

## SEL-1ENC2

### MPEG-2/H.264 Contribution Encoder

The Selenio SEL-1ENC2 module is among the most compact, power-efficient, full featured contribution encoders on the market today. It incorporates the latest Silicon Architectures to surpass the barriers inherent in previous-generation approaches.

The Selenio SEL-1ENC2 contribution encoder works in both 8 and 10 bit modes, provides compression of a single video signal — using either the MPEG-2 or H.264 standards — and compression of up to eight streams of audio supporting a variety of common algorithms, as well as the processing of associated VBI, VANC, and Serial Data.

The Encoder is built with the latest technology in Compression and provides a high level of compatibility with the Selenio SEL-1DEC2 contribution encoder module and other industry encoders. SEL-1ENC2 and SEL-1DEC2 used in pair can deliver a Low Latency of 250ms guaranteed end to end, making a perfect contribution solution for Interview or sports applications.

Optimized for contribution applications — including studio-to-studio post production, stadium, surveillance, or satellite uplinks— the Selenio SEL-1ENC2 contribution encoder delivers a full complement of features in a space- and power-efficient footprint, and resets the standard for simplicity in the H.264 era.



### Product Features

- Video input formats supported:
  - 1080i/29.97, 1080i/25 – SMPTE 292
  - 720p/59.94, 720p/50 – SMPTE 292
  - 480i/29.97 – SMPTE 259
  - 576i/25 – SMPTE 259
- Coding formats supported:
  - H.264 High 422 Profile (4:2:2 8-bit and 10-bit) at Level 4.2
  - H.264 High 10 Profile (4:2:0 10-bit) at Level 4.2
  - AVCI-50: H.264 High 10 Intra Profile (4:2:0 10-bit) at Level 4.0 and 3.2
  - AVCI-100: H.264 High 4:2:2 Intra Profile (4:2:2 8-bit and 10-bit) at Level 4.1
  - H.264 high profile @ up to L4.2 (80 Mb/s max)
  - H.264 restricted to main profile @ up to L4.2
  - MPEG-2 422 profile @ up to high level (80 Mb/s max)
  - MPEG-2 restricted to main profile @ up to high level

- Reduced horizontal resolutions supported:
  - 1920 – 1440, 1280, 960
  - 1280 – 960, 640
  - 720 – 704, 640, 544, 528, 480, 352
- Audio input:
  - Eight HD-BNC connectors on the rear connector board for audio input
  - Embedded audio from the SDI video input
  - Audio signals from optional audio A/D expansion modules (future option)
- Up to Eight audio encoder engines supported:
  - MPEG-1 Layer 2
  - Dolby® AC-3 (maximum 6 stereo supported)
  - AAC-LC (MPEG-2 and MPEG-4)
  - HE-AAC V1 (SBR) and V2 (Parametric Stereo)
  - Dolby® E
  - SMPTE 302
- VANC processing:
  - VANC passthrough (SMPTE 2038) up to 2K words per field
  - EIA-608/708 closed captions
  - AFD
  - SCTE-104 splice-point signaling for SCTE-35 insertion
  - DVITC time code
  - OP47 teletext
  - Audio metadata
- VBI processing:
  - EIA608 closed captions
  - WSS signaling
  - WST teletext
  - VITC timecode
  - AMOL-48 or AMOL-96
  - VPS data
- Data input:
  - Closed captions from IP/UDP
  - SCTE-104 over IP/TCP for SCTE-35 insertion

## Product Details

The Selenio encoder module supports all popular video formats from standard definition (SD) to high definition (HD) to 1080i. Supported video and audio formats and compression standards can be upgraded in the field, providing a cost-effective expansion path for any facility.

Up to eight stereo pairs of audio can be supported, and a variety of audio compression options are available, including Dolby® AC-3 2.0 and 5.1, MPEG-1 Layer 2, AAC-LC stereo and 5.1, HE-AAC stereo and 5.1, and Dolby® E. All audio can be presented to the encoder as embedded on SDI, or as separate AES inputs.

### Front Module Connectivity

The SEL-1ENC2 encoder application module is interconnected with the two controller modules for SDI/ASI, 100Base-T for control and monitoring and 1000Base-T for data applications. An internal digital reference also is available from each controller.

