

## SEL-1DEC1

### MPEG-2/H.264 Universal Decoder

The Selenio SEL-1DEC1 module is a full-featured multiformat video decoder that handles both H.264 and MPEG-2 video streams and their commonly associated audio and metadata streams. The decoder is built with the latest silicon architectures and provides a high level of compatibility with the Selenio SEL-1ENC1 encoder module and other industry encoders.

The Selenio decoder supports the decoding of a single video signal from a variety of sources — using either the MPEG-2 or H.264 standards — and supports up to eight audio streams, as well as the processing of any supporting data insertion via VBI or VANC.

The flexibility of the Selenio decoder makes it ideal for production and distribution applications. Coupled with other modules in the Selenio series, this multifunction decoder works to address applications such as multiformat satellite decoding, confidence monitoring and much more.



### Product Features

- Supports receiving a single transport stream from any of the following sources:
  - Over IP using UDP or RTP protocols and SMPTE 2022 error protection
  - DVB-ASI from the rear I/O interface
  - Internal connection from other application modules in the frame
- Supports decoding of constant bit rate and variable bit rate streams:
  - H.264 high profile @ up to L4.2 (62.5 Mb/s maximum)
  - H.264 main profile @ up to L4.2
  - H.264 baseline profile @ up to L1.3
  - MPEG-2 422 profile @ up to high level (65 Mb/s maximum)
  - MPEG-2 restricted to main profile @ up to high level
- Supports any legal horizontal resolution
- Supports output video formats:
  - 1080p/59.94 / 1080p/50 – SMPTE 424/235 Level A and B
  - 1080i/59.94, 1080i/50 – SMPTE 292
  - 720p/59.94, 720p/50 – SMPTE 292
  - 480i/59.94 – SMPTE 259
  - 576i/50 – SMPTE 259

\*For additional broadcast-quality post-processing, refer to the following application modules:

- Provides horizontal scaling for streams with reduced horizontal resolution
- Supports cross-conversion in the following cases\*:
  - SD (NTSC or PAL) to HD (1080i, 720p) at the same frame rate as the source maintaining aspect ratio by letter/pillar boxing, as necessary
  - HD to SD at the same frame rate as the source maintaining aspect ratio by letter/pillar boxing, as necessary
  - HD to HD (1080i to/from 720p) at the same frame rate as the source
  - Mobile streams (vertical resolution below 480) displayed as either full screen with letter/pillar boxing, as necessary, or centered with no vertical scaling
  - 3 Gb/s to HD
  - Decoded video can be synchronized to the clock recovered from the input bit stream, or genlocked to the frame reference
  - Conversion (SEL-2XD1 and SEL-1XD1)
  - Frame sync (SEL-1FS1 and SEL-2FS1)
- Audio decoding
  - Supports up to eight audio streams
  - Supports MPEG-1 Layer 2, Dolby® AC-3, AAC-LC, HE-AAC, including SBR and parametric stereo, SMPTE 302 (AES-3 over MPEG), Dolby® E, and passthrough of SMPTE 337 pre-compressed audio streams
- VANC processing
  - VANC passthrough – SMPTE 2038/RDD-1
  - EIA-608/708 closed captions
  - AFD
  - SCTE-104 from SCTE-35 splice points
  - DVITC timecode
  - OP-47 teletext
  - Audio metadata
- VBI processing
  - EIA-608 closed captions
  - AFD
  - WST teletext
  - SMPTE timecode
  - AMOL-48 or AMOL-98
  - VPS
    - Lossless data (luma)
    - Test pattern generation
- Rear I/O connections
  - 1x HD-BNC – ASI input
  - 2x HD-BNC – SDI output
  - 2x HD-BNC – ASI loop-through
  - 8x HD-BNC – Primary AES audio outputs
  - 2x serial outputs – serial data and audio metadata

## Product Details

The Selenio decoder module provides the flexibility of decoding multiple standards of video from standard-definition (SD) and low-resolution formats through to 3 Gb/s and other high-definition (HD) formats. It also supports all the latest audio standards to provide a single-card solution for every need without resorting to a variety of card types.

