

DENSITÉ 3+ XIP-3901-UDC-IF



Dual-channel 4K UHD or Quad-channel HD SDI-IP Hybrid Format Converter with HDR and Audio Processing Application for the XIP-3911 and XIP-3901

XIP-3901-UDC-IF incoming feed processing application for the software-defined platforms Densité 3+ XIP-3911 and XIP-3901.

The XIP-3901-UDC-IF application from Grass Valley has two operating modes — SDI only or SDI and IP (hybrid) — for deployment flexibility and to provide a bridge to an all IP workflow. The XIP-3901-UDC-IF has optional HDR and audio processors and, in addition, allows the application to be configured as a dual-channel 4K UHD or quad-channel HD broadcast-quality format converter.

The XIP-3901-UDC-IF provides frame synchronization and video processing functions to perform up/down/crossconversion needed to maintain the chosen output format, irrespective of whether the input is HD 720p, 1080i, 1080p or UHD 2160p. High-quality up/down/crossconversion is performed at

both 50 and 59.94 Hz, based on multiple sophisticated processing technologies including detail enhancement, pixel-based de-interlacing, and advanced motion adaptive de-interlacing and anti-ringing. In addition, a set of video processing functions provide operators control of proc amp adjustment, signal enhancement, color correction and legalization of both paths.

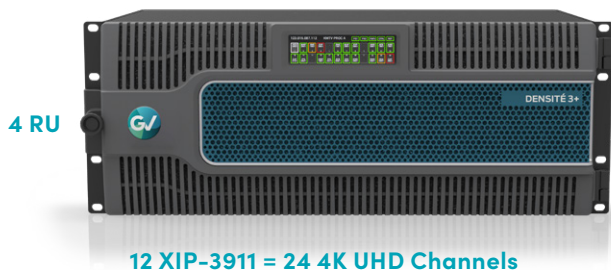
All processing channels on the XIP-3901-UDC-IF can be genlocked to PTP, an external reference, or to the frame reference internal URS signals. In the absence of a valid video input, the video output signal will freeze on the last good frame. Each processing channel is able to delay 12G/3G/HD embedded audio and metadata

to maintain synchronization with the video and offers a frame buffer which allows an additional delay increase up to 6 frames/fields.

In a hybrid SDI-IP environment, the XIP-3901-UDC-IF dual 25 GbE I/O supports the SMPTE ST 2110 suite of standards and JT-NM TR-1001-1 technical recommendation for easy integration in a broadcast network environment.

The optional HDR processor, 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. The HDR processor supports 33-point Tetrahedral 3D LUT interpolation and, in addition to the Grass Valley LUTs,

Densité 3+ FR4



Densité 3+ FR1



Key Features

- Independent dual-channel 4K UHD or quad-channel HD broadcast-quality up/down/cross video processor
- 12G 2160p, 3G 1080p and HD 1080i/720p SDI inputs and outputs
- Integrated frame synchronizer with additional video delay programmable to 6 frames
- Audio/video deglitcher to handle video hot switch at the input
- Video proc including: gain, offset, hue, horizontal and vertical picture enhancement during downconversion, RGB color corrector and gamut legalization
- PTP, external reference or dual URS frame reference supported
- Embedded audio and metadata delay and synchronization
- IP output available on dual 25 GigE IP media network interfaces:
 - SMPTE ST 2110-20/21 video outputs with associated SMPTE ST 2110-40 metadata streams
 - Four SMPTE ST 2110-30/31 Level A, B, C audio stream outputs per processing channel
 - SMPTE ST 2022-7 for seamless protection of IP streams
 - JT-NM TR-1001-1 compliant including NMOS IS-04/IS-05
 - SMPTE ST 2059-1/-2 PTP with BMCA
 - Media interfaces supports AOC cable, Short and Long Reach fiber
 - Both FEC74 (CL74 Fire Code) and FEC108 (Reed Solomon IEEE) Forward Error Correction are supported
- 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:
 - Agile HDR conversion based on input signal colorimetry
 - Supports 33-point Tetrahedral 3D LUT interpolation with choice among Grass Valley conversion algorithms, built-in BBC LUTs v1.5 NBCU LUTs, or user-defined custom LUTs compliant to Adobe cube file v1.0
- All processing operates in full 10-bit video signals with ability to pass sub-blacks and super-whites in SMPTE narrow video
- ITU R BT 2111 HLG/PQ color bar test patterns
- XIP-3901-UDC-AUD option adds four SMPTE ST 2110-30/31 audio input streams per processing channel, and provides 256 channel audio processors with level, delay, 2:1 mixer/shuffling, up-mixing and down-mixing 5.1.4 or 5.1 surround sound signal to a stereo channel pair
- GV Orbit for configuration, control and monitoring
- Individual XIP-3911 and XIP-3901 applications licensed, purchased as needed
- Rapid switching between XIP-3911 applications
- The XIP-3901-UDC-IF is also supported by the ATP-2000 Touch Panel with GV Orbit Dynamic Orchestration where all video processing parameters of both paths can be controlled from a touch panel interface

