Grass Valley®
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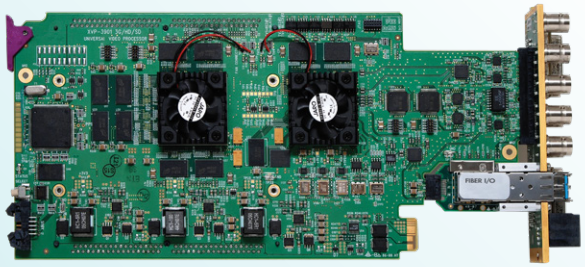
DATASHEET



XVP-3901-FS-R

3G/HD/SD Frame Sync Optimized for Rears with Bypass Relay

Space-saving, modular platform for advanced signal processing.

The XVP-3901-FS-R from Grass Valley® is a highly integrated, 3G/HD/SD frame synchronizer/aspect ratio converter and optional video/audio signal processor, which is designed to synchronize and process HD and SD signals for 3G/HD/SD hybrid plants. It is identical to the XVP-3901-FS except it supports rears with bypass relay.

It features a dual 3G/HD/SD input selector and provides multiple outputs. Although not up/down/crossconverting the input signal, the –FS-R model can still perform ARC control on SD signals, useful when converting 16:9 SD signals to 4:3 SD signals and vice-versa.

High quality aspect ratio conversion 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 signals are delivered in the correct aspect ratio when aired, the XVP-3901-FS-R 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 promotion and 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-FS-R 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-FS-R'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-FS-R can be upgraded in the field to the full XVP-3901 specification with up/down/crossconversion capability.

Key Features

Video

- Frame synchronizer and aspect ratio converter (50/59.94 Hz)
- Offers a multirate 3G/HD/SD input and outputs
- Supports 3G level A (mapping 1) and level B
- Flexible HD/SD/URS reference input
- 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
- Bypass relay supported
- 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 and teletext/OP-47
- 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

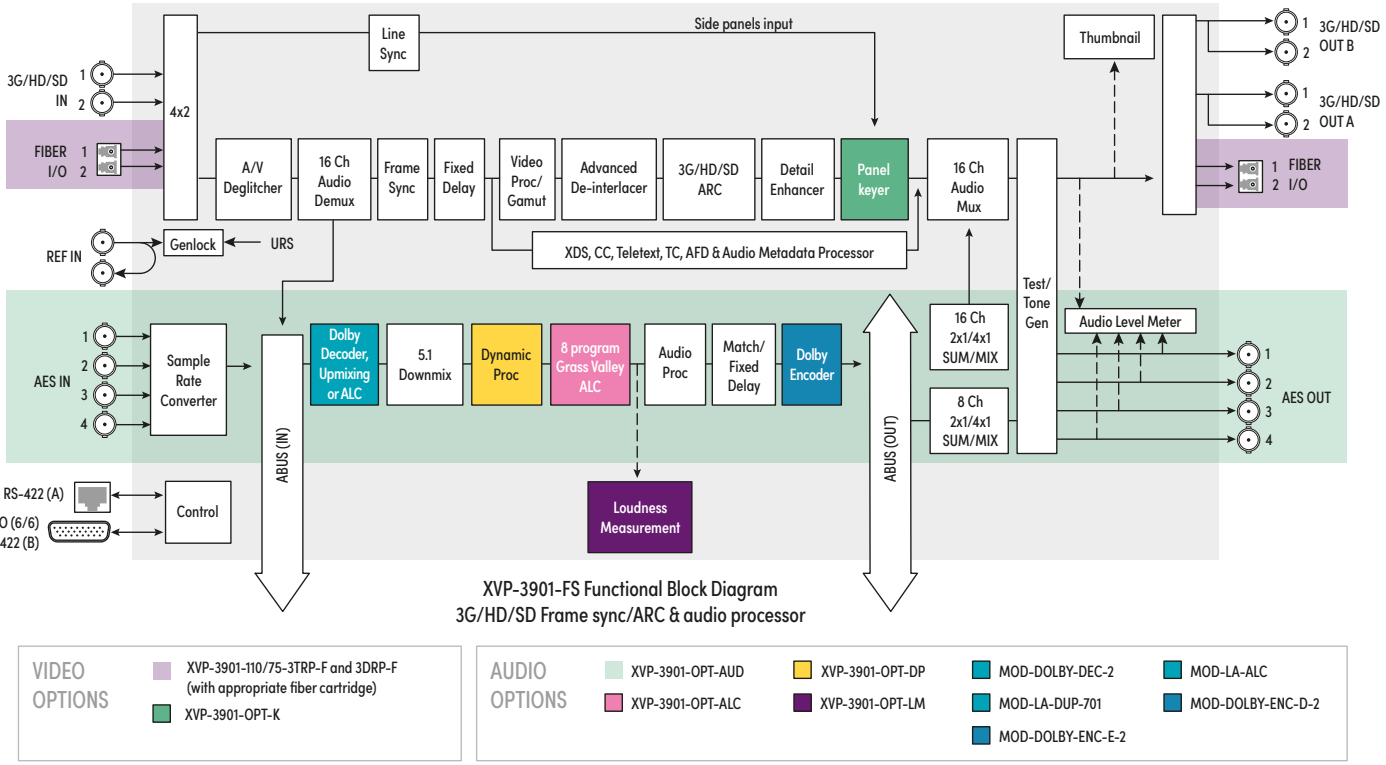
Optional Audio

- 16 channels embedded audio processing(32 channels internal)
- 4 AES inputs, 4 AES outputs
- Automation capabilities based on audio signal type detection
- Audio downmix: 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 iControl™ 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 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-FS-R

