

SEL-TCIP1-S

Single-Channel TICO Mezzanine Format for UHD 3G-SDI and 10 Gig-E

The Selenio SEL-TCIP1 is a single-channel module for the Selenio MCP1 and MCP3 platforms that supports the TICO mezzanine format for UHD over 3G-SDI and 10 Gig-E. TICO is a low-latency, light-weight compression technology from IntoPIX. The module can be configured in-field as either an encoder or decoder (Transmitter or Receiver).

The Transmitter (encoder mode) version of this product supports:

- One Quad-Link (4x 3G-SDI) UHD video input channel and uses the IntoPIX TICO lightweight mezzanine compression codec and SMPTE ST 2022-6 Encapsulation and 2022-5 Forward Error Correction (FEC) for transport over IP. Alternatively, the TICO compressed signal can be transported as a 3G-SDI stream through conventional 3Gb/s-capable SDI infrastructure.

The Receiver (decoder mode) version of this product supports:

- SMPTE ST 2022-6 de-encapsulation and SMPTE ST 2022-7 seamless switching, and it uses TICO decompression for the reconstruction of one Quad-Link (4x 3G-SDI) UHD video output channel.

Features

Utilizing IntoPIX's low-latency, lightweight compression technology in connection with SMPTE 2022-5/6/7, this module enables the transport of a UHD stream over a single 10GbE link, or over existing 3G SDI infrastructure. The low compression ratio of 4:1 is visually lossless.

Two SFP+ ports for IP network connection can support 10GbE in a primary (main) and secondary (back-up) configuration, supporting Link Redundancy and hitless switching per SMPTE 2022-7 standard on an IP network.

- Supports a variety of SFPs providing electrical/fiber interfaces
- Supports Selenio MCP standard module/service redundancy schemes
- Support for Multicast and Unicast
- Supports up to 6 VLANs on module external interfaces
- Single slot module operates in any slot of the Selenio MCP1 and Selenio MCP3 chassis
- Supports Imagine's 'SEAM' protocol

Transmitter (Tx) Features (Encoder Mode)

The Tx supports one UHD Quad-Link interface input, utilizing 4 out of the 8 bi-directional HD-BNCs. The spare HD-BNCs serve as outputs for transmitting the TICO code stream encapsulated into the active portion of a 3G-SDI Level A stream (in accordance with SMPTE 424M and 425M).

The supported image format is a "2-sample interleave" (2SI) or "Square division" (SQD), as specified in SMPTE ST 425-5 & ST 435-1, respectively.

The UHD stream is compressed using IntoPIX's virtually lossless and low-latency TICO technology to a ratio up to 4:1 before encapsulating the compressed stream into a 10GbE stream.

The Transmitter transparently passes on the audio data and control packets from one of the four links (user selectable), alongside the compressed video data. It can automatically map/re-order individual links of a Quad-Link stream, based on the embedded Payload ID (channel assignment info), for proper source image reconstruction. Note that only the 2-sample interleave format specifies channel assignment information.

- Lightweight compressed (TICO) UHD signals over 10GigE link and 3G-SDI
- Support for SMPTE 2022-6 transmit over 10GigE IP links
- Support for SMPTE 2022-5 Forward Error Correction
- Support for SMPTE ST 425-5 2-sample interleave mapping (2SI) @ 50, 59.94 or 60 Hz, Level A or B
- Support for SMPTE ST 435-1 Square Division mapping (SQD) @ 50, 59.94 or 60 Hz, Level A or B
- Auto mapping of mixed-up Quad-Link signals (Any-Link to Any-BNC), based on Payload ID (2SI mode only)
- Auto-detect, status and monitoring of the SDI input standard
- Support for transparent transport of VANC/HANC data from one of the four links (user-selectable), though a maximum of 16 Audio channels
- Thumbnail monitoring of video input(s). The SMPTE ST 425-5 2-sample interleave mapping of the source image already provides a 'down-scaled' version of the UHD source with every of the four 3Gb/s signals in the Quad-Link.
- Optional bypass of Link #1 to SDI Output

Receiver (Rx) Features (Decoder Mode)

The Rx supports one UHD Quad-Link interface output, utilizing 4 out of the 8 bi-directional HD-BNCs. One of the spare HD-BNCs serves as an input, for an alternative method for receiving the TICO code stream encapsulated into the active portion of a 3G-SDI Level A stream (in accordance with SMPTE 424M and 425M).

The supported image format is a "2-sample interleave" (2SI) or "Square division" (SQD), as specified in SMPTE ST 425-5 & ST 435-1, respectively.

The Receiver can recover, decompress and synchronize the TICO compressed video data, and re-mux the VANC/HANC data back into the outgoing Quad-Link(s).

