 16384fr (trigger condition)

GPI/O program: TALLY any input state or warning or set as trigger

Pattern select: Color bars, Black

Edit caption: 19 characters available, size and position adjustment

Reporting & Logging: Input Loss; Input Line Standard; EDH error; Audio & data presence, change over status, main video output

Audio Controls

Video input select: Input 1, Input 2, Follow video

Audio in – disembed: Pairs 1-16

Channel 1 – 32 Mute: On/Off

Channel 1 – 32 Polarity Inv: On/Off

Group 1 -8 Embed Enable: On/Off

Channel 1 – 32 Gain: +12 dB to -80 dB in 0.1 dB steps

Pair 1 – 16 Stereo: Link channel pairs

Delay add-in bulk, RollTrack, current video: On/Off

Bulk manual delay: 0 ms to +1.75s in 1 ms steps

Fine manual delay: 0 ms to +250 ms in 0.1 ms steps

Tone frequency 1-8: 100 Hz to 10 kHz in 100 Hz steps

Channel ident: On/Off

Mixers: 4x8 input audio mixers

Channel routing: Pairs 1-16, Invert, Mute, Silence, Tone 1-8

Gain: +12 dB to -80 dB in 0.1 dB steps

Other Controls

GPI input high/low select (Input 1-8): In Rules (Input 1, Input 2), Priority (None, Input 1, Input 2), Out 1 (Input 1, Input 2), Follow Out 1 (On, Off), User Memory 1-16, Input 1 Pattern (On, Off), Input 2 Pattern (On, Off), Input 1 Caption (On, Off), Input 2 Caption (On, Off)

GPI level invert: High/Low

GPI output source (Output 1-8): In Rules (Input 1, Input 2), Output 1 Rules (On, Off), Priority (None, Input 1, Input 2), Output 1 (Rules, Input 1, Input 2), User Memory 1-16, Input 1-2 (Present, Lost), Input 1-2 Valid (OK, Fail), Output 1 on Input 1 and State (Ok, Fail), Output 1 on Input 2 and State (Ok, Fail), Output 1 manually set to Input 1 and State (Ok, Fail), Output 1 manually set to Input 2 and State (Ok, Fail), Output 1 on rules and Input 1 and State (Ok, Fail), Output 1 on rules and Input 2 and State (Ok, Fail), Input 1 Pattern (On, Off), Input 2 Pattern (On, Off), Input 1 Caption (On, Off), Input 2 Caption (On, Off), Output 1 on Input 1, Output 1 on Input 2

User memories: Save/recall/rename

Memory naming: User-configurable naming of memories 1 – 16

Information window: video input status, audio input status, reference status, network status, rules status

EDH/CRC reset: Resets all EDH/CRC counts

RollTrack index: Allows up to 70 destinations

RollTrack sources: Unused, User Memory 1-16, GPI/O 1-8 (high/low/not used), Rules input (1-2), Output 1 (Rules, Input 1, Input 2), Output 1 Std, Input 1 Status (Ok,Fail), Input 2 Status (Ok, Fail), Input 1 Rules Status (Ok, Fail), Input 2 Rules Status (Ok, Fail), Output 1 Pattern (On, Off), Output 1 Captions (On, Off), Input 1 Pattern (On, Off), Input 1 Captions (On, Off), Input 2 Pattern (On, Off), Input 2 Captions (On, Off)

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

General Specifications

Electrical: 3 Gb/s SDI, SMPTE ST 424, 1.5Gb/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 (10 Hz) / 0.2 UI (1 kHz)

– 3G/HD-SDI 1.0 UI (10 Hz) / 0.2 UI (100 kHz)

GPI I/O (x8) characteristics:

– Closing contact type with internal source

– Input threshold voltage: 1V typical

Module Power Consumption

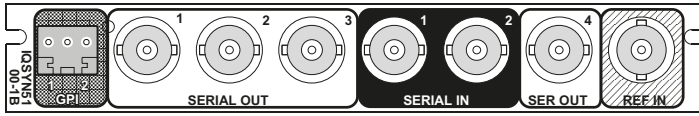IQSYN5100-1B3, IQSYN5103-2B3:

– 15 PR Max. (B Frames)