you can select from the built-in BBC LUTs v1.5, NBCU or you can choose your own custom LUTs compliant to Adobe cube file v1.0 for fully flexible HDR processing. This processor operates in full 10-bit video 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.

Four output streams of SMPTE ST 2110-30/31 audio conforming to Level A and Level C are supported per video channel. The XIP-3901-UDC-AUD option adds four audio input streams with advanced processing control for a total of 256 channels of audio with automatic delay to keep

lip sync — with audio level, delay, shuffling, up-mixing, and down-mixing 5.1.4 or 5.1 surround sound signal to a stereo channel pair.

The XIP-3901-UDC-IF can be configured, controlled and monitored by Grass Valley's GV Orbit, taking advantage of many features and functions specifically crafted to make IP easy. It can also be configured and controlled from iControl systems.

Based on the proven Densité modular framework, the flexible, space-efficient XIP-3911 and XIP-3901 agile processing platforms can accommodate a gradual adoption of different production elements into

1080p and 4K UHD broadcasting workflows — and it enables dual HDR/SDR production — all while protecting your investment in installed equipment. With flexibility to configure up to 12 XIP-3911 processing applications per Densité 3+ FR4 frame, the Densité platform scales to a market-leading density of 24 4K UHD processors with HDR conversions in a 4 RU frame.

With the XIP-3901-UDC-IF application being utilized in quad mode, the channel number is doubled to provide up to 48 HD processors in a 4 RU frame. This means space and cost-efficient scaling today and tomorrow.

XIP-3901-UDC-HDR processing option supported conversions:

GV LUT Conversions	BBC LUTs v1.4	Up to 8 User-defined LUTs
BT.709↔BT.2020	BT.709↔HLG BT.2100 Scene-referred	Adobe cube file v1.0 – 33 cube
BT.709↔HLG BT.2100	BT.709↔HLG BT.2100 Display-referred	BT.709↔BT.2020
BT.709↔PQ ST.2100	HLG BT.2100↔PQ BT.2100	Narrow↔Full range
S-Log3/S-Gamut3→ BT.709	S-Log3 BT.2020→HLG BT.2100	
S-Log3/S-Gamut3→HLG BT.2100		
S-Log3/S-Gamut3→PQ BT.2100		
<i>And new ITU R BT.2111 HLG/PQ Color bar test patterns</i>		

Specifications

SDI (Inputs/Outputs)

Physical: 10 used HD-BNC connectors: 2 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 in dual UHD/HD mode of operation)

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): 1080p59.94, 1080p50
- 12G: SMPTE ST 2082-10: 2160p59.94, 2160p50 (supported in dual UHD/HD mode of operation)

