

Densité Video Processing

This comprehensive lineup of signal processing tools provides advanced solutions for up, down, and cross-conversion, with additional features such as audio processing, frame synchronization, and DPI insertion. This portfolio supports the demanding needs of modern media production and distribution, ensuring seamless signal conversion and processing across multiple formats.

XVP-3901-XC

3G/HD Crossconverter with Optional Audio Processor

UDC-3901

Compact 3G/HD/SD Up/Down/Cross with Audio and Metadata Processor

XVP-1801-DC

HD/SD Downconverter/ARC and Frame Sync

XVP-1801

HD/SD Up/Down/Crossconverter with AFD

XVP-3901-DPI

3G/HD/SD DPI Inserter/Extractor with Frame Sync

XVP-1801-UC

HD Upconverter/Frame Sync/ARC

XVP-3901

3G/HD/SD Up/Down/Crossconverter with Optional Audio Processor

XVP-3901-DC

3G/HD/SD Downconverter with Optional Audio Processor

XVP-3901-UC

3G/HD/SD Upconverter with Optional Audio Processor

IRG-3401

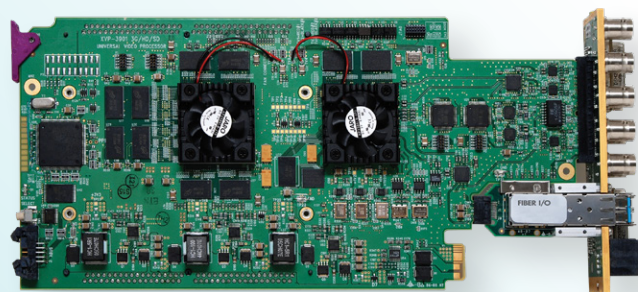
High Density ASI/IP Gateway

IRD-3802

MPEG Decoder with ASI and GigE IP Inputs

XVP-3901-XC

3G/HD Crossconverter with Optional Audio Processor



Space-saving, modular platform for advanced signal processing.

The XVP-3901-XC from Grass Valley® is a highly integrated, 3G/HD crossconverter with optional video/audio signal processor, which is designed to synchronize, crossconvert and process HD signals for 3G/HD hybrid plants. It is identical to the XVP-3901 except that it does not have up/downconversion capability.

It features a dual 3G/HD input selector and provides multiple outputs of the selected output format. The processor performs all the cross conversion, color space and aspect ratio conversion needed to maintain the chosen output formatting on the outputs, irrespective of whether the input is 3G (Level A or B), HD 1080i or HD 720p.

High quality crossconversion is performed at both 50 and 59.94 Hz, based on multiple sophisticated processing technologies. These include detail enhancement, pixel-based deinterlacing, and advanced motion adaptive deinterlacing and antiringing.

To ensure that the crossconverted video is delivered in the correct aspect ratio when aired, the XVP-3901-XC fully supports AFD. This provides automatic aspect ratio and video size control using embedded commands, and it prevents on-air aspect ratio errors such as the postage stamp effect.

A background keying capability allows side panels (or top and bottom panels) to be filled with graphics to improve on-air presentation for promotions or advertising.

A fiber input/output plug-in cartridge option significantly simplifies fiber installation and configuration. When the fiber cartridge is fitted, the card can select between fiber and BNC inputs and can output both electrical and optical signals simultaneously.

The processor's audio capabilities are equally advanced, with processing of up to 32 channels of audio, with automatic delay to keep lip sync. The processor provides shuffling and down-mixing, and options include automatic loudness

control (ALC), dynamic processing (limiter, compressor, and expander), loudness metering, and four AES inputs/outputs for additional flexibility.

The XVP-3901-XC has two on-board sockets for optional modules, including Dolby E encoding, Dolby Digital (AC-3) encoding, Dolby E/Dolby Digital (AC-3) decoding, and upmixing using Linear Acoustic upMAX technology. Grass Valley also offers a module that provide ALC. This module features the award-winning technology of AEROMAX by Linear Acoustic which is capable of maintaining constant loudness across different audio programs (see Automatic Loudness Control (ALC) datasheet).

There are many benefits to the XVP-3901-XC's high level of feature integration. A lower purchase cost per channel is obviously highly desirable but there are many other dimensions to cost savings that are readily achievable. These include

reduced space and cooling costs, less cabling, and a reduced spares inventory. By simplifying video and audio synchronization, and reducing the number of vendors, the system integration is also simplified significantly.

The XVP-3901-XC can be upgraded in the field to the full XVP-3901 specification with up/down/cross conversion capability.

Key Features

Video

- Cross/ARC converter with frame sync (50/59.94 Hz)
- Offers a multirate 3G/HD input and 3G/HD outputs
- Supports 3G level A (mapping 1) and level B
- Flexible HD/SD/URS reference input
- Advanced video deinterlacing for best image quality
- One frame of processing delay for all conversions
- Automatic ARC using AFD (SMPTE ST 2016), video index (SMPTE RP 186) and WSS, with custom and fixed presets
- Keyer option for filling black pillars and letter box
- Built-in proc amp with YUV/RGB color correction and legalizer
- Processes and converts ancillary data such as CC (CEA-608/CEA-708), timecode, teletext/OP-47 and SCTE 104 (SMPTE ST 2010)
- Inserts V-Chip and CGMS in XDS of CC (CEA-608)

- Optional SFP optical plug-in cartridges to select between fiber and BNC inputs and output both electrical and optical signals simultaneously
- Serial and GPIO ports for automation control
- Upgradeable to full XVP-3901 specification

Optional Audio

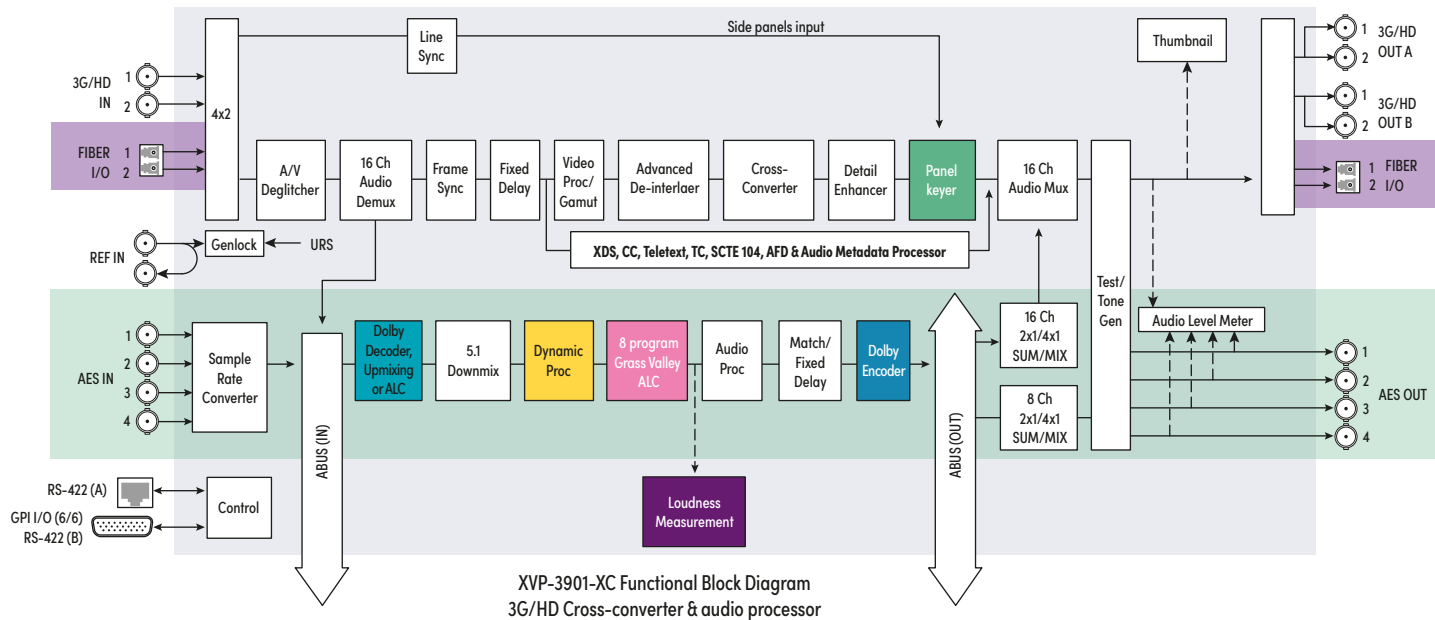
- 16 channels embedded audio processing (32 channels internal)
- 4 AES inputs, 4 AES outputs
- Automation capabilities based on audio signal type detection
- Audio down mix: 5.1 surround to Lt/Rt or Lo/Ro
- Optional audio dynamic processor (compressor/limiter/expander)
- Optional automatic loudness control with Grass Valley wideband processing (on-board)
- Optional loudness measurement of up to 4 audio programs and logging with GV Orbit® for end-to-end loudness monitoring solutions

- Loudness solution compliant to EBU R128, A/85 ITU-R BS.1770-3 and ARIB TR-B32
- Dolby E compatible
- Audio metadata processing (SMPTE ST 2020-A)
- Perfect audio/video sync plus additional audio user delay of up to 2 seconds
- Compatible with Grass Valley audio processing cards using ABUS
- On-board socket for 2 optional modules expansions:
 - Dolby E and Dolby Digital decoder
 - Dolby Digital and Dolby Digital Plus encoder
 - Dolby E encoder
 - Linear Acoustic upMAX
 - Linear Acoustic AEROMAX automatic loudness control

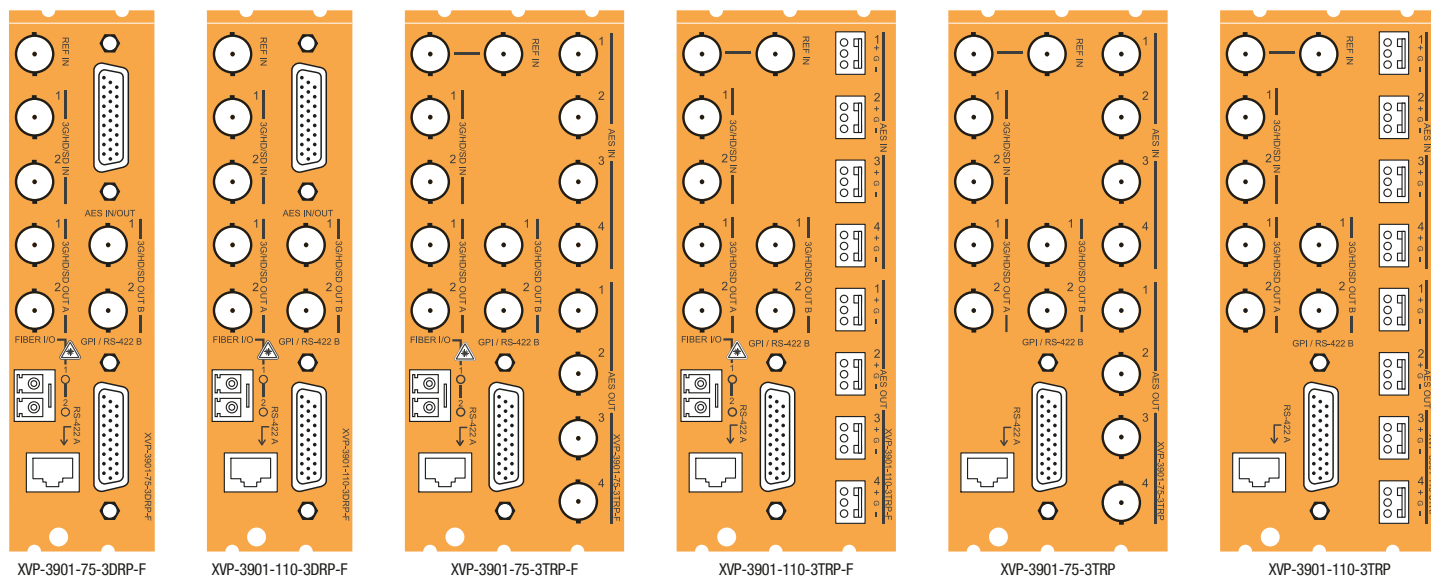
XVP-3901-XC

Input \ Output		HD				3G	
		720p50	720p59.94	1080i50	1080i59.94	1080p50	1080p59.94
HD	720p50	X		X		X	
	720p59.94		X		X		X
	1080i50	X		X		X	
	1080i59.94		X		X		X
	1080p23.98		X		X		X
	1080pSF23.98		X		X		X
	1080p25	X		X		X	
	1080p29.97		X		X		X
3G	1080p50	X		X		X	
	1080p59.94		X		X		X

Video Formats Supported



VIDEO OPTIONS	XVP-3901-110/75-3TRP-F and 3DRP-F (with appropriate fiber cartridge)	AUDIO OPTIONS	XVP-3901-OPT-AUD	XVP-3901-OPT-DP	MOD-DOLBY-DEC-2	MOD-LA-ALC
	XVP-3901-OPT-K		XVP-3901-OPT-ALC	XVP-3901-OPT-LM	MOD-LA-DUP-701	MOD-DOLBY-ENC-D-2
					MOD-DOLBY-ENC-E-2	

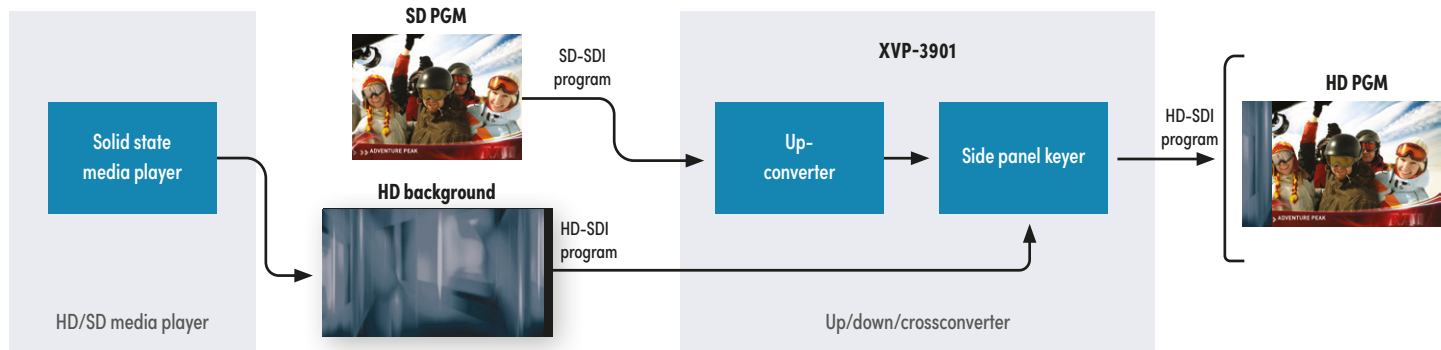


Up/Downconversion with Background Keying

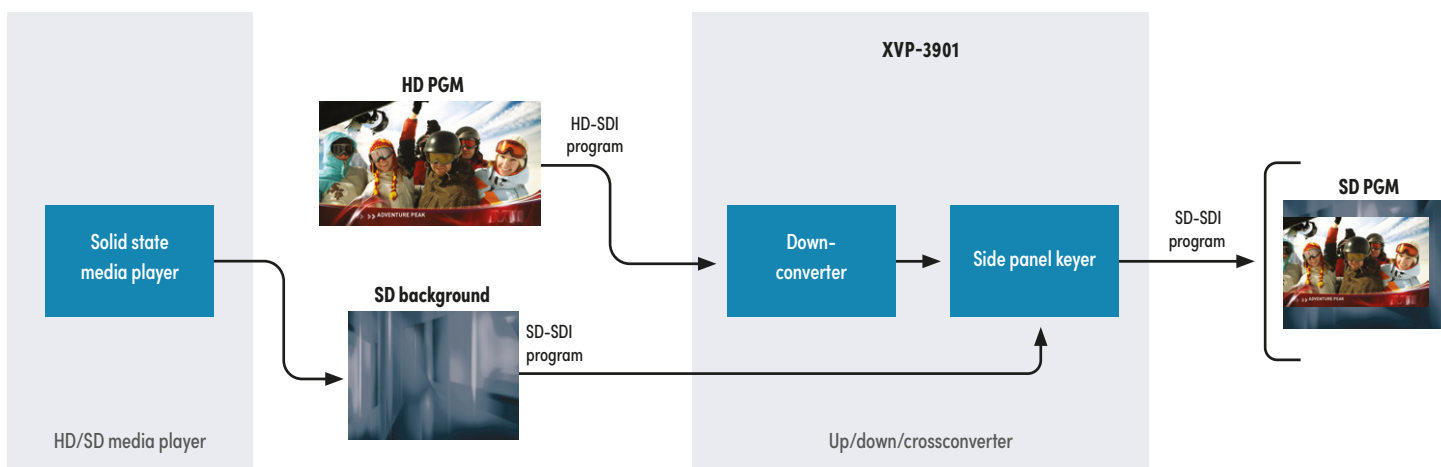
Up/downconversion with background keying using XVP-3901:

The XVP family of interfaces features a background keying capability which allows side panels or letterbox black bars, introduced by upconversion or downconversion, to be filled with video or graphics.

Upconversion with background keying using XVP-3901



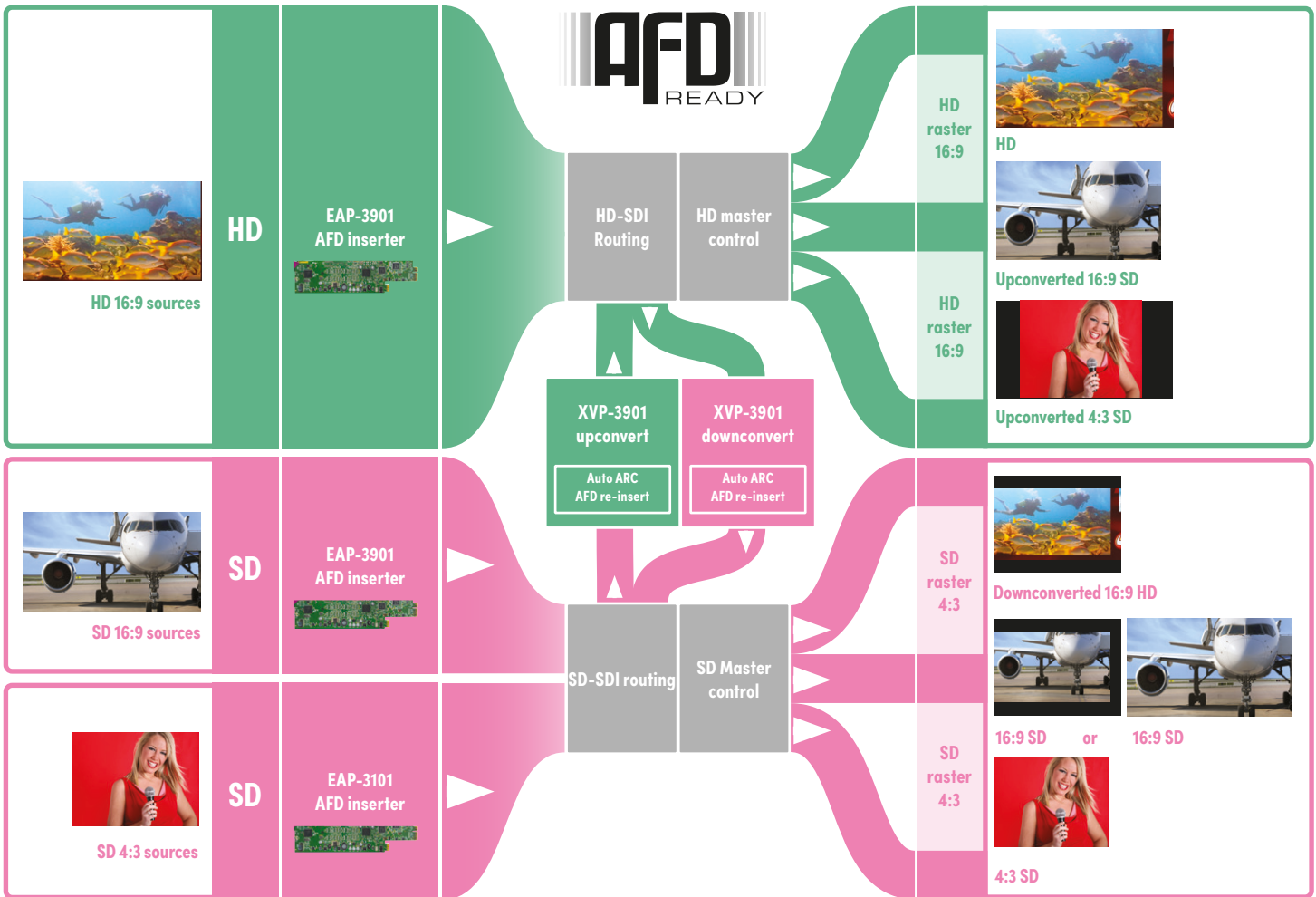
Downconversion with background keying using XVP-3901



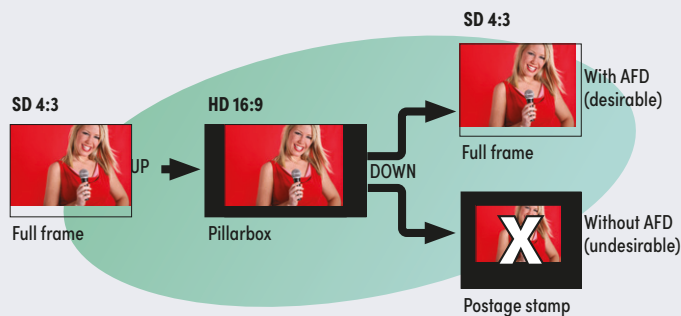
Frame Accurate Aspect Ratio Conversion with AFD

Frame accurate Aspect Ratio Conversion (ARC) can be performed automatically using embedded signaling based on the Active Format Description (AFD) standard. AFD data can be easily embedded in a signal by the Densité XVP processor family, and by the EAP-3901 embedder. With AFD, original image information is maintained throughout the entire conversion process for optimal viewing following 4:3 and 16:9 aspect ratio conversion.