- Support for SMPTE 2022-6 reception over 10GigE IP links
- Support for SMPTE 2022-5 Forward Error Correction
- Seamless Switching links support SMPTE 2022-7
- Frame syncing of compressed UHD signal (prior to TICO decode).
- VANC data drop / repeat with video sync events
- Provides thumbnail monitoring of video output(s)
- Non-PCM audio (e.g. Dolby E) frame drop/repeat to maintain sync with video
- Sample-rate conversion to maintain sync on PCM signals

Specifications

3G SDI INPUTS	
Number of inputs	4
Connector Type	Amphenol HD-BNC
Standards	SMPTE 424M (3G), 1080p50/59/60
Impedance	75 Ohms
Return Loss	> 18 dB to 1.5 GHz and > 10 dB to 3 GHz (3G)
Signal Level	800 mV ± 10%
Max input cable	> 100m for Belden 1694A co-axial cable (3G) (Adaptive cable equalization)
3G SDI OUTPUTS	
Number of outputs	4
Connector Type	Amphenol HD-BNC
Standards	SMPTE 424M (3G), 1080p50/59/60
Impedance	75 Ohms
Return Loss	> 18 dB to 1.5 GHz and > 10 dB to 3 GHz (3G)
Signal Level	800 mV ± 10%

3G SDI OUTPUTS					
DC Offset	0.0V ± 0.5 V				
Rise and Fall Times	< 135 ps (3G)				
Overshoot/Undershoot	<10%				
Jitter	< 2UI (673ps) peak-to-peak of timing jitter (>10Hz) (3G) <0.3UI (101ps) peak-to-peak of alignment jitter (>100kHz) (3G)				
OP+SFP+TRSM+10G SINGLE MODE OPTICAL TRANSCEIVER					
Transmitter					
Parameter	Minimum	Typical	Maximum	Unit	Notes
Laser OMA Output Power	-5.2			dBm	1
Laser Mean Output Power	-8.2		+0.5	dBm	1
Laser Off Power			-30	dBm	1
Extinction Ratio	3.5			dB	1
Transmitter and Dispersion Penalty (TDP)			3.2	dB	1
Center Wavelength	1260		1355	nm	1
Optical Return Loss Tolerance			12	dB	1
RECEIVER					
Parameter	Minimum	Typical	Maximum	Unit	Notes
Receiver Sensitivity (OMA)			-12.6	dBm	1
Stressed Receiver Sensitivity (OMA)			-10.3	dBm	1,2
Receiver Power Overload			+0.5	dBm	1
Receiver Reflectance			-12	dB	1
Center Wavelength	1260		1355	nm	1
Vertical Eye Closure Penalty	2.2			dB	3
Stressed Eye Jitter	0.3			UIp-p	3
RX_LOS (OMA) Assert			-17	dBm	4
RX_LOS (OMA) De-Assert	-30			dBm	4
RX_LOS (OMA) Hysteresis	0.5			dB	4
OP+SFP+TRMM+10G MULTI MODE OPTICAL TRANSCEIVER					
Transmitter					
Parameter	Minimum	Typical	Maximum	Unit	Notes
Laser OMA Output Power	-4.3			dBm	1
Laser Mean Output Power			-1.0	dBm	1
Laser Off Power			-30	dBm	1
Extinction Ratio	3.0			dB	1
Transmitter and Dispersion Penalty (TDP)			3.9	dB	1
Center Wavelength	840		860	nm	1
Optical Return Loss Tolerance			12	dB	1
RECEIVER					
Parameter	Minimum	Typical	Maximum	Unit	Notes

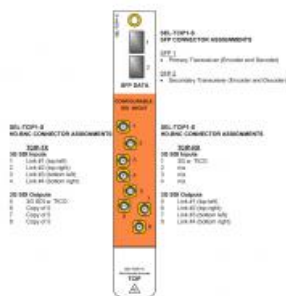
RECEIVER				
Receiver Sensitivity (OMA)			-11.1	dBm 1
Stressed Receiver Sensitivity (OMA)			-7.5	dBm 1,2
Receiver Power Overload	-1.0			dBm 1
Receiver Reflectance			-12	dB 1
Center Wavelength	840	860	nm	1
Vertical Eye Closure Penalty	3.5			dB 3
Stressed Eye Jitter	0.3			Ulp-p 3
RX_LOS (OMA) Assert			-12	dBm 4
RX_LOS (OMA) De-Assert	-30			dBm 4
RX_LOS (OMA) Hysteresis	0.5			dB 4
POWER CONSUMPTION				
Module Power Consumption	40W maximum			

Ordering Information

SEL-TCIP1-S	Single channel TICO mezzanine format processor (can be setup as an encoder or decoder), includes front module and single back module with eight HD-BNC connectors and dual 10 GBE ports, SFP+ ordered separately (OP+SFP+TRMM+10G for Multi Mode, OP+SFP+TRSM+10G for Single Mode, SEL+AOC+10G Direct Attach Active Optical Cable)
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SMALL FORM-FACTOR PLUGGABLE	
SEL+AOC+10G	10GbE Small Form Factor Pluggable SFP+ transceiver Direct Attach Active Optical Cable, designed for high speed, short range data link.
OP+SFP+TRSM+10G	SFP+ transceiver. 10-Gigabit Ethernet links up to 10km over Single Mode fiber.
OP+SFP+TRMM+10G	10BASE-SR Fiber Enhanced Small Form Factor Pluggable SFP+ transceiver. 10-Gigabit Ethernet links over multimode fiber. Maximum link length of 300m on 2000 MHz-km MMF.

Images/Diagrams



PROD - MCP MODULE - SEL-TCIP1-S - SWATCH