

SEL-1UHD1-x-S

Selenio™ UHD Up and Down Converter



As the television industry evolves to the higher resolution UHD-1 Ultra High Definition – based on a similar resolution used for PC monitors and Digital Cinema, 4K – Imagine Communications' Selenio™ Media Convergence Platform offers video conversion modules, enabling the integration of UHD-1 into an HD (High Definition) workflow or HD into a UHD-1 workflow.

The Selenio MCP UHD up and down converter modules are one-channel video conversion processors. Available as either an up converter processor or a down converter processor, the addition of a software license option enables the addition of the other conversion type, offering more flexibility in any system design or workflow.

The Selenio UHD up and down conversion modules feature 10-bit motion-adaptive processing to ensure that video conversion maintains the high quality for scaling, de-interlacing/interlacing and color (gamut) processing. The Selenio UHD up and down conversion modules also support the handling of embedded audio. When incorporated in the high-density Selenio MCP platform, this module is ideally suited for media companies as they roll out UHD TV to their customers.

Features

- Single-slot Selenio MCP3 form factor
- 10-bit scaling for high quality video
- Single channel UHD-1 quad link SDI-to-3G/HD/SD-SDI down conversion
- Single channel 3G/HD/SD-SDI up conversion to UHD-1 quad link SDI
- Embedded audio handling capability
- Video and audio synchronization and timing
- Video proc amp, color correction, and clipping
- Variable aspect ratio capability
- Audio gain, invert/phase reversal features
- Level A and Level B-DL, SQD and 2SI conversions
- Color volume control, supporting the following color spaces:
 - ITU BT rec. 2020
 - ITU BT rec. 601 for 480i
 - ITU BT rec. 601 for 576i
 - ITU BT rec. 709 for 720p, 1080i/p
 - Extended-gamut YCC color space (xvYCC, IEC61966-2-4) gamma function
 - Gamut-free mapping (no "artistic license") when operating outside gamut hard/soft clipping
- Input and output video routing
- Complies with:
 - SMPTE ST 259, SMPTE ST 292, and SMPTE ST 425-5 Annex B
 - 480i, 576i, 720p, 1080i, 1080p, and 2160p square division image formats
 - SMPTE ST 2036-1 UHD-1

Details

When UHD-1 is an uncompressed video signal, a quad link baseband SDI interconnection is used with four 3 Gb/s SDI connections for a resultant speed (bandwidth) of 12 Gb/s. The input to the up converter and output from the down converter is a single link baseband SDI connection with video formatted as HD (or SD) for connection into existing HD (or SD) devices.

There are several types of UHD-1 interfaces: Level A, Level B-DL (Dual Link), SQD (Squared Division) quad-split and 2SI (Two Stream Interleaved). All these various interfaces can be detected at the input of the down converter and selected by the user as required at the output for the up converter. SQD is supported now and a future code update will add support for 2SI.

When HD (or SD) content is up converted to UHD-1, the color volume will be ITU rec. 709 (ITU rec. 601 for SD) so as not to alter the original content. When UHD content is down converted to HD/SD, the color volume will be limited to ITU rec. 709 (ITU rec. 601 for SD).

The user has video proc amp, color correction, clipping and aspect ratio controls and an integrated frame sync with timing controls, offering the capability to time the up converted video output to other UHD sources in production or master control switchers, or time the down converted output to other HD/SD sources in production or master control switchers.

Not only is video converted and processed as required, but embedded audio can be processed with user control for audio level and lip sync corrections (audio gain, invert, delay).

Specifications

3G/HD/SD-SDI VIDEO INPUT

| | |
|------------------|--|
| Number of inputs | 4 (including 2 in SFP) |
| Standard | 1080p (SMPTE 424M) 3G HD-SDI * 1080i/p (SMPTE 292M) HD-SDI 720p (SMPTE 296M) HD-SDI 525/625 component (SMPTE 259M-C, 270 Mb/s) SD-SDI |
| Frame Rate | 1080i/p/psf: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 Hz 720p: 50, 59.94, 60 Hz 525/625 |
| Connector | (High-Density) HD-BNC |
| Impedance | 75 ohms |
| Return loss | >15 dB to 1485 MHz >10 dB from 1485 to 2790 MHz |
| Equalization | 3G: Adaptive cable equalization for up to 459 ft (140 m), typical, of Belden 1694A coaxial cable; 328 ft (100 m), typical HD: Adaptive cable equalization for up to 656 ft (200 m) typical, of Belden 1694A coaxial cable; 524 ft (160 m), typical SD: Adaptive cable equalization for up to 984 ft (300 m) typical, of Belden 8281 coaxial cable; 1,312 ft (400 m), typical, of Belden 1694A coaxial cable |