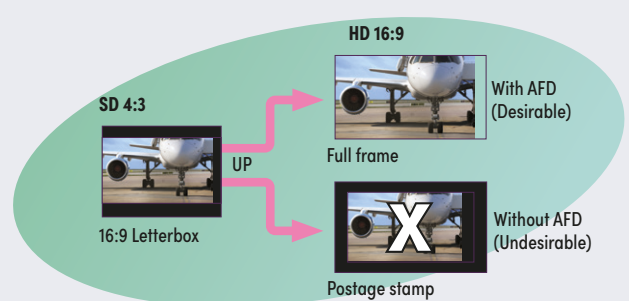
For example, processing three input source formats (16:9 HD, 16:9 SD and 4:3 SD) in a typical HD/SD hybrid plant results in six different output possibilities. However, using automatic aspect ratio control based on AFD will prevent the ARC errors that may occur with manual control.



4:3 aspect ratio conversion with AFD

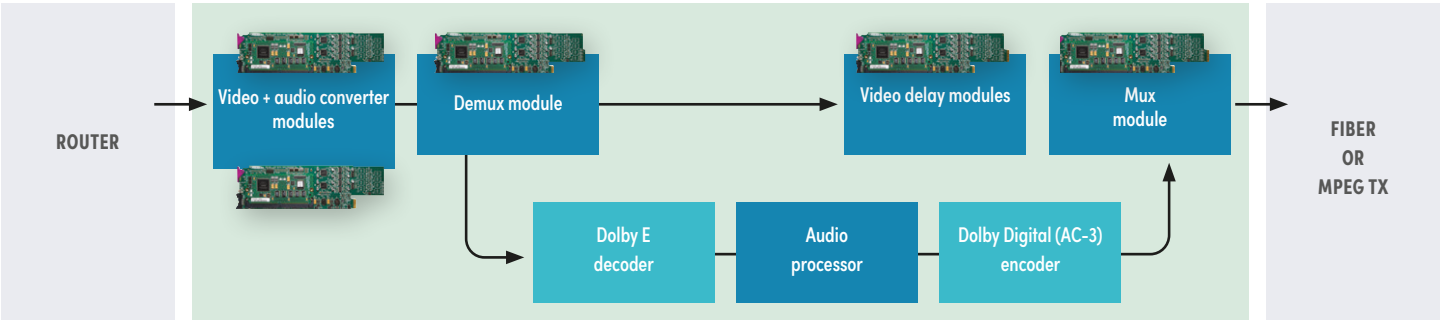


16:9 aspect ratio conversion with AFD

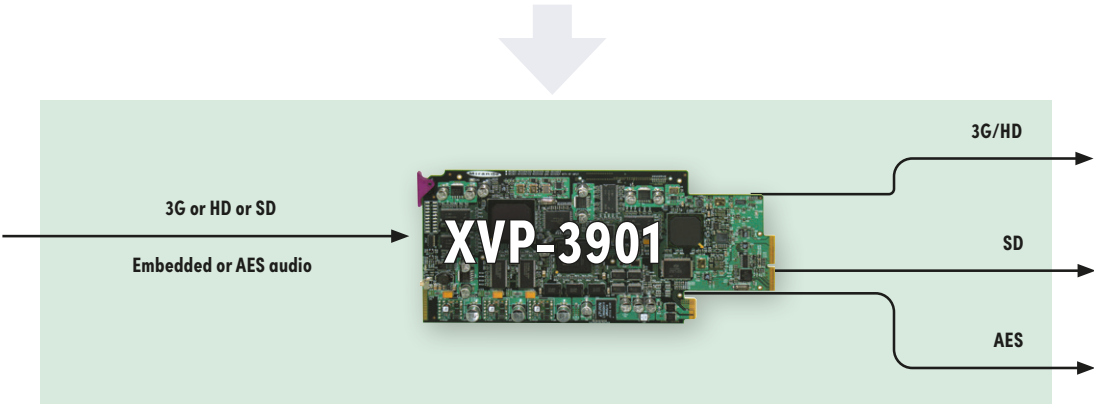


Incoming Feed Processing

Using the XVP-3901 significantly reduces the amount of equipment required for incoming feed processing. A single XVP-3901 replaces multiple single function devices to provide Dolby E decoding, audio processing and Dolby Digital or Dolby Digital Plus encoding.



Traditional approach to Dolby E decoding and Dolby Digital or Dolby Digital Plus encoding using multiple devices.

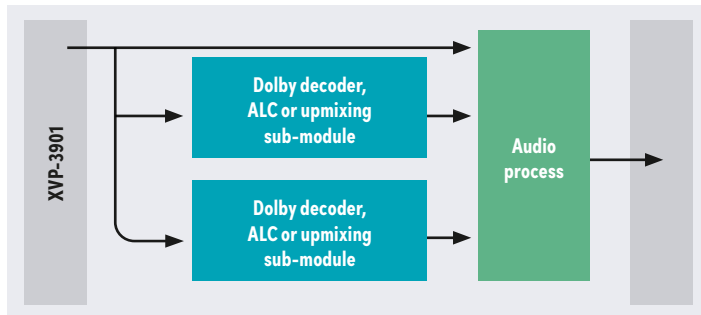


Using a single XVP-3901 3G/HD/SD up, down and cross converter with audio processor for incoming feed processing.

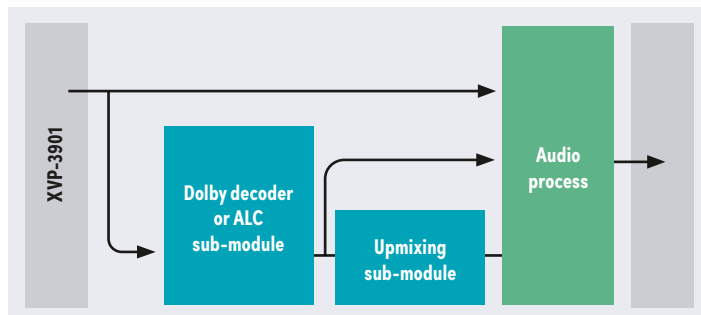
Incoming Feed Problems	XVP-3901 Features
Remote feeds need to be adapted to station infrastructure	Frame synchronization, full proc controls, color correction and legalizer
Multiple audio formats and audio synchronization: • Mixed up audio tracks • Lip sync • Dolby E and Dolby Digital encoded inputs • 5.1 audio • Loudness level	Extraction, processing and re-insertion for up to 4 embedded audio groups Video to audio match delay and fixed delay Audio track mixing and shuffling Discrete audio inputs/outputs handled using complimentary audio modules Dolby Metadata insertion, and will delay Dolby E audio without compromising encoded signal Decode Dolby E or Dolby Digital to discreet PCM channels Audio downmix from 5.1 audio to a Lt Rt or Lo Ro audio 2 channel signal Stereo to 5.1 upmixing using Linear Acoustic technology Automatic loudness control
Receiving SD or HD signals at different times of the day	Built-in up and downconversion automatically converts current input to house format
Receiving 1080i into 720p plant (or vice versa)	Built in 720p to/from 1080i crossconversion eliminates need for costly external converters
Providing 16:9 and 4:3 aspect ratio conversion	Automatic, frame accurate aspect ratio conversion using embedded signaling, based on the Active Format Description (AFD) standard Background keying capability to fill side or top/bottom panels with graphics

Flexible 5.1 Audio Processing

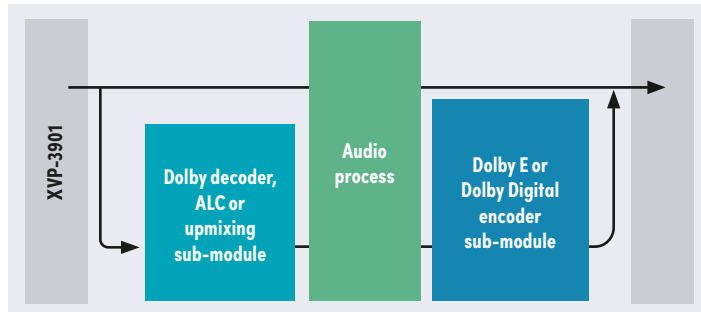
The XVP-3901 can provide very versatile audio processing sequences, due to the flexibility of the optional audio submodules. The submodules include Dolby E decoding, Dolby Digital decoding, Dolby E encoding, Dolby Digital and Dolby Digital Plus encoding, Linear Acoustic upMAX 2.0 to 5.1 upmixing and automatic loudness control (ALC). Two audio submodules can be fitted to an XVP-3901 processor. All audio channels created by the modules are preserved, and can be selected in the output shufflers and mixers for embedding or discrete AES outputs.



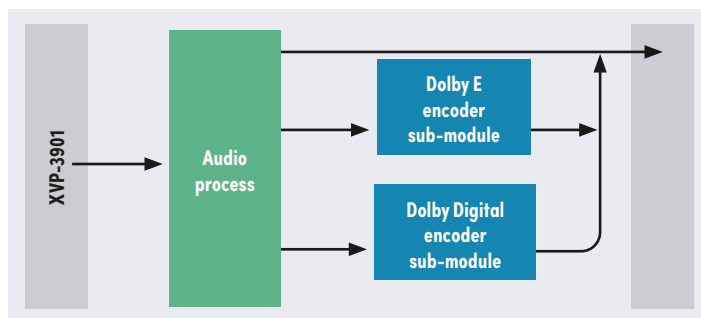
Dolby E / Dolby Digital (AC-3) decoding, automatic loudness control (ALC) or upmixing (or a different combination of these sub-modules) used in parallel ahead of audio processing.



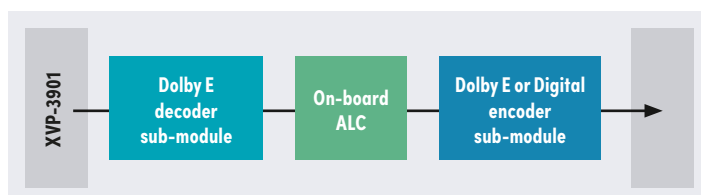
Dolby E / Dolby Digital (AC-3) decoding, ALC or upmixing (or a different combination of these sub-modules) followed by upmixing ahead of audio processing.



Dolby E / Dolby Digital (AC-3) decoding, ALC or upmixing followed by audio processing, and subsequently Dolby E or Dolby Digital (AC-3) encoding.



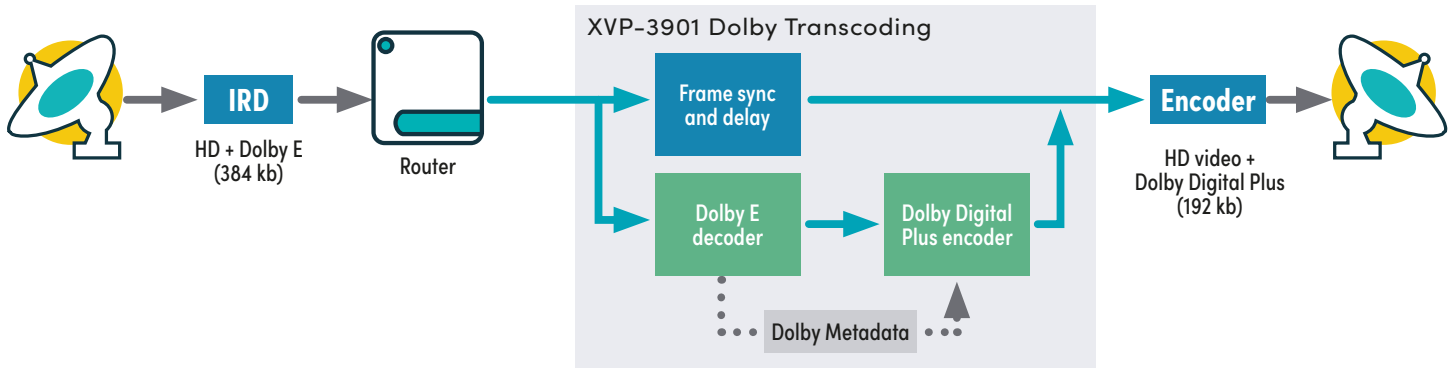
Dolby E and Dolby Digital (AC-3) encoding (or a different combination of these sub-modules) used in parallel after audio processing.



Dolby E decoding, ALC followed by Dolby E or Dolby Digital encoding.

Dolby Digital Plus Transcoding

The addition of Dolby Digital Plus to the Dolby Digital encoder means that Grass Valley's audio processing module will provide the same high-quality audio compression they always have, but at a data rate as much as 50 percent lower than currently required, enabling 5.1 multichannel audio at rates as low as 192 kb/s. When combining Dolby E decoding and Dolby Digital Plus encoding, broadcasters can deliver an efficient multichannel surround sound across multiple platforms and content types.



Specifications

Video Input (2) / Output (2)

Signal:

- SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
- SMPTE ST 424 (2.970, 2.970/1.001 Gb/s)

Supported formats:

- HD: SMPTE ST 274: 1080i59.94/50
- HD: SMPTE ST 296: 720p59.94/50
- 3G: SMPTE ST 425 level A (mapping 1), level B: 1080p59.94/50

Cable length:

- 150m (492 ft.) Belden 1694A at 1.485 Gb/s
- 120m (393 ft.) Belden 1694A at 2.970 Gb/s

Return loss: >15 dB up to 3 GHz

Jitter:

- HD: <0.2 UI (alignment jitter)
- 3G: <0.3 UI (alignment jitter)

Reference Input

Signal:

- SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst
- SMPTE ST 274/SMPTE ST 296 tri-level sync

Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits minimum

Latency: 1 frame in all modes

Additional delay: up to 15 frames

Audio Input (4)

Sampling freq.: 32 to 96 kHz

Quantization: up to 24 bits

AES3

- Level: 0.2 to 7 Vp-p
- Impedance: 110Ω balanced

AES3-id

- Level: 0.2 to 2 Vp-p
- Impedance: 75Ω
- Return loss: 15 dB at 6 MHz

Audio Output (4)

Sampling freq.: 48 kHz

Quantization: 24 bits

AES3

- Level: 2.75 Vp-p
- Impedance: 110Ω balanced

AES3-id

- Level: 1.0 Vp-p
- Impedance: 75Ω
- Return loss: 15 dB at 6 MHz

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz, synchronous

Number of channels: 16, 8 pairs, 4 groups

Freq. response: ±0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A-weighted)

THD-N: -138 dB (20 Hz to 20 kHz)

Miscellaneous

Fixed delay: 0 to 2.0 s

Step: 1 ms (coarse), 1 sample (fine)

GPI

Connector: 26-pin D-Sub, optoisolated

GPI in: Input selection: 1-2

Presets: 1-4

GPI out: Selected input: 1-2

Selected preset: 1-4

RS-422 A (automation)

Connector: RJ-45

Signal: OXTEL series automation protocol

RS-422 B (audio metadata)

Connector: 26-pin D-Sub

Signal: RDD6

ABUS Connector

As per ABUS standard, Grass Valley

Fiber

Full specifications available on SFP optical plug-in cartridges webpage and datasheet.

Test Pattern Generator

Video: Color bars – 100% white bar with 75% color

Audio:

- Left channel pulsed 1 kHz tone
- Right channel steady 1 kHz tone

Electrical

Power: 25W



Ordering

Densité® 3 frame

XVP-3901-XC

XVP-3901-75-3DRP-F
XVP-3901-110-3DRP-F

XVP-3901-75-3TRP-F
XVP-3901-110-3TRP-F

XVP-3901-75-3TRP
XVP-3901-110-3TRP

Options (software)

XVP-3901-OPT-AUD

XVP-3901-OPT-K

XVP-3901-OPT-DP

XVP-3901-OPT-LM

XVP-3901-UG-XC2XVP

XVP-3901-OPT-ALC-2

XVP-3901-OPT-ALC-6

XVP-3901-OPT-ALC-8

XVP-3901-OPT-ALC-16

Description

3G/HD cross converter with optional audio processor

Double rear connector panel, 75Ω and fiber connector
Double rear connector panel, 110Ω and fiber connector

Triple rear connector panel, 75Ω and fiber connector
Triple rear connector panel, 110Ω and fiber connector

Triple rear connector panel, 75Ω

Triple rear connector panel, 110Ω

Description

AES IO support and 16 channels on-board audio processing option

Background key input option

Dynamic audio processing option

Loudness meter option

Upgrade from XVP-3901-XC to full XVP

2-channel on-board ALC option by Grass Valley

6-channel on-board ALC option by Grass Valley

8-channel on-board ALC option by Grass Valley

16-channel on-board ALC option by Grass Valley

Options (hardware)

SFP-R-LC

SFP-RR-LC

SFP-RT-S13-LC

Other types of SFP Optical Plug-In Cartridges may be available for this product. Please visit www.grassvalley.com for more information.

NSH26M

BOC-DA26-8BNC-1

MOD-DOLBY-ENC-E-2

MOD-DOLBY-ENC-D-2

MOD-DOLBY-DEC-2

MOD-LA-DUP-701

MOD-LA-ALC-2

MOD-LA-ALC-6

MOD-LA-ALC-8

MOD-LA-ALC-2-DUP

MOD-LA-ALC-6-DUP

MOD-LA-ALC-8-DUP

Description

Single fiber Rx (input) cartridge with LC/PC connector

Dual fiber Rx (input) cartridge with LC/PC connector

Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector

HD-26 to terminal block adapter

75Ω digital audio breakout cable

Dolby E encoder

Dolby Digital and Dolby Digital Plus encoder

Dolby E and Dolby Digital decoder

Upmixing using Linear Acoustic Technology upMAX

2-channel ALC licensed by Linear Acoustic

6-channel ALC licensed by Linear Acoustic

8-channel ALC licensed by Linear Acoustic

2-channel ALC and upmix licensed by Linear Acoustic

6-channel ALC and upmix licensed by Linear Acoustic

8-channel ALC and upmix licensed by Linear Acoustic

Remote control

GV Orbit®, iControl™, iControl Solo

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

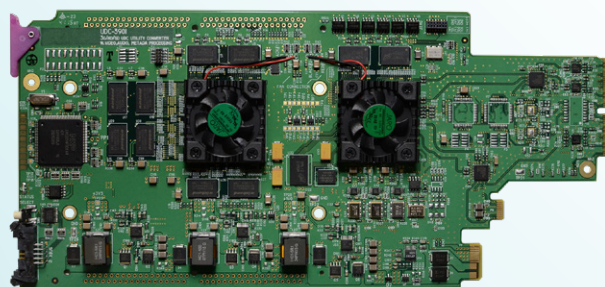
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UDC-3901

Densité Up/Down/ Crossconversion Compact 3G/HD/SD Up/Down/Cross with Audio and Metadata Processor



All-in-one processor that simplifies integration, reduces space, cabling and overall costs.

The Densité® Series UDC-3901 from Grass Valley® is a compact 3G/HD/SD up/down/crossconverter with video, audio and metadata processing. It offers up/down/crossconversion, with simultaneous 3G, HD and SD outputs.

The processor performs all the up/down/crossconversion, color space and aspect ratio conversion needed to maintain the chosen output formatting, irrespective of whether the input is 3G (Level A or B), HD 1080i, HD 720p or SD. To ensure that up/downconverted television is presented in the correct aspect ratio when aired, the UDC-3901 supports AFD (Active Format Description) SMPTE ST 2016. This provides automatic aspect ratio control using embedded control commands, and prevents on-air aspect ratio errors such as the postage stamp effect. In addition

to AFD, the UDC also supports VLI (Video Line Index) SMPTE RP 186 and WSS, which allows the card to adjust its ARC automatically without any external intervention. The UDC-3901 also processes and converts other ancillary data such as CC (608/708), timecode, teletext/OP-47 and SCTE 104 (SMPTE ST 2010).

An SFP input/output plug-in cartridge option offers a choice of additional input/outputs based from a wide selection of SFP including CVBS, HDMI, Copper and Fiber SDI. When an SFP cartridge is fitted, the card can select between SFP additional inputs and BNC/DIN inputs and can output both electrical and optical signals simultaneously.

The UDC-3901 processor's on-board audio capabilities allows 16 channels of audio, with automatic delay to keep lip sync, gain control, shuffling and downmixing.

Based on the proven Densité modular framework of over 100 functional cards, the flexible, space-efficient UDC-3901 cards accommodate the transition to multiformat production elements into broadcasting workflows, while protecting operational methods and investment in installed equipment. With flexibility to configure up to 24 UDC-3901 modules in the Densité 3+ FR4 frame with dual SD and 3G/HD simulcast each, the Densité platform scales to new market-leading density of 6 UDC/RU which means space- and cost-efficient scaling — today and tomorrow.

