

# DENSITÉ 3+ XIP-3901

## Agile Modular SDI/IP Processing Platform for Densité 3+

Reprogrammable FPGA pre-configured with 4K UHD processing applications.



The Densité 3+ XIP-3901 from Grass Valley is an agile processing platform that focuses on high-quality live production for HD, 1080p, 4K UHD and HDR.

This platform is a bridge for the hybrid world, consisting of today's proven SDI technology and the new IP SMPTE ST 2110 connectivity. To meet customers' needs both now and in the future, the XIP-3901 uses a flexible "virtualized" hardware platform. Based on a powerful FPGA engine, the XIP-3901 can be reconfigured with software updates for different applications as requirements change.

The XIP-3901 agile processing platform with a rear XIP-3901-3+DRP comes with all the 12G/quad link 3G/3G/HD-SDI connectivity to support two 4K UHD processing paths with dual 25 GbE SFP cages for SMPTE ST 2110 IP I/O applications. The XIP-3901 is installed in the established Densité modular frame, packing lots of audio/video processing power in a small form factor results in savings in terms of space, power and weight. With

advanced processing capabilities and power requirements, the XIP-3901 is supported by both Densité 3+ FR1 and FR4 frames.

The applications for the XIP-3901 agile IP/SDI processing platform provide full functionality of up/down/framesync-gearbox processing capability delivered through seven applications that allow your live productions – either from trucks, venues or stadiums – to make the most of the new 4K UHD and HDR formats. This includes playout channels where output of a 4K UHD HDR channel needs to be downconverted for an HD SDR simulcast version.

**Densité 3+ XIP-3901-UC** is an application that provides a dual-channel 12G/quad link 3G/3G/HD-SDI upconverter, which is designed to synchronize, upconvert and process HD and 3G 1080p signals for both 1080p and 4K UHD 2160p broadcast production. The XIP-3901-UC application features broadcast-quality scalers, motion-adaptive de-interlacers and color space conversions from ITU-R BT.709 to ITU-R BT.2020.

**Densité 3+ XIP-3901-DC** is an application that provide a dual-channel 12G/quad link 3G/3G/HD downconverter, which is designed to synchronize, downconvert and process 4K UHD 2160p and 1080p for both 1080p and HD broadcast production. The XIP-3901-DC application features broadcast-quality down-scalers, interlacers and color space conversions from ITU-R BT.2020 to ITU-R BT.709.

**Densité 3+ XIP-3901-FS** is an application that provide a dual-channel 12G/quad link 3G/3G/HD frame synchronizer with gearbox functionality, which is designed to synchronize and convert color space between ITU-R BT.2020 and ITU-R BT.709 in 4K UHD, 1080p and HD broadcast productions.

**The XIP-3901-UDC-IP** application is a dual-channel 4K UHD broadcast-quality format converter with optional HDR and audio processor, supporting IP with dual 25 GbE I/O. Based on open standards, this IP edge processing application is compliant to the SMPTE ST 2110 suite of standards and JT-NM TR-1001

## Key Features

- Independent dual-channel HD/UHD processor
- 12G 2160p, Quad Link 3G, 3G 1080p and HD 1080i/720p SDI input/output
- SMPTE ST 2110 and JT-NM TR-1001-1 IP input/output on dual 25 GbE
- XIP-3901-UDC-HDR option provides HDR conversion supporting both Wide Color Gamut BT.709/ BT.2020 and High Dynamic Range: HLG, PQ and S-Log3
- XIP-3901-UDC-AUD option provides individual channel level, delay, up/down mixing and 2:1 mixer/shuffling
- GV Orbit for configuration, control and monitoring
- Individual XIP-3901 application licensed, purchased as needed
- Rapid switching between XIP-3901 applications



technical recommendation for easy integration in a broadcast network production environment.

**The XIP-3901-GB-IP** is a dual-channel 4K UHD gearbox application for conversion between Quad-stream 1080p Two Sample Interleave or Square Division and Single-stream 4K UHD supporting IP with dual 25 GbE I/O.

**The XIP-3901-UDC-IF** application is a dual-channel 4K UHD or quad-channel HD broadcast-quality hybrid SDI/IP incoming feed processor with optional HDR and audio processor, supporting 12G/3G/HD SDI input/output, as well as IP with dual 25 GbE I/O.

Both XIP-3901-UDC-IP and XIP-3901-UDC-IF integrate all the video processing functions to perform the up/down/crossconversion needed to maintain chosen output formatting, irrespective of whether the input is HD 720p, 1080i, 1080p or UHD 2160p. High-quality up/down/crossconversion is based on multiple sophisticated processing technologies including detail enhancement, pixel-based de-interlacing and advanced motion adaptive de-interlacing and anti-ringing.