* Support for SMPTE 372M Level B (1080p50/59/60DL)

The SEL-UHD1-D uses an extended 3G-reach equalization. When combined with Belden 8281 coaxial cable, a pathological pattern, and a non-SMPTE424 (6.1.7)-compliant signal with excessive output amplitude excursions, the source equalization may be reduced to between 200 and 300 m for SD-SDI signals. This condition typically only occurs with older SD-SDI equipment having a 1µF capacitor on the output. All recent and multi-rate SD/HD/3G-SDI equipment is compliant with the standard (having at least a 4.7µF capacitor on the output), and can achieve 300 m with 8281 cable and pathological pattern.

3G/HD/SD-SDI VIDEO OUTPUT

| | |
|--------------------|---|
| Number of outputs | 4 |
| Standard | 1080p (SMPTE 424M) 3G HD-SDI 1080i/p (SMPTE 292M) HD-SDI 720p (SMPTE 296M) HD-SDI 525/625 component (SMPTE 259M-C, 270 Mb/s) SD-SDI |
| Frame Rate | 1080i/p/psf: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 Hz 720p: 50, 59.94, 60 Hz 525/625 |
| Connector | (High-Density) HD-BNC |
| Impedance | 75 ohms |
| Return loss | >15 dB to 1485 MHz >10 dB from 1485 to 2790 MHz |
| Signal level | 800 mV ± 10% |
| DC offset | 0.0V ± 0.5 V |
| Rise and Fall Time | 3G: <135 ps HD-SDI: <270 ps SD-SDI: 400 to 1500 ps |
| Overshoot | <10% |
| Jitter | Timing jitter: 3G HD-SDI: <2 UI pk-to-pk (>10 Hz) HD-SDI: <1 UI pk-to-pk (>10 Hz) SD-SDI: <0.2 UI pk-to-pk (>10 Hz) Alignment jitter: 3G HD-SDI: <0.3 UI pk-to-pk (>100 Hz) HD-SDI: <0.2 UI pk-to-pk (>100 Hz) SD-SDI: <0.2 UI pk-to-pk (>1 kHz) |

GPI INPUTS AND OUTPUTS

| | |
|--------------------------|---|
| Connector | Samtec TFM-110-01-L-D-RE1-WT 20 pin connector |
| Number of inputs/outputs | 6 (configurable GPI) |
| Logic Level | +5V TTL |

RS-232/422/485

| | |
|-----------------------------------|--|
| Number of Rx Ports | 1 RS-422/485 or RS-232 |
| Number of Tx Ports | 1 RS-422/485 or RS-232 |
| Standard Electrical specification | EIA-232-C, EIA-422-B, EIA-485-A, RS-232/422/485 switchable from user control, RS-422 termination through jumpers |

Ordering Information

| | |
|---------------|--|
| SEL-1UHD1-D-S | Single channel Quad Link UHD-1 to 3G/HD/SD-SDI down conversion and frame sync with embedded audio processing, includes front and submodule and single back module with two HD-BNC input connectors, two inputs on SFP (one SFP+2ERX+NR+L dual HD-BNC input SFP included) and four HD-BNC outputs, GPI and serial data port, optional SEL-1UHD1-SK-U software license key adds UHD-1 up conversion mode |
| SEL-1UHD1-U-S | Single channel 3G/HD/SD-SDI to UHD-1 Quad Link UHD-1 up conversion and frame sync with embedded audio processing, includes front and submodule and single back module with two HD-BNC input connectors, two inputs on SFP (one SFP+2ERX+NR+L dual HD-BNC input SFP included) and four HD-BNC outputs, GPI and serial data port, optional SEL-1UHD1-SK-D software license key adds UHD-1 down conversion mode |