The Densité UDC-3901 can be controlled by GV Orbit® or iControl Solo.

Key Features

Video

- Up/down/cross/ARC converter with frame sync (50/59.94 Hz)
- Offers a multirate 3G/HD/SD input and simultaneous 3G/HD/SD outputs
- Supports 3G level A (mapping 1) and level B
- Flexible HD/SD/URS reference input
- Advanced video de-interlacing for best image quality
- One frame of processing delay for all conversions
- Automatic ARC using AFD (SMPTE ST 2016), video index (SMPTE RP 186) and WSS

- Custom and fixed ARC presets
- Built-in proc amp with YUV/RGB color correction and legalizer
- Processes and converts ancillary data such as CC (608/708), timecode, teletext/OP-47 and SCTE 104 (SMPTE ST 2010)
- Inserts V-Chip and CGMS in XDS of CC (CEA-608)
- Optional SFP plug-in cartridges to select between SFP additional inputs and BNC/DIN inputs and output both electrical and optical signals simultaneously
- Serial and GPIO ports for automation control

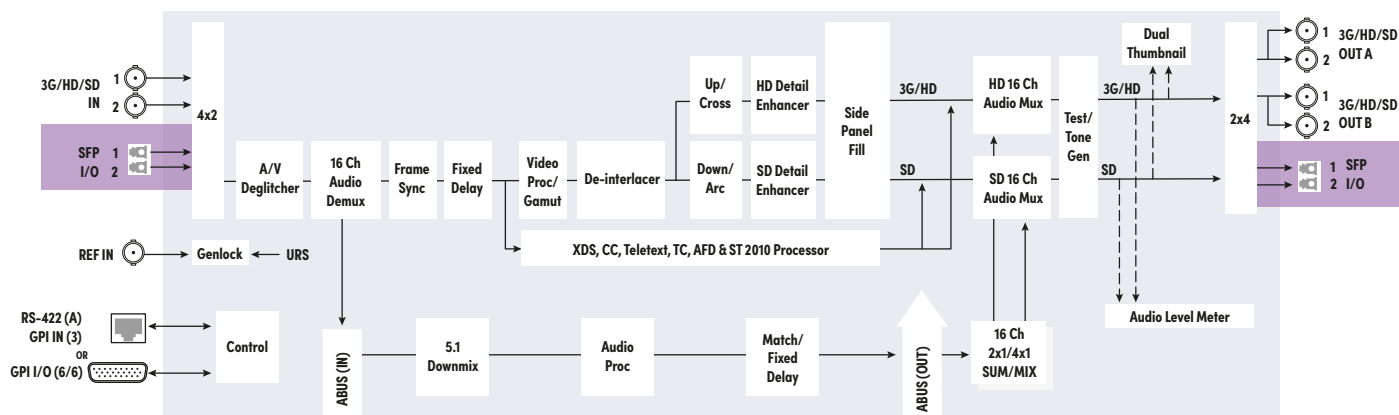
Audio

- 16 channels embedded audio processing (32 channels internal)
- Automation capabilities based on audio signal type detection
- Audio downmix: 5.1 surround to Lt/Rt or Lo/Ro
- Perfect audio/video sync plus additional audio user delay of up to 2 seconds
- Compatible with Grass Valley audio processing cards using ABUS

UDC-3901

Input \ Output		SD		HD					
		525	625	720p50	720p59.94	1080i50	1080i59.94	1080p50	1080p59.94
SD	525	X			X		X		X
	625		X	X		X		X	
HD	720p50		X	X		X		X	
	720p59.94	X			X		X		X
	1080i50		X	X		X		X	
	1080i59.94	X			X		X		X
	1080p23.98	X			X		X		X
	1080pSF23.98	X			X		X		X
	1080p25		X	X		X		X	
	1080p29.97	X			X		X		X
3G	1080p50		X	X		X		X	
	1080p59.94	X			X		X		X

Video Formats Supported



UDC-3901 Compact Up/Down/Crossconverter
Functional Block Diagram

Specifications

Video Input (2) / Output (2)

Signal:

- SMPTE ST 259-C (270 Mb/s)
- SMPTE ST 292 (1.485/1.001 Gb/s)
- SMPTE ST 424 (2.970, 2.970/1.001 Gb/s)

Supported formats:

- SD: 480i59.94, 576i50
- HD: SMPTE ST 274: 1080i59.94/50
- HD: SMPTE ST 296: 720p59.94/50
- 3G: SMPTE ST 425 level A (mapping 1), level B: 1080p59.94/50

Cable length:

- 300m (984 ft.) Belden 1694A at 270 Mb/s
- 150m (492 ft.) Belden 1694A at 1.485 Gb/s
- 120m (393 ft.) Belden 1694A at 2.970 Gb/s

Return loss: >15 dB up to 3 GHz

Jitter:

- HD/SD: <0.2 UI (alignment jitter)
- 3G: <0.3 UI (alignment jitter)

Reference Input

Signal:

- SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst
- SMPTE ST 274/SMPTE ST 296 tri-level sync

Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits minimum

Latency: 1 frame in all modes

Additional delay: up to 15 frames

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz, synchronous

Number of channels: 16, 8 pairs, 4 groups

Freq. response: ± 0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A-weighted)

THD-N: -138 dB (20 Hz to 20 kHz)

Miscellaneous

Fixed delay: 0 to 2.0 s

Step: 1 ms (coarse), 1 sample (fine)

GPI

Connector: 26-pin D-Sub, optoisolated

GPI in: Input selection: 1-2

Presets: 1-4

GPI out: Selected input: 1-2

Selected preset: 1-4

RS-422 A (automation)

Connector: RJ-45

Signal: OXTEL series automation protocol

ABUS Connector

As per ABUS standard, Grass Valley

Fiber

Full specifications available on SFP optical plug-in cartridges webpage and datasheet.

Test Pattern Generator

Video: Color bars – 100% white bar with 75% color

Audio:

- Left channel pulsed 1 kHz tone
- Right channel steady 1 kHz tone

Electrical

Power: 21W Max.



Ordering

Densité 3 frame

UDC-3901

UDC-3901-3DRP

UDC-3901-3+SRP

Description

Compact 3G/HD/SD up/down/crossconverter with video, audio and metadata processing

Double rear connector panel with SFP cage

Single rear connector panel with SFP cage for Densité 3+

Options (hardware)

SFP-3G-2OUT-L

SFP-HDMI-OUT

SFP-R-LC

SFP-RR-LC

SFP-T-S13-LC

SFP-TT-S13S13-LC

SFP-RT-S13-LC

Description

Dual SD/HD/3G SDI long reach output SFP with DIN connector

HDMI output SFP

Single fiber Rx (input) cartridge with LC/PC connector

Dual fiber Rx (input) cartridge with LC/PC connector

Single fiber Tx (output) cartridge at 1310 nm with LC/PC connector

Dual fiber Tx (output) cartridge at 1310 nm with LC/PC connector

Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector

Other types of SFP Optical Plug-In Cartridges may be available for this product.

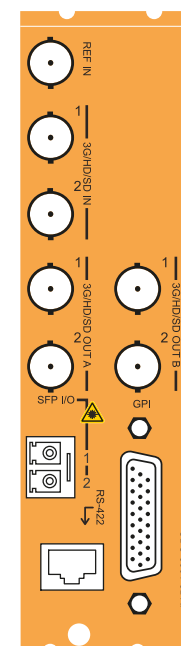
Please visit www.grassvalley.com for more information.

NSH26M

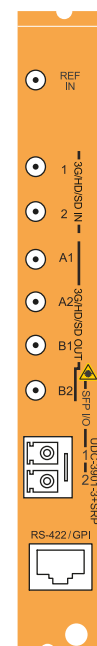
Remote control

HD-26 to terminal block adapter for UDC-3901-3DRP only

GV Orbit, iControl and iControl Solo



UDC-3901-3DRP



UDC-3901-3+SRP

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

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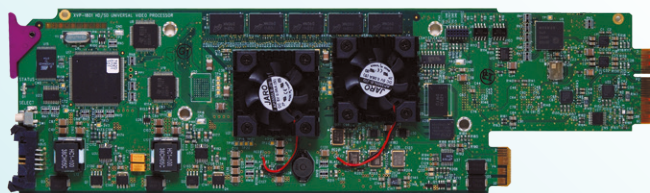
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XVP-1801-DC

HD/SD

Downconverter/ ARC and Frame Sync



Space-saving, modular platform for advanced signal processing.

The Densité® Series XVP-1801-DC from Grass Valley® offers high-quality downconversion with aspect ratio conversion and frame synchronization. It offers many advanced features, including AFD support and background keying, with optional 16 channel embedded audio processing. The superior conversion quality of the XVP at both 50 and 59.94 Hz stems from multiple technologies, including advanced motion adaptive de-interlacing and anti-ringing.

To ensure that downconverted television is presented in the correct aspect ratio when aired, the XVP module supports AFD (Active Format Description) SMPTE ST 2016. This provides automatic aspect ratio control using embedded control commands, and this prevents on-air aspect ratio errors such as the postage stamp effect. The ARC function offers fixed presets as well as variable user configurable aspect ratios.

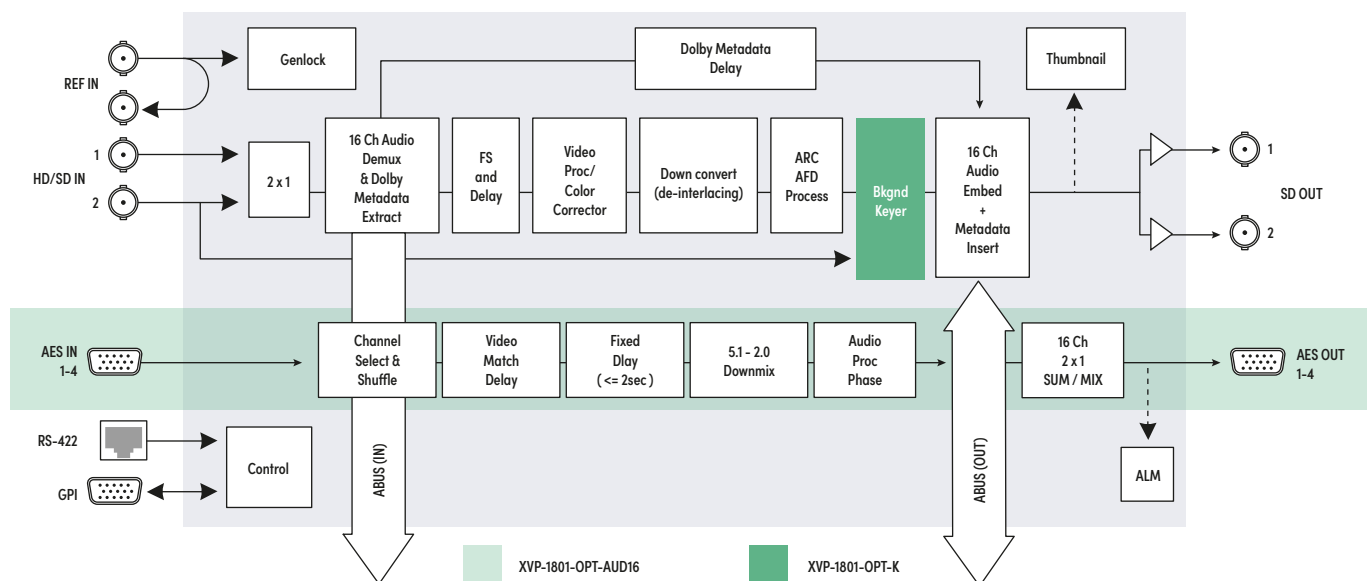
In addition to AFD, the XVP also supports VLI (Video Line Index) RP-186 and WSS, which allows the card to adjust its ARC automatically without any external intervention. The module re-inserts the correct AFD, VLI or WSS on the output, along with other HANC and VANC information. With the integration of a frame sync, incoming feed signals can be synched to house, and video/audio levels adjusted using a proc and color correction, when entering the facility. An RS-232/422 port is provided for automation control of ARC presets, and GPIs are also available for user presets.

To further improve on-air presentation, the XVP offers a background keying capability which allows letterbox black bars, introduced by downconversion, to be filled with video or graphics.

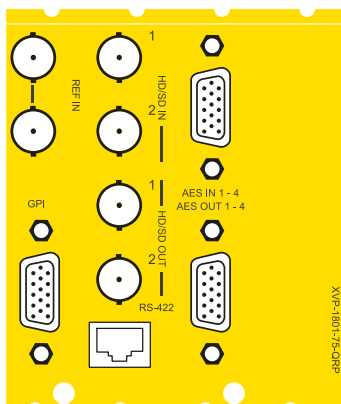
The XVP-1801-DC will pass and delay automatically all 16 channels (four groups) of embedded audio to keep lip sync. Full audio processing, shuffling, downmixing and four AES in and four AES out channels, are available as an option. A higher level of audio capabilities are provided by a range of audio processor companion cards. When connected to a DAP-1781, UAP-1783 or an AAP-1741, the XVP-1801 gains additional AES or analog audio channels while still maintaining lip sync. Depending on the audio processor selected, these boards also offer Dolby E or Dolby Digital (AC-3) for encoding or decoding, upmixing from 2.0 to 5.1, and full dynamic processing (limiter, compressor and expander).

Key Features

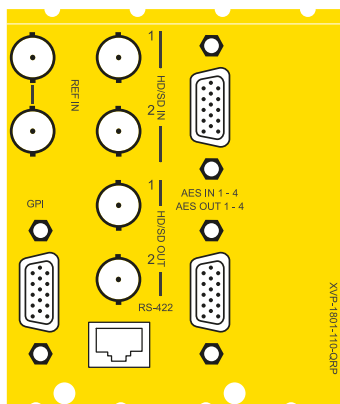
- Downconverter with frame sync
- Advanced adaptive video de-interlacing for higher image quality
- Automatic detection of film sequences
- Automatic ARC, using AFD (SMPTE ST 2016), VLI (RP-186) and WSS detection and correct re-insertion with the output
- Custom and fixed ARC presets
- Background keying capability during downconversion which allows letterbox black bars to be filled with video or graphics
- Built-in proc amp, color correction and legalizer
- Processes and converts ancillary data such as CC (608/708) and timecode
- Perfect audio/video synchronization plus additional audio fixed delay of up to 2 seconds
- Optional 16 channels of embedded full audio processing, shuffling and downmixing
- Optional 4 AES inputs and 4 AES outputs
- Dolby E compatible
- Audio metadata processing (SMPTE ST 2020-A)
- Compatible with Grass Valley audio processing cards, including the UAP-1783, AAP-1741 and DAP-1781
- Multiple presets for save and recall
- RS-422 protocol and GPI ports for automation or external device control
- Thumbnail and ALM streaming over IP
- Can be upgraded in the field to the full XVP-1801 up/down/crossconverter specification



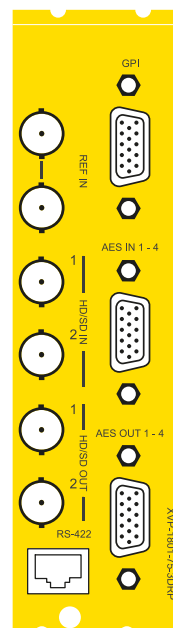
XVP-1801-DC Downconverter



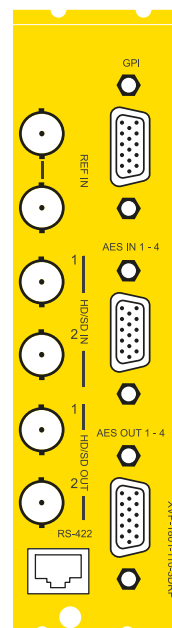
XVP-1801-75-QRP



XVP-1801-110-QRP



XVP-1801-75-3DRP



XVP-1801-110-3DRP

Specifications

Video Inputs (2)

Signal:

HD: SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)

Supported formats:

HD: SMPTE ST 274: 1080i59.94/50

HD: SMPTE ST 296: 720p59.94/50

Embedded audio: SMPTE ST 299-272

Cable length:

340m (1,115 ft.) Belden 1694A at 270 Mb/s

150m (492 ft.) Belden 1694A at 1.485 Gb/s

Return loss: >15 dB up to 1.5 GHz

Video Output

Signal: SMPTE ST 259-C (270 Mb/s)

Supported formats: SD: 480i59.94, 576i50

Embedded audio: SMPTE ST 299, SMPTE ST 272

Return loss: >15 dB up to 1.5 GHz

Jitter: <0.2 UI

Reference Input

Signal:

SMPTE ST 170/SMPTE ST 318/ITU 624-4/BUT 470-6 blackburst

SMPTE ST 274/SMPTE ST 296 tri-level sync (black)

Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits

Latency:

1 frame in all modes

Up to 6 frames of additional delay can be added

Audio Digital Inputs (4)

Sampling freq.: 32 to 96 kHz

Quantization: Up to 24 bits

AES3

Level: 0.2 to 7 Vp-p

Impedance: 110Ω balanced

AES3-id

Level: 0.2 to 2 Vp-p

Impedance: 75Ω

Return loss: 15 dB at 6 MHz

Audio Digital Outputs (4)

Sampling freq.: 48 kHz

Quantization: 24 bits

AES3

Level: 3 Vp-p

Impedance: 110Ω balanced

AES-3id

Level: 1.0 Vp-p

Impedance: 75Ω

Return loss: 15 dB at 6 MHz

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz

Number of channels: 16 (4 groups)

Freq. response: ±0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A weighted)

THD+N: -138 dB (20 Hz to 20 kHz)

Miscellaneous

Fixed delay: 0 to 2.0s

Step: 1 ms (coarse), 1 sample (fine)

GPI (8)

Connector: 15-pin D-Sub, opto-isolated

GPI in:

Input selection: 1, 2

Presets: 1, 2, 3, 4

GPI out: Provides status of selected input: 1 or 2

RS-422 (Automation)

Connector: RJ45

Signal: OXTEL Series automation protocol

ABUS Connector

As per ABUS standard, Grass Valley

Test Pattern Generator

Video:

Color bars — 100% white bar with 75% color

Audio:

Left channel pulsed 1 kHz tone

Right channel steady 1 kHz tone

Electrical

Power: 17W

XVP-1801-DC

		Output	SD	
		Input	525	625
SD	525		X	
	625			X
HD	720p50			X
	720p59.94		X	
	1080i50			X
	1080i59.94		X	



Ordering

Densité 2 frame	Densité 3 frame	Description	Options (software)	Description
XVP-1801-DC	XVP-1801-DC-3RU	HD/SD downconverter/frame sync/ARC	XVP-1801-OPT-AUD16	AES IO support and 16 channels on-board audio processing option
	XVP-1801-75-3DRP	Double rear connector panel, 75Ω	XVP-1801-OPT-K	Background key input option
	XVP-1801-110-3DRP	Double rear connector panel, 110Ω	XVP-1801-UG-DC2XVP	Upgrade from XVP-1801-DC to full XVP
XVP-1801-75-QRP		Quadruple rear connector panel, 75Ω	Options (hardware)	
XVP-1801-110-QRP		Quadruple rear connector panel, 110Ω	BOC-DE15-4BNC-1	75Ω digital audio breakout cable
			NSH15M	HD-15 to terminal block adapter
			Remote control	GV Orbit®, iControl™, iControl Solo

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

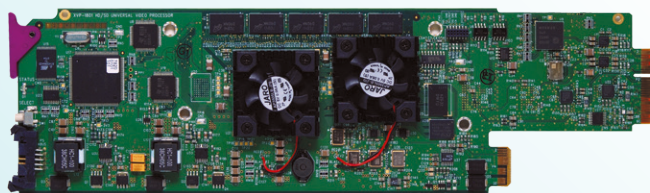
DS-PUB-3-0426A-EN

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XVP-1801

HD/SD Up/Down/ Crossconverter with AFD



Space-saving, modular platform for advanced signal processing.

The Densité® Series XVP-1801 from Grass Valley® is a high-quality, HD/SD up/down/crossconverter and video/audio signal processor, with AFD support and background keying. The superior conversion quality of the XVP at both 50 and 59.94 Hz stems from multiple technologies, including advanced motion adaptive de-interlacing and anti-ringing.

To ensure that up/downconverted television is presented in the correct aspect ratio when aired, the XVP module supports AFD (Active Format Description) SMPTE ST 2016. This provides automatic aspect ratio control using embedded control commands, and prevents on-air aspect ratio errors such as the postage stamp effect. The ARC function offers fixed presets as well as variable user configurable aspect ratios.

In addition to AFD, the XVP also supports VLI (Video Line Index) RP-186 and WSS, which allows the card to adjust its ARC automatically without any external intervention.

The module re-inserts the correct AFD, VLI or WSS on the output, along with other HANC and VANC information. With the integration of a frame sync, incoming feed signals can be synced to house, and video/audio levels adjusted using a proc and color correction, when entering the facility.