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

Reference Input

Physical: HD-BNC/75Ω connector

Standard: SMPTE ST 170/SMPTE ST 318/ITU 624-4 blackburst

Ethernet Port for Media

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

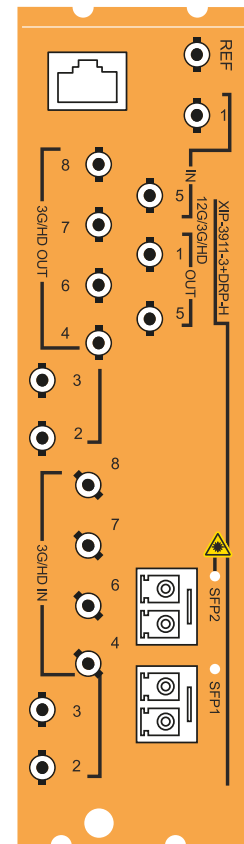
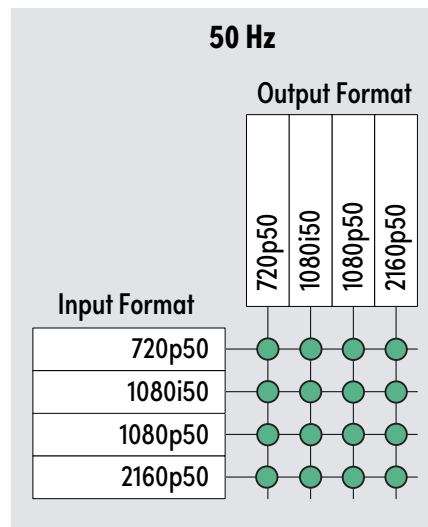
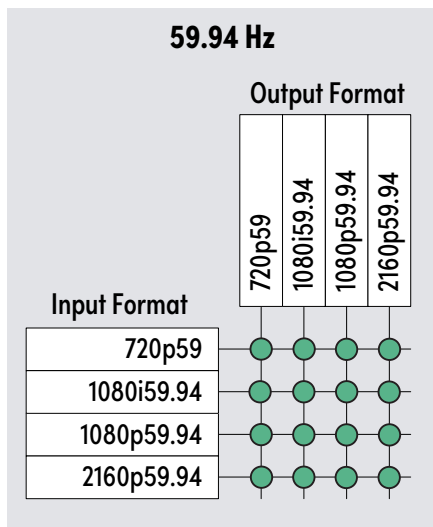
Video Processing Performance

Signal path: 10 bits minimum

Electrical

Power: 60W maximum

Supported input/output video formats:



XIP-3911-3+DRP-H

Ordering

Application Software

XIP-3901-UDC-IF

Application Options

XIP-3901-UDC-HDR

HDR processing option

XIP-3901-UDC-AUD

Audio processing, down/up mix, shuffling option

Densité 3+ Frame

XIP-3911

Agile SDI/IP processing platform

XIP-3911-3+DRP-H

Double rear panel for Densité 3+ with HD-BNC

SFP+ Options

One or two SFP+ are needed to run this application with SMPTE ST 2110 IP streams

SFP-25G-SR

SFP28 25GBASE optical transceiver MMF

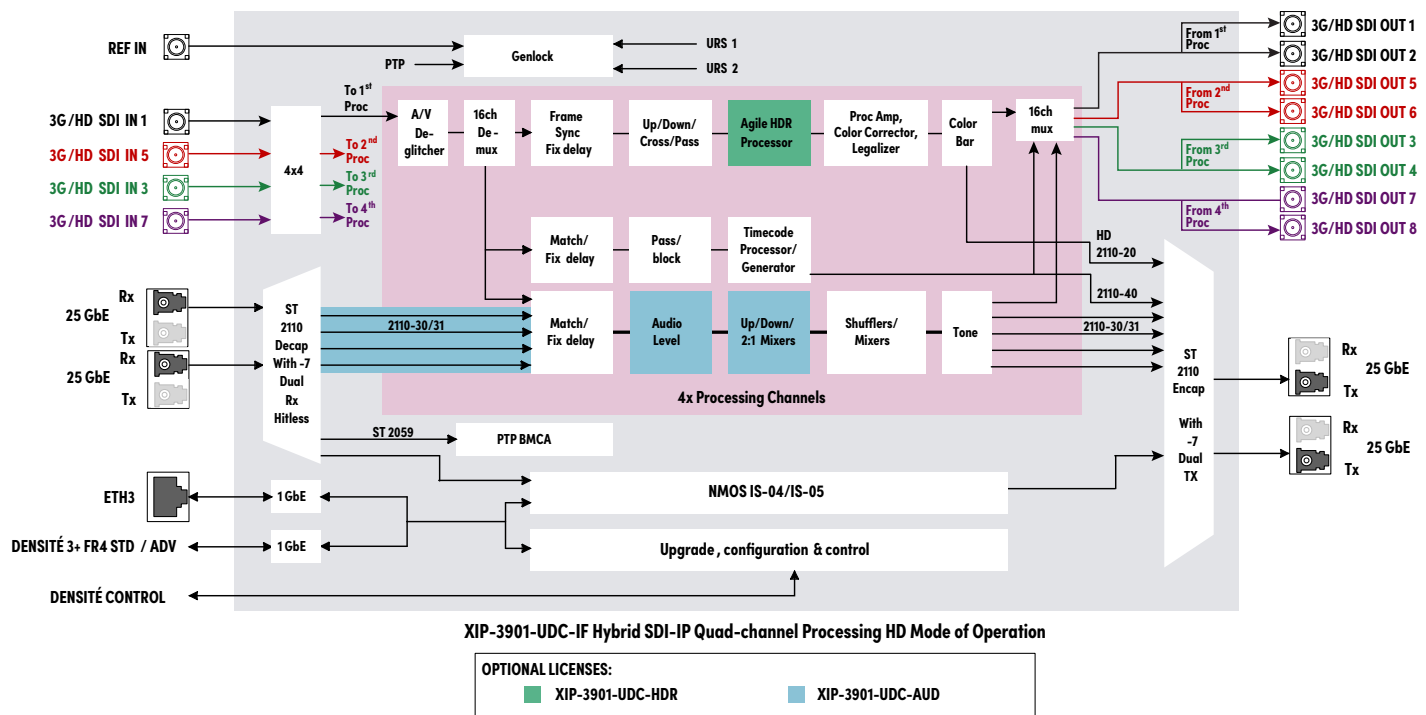
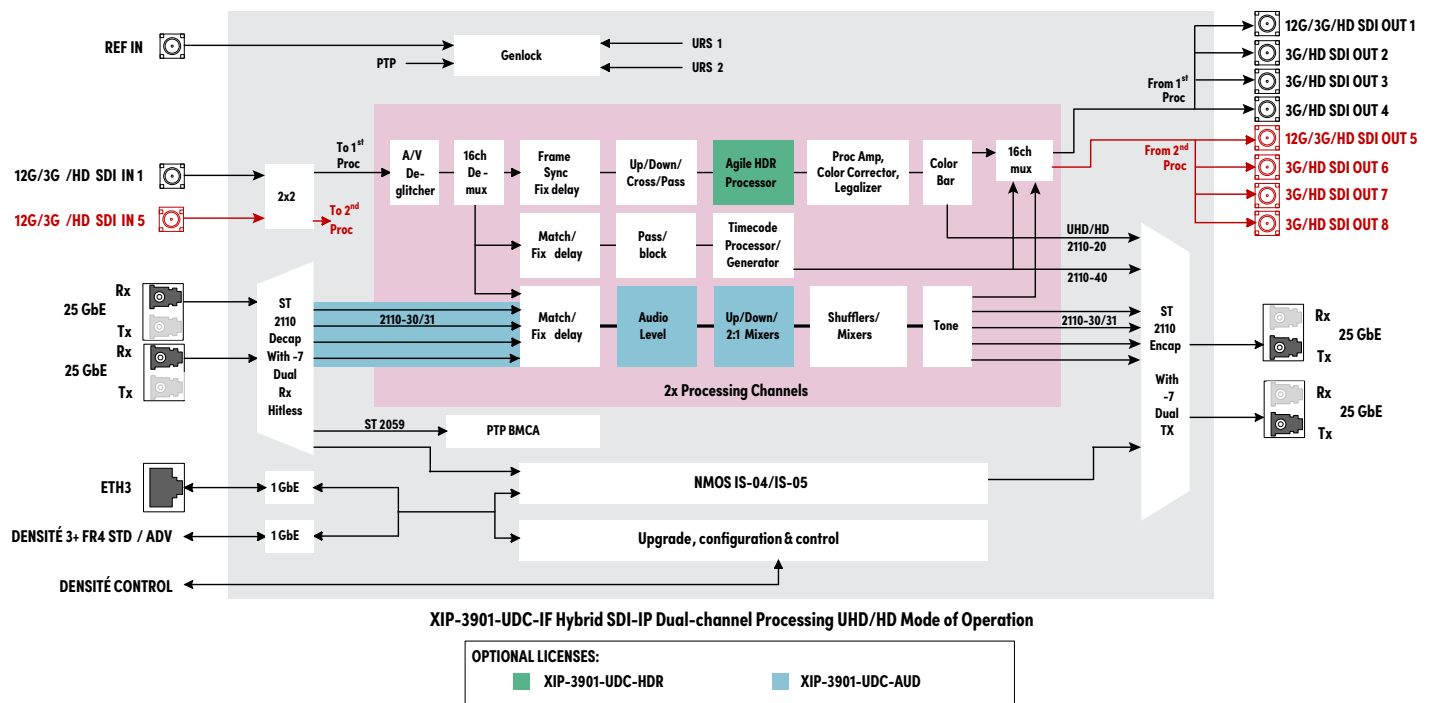
SFP-25G-LR