### Back Module Connectivity

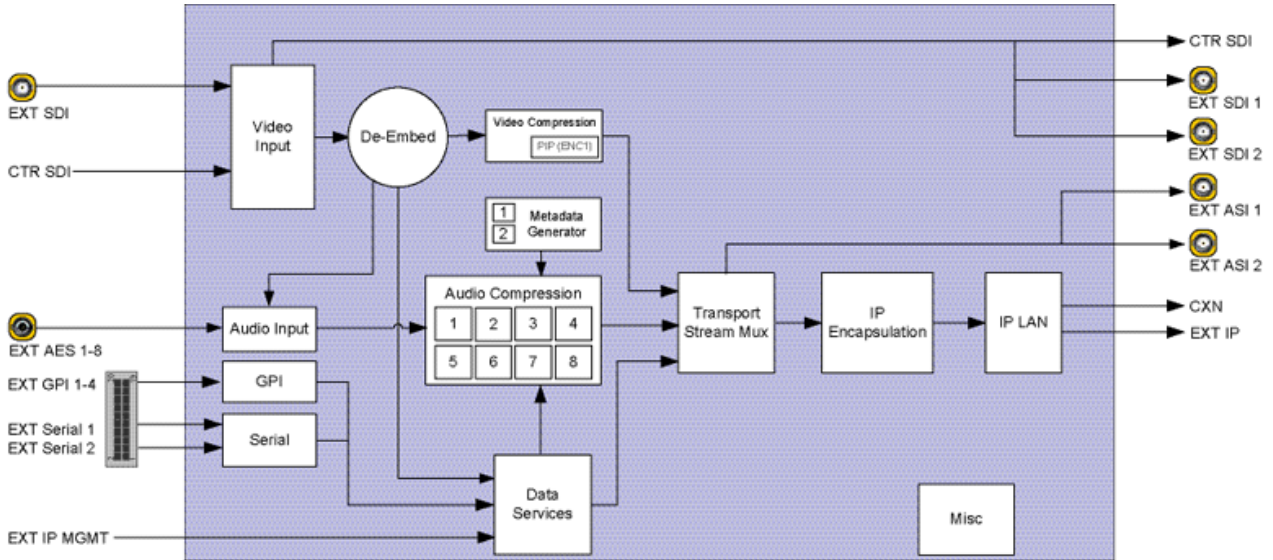
The SEL-1ENC2 encoder application module offers two choices for back module external connectivity — one with HD-BNC electrical connections for input and output, and one with an SFP optical input with HD-BNC outputs. Both back modules provide AES-3 connections by utilizing HD-BNC connectors and a GPI/serial port connector.

SDI and ASI interfaces utilize a Belden-type 1505A, 1694A or 1695A cable with HDBNC 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 input connectivity, an SFP receiver can be added to the appropriate back module.