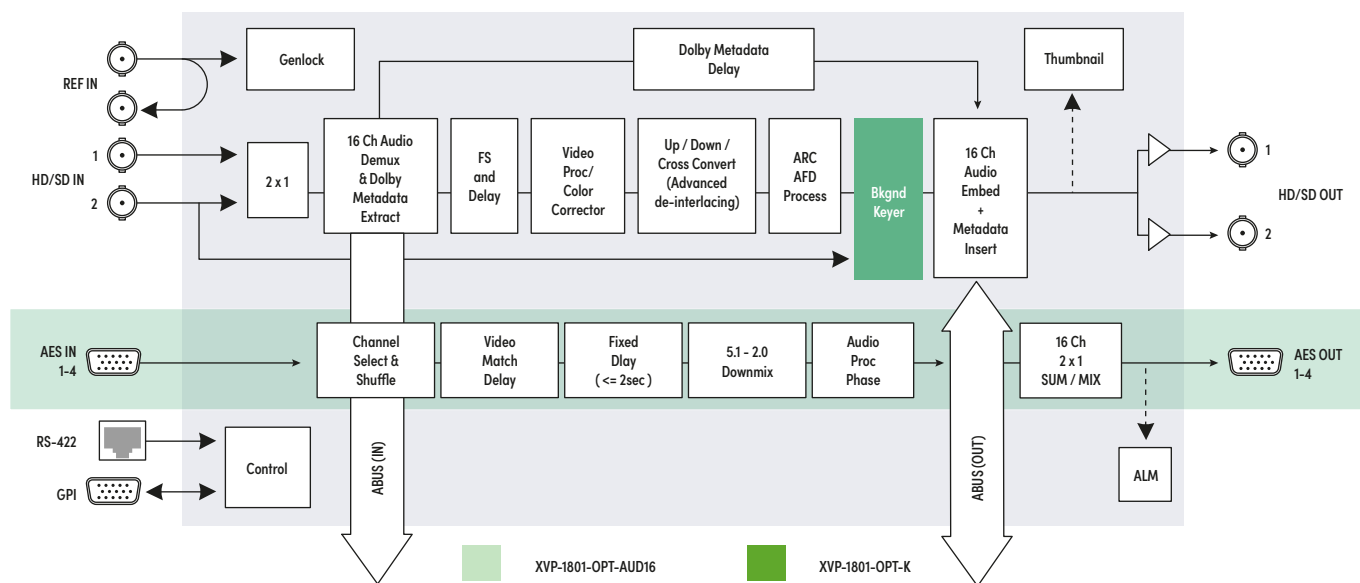
A RS-232/422 port is provided for automation control of ARC presets, and GPIs are also available for user presets.

To further improve on-air presentation, the XVP offers background keying capability which allows side panels or letterbox black bars, introduced by upconversion or downconversion, to be filled with video or graphics.

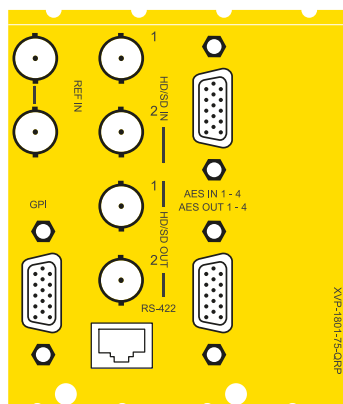
The XVP-1801 will automatically pass and delay all 16 channels (four groups) of embedded audio to keep lip sync. Full audio processing, shuffling, downmixing and four AES in and four AES out channels, are available as an option. A higher level of audio capabilities are provided by a range of audio processor companion cards. When connected to a DAP-1781, UAP-1783 or an AAP-1741, the XVP-1801 gains additional AES or analog audio channels while still maintaining lip sync. Depending on the audio processor selected, these boards also offer Dolby E or Dolby Digital for encoding or decoding, upmixing from 2.0 to 5.1, and full dynamic processing (limiter, compressor and expander).

Key Features

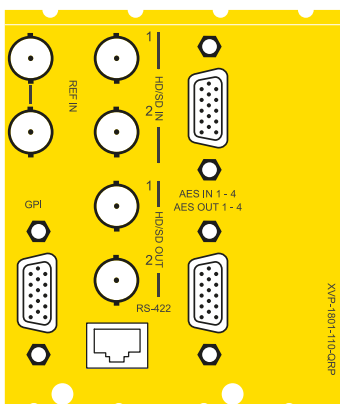
- Up/down/cross/ARC converter with frame sync
- Advanced adaptive video de-interlacing for higher image quality
- Automatic detection of film sequences
- Automatic ARC, using AFD (SMPTE ST 2016), VLI (RP-186) and WSS detection and correct re-insertion with the output
- Custom and fixed ARC presets
- Background keying capability during up or down conversion which allows side panels or letterbox black bars to be filled with video or graphic
- Built-in proc amp, color correction and legalizer
- Processes and converts ancillary data such as CC (608/708) and timecode
- Perfect audio/video synchronization plus additional audio fixed delay of up to 2 seconds
- Optional 16 channels of embedded full audio processing, shuffling and downmixing
- Optional 4 AES inputs and 4 AES outputs
- Dolby E compatible
- Audio metadata processing (SMPTE ST 2020-A)
- Compatible with Grass Valley audio processing cards, including the UAP-1783, AAP-174 and DAP-1781
- Multiple presets for save and recall
- RS-422 protocol and GPI ports for automation or external device control
- Thumbnail and ALM streaming over IP



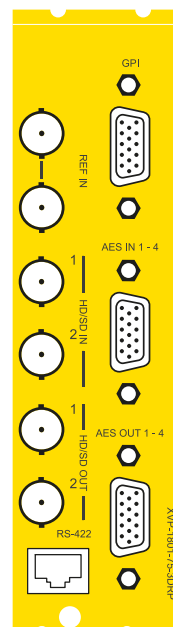
XVP-1801 HD/SD Up/Down/Cross converter



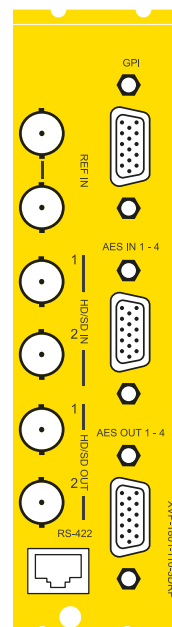
XVP-1801-75-QRP



XVP-1801-110-QRP



XVP-1801-75-3DRP



XVP-1801-110-3DRP

Specifications

Video Inputs (2)

Signal:

SD: SMPTE ST 259-C (270 Mb/s)
HD: SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)

Supported formats:

SD: SMPTE ST 125: 480i59.94
SD: EBU: 576i50
HD: SMPTE ST 274: 1080i59.94/50
HD: SMPTE ST 296: 720p59.94/50

Embedded audio: SMPTE ST 299-272

Cable length:

340m (1,115 ft.) Belden 1694A at 270 Mb/s
150m (492 ft.) Belden 1694A at 1.485 Gb/s

Return loss: >15 dB up to 1.5 GHz

Video Output

Signal:

SMPTE ST 259-C (270 Mb/s)
SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)

Supported formats:

SD: 480i59.94, 576i50
HD: SMPTE ST 274: 1080i59.94/50
HD: SMPTE ST 296: 720p59.94/50

Embedded audio: SMPTE ST 299, SMPTE ST 272

Return loss: >15 dB up to 1.5 GHz

Jitter: HD/SD: <0.2 UI

Reference Input

Signal:

SMPTE ST 170/SMPTE ST 318/ITU 624-4/BUT 470-6 blackburst
SMPTE ST 274/SMPTE ST 296 tri-level sync (black)

Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits

Latency:

1 frame in all modes
Up to 6 frames of additional delay can be added

Audio Digital Inputs (4)

Sampling freq.: 32 to 96 kHz

Quantization: Up to 24 bits

AES3

Level: 0.2 to 7 Vp-p
Impedance: 110Ω balanced

AES3-id

Level: 0.2 to 2 Vp-p
Impedance: 75Ω
Return loss: 15 dB at 6 MHz

Audio Digital Outputs (4)

Sampling freq.: 48 kHz

Quantization: 24 bits

AES3

Level: 3 Vp-p
Impedance: 110Ω balanced

AES-3id

Level: 1.0 Vp-p
Impedance: 75Ω
Return loss: 15 dB at 6 MHz

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz

Number of channels: 16 (4 groups)

Freq. response: ±0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A weighted)

THD+N: -138 dB (20 Hz to 20 kHz)

XVP-1801

Output Input		SD		HD			
		525	625	720p50	720p59.94	1080i50	1080i59.94
SD	525	X			X		X
	625		X	X		X	
HD	720p50		X	X		X	
	720p59.94	X			X		X
	1080i50		X	X		X	
	1080i59.94	X			X		X

Miscellaneous

Fixed delay: 0 to 2.0s

Step: 1 ms (coarse), 1 sample (fine)

GPI (8)

Connector: 15-pin D-Sub, opto-isolated

GPI in:

Input selection: 1, 2
Presets: 1, 2, 3, 4

GPI out: Provides status of selected input: 1 or 2

RS-422 (Automation)

Connector: RJ45

Signal: OXTEL Series automation protocol

ABUS Connector

As per ABUS standard, Grass Valley

Test Pattern Generator

Video: Color bars – 100% white bar with 75% color

Audio:

Left channel pulsed 1 kHz tone
Right channel steady 1 kHz tone

Electrical

Power: 17W



Ordering

Densité 2 frame

XVP-1801

Densité 3 frame

XVP-1801-3RU
XVP-1801-75-3DRP
XVP-1801-110-3DRP

Description

HD/SD universal video processor
Double rear connector panel, 75Ω
Double rear connector panel, 110Ω
Quadruple rear connector panel, 75Ω
Quadruple rear connector panel, 110Ω

Options (hardware)

BOC-DE15-4BNC-1
NSH15M

Related products

AAP-1741
UAP-1783
DAP-1781

Remote control

Description

75Ω digital audio breakout cable
HD-15 to terminal block adapter
4 ch. analog audio processor
8 ch. universal audio processor
8 ch. digital audio processor
GV Orbit®, iControl™, iControl Solo

Options (software)

Description

XVP-1801-OPT-K Background key input option
XVP-1801-OPT-AUD16 AES IO support and 16 channels on-board audio processing option

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

DS-PUB-3-0425A-EN

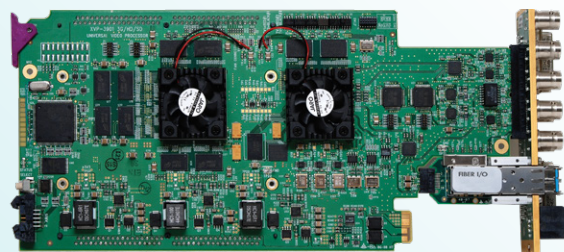
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XVP-3901-DPI

Densité Digital Program Insertion

3G/HD/SD DPI Inserter/Extractor with Frame Sync



Space-saving, modular platform for advanced signal processing.

The XVP-3901-DPI from Grass Valley® is the perfect solution for digital program insertion (DPI) applications. It embeds SMPTE ST 2010 packets containing SCTE 104 DPI messages based on GPI triggers. It can also monitor embedded SMPTE ST 2010 packets for specific SCTE 104 split request messages and triggers the appropriate GPO. All DPI events can be monitored and logged through GV Orbit®.

Using the RS-422 serial port, the XVP-3901-DPI becomes an SCTE 104 injector and it can interface with an automation system to receive and insert a wider range of SCTE 104 messages. The card will return different acknowledge messages to the automation to indicate when the message has been received and when it has been inserted. This allows tracking and logging using the automation's as-run.

The support of AFD (Active Format Description) SMPTE ST 2016, VLI (Video Line Index) RP-186 and WSS (Wide Screen Signaling) allows the card to adjust its ARC automatically without any external intervention. It will also re-insert the proper AFD, VLI or WSS on the output along with other HANC and VANC information. With the integration of the frame sync, incoming feed signals can be synched to house and have the proper ARC when entering the facility. The XVP-3901-DPI also offers a video proc-amp with full YUV/RGB level controls and RGB gamut correction.

The XVP-3901-DPI provides audio capabilities with processing of up to 32 channels of audio, with automatic delay to keep lip-sync. It provides shuffling and down-mixing and four AES inputs/outputs for additional flexibility.

The XVP-3901-DPI allows up to 10 cards to fit in a Densité® 3 frame. Two rear modules with a bypass relay, XVP-3901-75-3DRP-R and XVP-3901-110-3DRP-R-F, are available to automatically bypass the card's processing when the card loses power or if it is removed from the frame.

Rear modules names finishing with '-F' suffix have integrated fiber I/O for applications where fiber connectivity is required. A fiber input/output cartridge is offered as an option. This integrates and makes fiber connectivity easier to install and configure.

All card parameters and statuses can be controlled or monitored through GV Orbit.

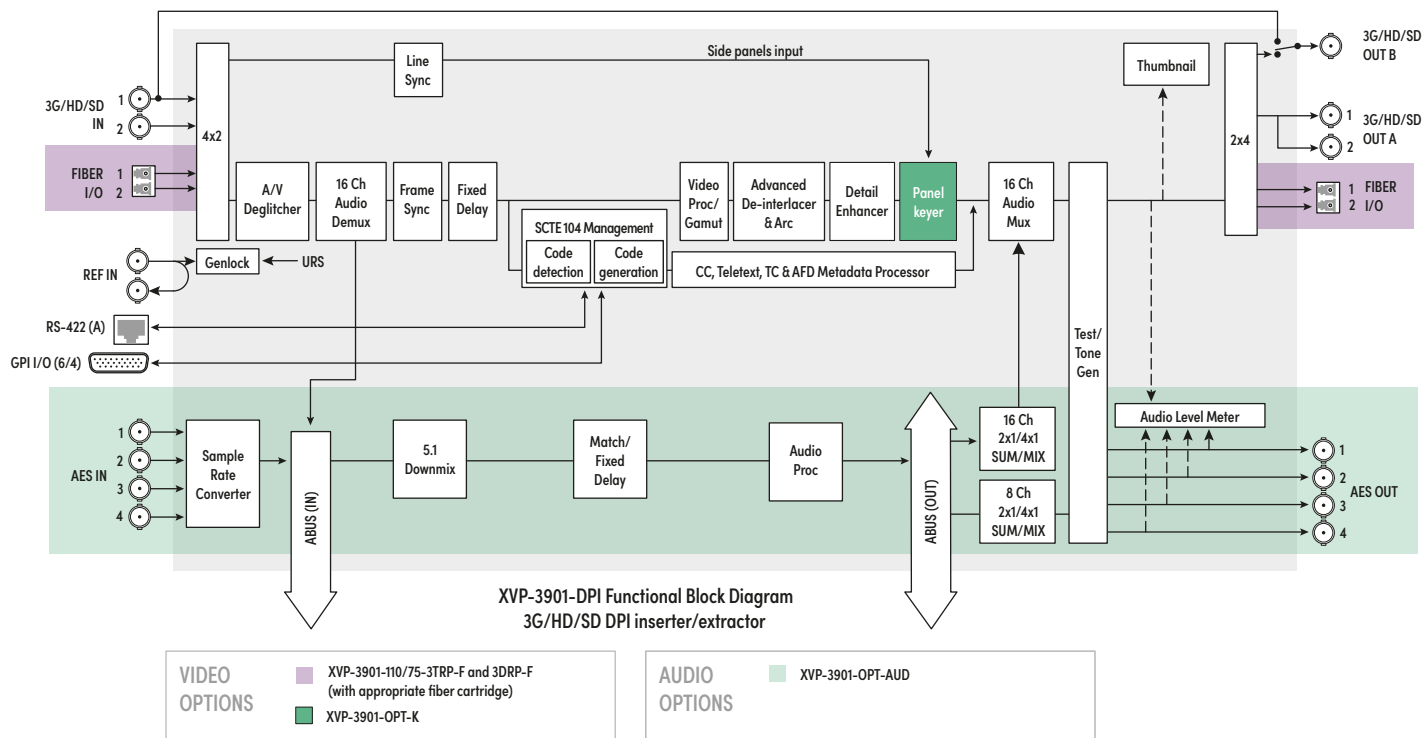
Key Features

- Inserts SCTE104 messages into VANC as per SMPTE ST 2010
- Monitors and extracts SCTE 104 packets and triggers GPI
- 6 GPI inputs and 4 GPO outputs
- Serial port for SCTE 104 serial communication with an automation system: Grass Valley Morpheus®, Floral Systems and DNF Controls GTP-32 Controls Processor
- Bypass relay on rear module (XVP-3901-75-3DRP-R, XVP-3901-110-3DRP-R-F)
- Offers a multirate 3G/HD/SD input and outputs
- Frame synchronizer and aspect ratio converter
- Supports 3G for both Level A (mapping 1) and Level B
- Flexible HD/SD/URS reference input
- Advanced video deinterlacing for higher image quality
- User-programmable additional fixed video delay up to 15 frames
- Automatic ARC using AFD (SMPTE ST 2016), video index (SMPTE RP 186) and WSS
- Custom and fixed ARC presets
- Keyer option for filling black pillars and letter box
- Built-in proc amp with YUV/RGB color correction and legalizer
- Processes and converts ancillary data such as closed-captions (CEA-608-B/CEA-708B), teletext (ETSI EN 300 706/OP-47) and timecode
- Optional optical fiber module
- Perfect audio/video synchronization plus additional audio fixed delay of up to 2 seconds
- Optional 16 channels of embedded full audio processing, shuffling and downmixing
- Offers four AES inputs and outputs

XVP-3901-DPI

Input \ Output		SD		HD				3G	
		525	625	720p50	720p59.94	1080i50	1080i59.94	1080p50	1080p59.94
SD	525	X							
	625		X						
HD	720p50			X					
	720p59.94				X				
	1080i50					X			
	1080i59.94						X		
	1080p23.98						X		
	1080pSF23.98						X		
	1080p25					X			
	1080p29.97						X		
3G	1080p50							X	
	1080p59.94								X

Video Formats Supported



Specifications

Video Input (2) / Output (2)

Signal:

SMPTE ST 259-C (270 Mb/s)
SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
SMPTE ST 424 (2.970, 2.970/1.001 Gb/s)

Supported formats:

SD: 480i59.94, 576i50
HD: SMPTE ST 274: 1080i59.94, 1080i50
HD: SMPTE ST 296: 720p59.94, 720p50
3G: SMPTE ST 425 level A (mapping 1), level B: 1080p59.94, 1080p50

Cable length*:

300 m Belden 1694A at 270 Mb/s
150 m Belden 1694A at 1.485 Gb/s
120 m Belden 1694A at 2.970 Gb/s

Return loss*:

>15 dB up to 3 GHz
Jitter:
HD/SD: <0.2 UI (alignment jitter)
3G: <0.3 UI (alignment jitter)

Reference Input

Signal:

SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst
SMPTE ST 274/SMPTE ST 296 tri-level sync
Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits minimum

Latency: 1 frame in all modes

Additional delay: up to 15 frames

Audio Input (4)

Sampling freq.: 32 to 96 kHz

Quantization: up to 24 bits

AES3

Level: 0.2 to 7 Vp-p
Input impedance: 110Ω balanced

AES3-Id

Level: 0.2 to 2 Vp-p
Input impedance: 75Ω
Return loss: 15 dB at 6 MHz

Audio Output (4)

Sampling freq.: 48 kHz

Quantization: 24 bits

AES3

Level: 2.75 Vp-p
Impedance: 110Ω balanced

AES-3Id

Level: 1.0 Vp-p
Impedance: 75Ω
Return loss: 15 dB at 6 MHz

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz, synchronous

Number of channels: 16, 8 pairs, 4 groups

Freq. response: ±0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A-weighted)

THD-N: -138 dB (20 Hz to 20 kHz)

Miscellaneous

Fixed delay: 0 to 2.0s

Step: 1 ms (coarse), 1 sample (fine)

GPI (6 In, 4 Out)

Connector: 26-pin D-Sub, opto-isolated

RS-422 A (Automation)

Connector: RJ-45

Signal: Automation protocol

ABUS Connector

As per ABUS standard, Grass Valley

Fiber

Full specifications available on SFP optical plug-in cartridges webpage and datasheet.