SOFTWARE LICENSE OPTION

| | |
|------------------|---|
| SELOPT-UHD1-SK-D | Software license key to add down conversion mode to SEL-1UHD1-U-S |
| SELOPT-UHD1-SK-U | Software license key to add up conversion mode to SEL-1UHD1-D-S |

ACCESSORIES

| | |
|--------------------|--|
| SELOPTCAB-HD-BNC-V | HD-BNC Plug to BNC Jack Adaptor Cable for Video (12" / 0.3m) |
| SELOPT-TOOL-CABLE | HD-BNC Cable Insertion and Extraction Tool |

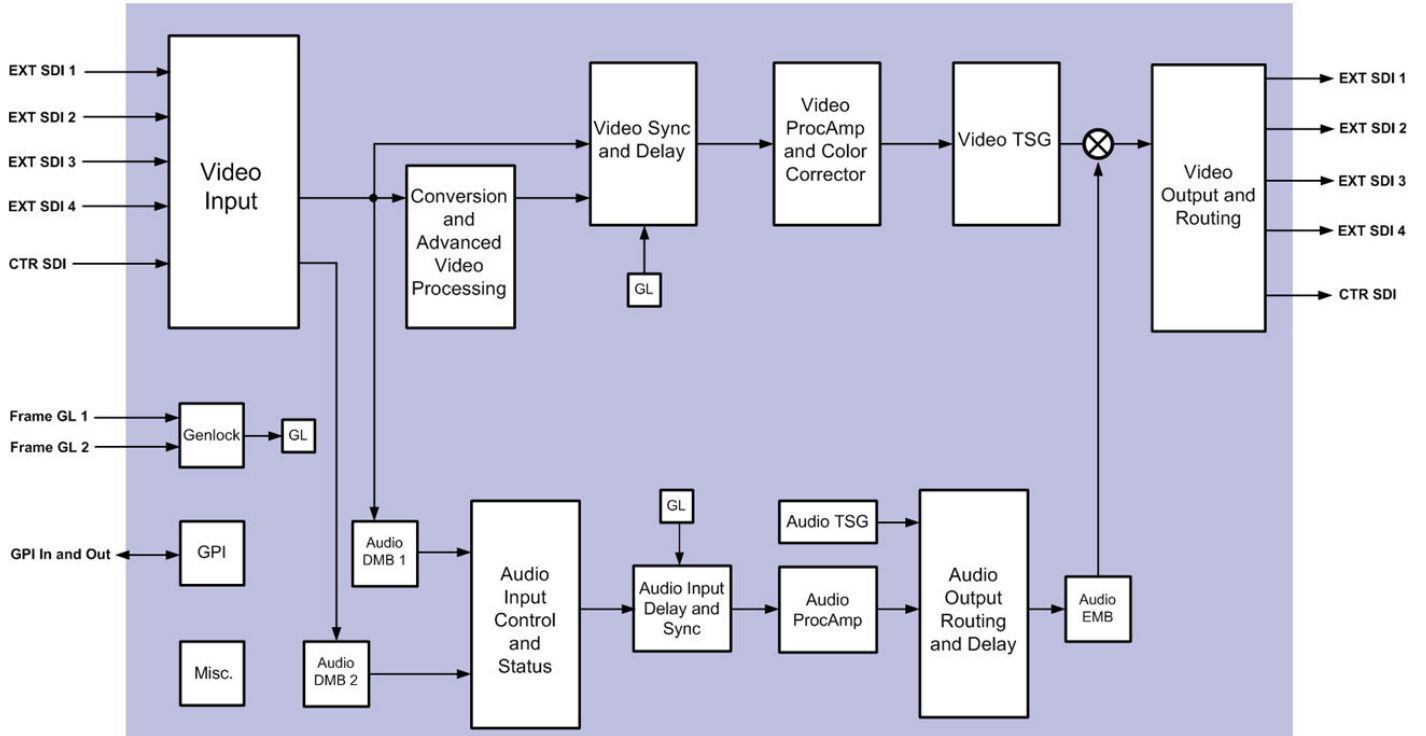
SELENIO MCP3 FRAMES, CONTROLLER(S), POWER SUPPLY(S)

| | |
|-----------------|---|
| SEL-FR3-AC-RR | Selenio 3RU Frame: one AC PSU, two external reference looping BNC inputs, one controller (one RJ45 for control / monitoring, one RJ45 for data (video IP sub module required)), no control panel |
| SEL-FR3-AC-RR-R | Selenio 3RU Frame: two AC PSU, two external reference looping BNC inputs, two controllers (each one RJ45 for control / monitoring, each one RJ45 for data (video IP sub module required)), no control panel |
| SELOPT-PSU-AC | Optional AC power supply module, Selenio |