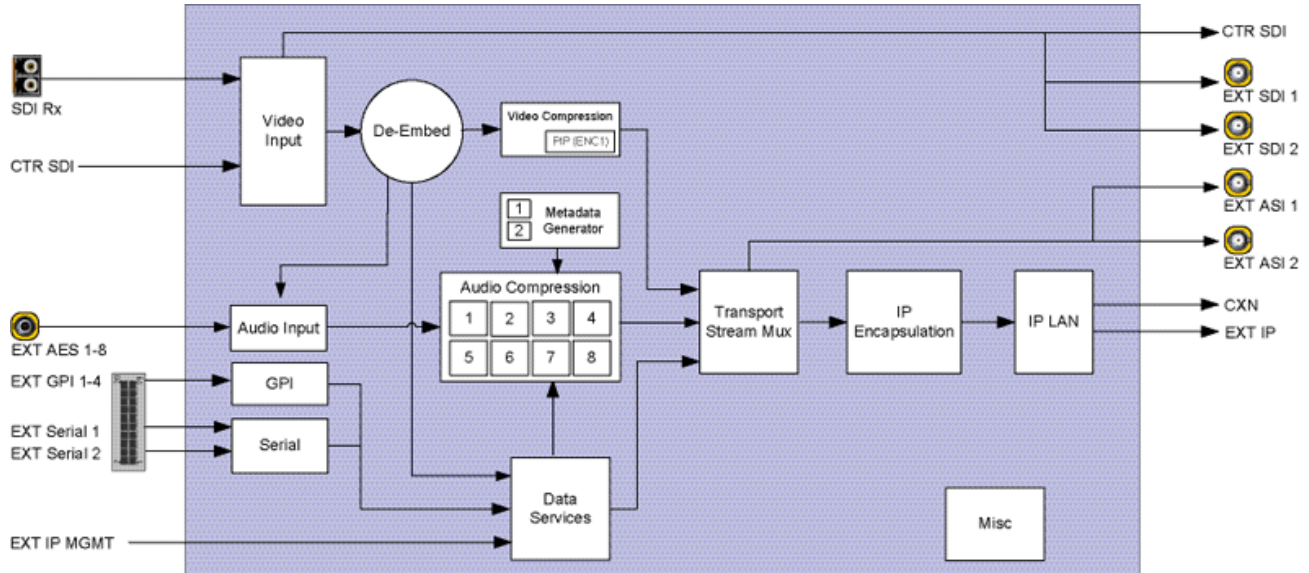
## Images/Diagrams

### Block Diagrams

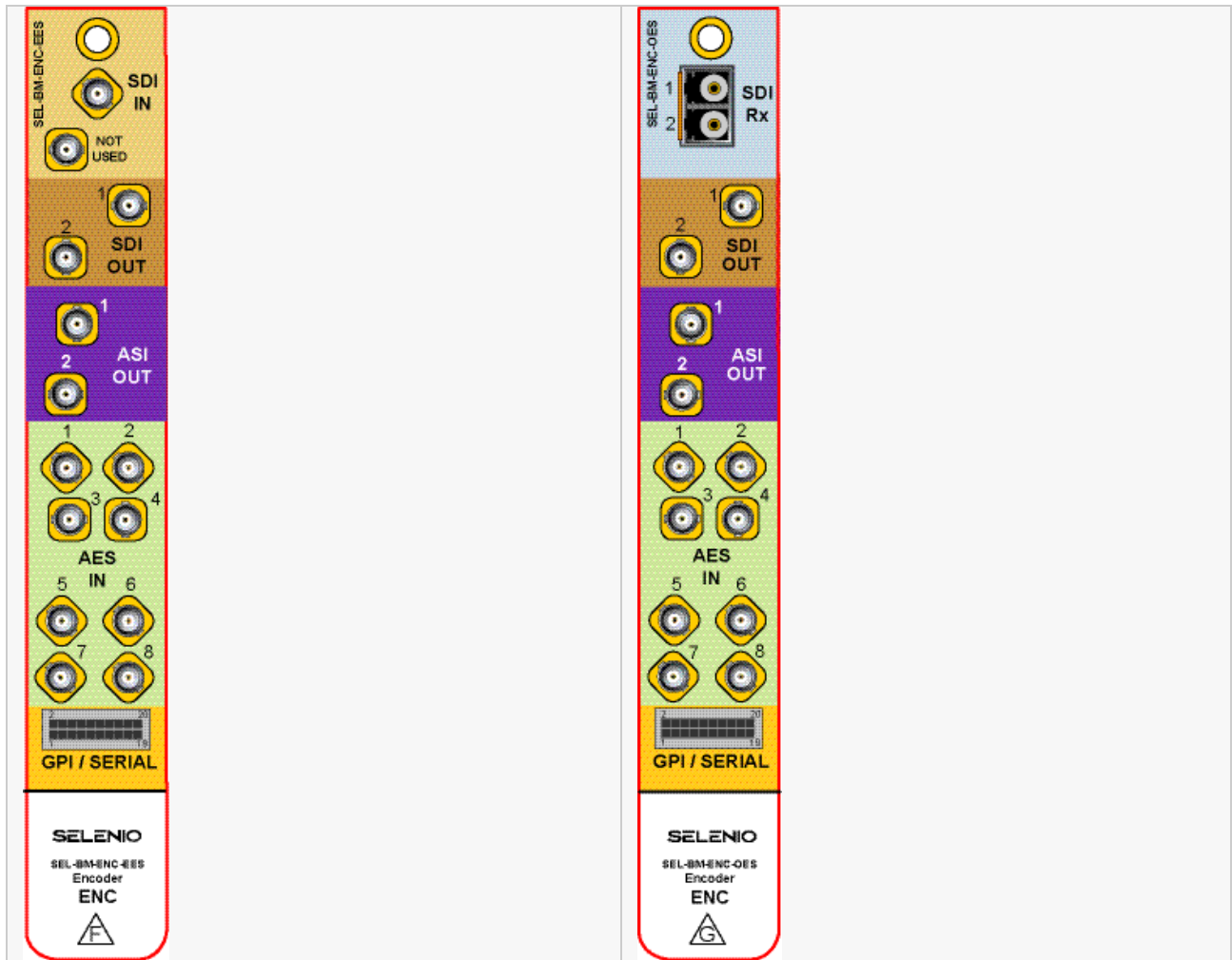
#### Electrical to Electrical (EES)