Relay Rear Versions:

– IQSYN5101-1B3: 15.5 PR Max. (B Frames)

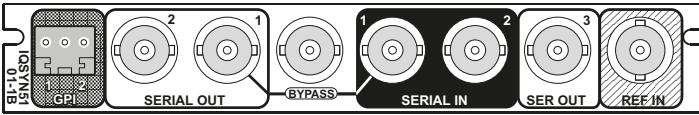– IQSYN5104-1B3, IQSYN5105-2B3, IQSYN5106-2B3: 16 PR Max (B frames)

IQSYN5100-1B3

HD/SD-SDI Frame Synchronizer with advanced audio processing. 2 SDI inputs, reference input, 4 SDI outputs, 2 GPI/Os
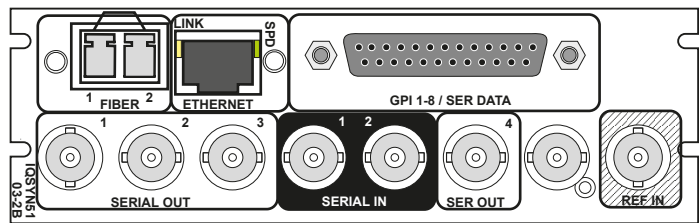

IQSYN5101-1B3

HD/SD-SDI Frame Synchronizer with advanced audio processing. 2 SDI inputs, reference input, 3 SDI outputs, 2 GPI/Os, relay input bypass
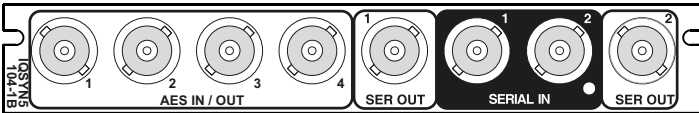

IQSYN5103-2B3

HD/SD-SDI Frame Synchronizer with advanced audio processing. 2 SDI inputs, reference input, 4 SDI outputs, 8 GPI/Os, fiber SFP, Ethernet
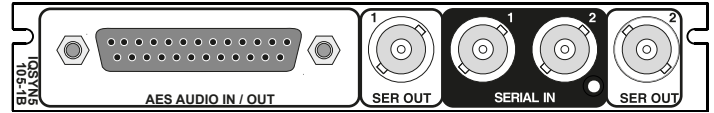

IQSYN5104-1B3

3G/HD/SD-SDI Frame Synchronizer with advanced audio processing and 4 AES re-embedder. 2 SDI inputs, frame reference inputs, 2 SDI, 4 unbalanced AES inputs/outputs.


IQSYN5105-1B3

3G/HD/SD-SDI Frame Synchronizer with advanced audio processing and 4 AES re-embedder. 2 SDI inputs, frame reference inputs, 2 SDI outputs, 4 balanced AES inputs/outputs.

IQSYN5106-2B3

3G/HD/SD-SDI Frame Synchronizer with advanced audio processing and 4 AES re-embedder. 2 SDI inputs, frame reference inputs, 2 SDI outputs, 4 balanced AES inputs/outputs 8 GPI/Os, fiber SFP, Ethernet.
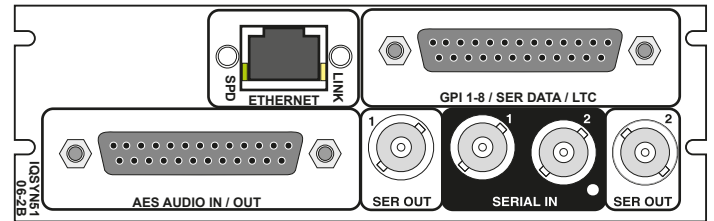
Software Options

IQOPTS5-CC   Software option to color corrector to IQSYN51

Fiber SFP Options

FC1-13T1	Single 1310 nm Tx
FC1-13T2	Dual 1310 nm Tx
FC1-R1	Single Rx
FC1-R2	Dual Rx
FC1-13TR	Transceiver 1310 nm/Rx
FC1-HDBT2	HD-BNC Dual Tx
FC1-HDBR2	HD-BNC Dual Rx
FC1-HDMI2	HDMI Tx with 2m cable

CWDM Tx – Wavelengths available on request.

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

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

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