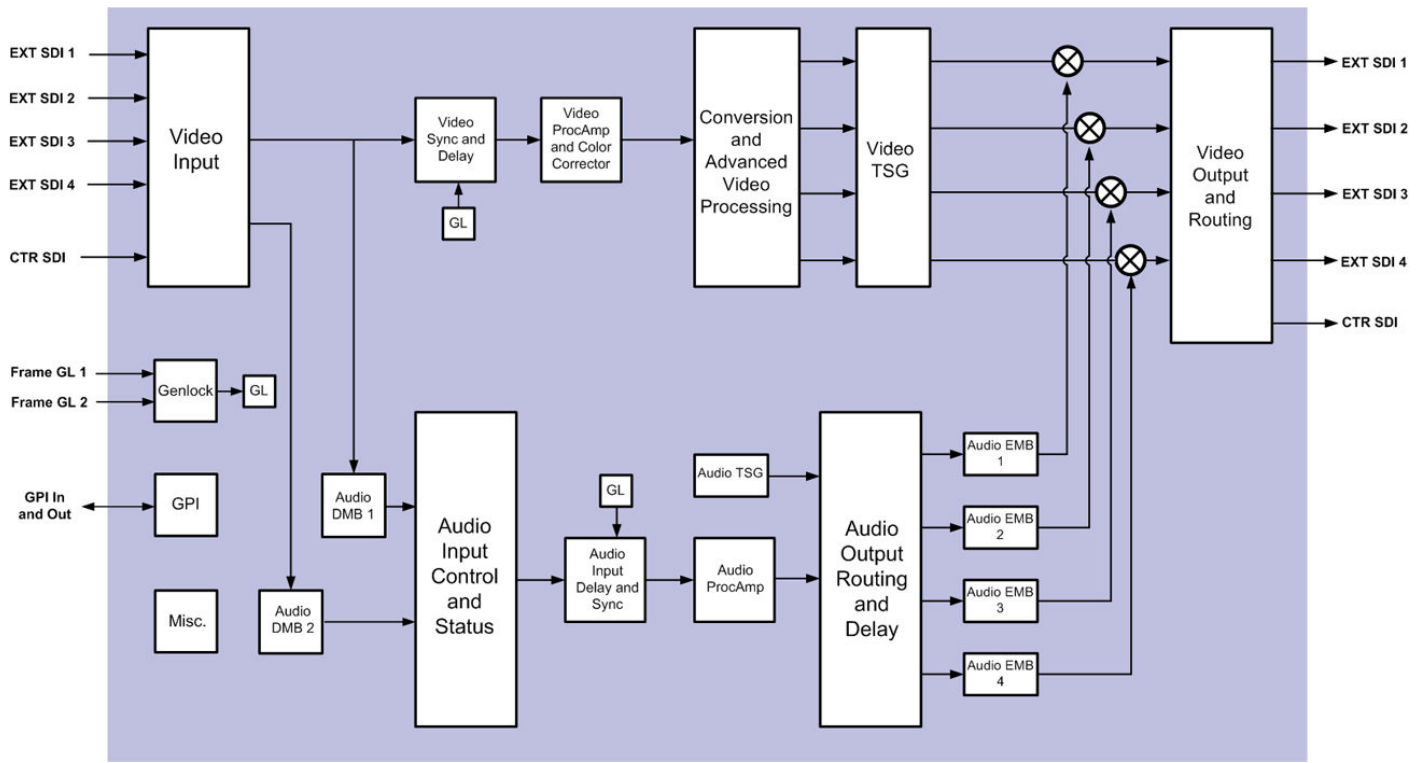
Selenio™ MCP3



SEL-UHD-D Block Diagram



SEL-UHD-U Block Diagram



Back Module