Up to eight channels of MPEG-1 Layer 2, Dolby® AC-3, AAC-LC, HE-AAC, Dolby® E or SMPTE 302 (uncompressed) audio can be supported. Audio outputs are provided as unbalanced AES or embedded audio.

In addition, VANC and VBI data are re-inserted back into the video signal.

### Front Module Connectivity

The SEL-1DEC1 decoder application module is interconnected with the two controller modules for SDI/ASI, 100Base-T for control and monitoring and 1000Base-T for data applications. The primary and backup reference signals are distributed as well.

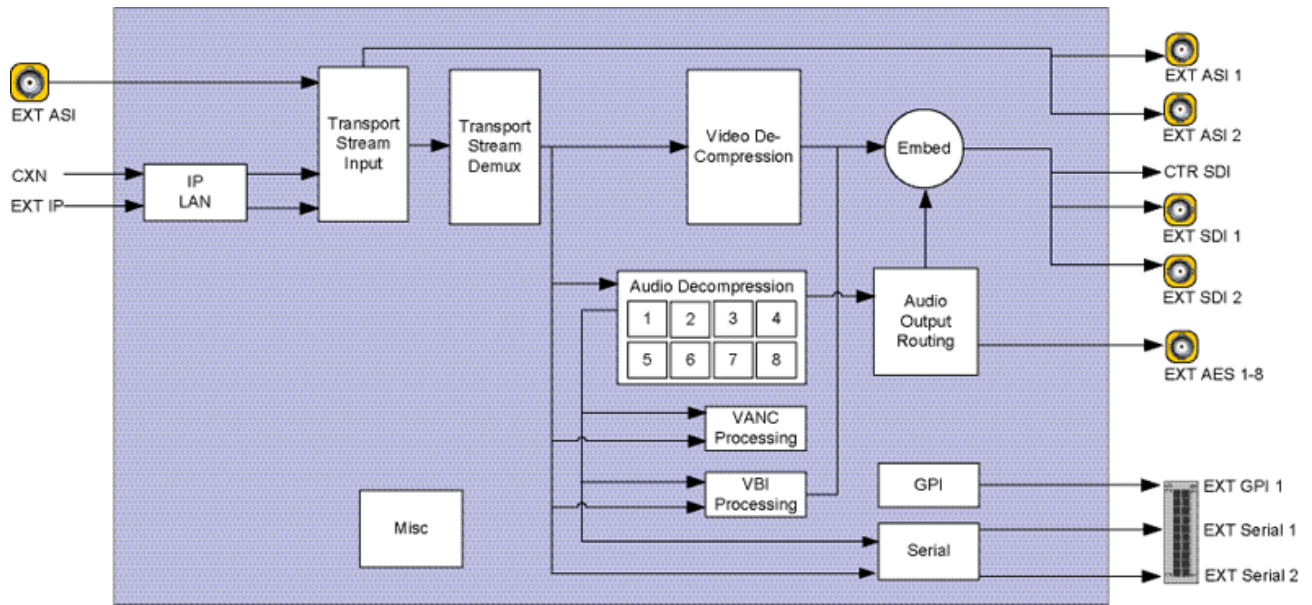
### Back Module Connectivity

The SEL-1DEC1 decoder application module offers two choices for back module external connectivity — one with HD-BNC electrical connections for input and output, and one with two dual SFP optical outputs. Both back modules provide AES-3 connections by utilizing HD-BNC connectors and a GPI/serial port connector.