Test Pattern Generator

Video: Color bars - 100% white bar with 75% color

Audio:

Left channel pulsed 1 kHz tone

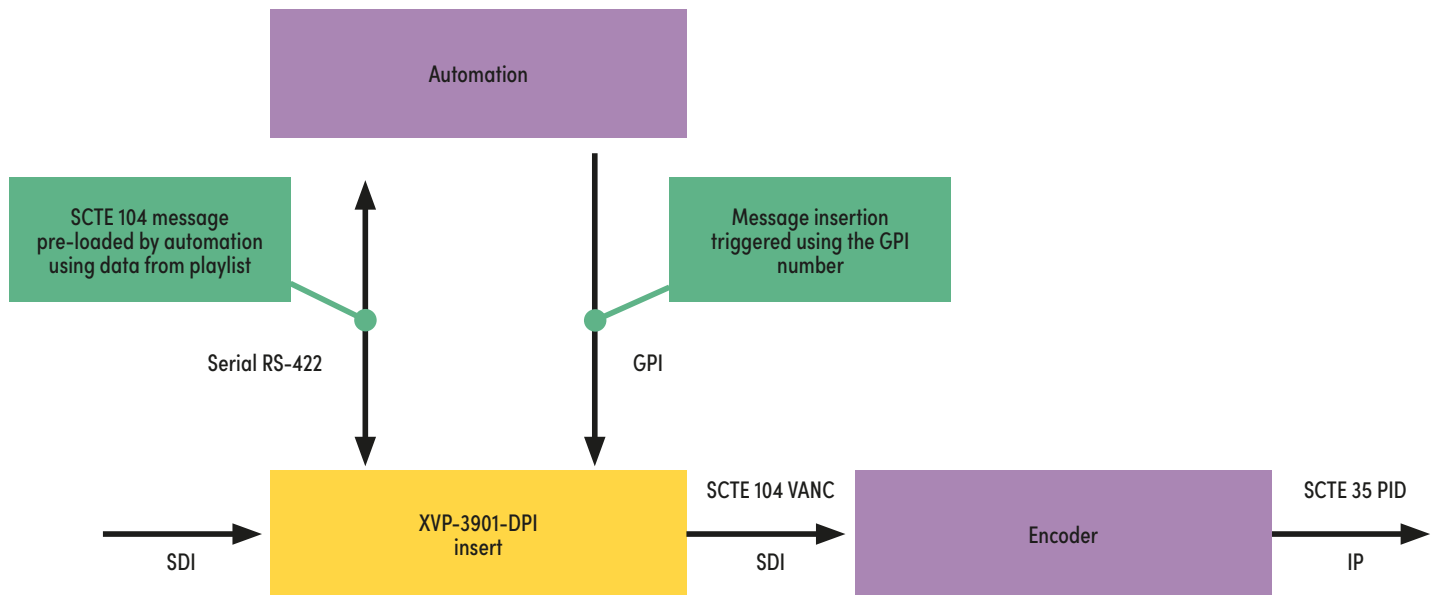
Right channel steady 1 kHz tone

Electrical

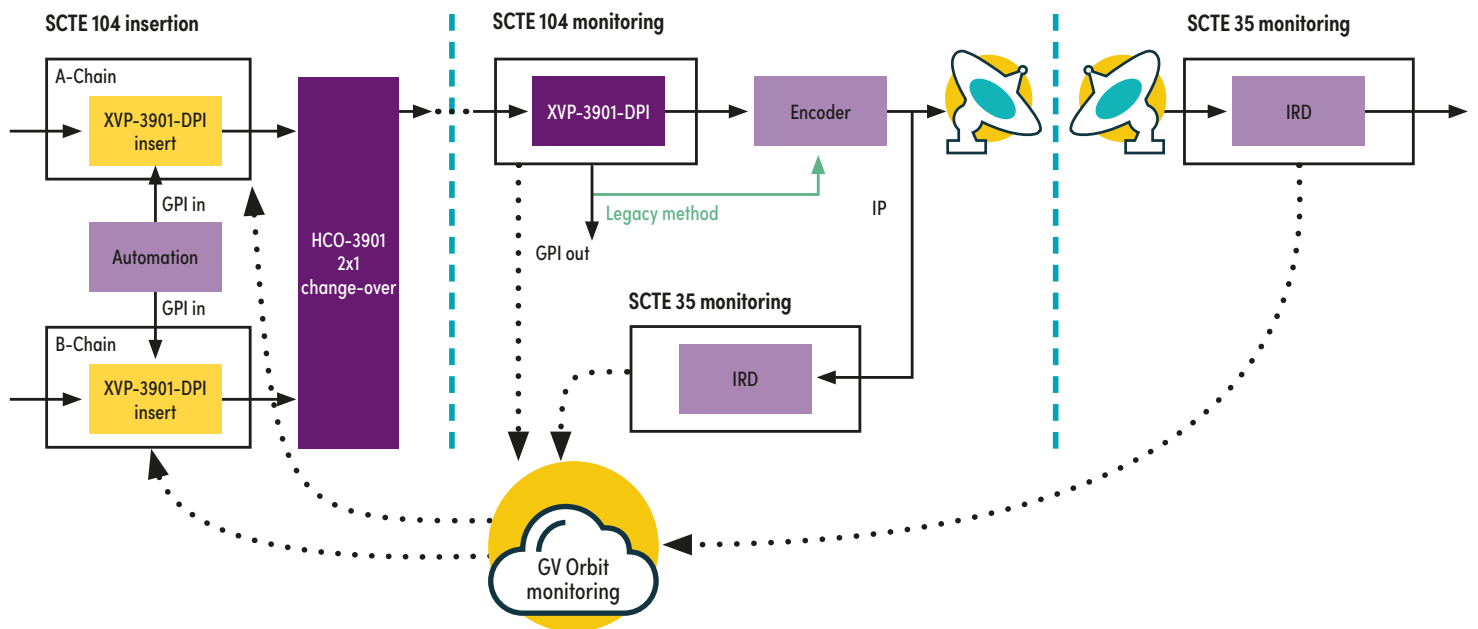
Power: 25W

* Cable length and return loss specifications will be reduced when using the output protected by the bypass relay on XVP-3901-110/75-3DRP-R rears. Refer to the manual for more detail.

Advanced SCTE 104 Insertion Using Automation



Fixed Splice Message Insertion Triggered by GPI



Ordering

Densité 3 Frame

XVP-3901-DPI

3G/HD/SD DPI inserter/extractor

XVP-3901-75-3DRP-R

Double-slot-width panel with 75Ω audio and bypass relay

XVP-3901-110-3DRP-R-F

Double-slot-width panel with 110Ω audio, bypass relay and fiber I/O

Options (software)

XVP-3901-OPT-AUD

AES IO support and 16 channels on-board audio processing option

XVP-3901-OPT-K

Background key input option

Options (hardware)

SFP-R-LC

Single fiber Rx (input) cartridge with LC/PC connector

SFP-RR-LC

Dual fiber Rx (input) cartridge with LC/PC connector

SFP-RT-S13-LC

Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector

Other types of SFP Optical Plug-In Cartridges may be available for this product.

Please visit SFP page at www.grassvalley.com more information.

NSH26M

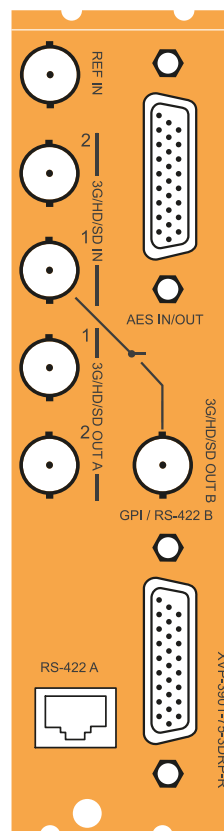
HD-26 to terminal block adapter

BOC-DA26-8BNC-1

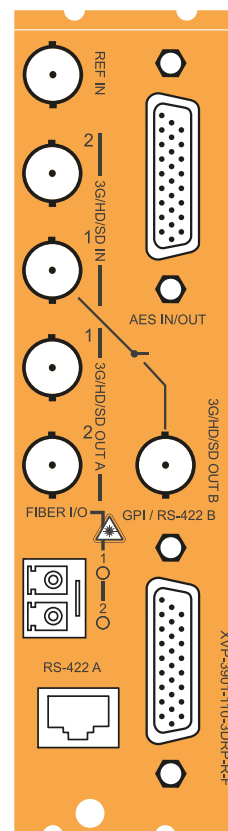
75Ω digital audio breakout cable

Remote control

GV Orbit, iControl™, iControl Solo



XVP-3901-75-3DRP-R



XVP-3901-110-3DRP-R-F

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

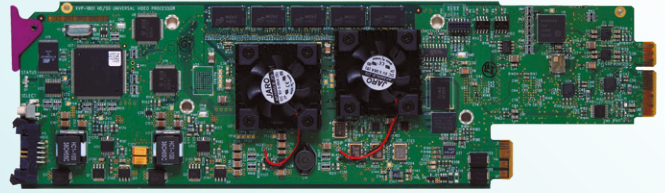
DS-PUB-3-0204A-EN

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XVP-1801-UC

HD Upconverter/ Frame Sync/ARC



Space-saving, modular platform for advanced signal processing.

The Densité® Series XVP-1801-UC from Grass Valley® provides high-quality upconversion and frame synchronization. It offers many advanced features, including AFD support and background keying, with optional 16 channel embedded audio processing. The superior conversion quality of the XVP at both 50 and 59.94 Hz stems from multiple technologies, including advanced motion adaptive de-interlacing and anti-ringing.

To ensure that upconverted television is presented in the correct aspect ratio when aired, the XVP module supports AFD (Active Format Description) SMPTE ST 2016. This provides automatic aspect ratio control using embedded control commands, and this prevents on-air aspect ratio errors such as the postage stamp effect. The ARC function offers fixed presets as well as variable user configurable aspect ratios.

In addition to AFD, the XVP also supports VLI (Video Line Index) RP-186 and WSS, which allows the card to adjust its ARC automatically without any external intervention. The module re-inserts the correct AFD, VLI or WSS on the output, along with other HANC and VANC information. With the integration of a frame sync, incoming feed signals can be synched to house, and video/ audio levels adjusted using a proc and color correction, when entering the facility.

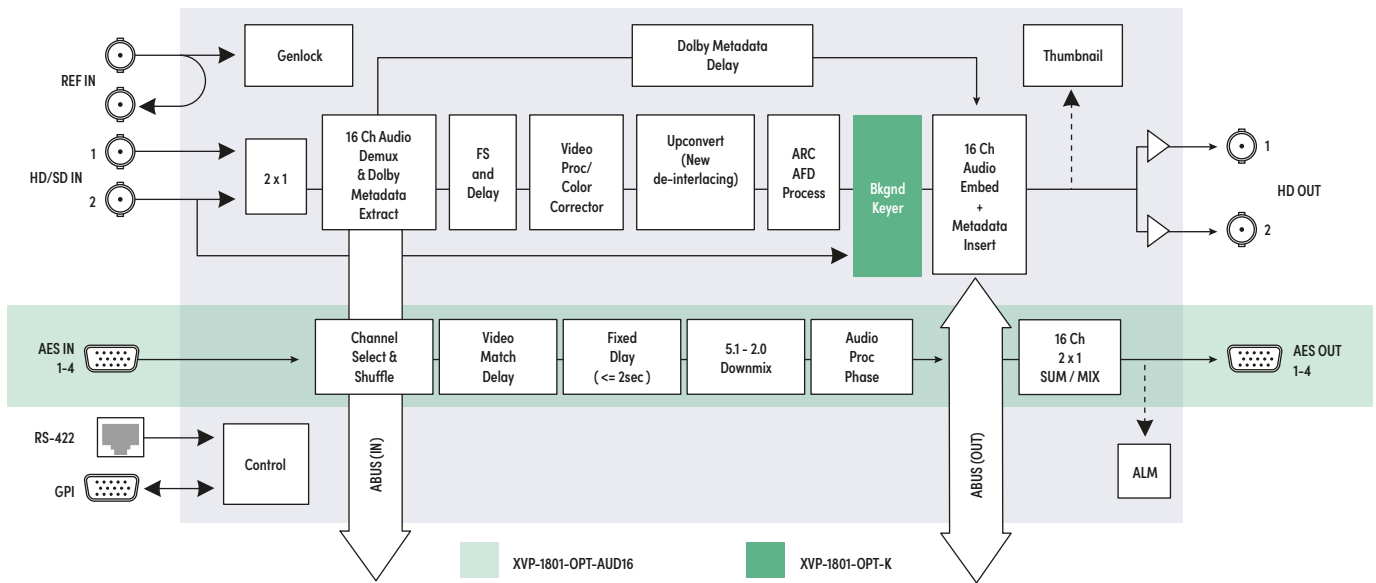
An RS-232/422 port is provided for automation control of ARC presets, and GPIs are also available for user presets.

To further improve on-air presentation, the XVP offers a background keying capability which allows side panels, introduced by upconversion, to be filled with video or graphics.

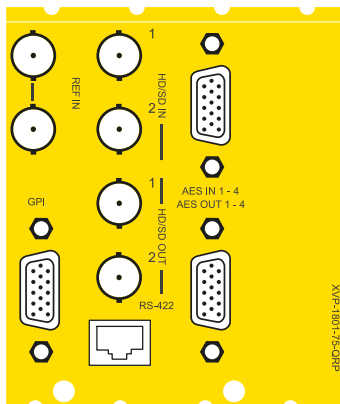
The XVP-1801-UC will pass and delay automatically all 16 channels (four groups) of embedded audio to keep lip sync. Full audio processing, shuffling, downmixing and four AES in and four AES out channels, are available as an option. A higher level of audio capabilities are provided by a range of audio processor companion cards. When connected to a DAP-1781, UAP-1783 or an AAP-1741, the XVP-1801 gains additional AES or analog audio channels while still maintaining lip sync. Depending on the audio processor selected, these boards also offer Dolby E or Dolby Digital (AC-3) for encoding or decoding, upmixing from 2.0 to 5.1, and full dynamic processing (limiter, compressor and expander).

Key Features

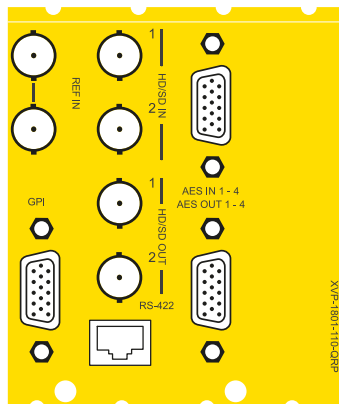
- Upconverter with frame sync
- Advanced adaptive video de-interlacing for higher image quality
- Automatic detection of film sequences
- Automatic ARC, using AFD (SMPTE ST 2016), VLI (RP-186) and WSS detection and correct re-insertion with the output
- Custom and fixed ARC presets
- Background keying capability during up or down conversion which allows side panels or letterbox black bars to be filled with video or graphics
- Built-in proc amp, color correction and legalizer
- Processes and converts ancillary data such as CC (608/708) and timecode
- Perfect audio/video synchronization plus additional audio fixed delay of up to 2 seconds
- Optional 16 channels of embedded full audio processing, shuffling and downmixing
- Optional 4 AES inputs and 4 AES outputs
- Dolby E compatible
- Audio metadata processing (SMPTE ST 2020-A)
- Compatible with Grass Valley audio processing cards, including the UAP-1783, AAP-174 and DAP-1781
- Multiple presets for save and recall
- RS-422 Protocol and GPI ports for automation or external device control
- Thumbnail and ALM streaming over IP
- Can be upgraded in the field to the full XVP-1801 up/down/crossconverter specification



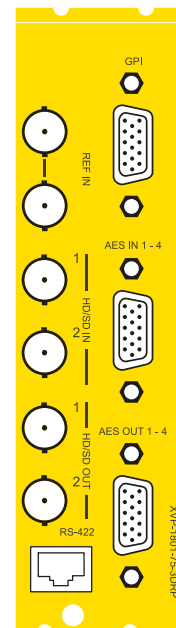
XVP-1801-UC HD Upconverter



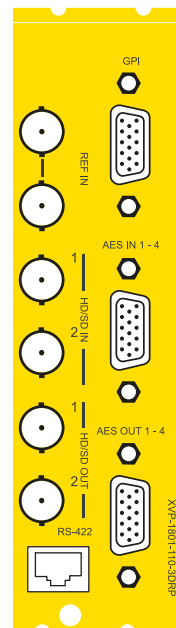
XVP-1801-75-QRP



XVP-1801-110-QRP



XVP-1801-75-3DRP



XVP-1801-110-3DRP

Specifications

Video Inputs (2)

Signal:

SD: SMPTE ST 259-C (270 Mb/s)

Supported formats:

SD: SMPTE ST 125: 480i59.94

SD: EBU: 576i50

Embedded audio: SMPTE ST 299-272

Cable length: 340m (1,115 ft.) Belden 1694A at 270 Mb/s

Return loss: >15 dB up to 1.5 GHz

Video Output

Signal: SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)

Supported formats:

HD: SMPTE ST 274: 1080i59.94/50

HD: SMPTE ST 296: 720p59.94/50

Embedded audio: SMPTE ST 299, SMPTE ST 272

Return loss: >15 dB up to 1.5 GHz

Jitter: <0.2 UI

Reference Input

Signal: SMPTE ST 170/SMPTE ST 318/ITU 624-4/BUT 470-6 blackburst

Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits

Latency:

1 frame in all modes

Up to 6 frames of additional delay can be added

Audio Digital Inputs (4)

Sampling freq.: 32 to 96 kHz

Quantization: Up to 24 bits

AES3

Level: 0.2 to 7 Vp-p

Impedance: 110Ω balanced

AES3-id

Level: 0.2 to 2 Vp-p

Impedance: 75Ω

Return loss: 15 dB at 6 MHz

Audio Digital Outputs (4)

Sampling freq.: 48 kHz

Quantization: 24 bits

AES3

Level: 3 Vp-p

Impedance: 110Ω balanced

AES-3id

Level: 1.0 Vp-p

Impedance: 75Ω

Return loss: 15 dB at 6 MHz

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz

Number of channels: 16 (4 groups)

Freq. response: ±0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A weighted)

THD+N: -138 dB (20 Hz to 20 kHz)

Miscellaneous

Fixed delay: 0 to 2.0s

Step: 1 ms (coarse), 1 sample (fine)

GPI (8)

Connector: 15-pin D-Sub, opto-isolated

GPI in:

Input selection: 1, 2

Presets: 1, 2, 3, 4

GPI out: Provides status of selected input: 1 or 2

RS-422 (Automation)

Connector: RJ45

Signal: OXTEL Series automation protocol

ABUS Connector

As per ABUS standard, Grass Valley

Test Pattern Generator

Video: Color bars — 100% white bar with 75% color

Audio:

Left channel pulsed 1 kHz tone

Right channel steady 1 kHz tone

Electrical

Power: 17W

XVP-1801-UC

Input \ Output		HD			
		720p50	720p59.94	1080i50	1080i59.94
SD	525		X		X
	625	X		X	
HD	720p50	X		X	
	720p59.94		X		X
	1080i50	X		X	
	1080i59.94		X		X



Ordering

Densité 2 frame

XVP-1801-UC

XVP-1801-75-QRP

XVP-1801-110-QRP

Options (software)

XVP-1801-OPT-AUD16

XVP-1801-OPT-K

XVP-1801-UG-UC2XVP

Options (hardware)

BOC-DE15-4BNC-1

NSH15M

Remote control

Densité 3 frame

XVP-1801-UC-3RU

XVP-1801-75-3DRP

XVP-1801-110-3DRP

Description

AES IO support and 16 channels on-board audio processing option

Background key input option

HD/SD Upconverter/Frame Sync/ARC

75Ω digital audio breakout cable

HD-15 to terminal block adapter

GV Orbit®, iControl™, iControl Solo

Description

HD/SD Upconverter/Frame Sync/ARC

Double rear connector panel, 75Ω

Double rear connector panel, 110Ω

Quadruple rear connector panel, 75Ω

Quadruple rear connector panel, 110Ω

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

DS-PUB-3-0429B-EN

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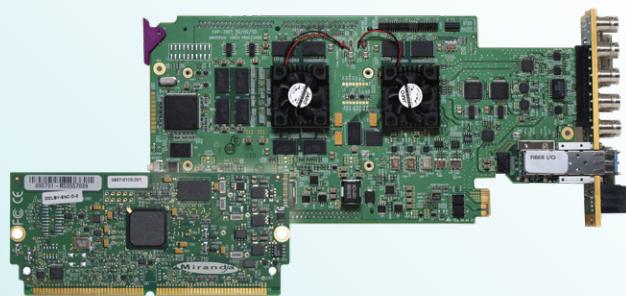
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XVP-3901

Densité Up/Down/ Crossconversion

3G/HD/SD Up/Down/Crossconverter with Optional Audio Processor

The all-in-one processing family that simplifies integration, reduces space, cabling and overall costs.



The award-winning XVP-3901 family from Grass Valley delivers all essential video and audio signal processing functions on a single module. It offers up/down/crossconversion, with simultaneous 3G, HD and SD outputs. There's also integral fiber I/O, full AFD support and background keying.

The processor performs all the up/down/crossconversion, color space and aspect ratio conversion needed to maintain the chosen output formatting, irrespective of whether the input is 3G (Level A or B), HD 1080i, HD 720p or SD.

High quality up/down/crossconversion is performed at both 50 and 59.94 Hz, based on multiple sophisticated processing technologies. These include detail enhancement, pixel-based de-interlacing, and advanced motion adaptive de-interlacing and anti-ringing.

To ensure that the upconverted or downconverted video is delivered in the correct aspect ratio when aired, the XVP-3901 fully supports AFD. This provides automatic aspect ratio and video size control using embedded

commands, and it prevents on-air aspect ratio errors such as the postage stamp effect.

Frame accurate Aspect Ratio Conversion (ARC) can be performed automatically, using embedded signaling based on the Active Format Description (AFD) standard. AFD data can be easily embedded in a signal by the Densité XVP processor family, and by the EAP-3901 embedder. With AFD, original image information is maintained throughout the entire conversion process for optimal viewing following 4:3 and 16:9 aspect ratio conversion.

For example, processing three input source formats (16:9 HD, 16:9 SD and 4:3 SD) in a typical HD/SD hybrid plant results in six different output possibilities. However, using automatic aspect ratio control based on AFD prevents any ARC errors that may occur with manual control.

A background keying capability allows side panels (or top and bottom panels) to be filled with graphics to improve on-air presentation.