**The XIP-3901-JPEG-XS** application supports multiple channels of HD and UHD encoding/decoding between SMPTE ST 2110-20 uncompressed video and SMPTE ST 2110-22 high-quality compressed video using the JPEG XS standard. The application provides a low-latency encoding side and an optional SMPTE ST 2110 stream alignment is available on the decoding side to match production studio equipment top-of-frame reference, if needed.

The XIP-3901-JPEG-XS application offers a bridge between a remote contribution network and a core production network using ultra-low latency encoding and decoding to efficiently manage network bandwidth over long distances, supporting compression ratios from 6:1 to 36:1.

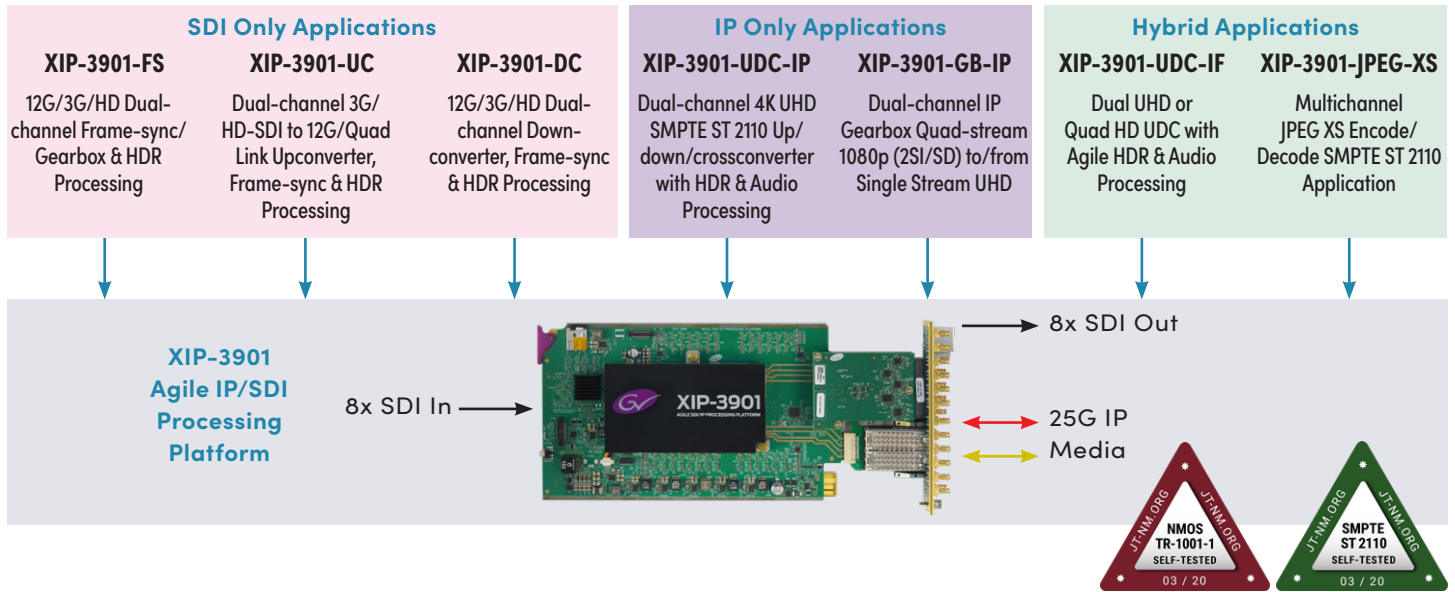
**The optional HDR processor** available on some applications, XIP-3901-UDC-HDR, allows conversion between SDR and HDR formats and wide color gamut BT.709 and BT.2020, supporting HLG (ITU-R BT.2100), PQ (ITU-R BT.2100), and S-Log3/S-Gamut3 formats. In addition to the Grass Valley LUTs, you can select BBC LUTs v1.4 or you can choose your own custom LUTs

compliant to Adobe cube file v1.0 for fully flexible HDR processing. The HDR processor operates in full 10-bit video signals with the ability to pass sub-blacks and super-whites in SMPTE Narrow video signals and the support of SMPTE Full in PQ and S-Log3 signals.

All XIP-3901 applications are configured, controlled and monitored by GV Orbit from Grass Valley, taking advantage of many features and functions specifically crafted to make IP easy. They can also be configured and controlled from iControl systems.

Based on the proven Denité modular framework, the flexible, space-efficient XIP-3901 agile processing platform can accommodate a gradual adoption of different production elements into 1080p and 4K UHD broadcasting workflows, all while protecting your investment in installed equipment. With flexibility to configure up to 12 XIP-3901 dual-channel processing applications per Denité 3+ FR4 frame, the Denité platform scales to a density of 24 4K UHD processors in a 4 RU frame. This means space and cost-efficient scaling today and tomorrow.

# XIP Application Agility Evolution



## Specifications

I/Os described here may not all be used by all applications. Please see datasheets for each application for more information. These specifications apply to XIP-3901 hardware platform capabilities.