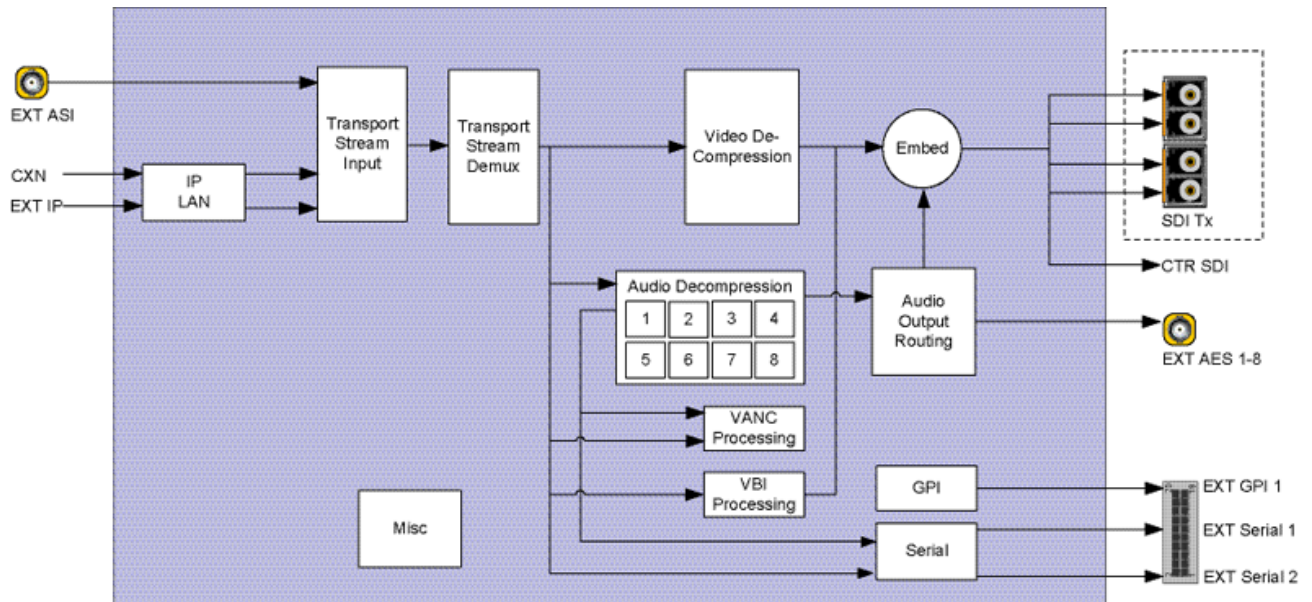
SDI and ASI interfaces utilize a Belden-type 1505A, 1694A or 1695A cable with HD-BNC connectors, and AES-3 interfaces utilize a Belden-type 1855 cable with HD-BNC connectors. A cable removal tool is provided for these types of HD-BNC connections. For optical output connectivity, an SFP transmitter can be added to the appropriate back module.