A fiber input/output plug-in cartridge option significantly simplifies fiber

installation and configuration. When the fiber cartridge is fitted, the card can select between fiber and BNC inputs and can output both electrical and optical signals simultaneously. The processor's audio capabilities are equally advanced, with processing of up to 32 channels of audio, with automatic delay to keep lip sync. The processor provides shuffling and downmixing, and options include automatic loudness control (ALC), dynamic processing (limiter, compressor and expander), loudness metering and four AES inputs/outputs for additional flexibility.

The XVP-3901 has two on-board sockets for optional modules, including Dolby E encoding, Dolby Digital (AC-3) encoding, Dolby E/Dolby Digital (AC-3) decoding, and upmixing using Linear Acoustic upMAX technology. Grass Valley also offers two modules that provide automatic loudness control. These modules feature award-winning technologies such as AEROMAX by Linear Acoustic which is capable of maintaining constant loudness (ALC) across different audio programs.

Key Features

Video

- Up/down/cross/ARC converter with frame sync (50/59.94 Hz)
- Offers a multirate 3G/HD/SD input and simultaneous 3G/HD/SD outputs (XVP-3901 full version only)
- Options for upconverter only, or downconverter only versions, including all other XVP processing features
- Supports 3G level A (mapping 1) and level B
- Flexible HD/SD/URS reference input
- Advanced video de-interlacing for best image quality
- One frame of processing delay for all conversions
- Automatic ARC using AFD (SMPTE ST 2016), video index (SMPTE RP 186) and WSS
- Custom and fixed ARC presets
- Keyer option for filling black pillars and letter box
- Built-in proc amp with YUV/RGB color correction and legalizer

- Processes and converts ancillary data such as CC (CEA-608/CEA-708), timecode, teletext/OP-47 and SCTE-104 (SMPTE ST 2010)
- Inserts V-Chip and CGMS in XDS of CC (CEA-608)
- Optional SFP optical plug-in cartridges to select between fiber and BNC inputs and output both electrical and optical signals simultaneously
- Serial and GPIO ports for automation control
- Dual fingerprint generation to monitor lip sync on SD and HD outputs

Optional Audio

- 16 channels embedded audio processing (32 channels internal)
- 4 AES inputs, 4 AES outputs
- Automation capabilities based on audio signal type detection
- Audio downmix: 5.1 surround to Lt/Rt or Lo/Ro
- Optional audio dynamic processor (compressor/limiter/expander)

- Optional automatic loudness control (ALC) with Grass Valley wideband processing (on-board)
- Optional loudness measurement of up to four audio programs and logging with GV Orbit for end-to-end loudness monitoring solutions
- Loudness solution compliant to EBU R128, A/85 ITU-R BS.1770-3 and ARIB TR-B32
- Dolby E compatible
- Audio metadata processing (SMPTE ST 2020-A)
- Perfect audio/video sync plus additional audio user delay of up to 2 seconds
- Compatible with Grass Valley audio processing cards using ABUS
- On-board socket for two optional module expansions:
 - Dolby E and Dolby Digital decoder
 - Dolby Digital and Dolby Digital Plus encoder
 - Dolby E encoder
 - Linear Acoustic upMAX
 - Linear Acoustic AEROMAX automatic loudness control

XVP-3901 is also available with reduced feature set for applications requiring just upconversion or downconversion to provide the ideal cost to features balance. All cut-down versions can be upgraded to full XVP-3901 specification at a later date if required.

There are many benefits to the XVP-3901's high level of feature integration. A lower purchase cost per channel

is obviously highly desirable but there are many other dimensions to cost savings that are readily achievable. These include reduced space and cooling costs, less cabling and a reduced spares inventory. By simplifying video and audio synchronization, and reducing the number of vendors, system integration is also simplified significantly.

XVP-3901

Input \ Output		SD		HD				3G	
		525	625	720p50	720p59.94	1080i50	1080i59.94	1080p50	1080p59.94
SD	525	X			X		X		X
	625		X	X		X		X	
HD	720p50		X	X		X		X	
	720p59.94	X			X		X		X
	1080i50		X	X		X		X	
	1080i59.94	X			X		X		X
	1080p23.98	X			X		X		X
	1080pSF23.98	X			X		X		X
	1080p25		X	X		X		X	
	1080p29.97	X			X		X		X
3G	1080p50		X	X		X		X	
	1080p59.94	X			X		X		X

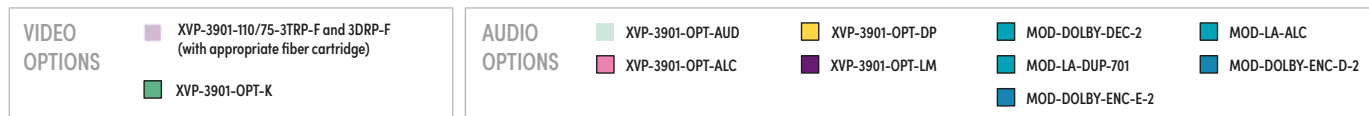
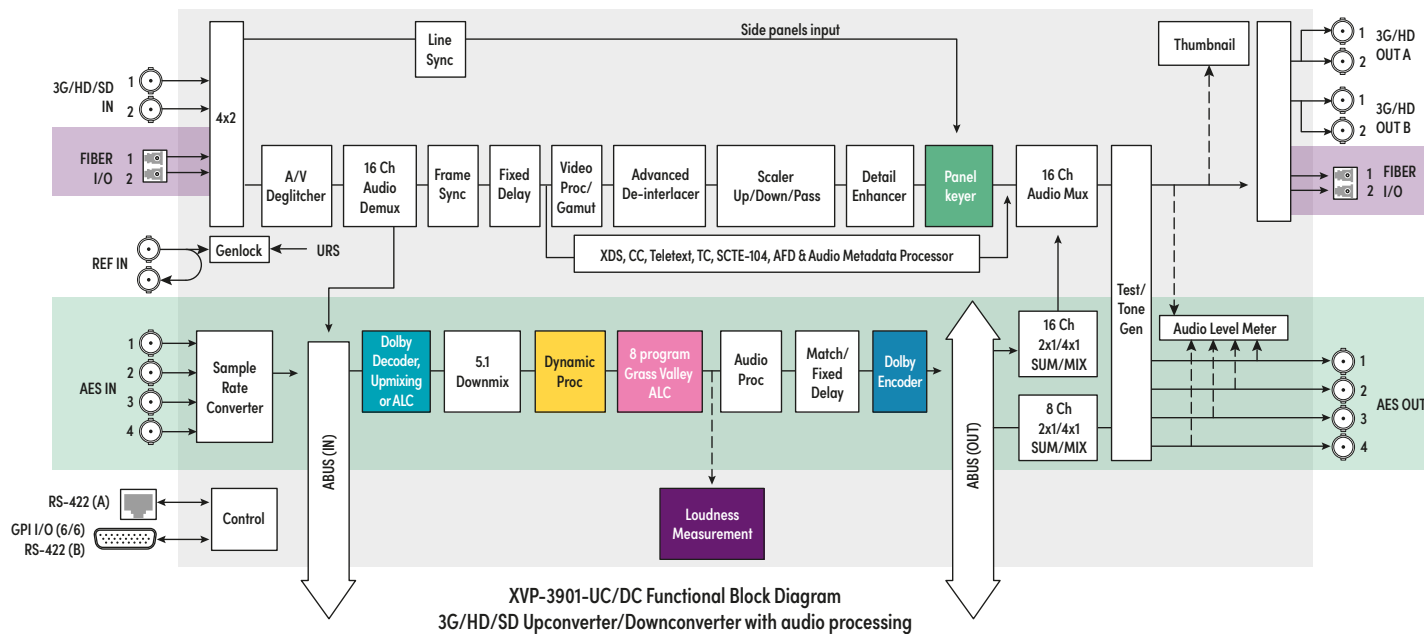
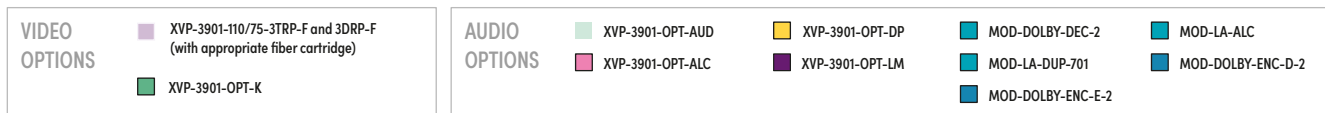
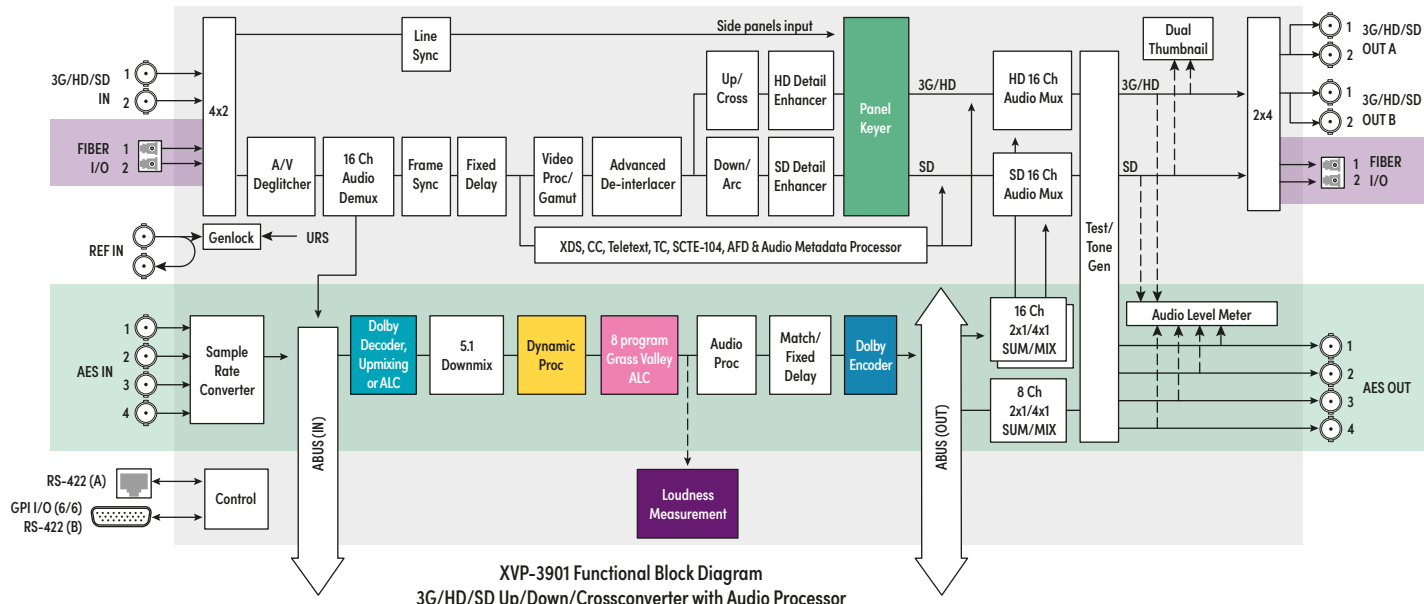
Video Formats Supported.

XVP-3901-UC							
Input \ Output		HD				3G	
		720p50	720p59.94	1080i50	1080i59.94	1080p50	1080p59.94
SD	525		X		X		X
	625	X		X		X	
HD	720p50	X					
	720p59.94		X				
	1080i50			X			
	1080i59.94				X		
	1080p23.98				X		
	1080pSF23.98				X		
	1080p25			X			
	1080p29.97				X		
3G	1080p50					X	
	1080p59.94						X

Video Formats Supported.

XVP-3901-DC			
Input \ Output		SD	
		525	625
SD	525	X	
	625		X
HD	720p50		X
	720p59.94	X	
	1080i50		X
	1080i59.94	X	
	1080p23.98	X	
	1080pSF23.98	X	
	1080p25		X
	1080p29.97	X	
3G	1080p50		X
	1080p59.94	X	

Video Formats Supported.



Specifications

Video Input (2) / Output (2)

Signal:

SMPTE ST 259-C (270 Mb/s)
SMPTE ST 292 (1.485, 1.485/ 1.001 Gb/s)
SMPTE ST 424 (2.970, 2.970/ 1.001 Gb/s)

Supported formats:

SD: 480i59.94, 576i50
HD: SMPTE ST 274: 1080i59.94/50
HD: SMPTE ST 296: 720p59.94/50
3G: SMPTE ST 425 level A (mapping 1), level B: 1080p59.94/50

Cable length:

300m (984 ft.) Belden 1694A at 270 Mb/s
150m (492 ft.) Belden 1694A at 1.485 Gb/s
120m (393 ft.) Belden 1694A at 2.970 Gb/s

Return loss: >15 dB up to 3 GHz

Jitter:

HD/SD: <0.2 UI (alignment jitter)
3G: <0.3 UI (alignment jitter)

Reference Input

Signal:

SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst
SMPTE ST 274/SMPTE ST 296 tri-level sync

Return loss: >35 dB up to 5.75 MHz

Video Processing Performance

Signal path: 10 bits minimum

Latency: 1 frame in all modes

Additional delay: up to 15 frames

Audio Input (4)

Sampling freq.: 32 to 96 kHz

Quantization: up to 24 bits

AES3

Level: 0.2 to 7 Vp-p
Impedance: 110Ω balanced

AES3-id

Level: 0.2 to 2 Vp-p
Impedance: 75Ω
Return loss: 15 dB at 6 MHz

Audio Output (4)

Sampling freq.: 48 kHz

Quantization: 24 bits

AES3

Level: 2.75 Vp-p
Impedance: 110Ω balanced

AES3-id

Level: 1.0 Vp-p
Impedance: 75Ω
Return loss: 15 dB at 6 MHz

Audio Processing Performance

Quantization: 24 bits

Sampling: 48 kHz, synchronous

Number of channels: 16, 8 pairs, 4 groups

Freq. response: ±0.02 dB (20 Hz to 20 kHz)

SNR: 123 dB (A-weighted)

THD-N: -138 dB (20 Hz to 20 kHz)

Miscellaneous

Fixed delay: 0 to 2.0 s

Step: 1 ms (coarse), 1 sample (fine)

GPI

Connector: 26-pin D-Sub, optoisolated

GPI in: Input selection: 1-2

Presets: 1-4

GPI out: Selected input: 1-2

Selected preset: 1-4

RS-422 A (automation)

Connector: RJ-45

Signal: OXTEL series automation protocol

RS-422 B (audio metadata)

Connector: 26-pin D-Sub

Signal: RDD6

ABUS Connector

As per ABUS standard, Grass Valley

Fiber

Full specifications available on SFP optical plug-in cartridges webpage and datasheet.

Test Pattern Generator

Video: Color bars - 100% white bar with 75% color

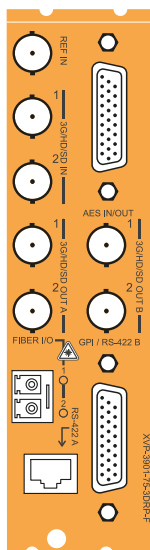
Audio:

Left channel pulsed 1 kHz tone

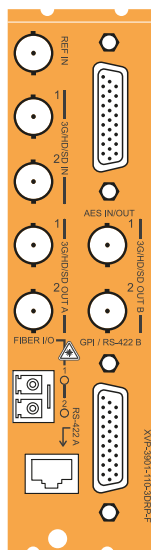
Right channel steady 1 kHz tone

Electrical

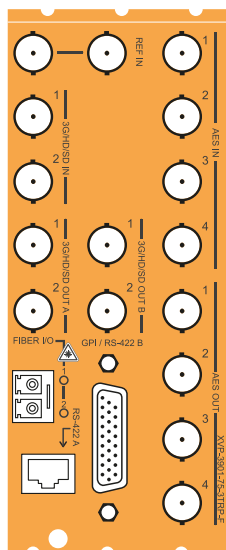
Power: 25W



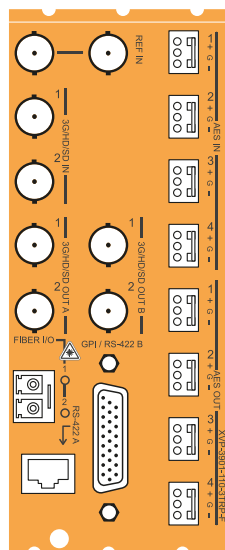
XVP-3901-75-3DRP-F



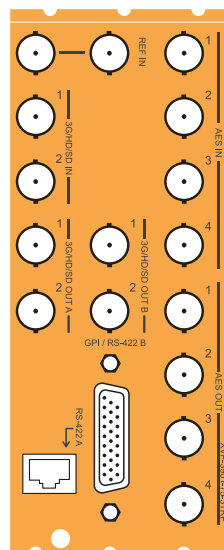
XVP-3901-110-3DRP-F



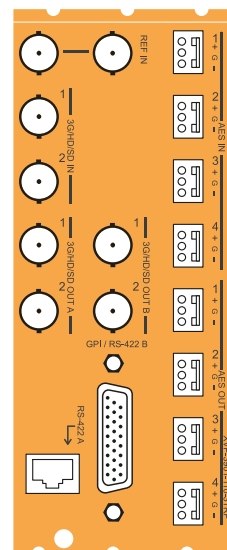
XVP-3901-75-3TRP-F



XVP-3901-110-3TRP-F



XVP-3901-75-3TRP



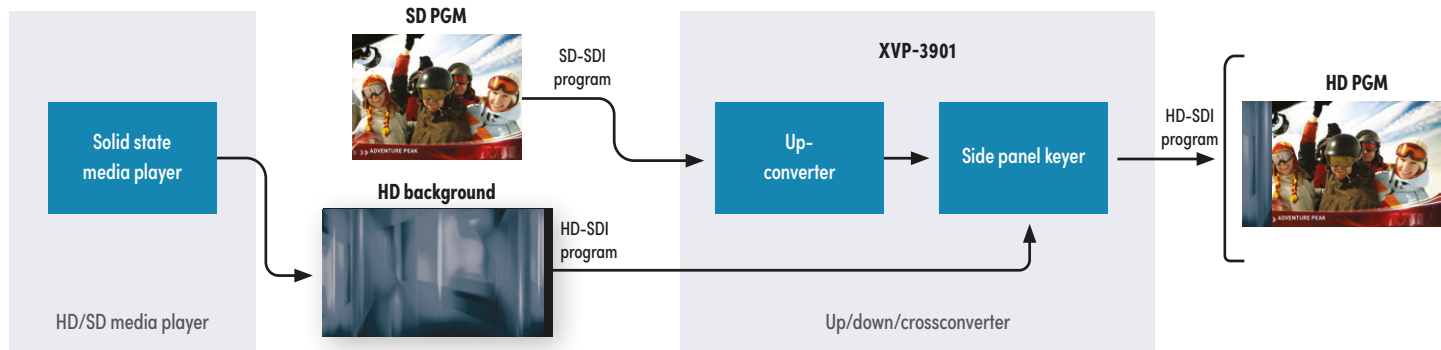
XVP-3901-110-3TRP

Up/Downconversion with Background Keying

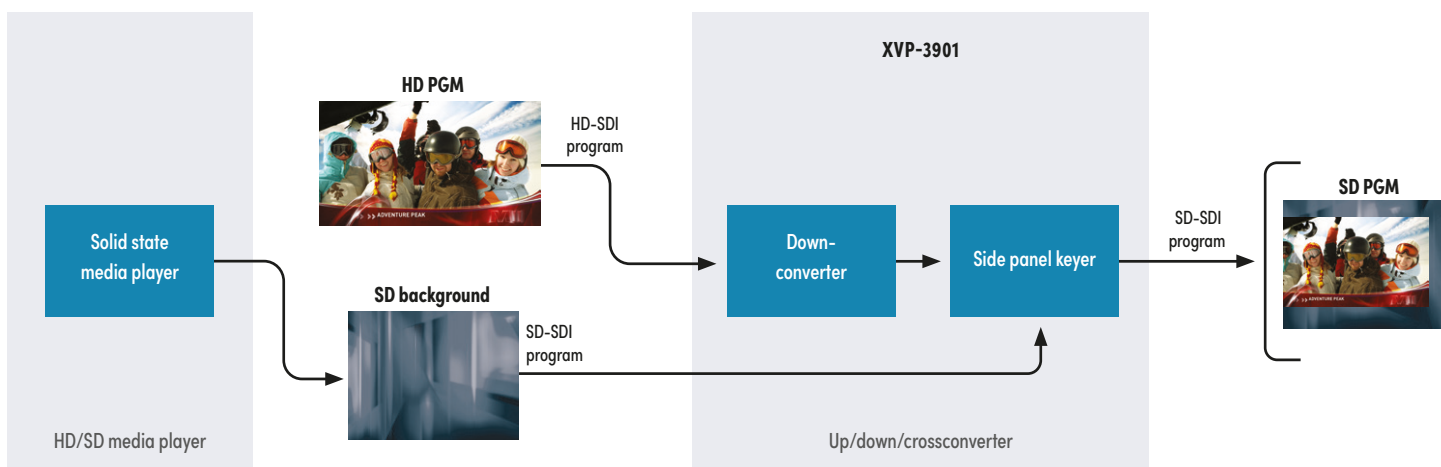
Up/downconversion with background keying using XVP-3901:

The XVP family of interfaces features a background keying capability which allows side panels or letterbox black bars, introduced by upconversion or downconversion, to be filled with video or graphics.