#### Optical to Electrical (OES)



Back Modules



Specifications

Specifications and designs are subject to change without notice

1.5 Gb/s HD-SDI Inputs	
Number of Inputs	2
Standard	SMPTE 292M (1.485, 1.485/1.001 Gb/s)
Connector	HD-BNC
Impedance	75 ohms
SD-SDI Inputs	
Connector	HD-BNC
Impedance	75 ohms
Sensitivity	<100 mV
Input Audio Sample Rate	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%)
1.5 Gb/s HD-SDI Outputs	
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
SD-SDI Outputs	
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
Electrical	
Power Consumption	40 W maximum

## Ordering Information

Encoder Hardware Only	
SEL-1ENC2-EES	MPEG-2/H.264 contribution encoder HW including back module with HD-BNC connector SDI
SEL-1ENC2-OES	MPEG-2/H.264 contribution encoder HW including back module with SFPI/F and HD-BNC connector SDI
Encoder Module Types	
SEL-SK-E2-C-BSC-HD	SW ENC2, MPEG-2 HD, H.264 HD high and main profile, 4:2:0, 8-bit
SEL-SK-E2-C-BSC-SD	SW ENC2, MPEG-2 SD, H.264 SD high and main profile, 4:2:0, 8-bit
SEL-SK-E2-C-PRO-HD	SW ENC2, MPEG-2 HD/SD 4:2:0 and 4:2:2 8-bit, H.264 HD/SD high and main profile, 4:2:0 and 4:2:2, up to 10-bit
SEL-SK-E2-C-PRO-SD	SW ENC2, MPEG-2 SD 4:2:0 and 4:2:2 8-bit, H.264 SD high and main profile, 4:2:0 and 4:2:2, up to 10-bit
SEL-SK-E2-C-STD-HD	SW ENC2, MPEG-2 HD/SD, H.264 HD/SD high and main profile, 4:2:0 and 4:2:2, 8-bit
SEL-SK-E2-C-STD-SD	SW ENC2, MPEG-2 SD, H.264 SD high and main profile, 4:2:0 and 4:2:2, 8-bit
Encoder Options	
SELOPT-SK-E2-AAC	Software-keyed option for Selenio encoder to support of AAC audio on 4 stereo pairs
SELOPT-SK-E2-BISS	Software-keyed option for DVB fixed-key scrambling modes BISS-1
SELOPT-SK-E2-DDE	Software-keyed option for support of Dolby AC-3 (5.1 uses 3 existing stereo pairs of audio)
SELOPT-SK-E2-DEE	Software-keyed option for support for Dolby® on 4 stereo pairs of audio
SELOPT-SK-E2-LCL	Software keyed option for ENC2 - Support for DTS Neural Loudness Control for up to 4 stereo pairs, or one 5.1 and a stereo pair. When in use will reduce the maximum audio
SELOPT-SK-E2-DED	Software keyed option for ENC2 - Support for decoding of a single Dolby-E. When in use will reduce the maximum audio encodes to 4 stereo pairs
SELOPT-SK-E2-GL	Software keyed option for ENC - Support for genlock on the input to the encoder
Encoder Front Module Only	
SEL-FM-ENC2	MPEG-2/4 contribution encoder front module only
Encoder Back Modules	
SEL-BM-EN2-EES	Single back module for ENC2 front module with HD-BNC connectors for SDI input, 2 SDI outputs, 2 ASI outputs, 8 AES (unbalanced) inputs and socket/plug for 4 GPI inputs, 4 GPI outputs and 2 serial data connections
SEL-BM-EN2-OES	Single back module for ENC2 front module with SFP optical input (order separately), HD-BNC connectors for SDI outputs, 2 ASI outputs, 8 AES (unbalanced) inputs and socket/plug for 4 GPI inputs, 4 GPI outputs and 2 serial data connections
SFP Dual-Input Option	
OP+SFP+RR	Small Form Factor Pluggable (SFP) for Imagine Communications Fiber Optic Products. Dual PIN receiver with pathological support for baseband video