## Images/Diagrams

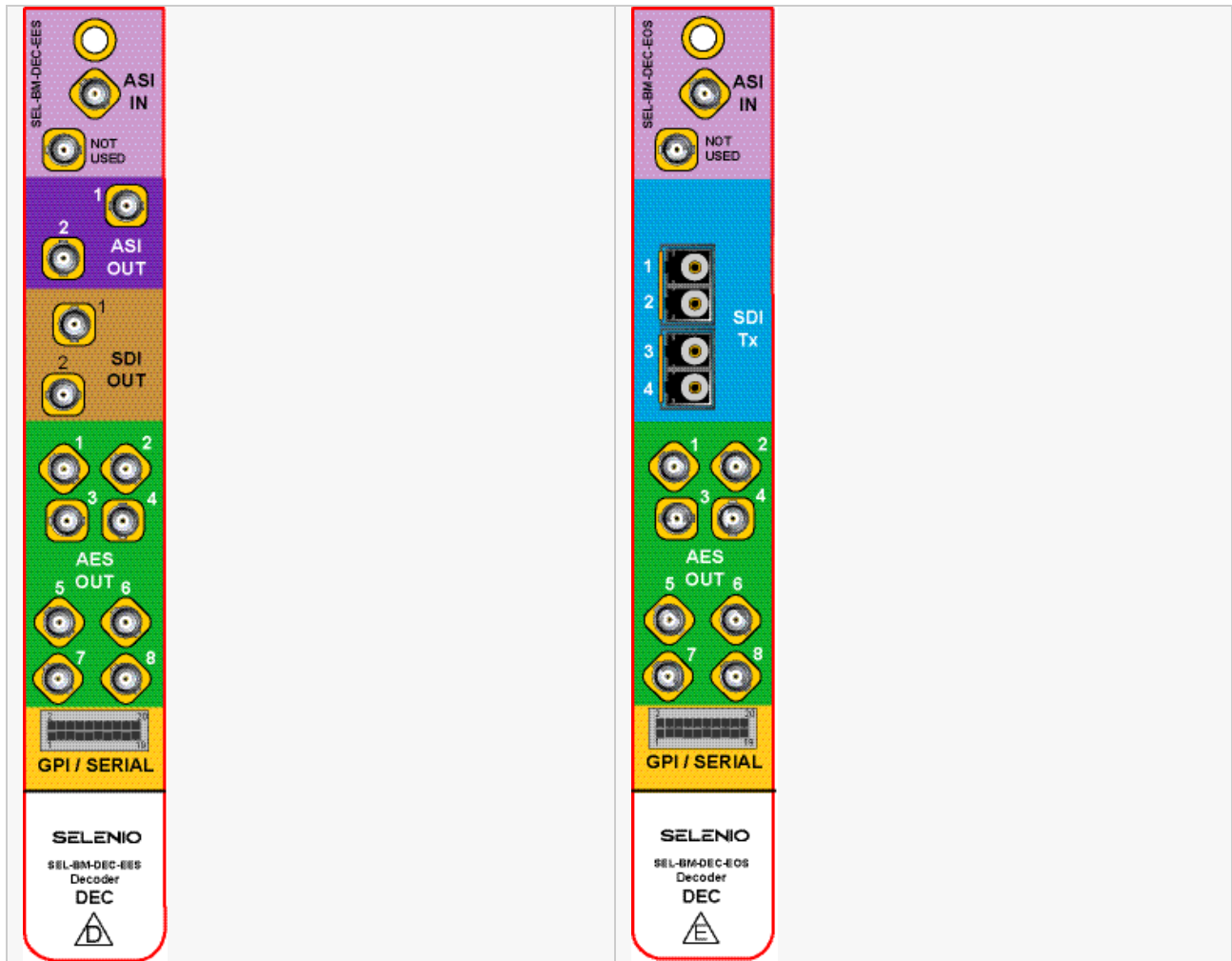
### Electrical to Electrical (EES)



### Electrical to Optical (EOS)



Back Modules



Specifications

Specifications and designs are subject to change without notice

ASI Input	
Number of Inputs	1
Standard	EN 50083-9
Connector	HD-BNC
Data Rate	0 to 210 Mb/s
Minimum Sensitivity	200 mV
Maximum Input Voltage	88 mV pk-pk
Minimum Discrete Connector	-15 dB (0.3 MHz to 1 GHz)

SERIAL VIDEO OUTPUT (SDI, HD-SDI, 3 Gb/s)	
<b>3 Gb/s HD-SDI Outputs</b>	
Number of Outputs	2
Standard	SMPTE 424M
Connector	HD-BNC
Impedance	75 ohms
Signal Level	800 mV $\pm$ 10%
DC Offset	0 V $\pm$ 0.5 V
Rise and Fall Time	<135 ps (20% to 80%), differ by no more than 50 ps
Overshoot	<10% of amplitude
Jitter	Timing jitter: 2 UI pk-pk Alignment jitter: 0.3 UI pk-pk
<b>1.5 Gb/s HD-SDI Outputs</b>	
Number of Outputs	2
Standard	SMPTE 292M (1.485, 1.485/1.001 Gb/s)
Connector	HD-BNC
Impedance	75 ohms
Signal Level	800 mV $\pm$ 10%
DC Offset	0 V $\pm$ 0.5 V
Rise and Fall Time	<270 ps (20% to 80%)
Overshoot	<10% of amplitude (all outputs terminated)
Jitter	Timing jitter: <1 UI pk-pk Alignment jitter: <0.2 UI pk-pk
<b>SD-SDI Outputs</b>	
Number of Outputs	2
Standard	SMPTE 259M-C (270 Mb/s, 525/625 component video)
Connector	HD-BNC
Impedance	75 ohms
Signal Level	800 mV $\pm$ 10%
DC Offset	0 V $\pm$ 0.5 V
Rise and Fall Time	400 to 1500 ps (20% to 80%)
Overshoot	<10% of amplitude (all outputs terminated)
Jitter	<0.2 UI pk-pk
<b>DIGITAL AUDIO OUTPUTS</b>	
<b>Unbalanced AES Output</b>	
Standard	AES-3, SMPTE 276M
Type	Unbalanced, AC coupled
Connector	HD-BNC
Impedance	75 ohms
Signal Amplitude	1 V pk-pk @ 10% into 75 ohms load
Audio Rate	48 kHz
Rise and Fall Time	30 to 44 ns (10% to 90%)
Bits	24, 20 or 16
Channel Status and User Bit	Maintained, but professional mode, 48 kHz