Upconversion with background keying using XVP-3901



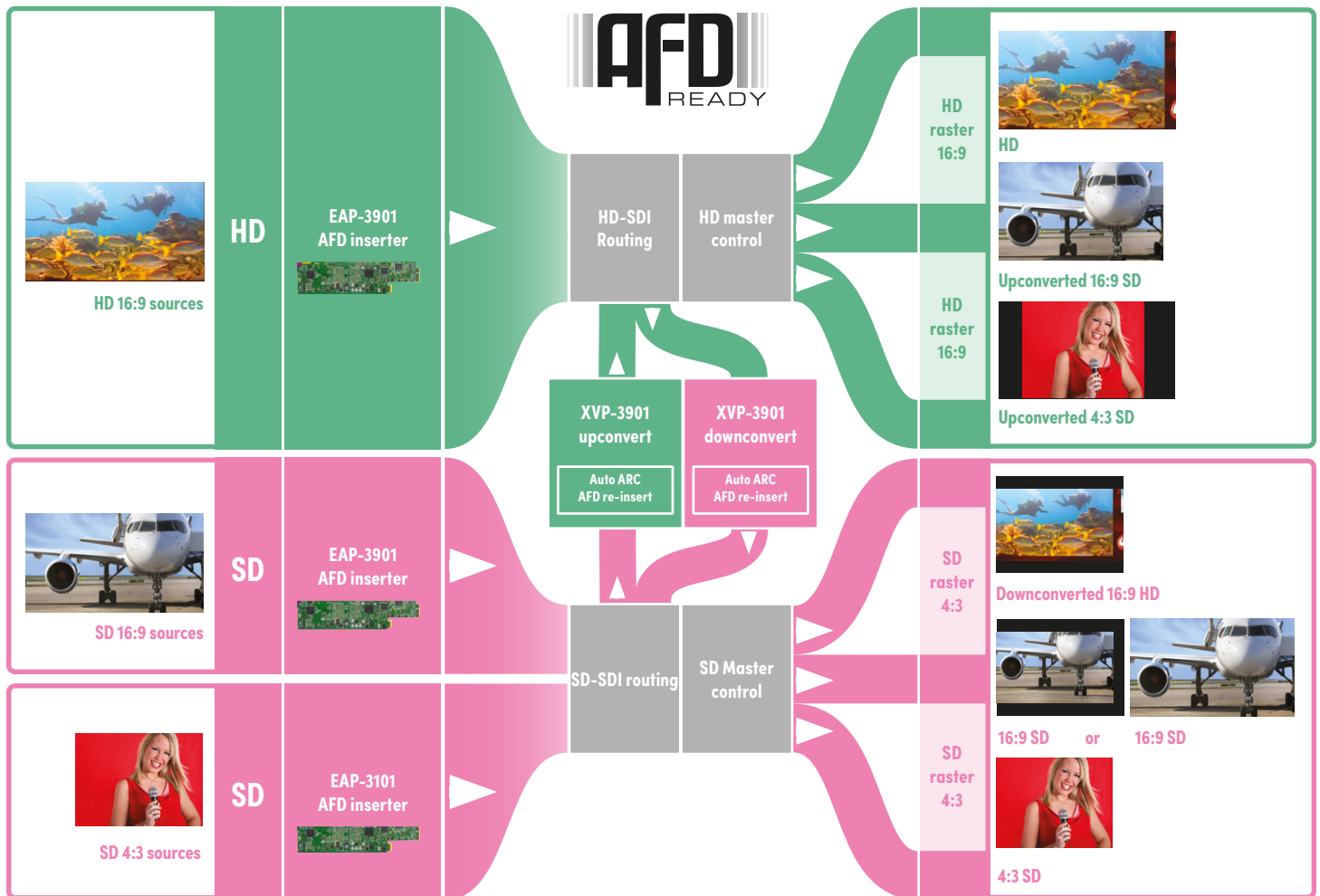
Downconversion with background keying using XVP-3901



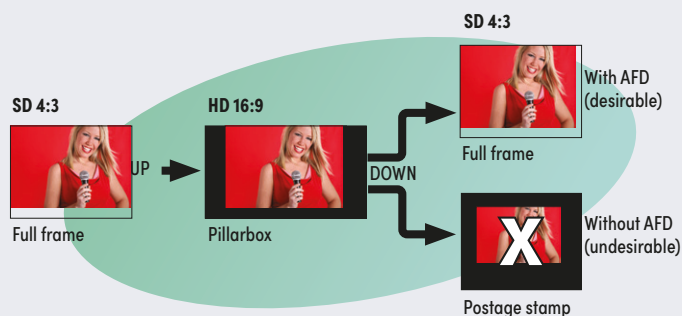
Frame Accurate Aspect Ratio Conversion with AFD

Frame accurate Aspect Ratio Conversion (ARC) can be performed automatically using embedded signaling based on the Active Format Description (AFD) standard. AFD data can be easily embedded in a signal by the Densité XVP processor family, and by the EAP-3901 embedder. With AFD, original image information is maintained throughout the entire conversion process for optimal viewing following 4:3 and 16:9 aspect ratio conversion.

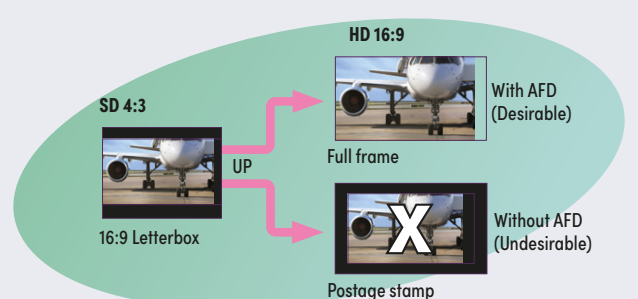
For example, processing three input source formats (16:9 HD, 16:9 SD and 4:3 SD) in a typical HD/SD hybrid plant results in six different output possibilities. However, using automatic aspect ratio control based on AFD will prevent the ARC errors that may occur with manual control.



4:3 aspect ratio conversion with AFD

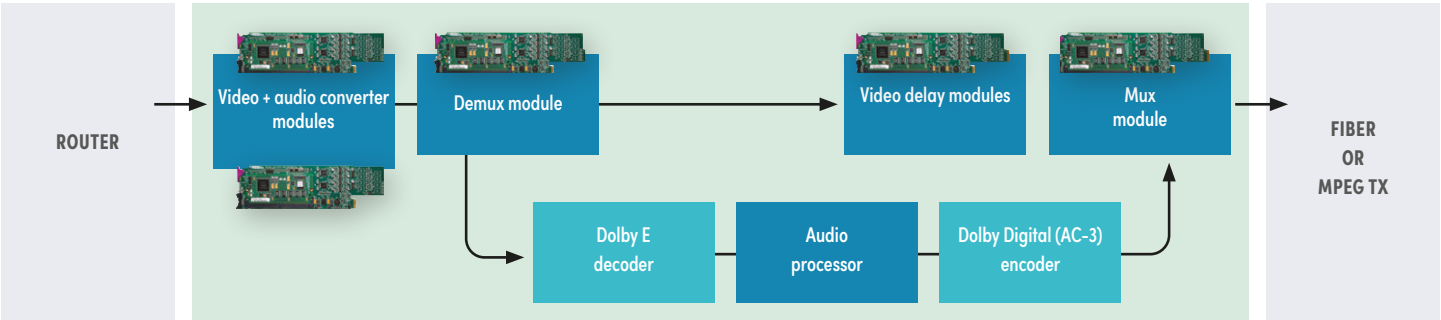


16:9 aspect ratio conversion with AFD

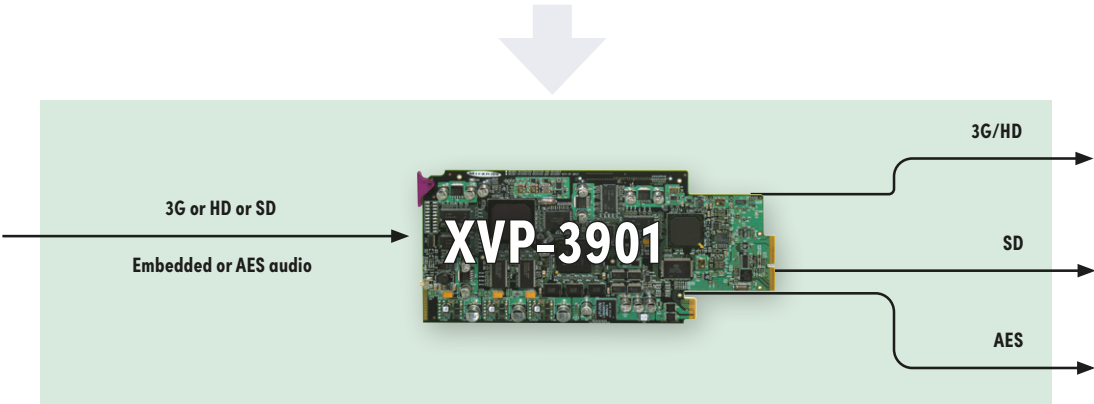


Incoming Feed Processing

Using the XVP-3901 significantly reduces the amount of equipment required for incoming feed processing. A single XVP-3901 replaces multiple single function devices to provide Dolby E decoding, audio processing and Dolby Digital or Dolby Digital Plus encoding.



Traditional approach to Dolby E decoding and Dolby Digital or Dolby Digital Plus encoding using multiple devices.

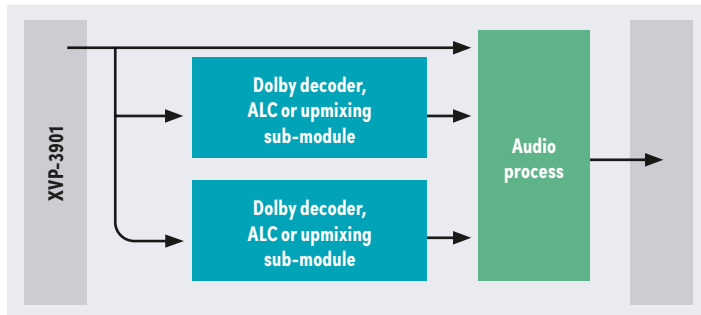


Using a single XVP-3901 3G/HD/SD up, down and cross converter with audio processor for incoming feed processing.

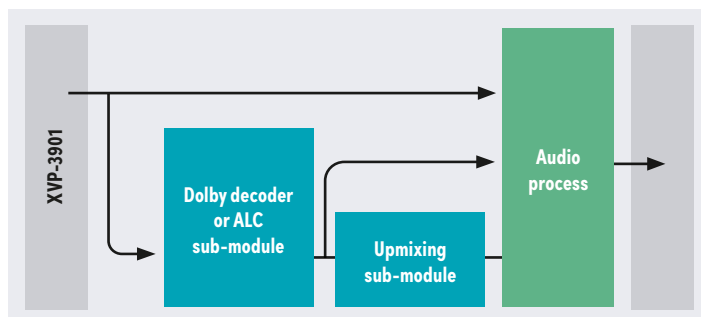
Incoming Feed Problems	XVP-3901 Features
Remote feeds need to be adapted to station infrastructure	Frame synchronization, full proc controls, color correction and legalizer
Multiple audio formats and audio synchronization: - Mixed up audio tracks - Lip sync - Dolby E and Dolby Digital encoded inputs 5.1 audio - Loudness level	Extraction, processing and re-insertion for up to 4 embedded audio groups Video to audio match delay and fixed delay Audio track mixing and shuffling Discrete audio inputs/outputs handled using complimentary audio modules Dolby Metadata insertion, and will delay Dolby E audio without compromising encoded signal Decode Dolby E or Dolby Digital to discreet PCM channels Audio downmix from 5.1 audio to a Lt Rt or Lo Ro audio 2 channel signal Stereo to 5.1 upmixing using Linear Acoustic technology Automatic loudness control
Receiving SD or HD signals at different times of the day	Built-in up and downconversion automatically converts current input to house format
Receiving 1080i into 720p plant (or vice versa)	Built in 720p to/from 1080i crossconversion eliminates need for costly external converters
Providing 16:9 and 4:3 aspect ratio conversion	Automatic, frame accurate aspect ratio conversion using embedded signaling, based on the Active Format Description (AFD) standard Background keying capability to fill side or top/bottom panels with graphics

Flexible 5.1 Audio Processing

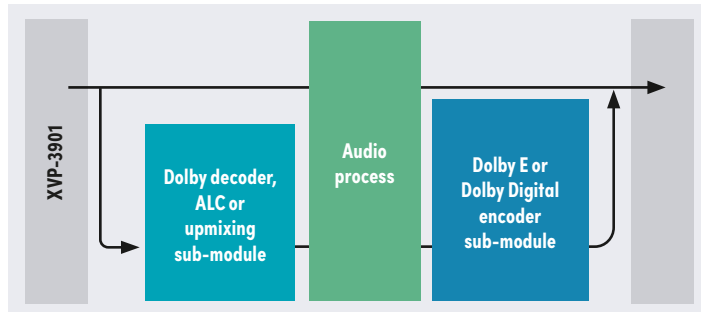
The XVP-3901 can provide very versatile audio processing sequences, due to the flexibility of the optional audio submodules. The submodules include Dolby E decoding, Dolby Digital decoding, Dolby E encoding, Dolby Digital and Dolby Digital Plus encoding, Linear Acoustic upMAX 2.0 to 5.1 upmixing and automatic loudness control (ALC). Two audio submodules can be fitted to an XVP-3901 processor. All audio channels created by the modules are preserved, and can be selected in the output shufflers and mixers for embedding or discrete AES outputs.



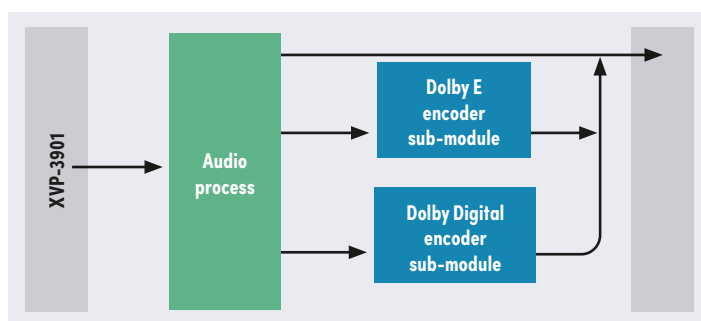
Dolby E / Dolby Digital (AC-3) decoding, automatic loudness control (ALC) or upmixing (or a different combination of these sub-modules) used in parallel ahead of audio processing.



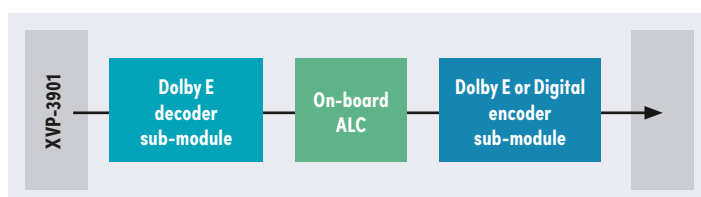
Dolby E / Dolby Digital (AC-3) decoding, ALC or upmixing (or a different combination of these sub-modules) followed by upmixing ahead of audio processing.



Dolby E / Dolby Digital (AC-3) decoding, ALC or upmixing followed by audio processing, and subsequently Dolby E or Dolby Digital (AC-3) encoding.



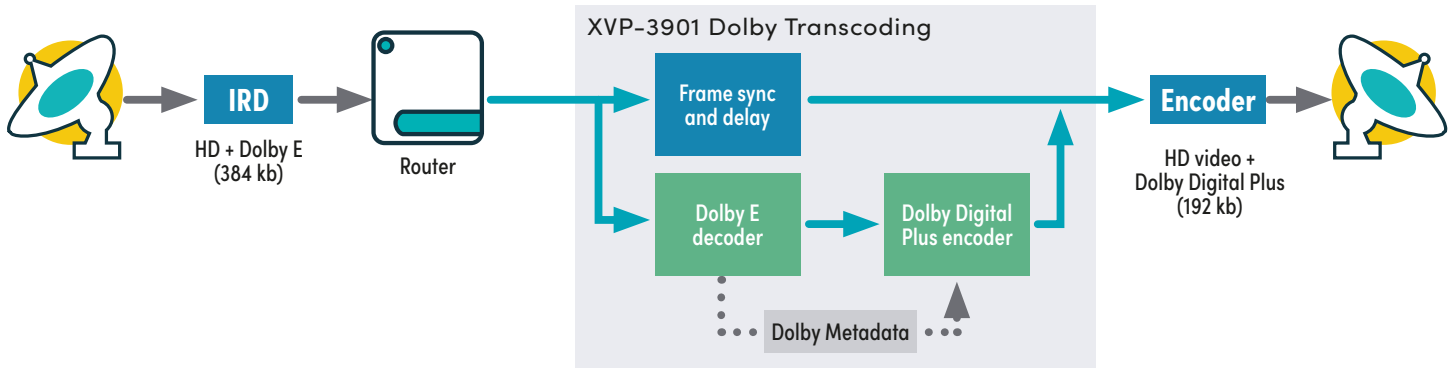
Dolby E and Dolby Digital (AC-3) encoding (or a different combination of these sub-modules) used in parallel after audio processing.



Dolby E decoding, ALC followed by Dolby E or Dolby Digital encoding.

Dolby Digital Plus Transcoding

The addition of Dolby Digital Plus to the Dolby Digital encoder means that Grass Valley's audio processing module will provide the same high-quality audio compression they always have, but at a data rate as much as 50 percent lower than currently required, enabling 5.1 multichannel audio at rates as low as 192 kb/s. When combining Dolby E decoding and Dolby Digital Plus encoding, broadcasters can deliver an efficient multichannel surround sound across multiple platforms and content types.



Ordering

Densité 3 Frame

XVP-3901

3G/HD/SD up, down and cross converter with optional audio processor

XVP-3901-UC

3G/HD/SD upconverter with optional audio processor

XVP-3901-DC

3G/HD/SD downconverter with optional audio processor

XVP-3901-75-3DRP-F

Double rear connector panel, 75Ω and fiber connector

XVP-3901-110-3DRP-F

Double rear connector panel, 110Ω and fiber connector

XVP-3901-75-3TRP-F

Triple rear connector panel, 75Ω and fiber connector

XVP-3901-110-3TRP-F

Triple rear connector panel, 110Ω and fiber connector

XVP-3901-75-3TRP

Triple rear connector panel, 75Ω

XVP-3901-110-3TRP

Triple rear connector panel, 110Ω

Options (software)

XVP-3901-OPT-AUD

AES IO support and 16 channels on-board audio processing option

XVP-3901-OPT-K

Background key input option

XVP-3901-OPT-DP

Dynamic audio processing option

XVP-3901-OPT-LM

Loudness meter option

XVP-3901-UG-UC2XVP

Upgrade from XVP-3901-UC to full XVP

XVP-3901-UG-DC2XVP

Upgrade from XVP-3901-DC to full XVP

XVP-3901-OPT-ALC-2

2-channel on-board ALC option by Grass Valley

XVP-3901-OPT-ALC-6

6-channel on-board ALC option by Grass Valley

XVP-3901-OPT-ALC-8

8-channel on-board ALC option by Grass Valley

XVP-3901-OPT-ALC-16

16-channel on-board ALC option by Grass Valley

Options (hardware)

SFP-R-LC

Single fiber Rx (input) cartridge with LC/PC connector

SFP-RR-LC

Dual fiber Rx (input) cartridge with LC/PC connector

SFP-RT-S13-LC

Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector

Other types of SFP Optical Plug-In Cartridges may be available for this product.

Please visit www.grassvalley.com for more information.

NSH26M

HD-26 to terminal block adapter

BOC-DA26-8BNC-1

75Ω digital audio breakout cable

MOD-DOLBY-ENC-E-2

Dolby E encoder

MOD-DOLBY-ENC-D-2

Dolby Digital and Dolby Digital Plus encoder

MOD-DOLBY-DEC-2

Dolby E and Dolby Digital decoder

MOD-LA-DUP-701

Upmixing using Linear Acoustic Technology upMAX

MOD-LA-ALC-2

2-channel ALC licensed by Linear Acoustic

MOD-LA-ALC-6

6-channel ALC licensed by Linear Acoustic

MOD-LA-ALC-8

8-channel ALC licensed by Linear Acoustic

MOD-LA-ALC-2-DUP

2-channel ALC and upmix licensed by Linear Acoustic

MOD-LA-ALC-6-DUP

6-channel ALC and upmix licensed by Linear Acoustic

MOD-LA-ALC-8-DUP

8-channel ALC and upmix licensed by Linear Acoustic

Remote control

GV Orbit, iControl, iControl Solo

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

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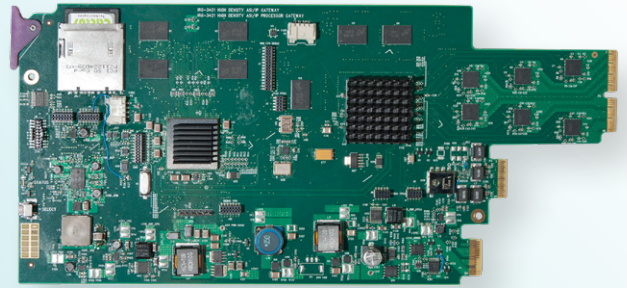
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IRG-3401

High Density ASI/IP Gateway

Space-saving, modular platform for advanced signal processing.