SFP28 25GBASE optical transceiver SMF

Remote Control

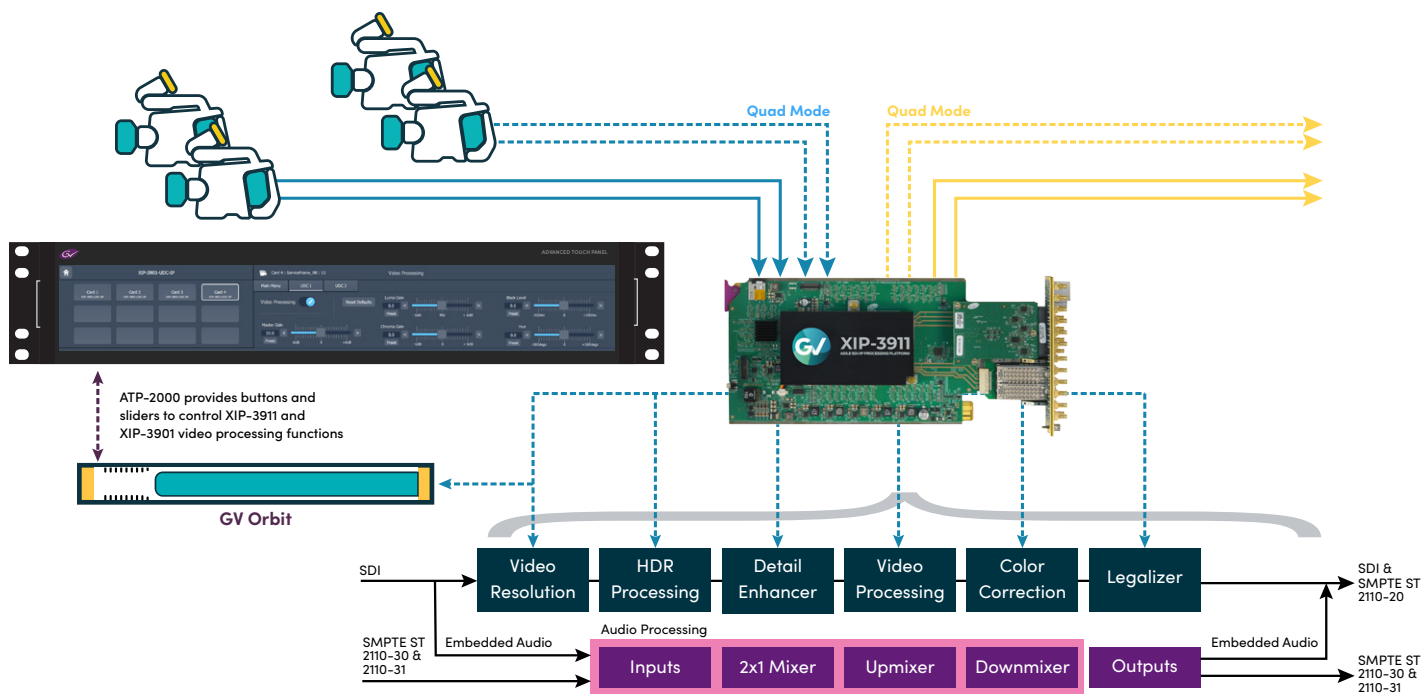
GV Orbit version 1.2, iControl or iControl Solo (version 7.50 or higher required)