ASI Outputs	
Number of Outputs	2
Standard	EN 50083-9
Connector	HD-BNC
Data Rate	0 to 210 Mb/s
Output Voltage	800 mV $\pm$ 10% pk-pk
Clock Rate	270 MHz $\pm$ 100 ppm
Deterministic Jitter	10% pk-pk
Random Jitter	8% pk-pk
Maximum Rise and Fall Time	1.2 ns (20% to 80%)
Electrical	
Power Consumption	40 W maximum

## Ordering Information

Decoder Hardware Only	
SEL-1DEC1-EES	Multi-standard decoder includes decoding of a single channel of video and 4 stereo pairs of audio on the front module, includes single back module with HD-BNC connectors for ASI input, 2 ASI outputs, 2 SDI video outputs, 8 AES (unbalanced) outputs and socket/plug for 4 GPI inputs, 4 GPI outputs and 2 serial data connections
SEL-1DEC1-EOS	Multi-standard decoder includes decoding of a single channel of video and 4 stereo pairs of audio on the front module, includes single back module with HD-BNC connector for ASI input, dual SFP optical output (order 1 or 2 SFP dual-output option separately), 8 AES (unbalanced) outputs and socket/plug for 4 GPI inputs, 4 GPI outputs and 2 serial data connections
Decoder Module Types	
SEL-SK-DE-STD	MPEG-2/H.264 4:2:0 video profile
SEL-SK-DE-PRO	MPEG-2 4:2:0 and 4:2:2 video profiles, H.264 4:2:0 up to 1080P 3G support
Decoder Options	
SELOPT-SK-DE-AUD4	Software-keyed option for additional 4 stereo pairs of audio available on-board
SELOPT-SK-DE-DED	Software-keyed option for support for Dolby® E on 4 stereo pairs of audio
SELOPT-SK-DE-DDD	Software-keyed option for support of Dolby® AC-3 2.0 and 5.1 (uses 3 existing stereo pairs of audio)
SELOPT-SK-DE-S302	Software-keyed option to support for up to 8 stereo pairs of SMPTE-302 pass-through audio
SELOPT-SK-DE-BISS	Software-keyed option for DVB Fixed-key Scrambling modes BISS-1
Decoder Front Module Only	
SEL-FM-1DEC1	Multi-standard 4:2:0 decoder, front module only
Decoder Back Modules	
SEL-BM-DEC-EES	Single back module for DEC front module with HD-BNC connectors for ASI input, 2 ASI outputs, 2 SDI video outputs, 8 AES (unbalanced outputs) and socket/plug for 4 GPI inputs, 4 GPI outputs and 2 serial data connections
SEL-BM-DEC-EOS	Single back module for DEC front module with HD-BNC connector for ASI input, dual SFP optical output (order 1 or 2 SFP dual-output option separately), 8 AES (unbalanced outputs) and socket/plug for 4 GPI inputs, 4 GP outputs and 2 serial data connections
SFP Dual-Output Options	
OP+SFP+TT+13+13	Small Form Factor Pluggable (SFP) for Imagine Communications Fiber Optic products; 1310 nm and 1310 nm wavelength dual transmitter with pathological support for baseband video