The IRG-3401 from Grass Valley® facilitates cable, satellite and IPTV operators' migration towards IP infrastructures by offering a flexible highly integrated DVB-ASI/IP bidirectional gateway that can bridge any type of MPEG transport stream from/to IP networks. The high density allows 120 gateways per 3 RU Densité® 3 frame, saving substantial rack space in high channel count environments. Its scalability through modularity is the ideal solution to address increasing TV channel lineups.

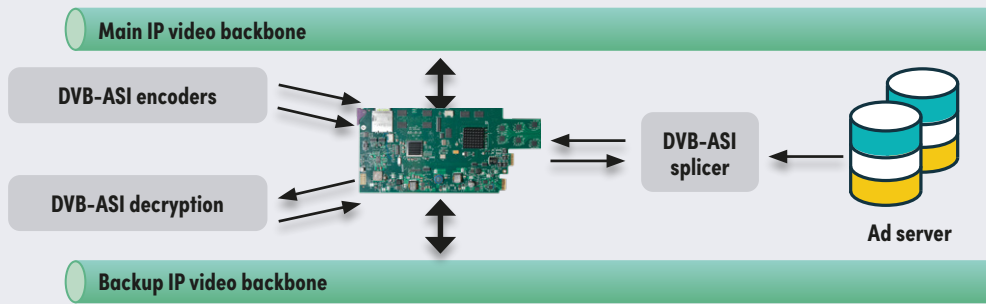
The dual Ethernet SFP sockets allow fiber or electrical connectivity to the main and backup video backbone to provide complete redundancy of MPEG transport streams. Each DVB-ASI I/O can also be paired in redundant mode. Combined together the IP and DVB-ASI redundant ports offer a robust solution to ensure uninterrupted services.

Key Features

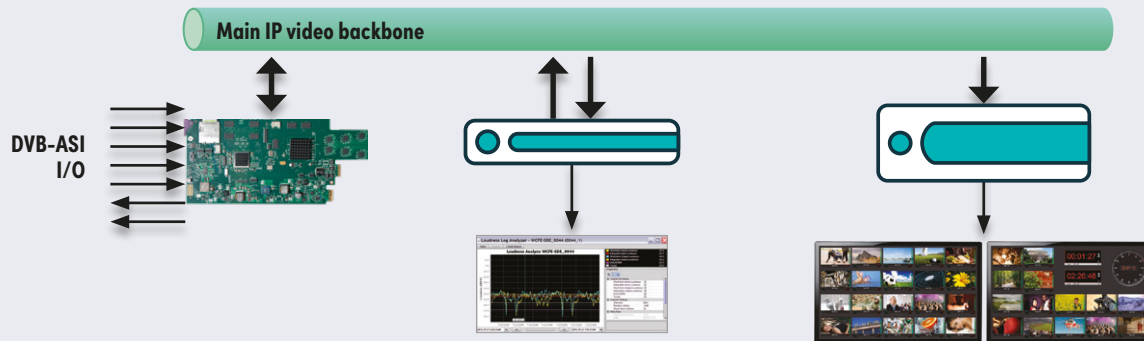
- Very high density with 12 gateways per card/120 gateways per 3 RU frame
- Handle most demanding streams:
 - Up to 213 Mb/s per DVB-ASI
 - Total of 800 Mb/s on Ethernet
- Configure each DVB-ASI as an input or output
- Convert legacy ASI devices to IP with simultaneous IP to ASI and ASI to IP conversions
- Flexible IP connectivity through two distinct SFP ports for optical or electrical modules
- Full redundancy to avoid service interruptions
- Pair DVB-ASI I/Os as main and backup
 - Copy TS streams on both IP ports simultaneously (port mirroring)
 - Automatic change-over switch for both Ethernet ports and DVB-ASI ports
- MPEG Cop3 FEC (SMPTE ST 2022) support for better signal integrity over IP
- UDP/RTP encapsulation 1 to 7 TS/IP packet
- Better multicast traffic control using IGMPv3 MSM/SSM
- Network jitter removal

Typical Applications

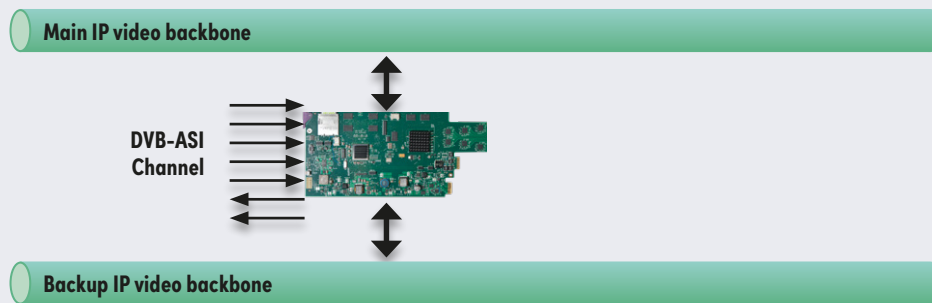
Connect any legacy DVB-ASI equipment to an IP video network



DVB-ASI interface to IP-only devices



Aggregate/Distribute DVB-ASI TV channels from/to the IP video backbone



Specifications

ASI (Inputs/Outputs)

Physical: 12 BNC connectors configurable independently as input or output

Standards: EN50083-9 (V2:3/98) DVB ASI

Cable length: 300m (984 ft.) Belden 1694A at 270 Mb/s

Data bit rate: Each I/O up to 213 Mb/s

TS packet size: 188/204 bytes

Return loss: >15 dB up to 270 MHz

Output jitter: <0.2UI (0.74 ns) pp

Ethernet Ports

Physical: 2 SFP sockets for electrical (RJ45) or optical cartridge

Standards: IEEE 802.3 1000 Mb/s Ethernet

Transport: UDP/RTP with FEC Pro-MPEG CoP3 1-7 TS/IP Unicast or Multicast with IGMPv3 MSM/SSM

Performance: Up to 800 Mb/s of streaming

Electrical

Power: 15W

Ordering

Densité 3 frame

IRG-3401

Description

High density ASI/IP gateway

IRG-3401-3DRP

Double 3 RU rear module with SFP sockets

Note: One or two SFP option must be ordered for each IRG-3401

SFP options

SFP-ETH-RT-1000-RJ45

Description

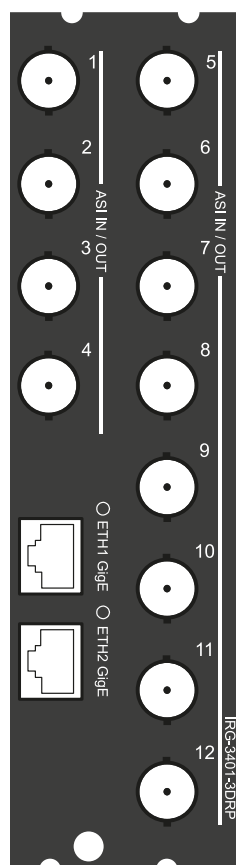
Ethernet electrical GigE cartridge RJ45 connector

SFP-ETH-10-S13-LC

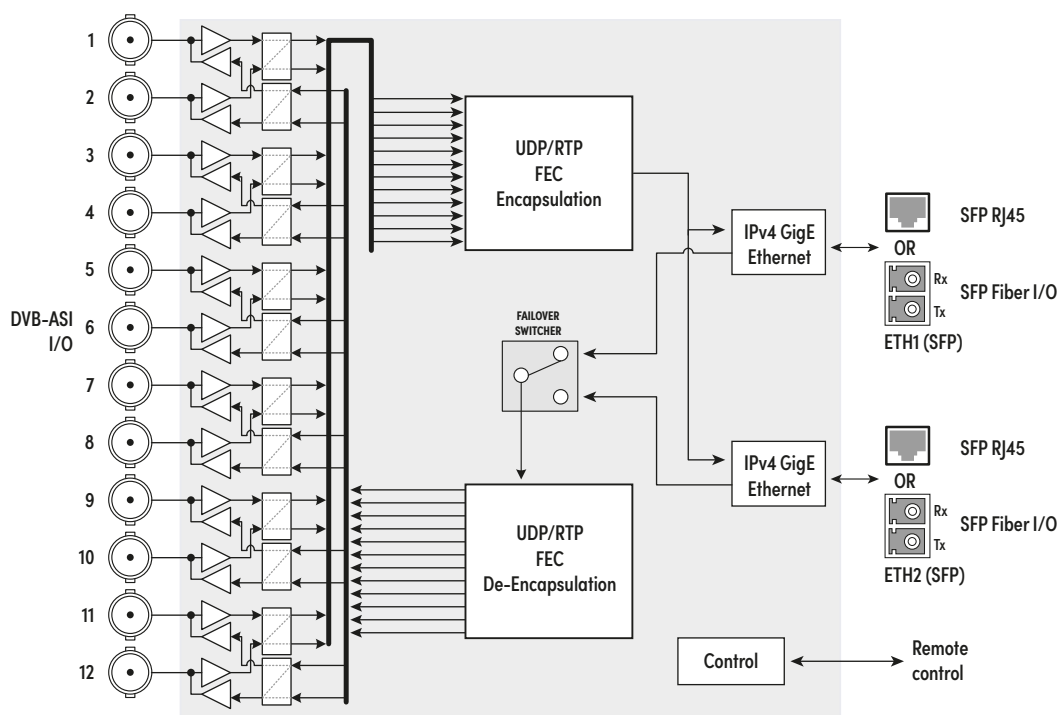
Ethernet 10 km (6.21 mi.) cartridge / 1310 nm with LC/PC connector

SFP-ETH-RT-M85-LC

Ethernet multimode cartridge / 850 nm with LC/PC connector



IRG-3401-3DRP



IRG-3401 Functional Block Diagram

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

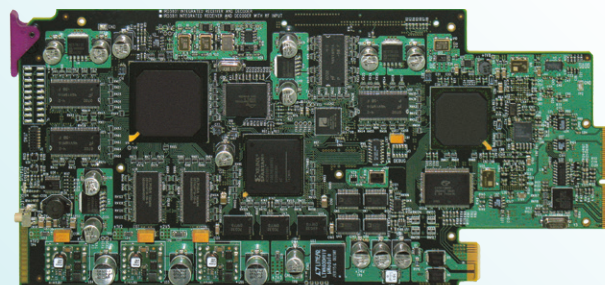
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IRD-3802

MPEG Decoder with ASI and GigE IP Inputs



Space-saving, modular platform for advanced signal processing.

The IRD-3802 from Grass Valley® provides MPEG-2 decoding of ASI and IP transport streams to either HD or SD. It also provides processing of key video and audio parameters and signal probing functions for feed aggregation, distribution and monitoring applications by broadcasters and TV services providers.

DVB-ASI or IP transport streams fed to the IRD-3802 can be decoded to provide either HD or SD video with embedded multichannel audio, in all leading formats, as well as composite video and stereo analog audio for monitoring. The IRD is also available with a DVB-CI slot, supporting leading conditional access systems, and allowing descrambling of multiple encrypted services. With its Gigabit Ethernet port, the IRD-3802 can also act as a gateway, by performing IP encapsulation of the input transport stream in either RTP or UDP mode.

The IRD also provides optional video signal processing with frame synchronization and selectable delay, as well as proc amp, up/down/crossconversion and aspect ratio conversion. The IRD can decode an extensive range of metadata, such as CEA-608 compliant closed captioning, teletext, AFD, V-chip and DVITC timecode, which can be embedded in the decoded SDI signal. Transport stream metadata, such as PSIP can also be analyzed.

The audio processing capabilities of the IRD-3802 are also extensive, with dual audio decoding and selectable stereo downmix modes of decoded MPEG-1 and Dolby Digital (AC-3) 2.0 audio. Optionally, the IRD-3802 also performs embedding of decoded of Dolby Digital (AC-3) 5.1 audio, with discrete 8-channel output.

In addition, the IRD-3802 performs a wide range of signal quality probing, with user-defined alarm settings on an extensive range of transport stream parameters, including TR 101 290 alarms, transport stream structure analysis and individual program statistics. The IRD also generates low-resolution H.264 video proxy and 2-channel audio streams of selected programs for monitoring.

Key Features

Input/output versatility

- Dual ASI transport stream inputs
- Single ASI transport stream output for signal monitoring or retransmission
- IP transport stream input/output: an ASI signal can be re-transmitted as IP and an IP stream can be forwarded as ASI
- IRD acts as IP video gateway with forward error correction (FEC) for improved quality
- IRD-3802 is now available with a rear module featuring two Ethernet ports and change-over functionality for use in redundant IP router topologies
- Dual HD/SD SDI outputs
- Composite video and stereo analog audio monitoring outputs

Easy input and program selection

- Manual or automatic input selection mode
- Automatic mode allows switching to backup input upon loss of signal on active input, with adjustable duration
- Program selection using local control or iControl™
- MPTS automatic program selection mode and recovery

Extensive video format support

- 1920x1080i59.94/50
- 1280x720p59.94/50
- 720x486i59.94 and 720x576i50

Comprehensive dual program audio decoding

- Decoding of MPEG-1 layer 2 stereo audio
- Decoding of Dolby Digital (AC-3) 2.0 audio
- Optional decoding and embedding of Dolby Digital (AC-3) 5.1 audio to SDI with support of main and associated audio services for up to discrete 8-channel output
- Selectable pass-through of Dolby Digital stream to SDI
- Decoding of AAC-LC audio for 2/0 and 1/0 coding modes

Frame synchronizer/delay, reference input and video proc

- Supports timing, full phasing and freeze modes
- Reference can be external via BNC, internal using URS or directly from the decoded signal with selectable genlock modes
- Video proc amp functions including, brightness, saturation, hue and contrast

Decoded video format identification

- Identification of key video parameters
 - Aspect ratio identification: 16:9 or 4:3
 - Video resolution

Audio processing and format identification

- Provides downmix of 5.1 channel to Lt/Rt or Lo/Ro modes
- Extensive Dolby Digital metadata reporting
- Support for secondary audio program (SAP)
- Configurable Dolby Digital dynamic range and compression
- Dolby metadata embedding on SDI (SMPTE ST 2020-A)

Metadata extraction, display and embedding

- EIA-608 and EIA-708 closed captioning
- WST teletext
- SMPTE ST 12 timecode
- SMPTE ST 2016 AFD flag

Extensive PSIP data extraction

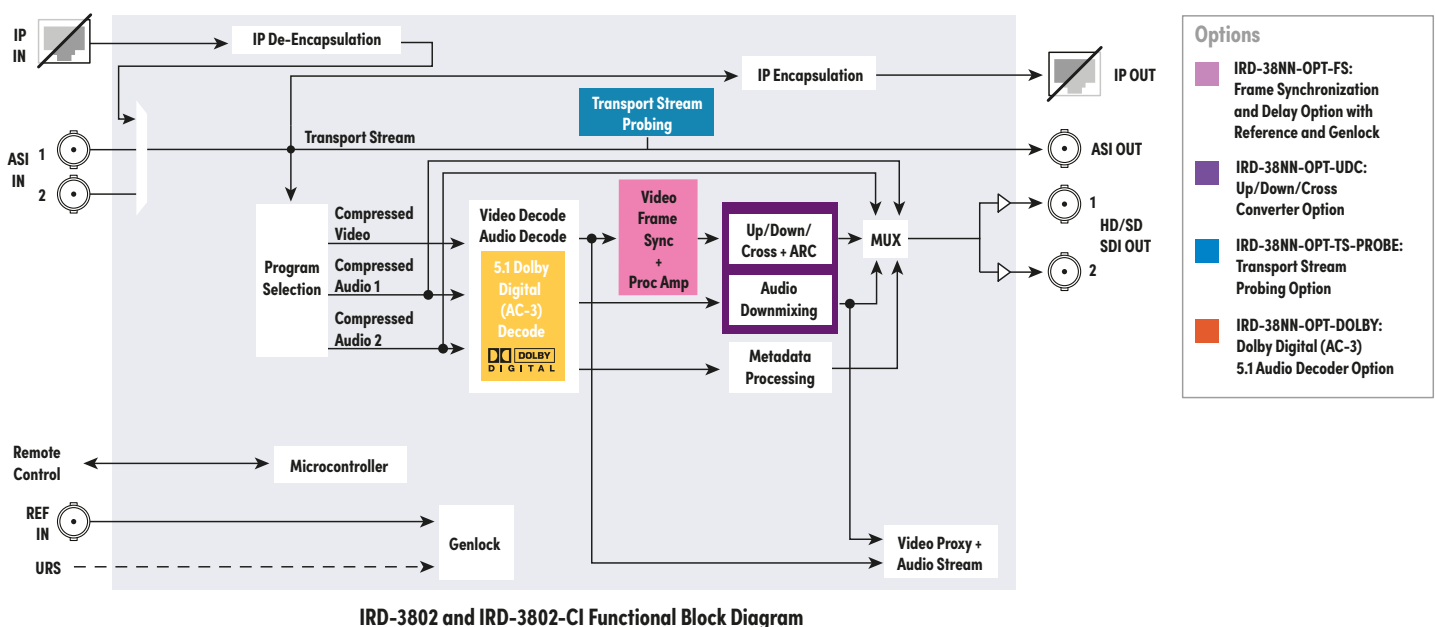
- Time and date and other STT data
- VCT, EIT, RRT, TSID

Transport stream probing and alarming

- Transport stream (TS) monitoring and alarming and settings:
 - TR 101 290 Priority 1 and Priority 2 alarming on key parameters
 - Logging of alarms using iControl
- Detailed TS structure reporting using graphical and hierarchical views
- Individual program data statistics, including individual program bit rate, content and PMT data
- IRD generates low-resolution H.264 video proxy and 2-channel audio streams of selected programs for monitoring

Video up/down/crossconversion

- Extensive selection of video format conversions



Specifications

ASI Inputs

Quantity/connector: 2 inputs with BNC connectors

Standards: EN50083-9 (V2:3/98) DVB ASI

Data bit rate: DVB ASI: Up to 80 Mb/s

Mode: Burst and byte supported

TS packet length: 188/204 byte packets

Return loss: >15 dB up to 270 MHz

ASI Output

Quantity/connector: One output with BNC connector

IP Input/Output

Quantity/connector: One gigabit Ethernet with RJ45 connector IEEE 802.3

Standards: Pro-MPEG code of practice 3 (CoP3)

Stream protocols: IP/UDP, RTP and IGMPV3

Video Decoder

Compatibility standard:

- MPEG-2 compatible MP at HL
- 4:2:0, resolution up to 1080i, 59.94 Hz
- ATSC A/53

Bit rate: Up to 25 Mb/s

Audio Decoder

Standard:

- MPEG-1 layer-II
- Dolby Digital (AC-3) audio 2.0
- Optional Dolby Digital (AC-3)
- Audio 5.1
- AAC-LC audio 2/0 and 1/0
- Dual Dolby Digital pass-through

Service/channels: As per ATSC A/54A

Video Outputs

HD/SD SDI outputs: 2 outputs with BNC connectors

Signal:

- SMPTE ST 259-C (270 Mb/s)
- SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)

Supported formats:

- SD: 480i59.94, 576i50
- HD: SMPTE ST 274: 1080i59.94/50
- HD: SMPTE ST 296: 720p59.94/50

Embedded audio: SMPTE ST 299, SMPTE ST 272

Return loss: >15 dB up to 1.5 GHz

Jitter:

- <0.2 UI as per SMPTE ST 259-C for SD output
- <0.2 UI as per SMPTE ST 292 for HD output

Monitoring Outputs

Analog video: NTSC 525/60, PAL (625/50) with one BNC connector

Analog audio: Unbalanced analog audio with two RCA connectors

Video and TS Metadata

CC data extraction: NTSC CC1 and CC2 as per EIA-608B

DTV CC: EIA-608B compliant bytes of EIA-708B

CC embedding: CC embedding as per SMPTE ST 334

Teletext: WST/EIA 300 706

Timecode: SMPTE ST 12

PSIP: ATSC PSIP standard A/65

Reference Input

Reference input: One input with BNC connector

Signal:

- SMPTE ST 170/SMPTE ST 318/ITU 624-4/BUT 470-6 blackburst
- SMPTE ST 274/SMPTE ST 296 tri-level sync (black)

Return loss: >35 dB up to 5.75 MHz

Electrical

Power: 20W

Ordering

IRD-3802

MPEG decoder with ASI and GigE IP inputs

IRD-3802-3DRP

Double rear connector panel

Options

IRD-38NN-OPT-FS

Frame synchronization and delay option with reference and genlock

IRD-38NN-OPT-UDC

Up/down/crossconverter option

IRD-38NN-OPT-TS-PROBE

Transport stream probing option

IRD-38NN-OPT-DOLBY

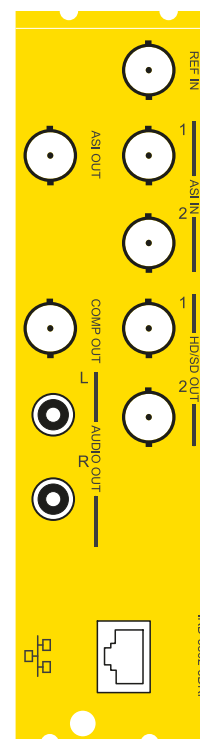
Dolby Digital (AC-3) 5.1 audio decoder option

Related products

Densité REF-1801 reference module

Remote control

GV Orbit®, iControl, iControl Solo



IRD-3802-3DRP

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