XIP-3901-UDC-IF Application Functional Diagrams

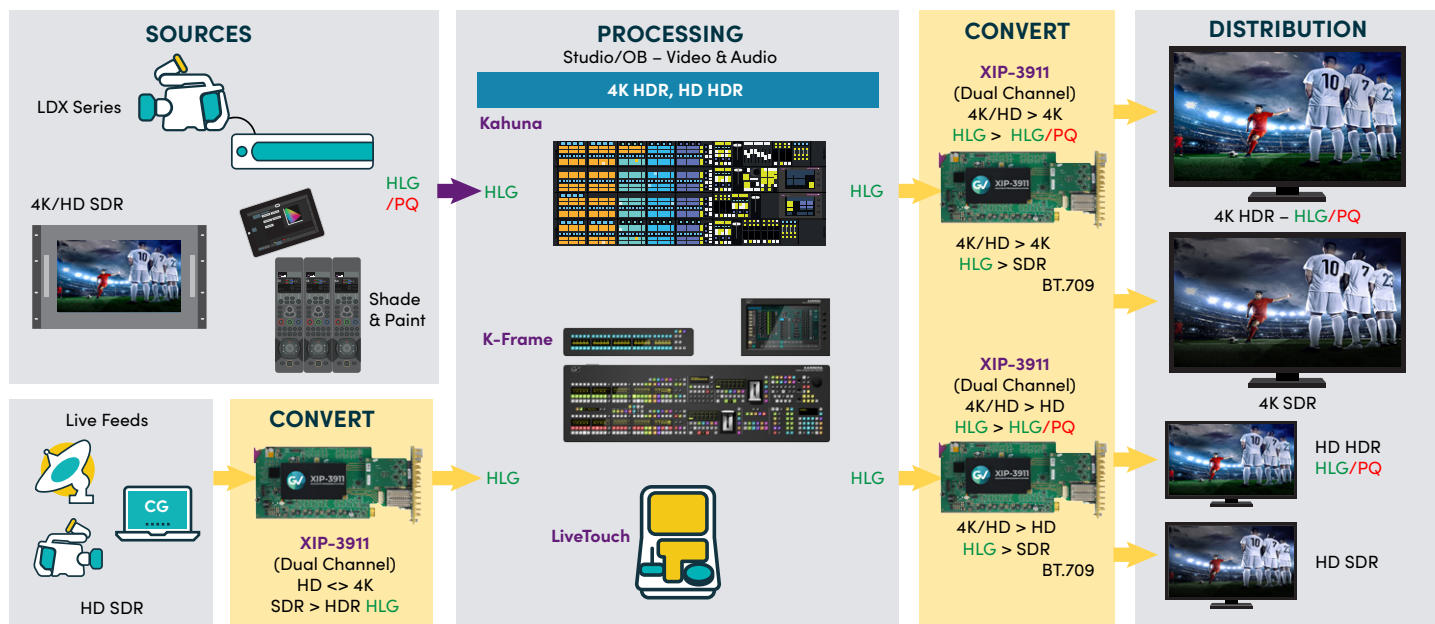


Control, Configuration and Monitoring

Featured Solution: ATP-2000 Touch Panel with GV Orbit Dynamic Orchestration



Typical HDR/SDR Format Conversion Used in Live Production

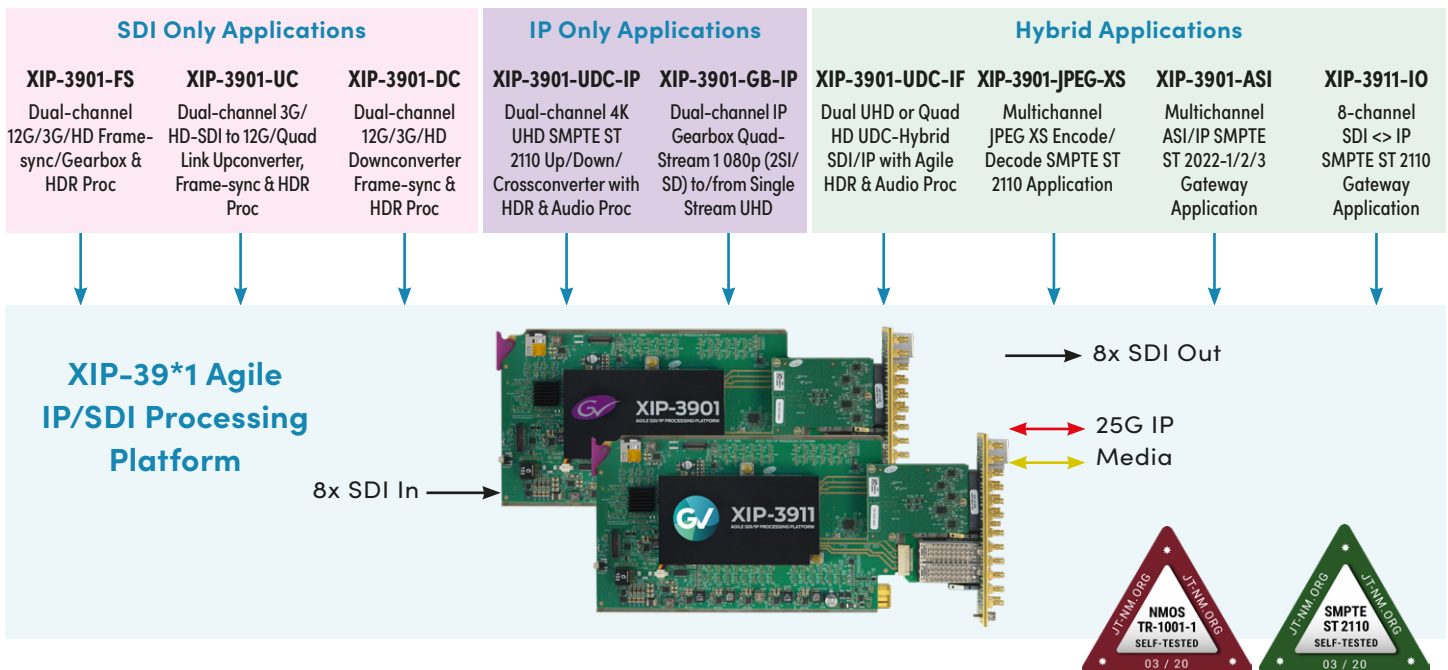


XIP Application Portfolio

All the processing applications delivered on the XIP-3911 and XIP-3901 platforms allow live productions, either from trucks, venues, stadiums or broadcast facilities to make the most of new UHD and HDR formats. Packing lots of audio/video processing power in a small form factor results in savings in terms of space, power and weight.

The XIP-3911 Agile Processing Platform also provides long-term value by protecting a customer's CAPEX investment in current HD and UHD SDI and now IP infrastructure. The application-based licensing model adapts the XIP-3911 to new workflows with different software applications resulting in a truly virtualized hardware environment.

XIP Application Agility Evolution



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

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