### SDI (Inputs/Outputs)

**Physical:** 16 HD-BNC connectors: 8 in, 8 out

#### SDI standard:

- SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
- SMPTE ST 424 (2.970, 2.970/1.001 Gb/s)
- SMPTE ST 2082-1:2015 (in 1 & 5, out 1 & 5)

#### Supported input/output formats:

- HD: SMPTE ST 274: 1080i59.94, 1080i50
- HD: SMPTE ST 296: 720p59.94, 720p50
- 3G: SMPTE ST 425 level A (mapping 1), level B dual link: 1080p59.94, 1080p50
- 4K UHD: Quad Link 3 Gb/s SMPTE ST 425-5: 1080p59.94, 1080p50
- 12G: SMPTE ST 2082-10: 2160p59.94, 2160p50

#### Cable length (Belden 1694A):

- HD: 250m (820 ft.) at 1.485 Gb/s
- 3G: 150m (492 ft.) at 2.970 Gb/s
- 12G: 55m (180 ft.) at 11.88 Gb/s

#### Jitter:

- HD/SD: <0.2 UI (alignment jitter)
- 3G: <0.3 UI (alignment jitter)
- 12G: <0.3 UI (alignment jitter)

### Reference Input

**Physical:** SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst

### Ethernet Port for Media

(for applications with IP I/O)

**Physical:** Two SFP28 sockets for active optical cable, short- and long-reach fiber

**Standard:** IEEE 802.3-2008 25 GbE

**Performance:** Up to 25 Gb of streaming per direction

### Ethernet Port for Control

**Physical:** One electrical RJ45 port

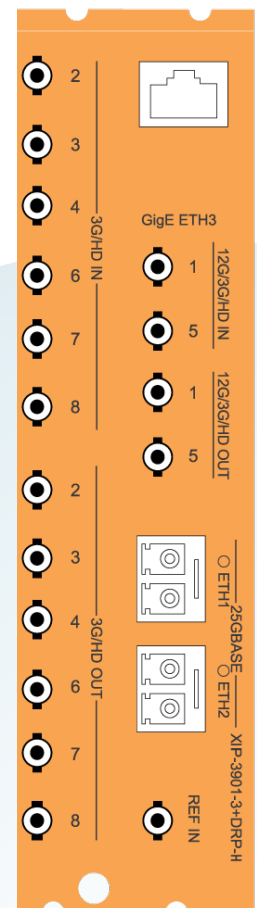
**Standard:** IEEE 802.3 1000 Mb/s

### Video Processing Performance

**Signal path:** 10 bits minimum

### Electrical

**Power:** 60W maximum



XIP-3901-3+DRP-H

## Ordering

### Densité 3+ Frame

#### XIP-3901

Agile SDI/IP Processing Platform

#### XIP-3901-3+DRP-H

Double rear panel for Densité 3+ with HD-BNC

#### Application Software (Must select at least one)

#### XIP-3901-UC

12G/3G/HD SDI Dual Up Converter application

#### XIP-3901-DC

12G/3G/HD SDI Dual Down Converter application

#### XIP-3901-FS

12G/3G/HD SDI Dual Frame Sync and Gearbox application

#### XIP-3901-UDC-IP

Dual-channel 4K UHD up/down/cross IP application

#### XIP-3901-UDC-IF

Dual-channel 4K UHD SDI-IP Hybrid incoming feed application

#### XIP-3901-GB-IP

Dual-channel 4K UHD Gearbox IP application

#### XIP-3901-JPEG-XS

Multichannel JPEG XS Encode/Decode SMPTE ST 2110 application

### Application Options

#### XIP-3901-UDC-HDR

HDR Processing option on selected application

#### XIP-3901-UDC-AUD

Audio processing, down/up mix, shuffling option

**SFP+ Options** (One or two SFP+ are needed to run IP applications)

#### SFP-25G-SR

SFP28 25GBASE optical transceiver MMF

#### SFP-25G-LR

SFP28 25GBASE optical transceiver SMF

### Remote Control

GV Orbit, iControl or iControl Solo

Ordering Code	Description	Application						
		XIP-3901-UC	XIP-3901-DC	XIP-3901-FS	XIP-3901-UDC-IF	XIP-3901-UDC-IP	XIP-3901-GB-IP	XIP-3901-JPEG-XS
XIP-3901	Agile SDI/IP Processing Platform	✓	✓	✓	✓	✓	✓	✓
XIP-3901-3+DRP-H	Double rear panel for Densité 3+ with HD-BNC	✓	✓	✓	✓	✓	✓	✓
SFP-25G-SR	SFP28 25GBASE Optical Transceiver MMF				✓	✓	✓	✓
SFP-25G-LR	SFP28 25GBASE Optical Transceiver SMF				✓	✓	✓	✓
XIP-3901-UDC-HDR	HDR Processing option applications	✓	✓	✓	✓	✓		
XIP-3901-UDC-AUD	Audio processing, Down/Up Mix, Shuffling option				✓	✓		

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

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