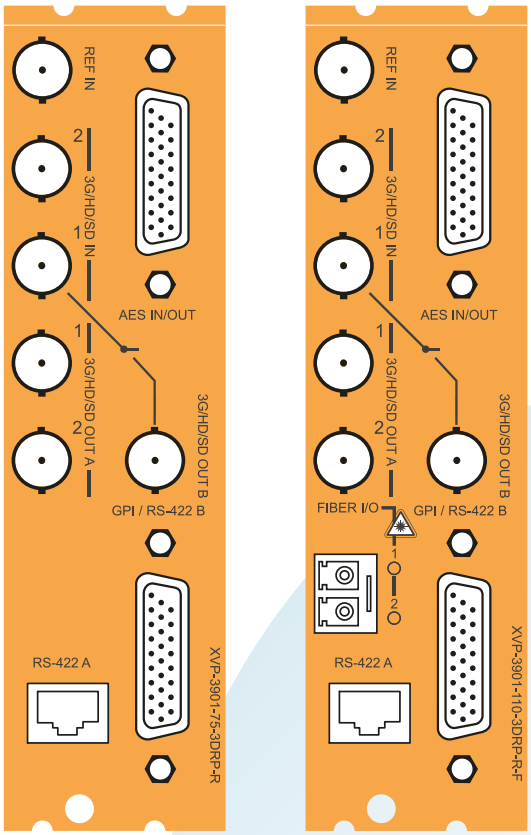
Input \ Output		SD		HD				3G	
		525	625	720p50	720p59.94	1080i50	1080i59.94	1080p50	1080p59.94
SD	525	X							
	625		X						
HD	720p50			X					
	720p59.94				X				
	1080i50					X			
	1080i59.94						X		
	1080p23.98						X		
	1080pSF23.98						X		
	1080p25					X			
	1080p29.97						X		
3G	1080p50				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

Video Formats Supported



XVP-3901-FS Functional Block Diagram
3G/HD/SD Frame sync/ARC & audio processor

VIDEO OPTIONS	AUDIO OPTIONS			
XVP-3901-110/75-3TRP-F and 3DRP-F (with appropriate fiber cartridge)	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	



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

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

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 2.0 s

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

GPI

Connector: 26-pin D-Sub, optoisolated

GPI in: Input selection: 1-2

Presets: 1-4

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

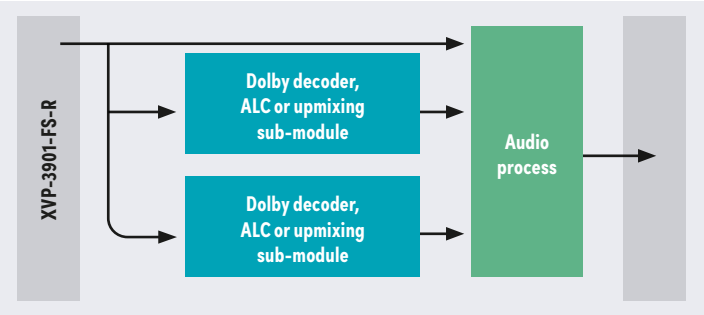
Electrical

Power: 25W

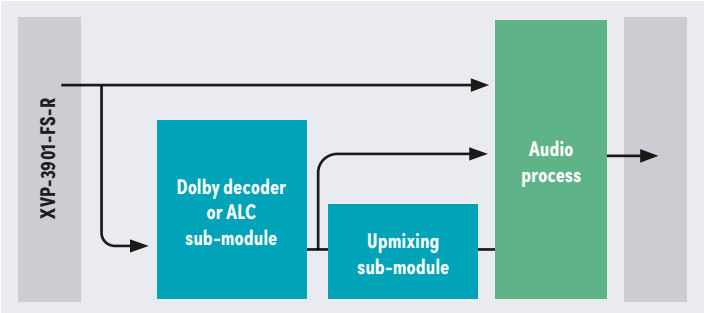
Note: Cable length and return loss specifications will be reduced when using the output protected by the bypass relay on XVP-3901-110/75-3DRP-R rears.

Flexible 5.1 Audio Processing

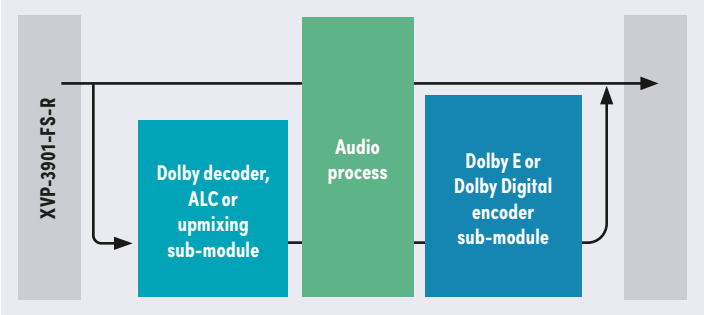
The XVP-3901-FS can provide very versatile audio processing sequences, due to the flexibility of the optional audio sub-modules. The sub-modules include Dolby E decoding, Dolby Digital decoding, Dolby E encoding, Dolby Digital and Dolby Digital Plus encoding, Linear Acoustic upMAX 2.0 to 5.1 upmixing and automatic loudness control (ALC). Two audio sub-modules can be fitted to an XVP-3901-FS 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.



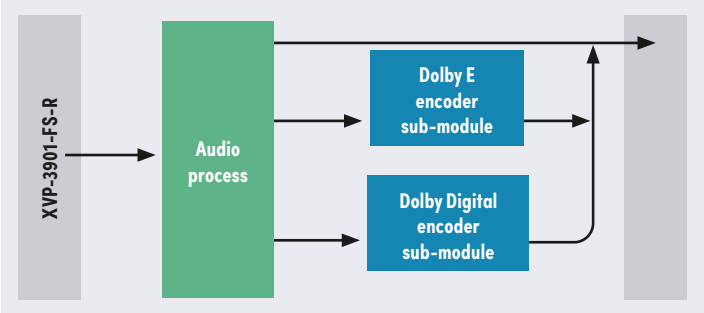
Dolby E / Dolby Digital (AC-3) decoding, automatic loudness control (ALC) or upmixing (or a different combination of these sub-modules) used in parallel ahead of audio processing.



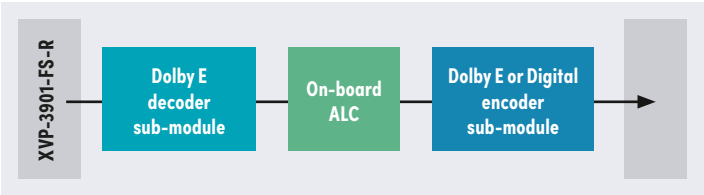
Dolby E / Dolby Digital (AC-3) decoding, ALC or upmixing (or a different combination of these sub-modules) followed by upmixing ahead of audio processing.



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



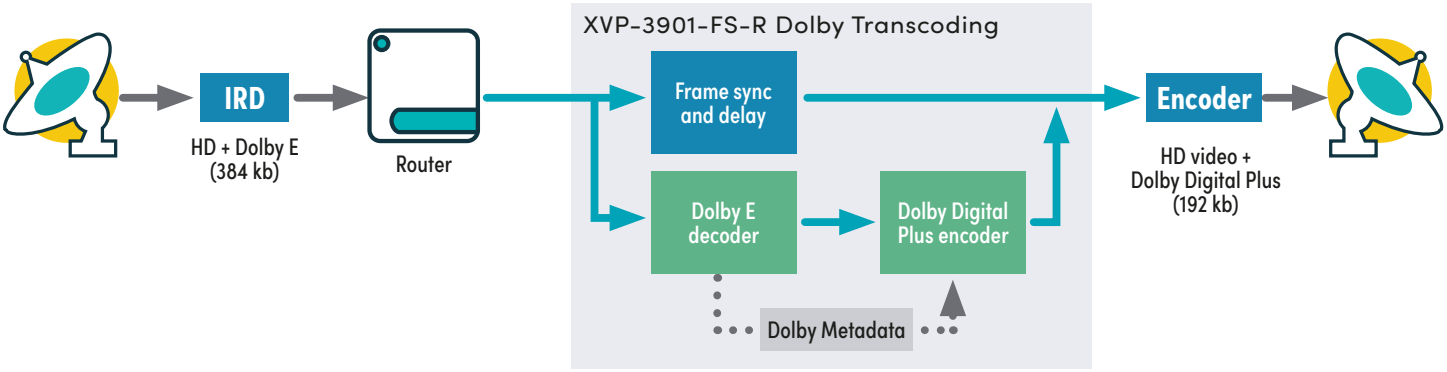
Dolby E and Dolby Digital (AC-3) encoding (or a different combination of these sub-modules) used in parallel after audio processing.



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-FS-R

3G/HD/SD frame sync optimized for rears with bypass relay

XVP-3901-75-3DRP-R

Double rear connector panel, 75Ω and bypass relay (XVP-3901-FS-R required)

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

Double rear connector panel, 110Ω, bypass relay and fiber connection (XVP-3901-FS-R required)

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-FS2XVP

Upgrade from XVP-3901-FS 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-T-S13-LC

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

SFP-TT-S13S13-LC

Dual fiber Tx (output) cartridge at 1310 nm 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