

Densité Video Distribution

The Densité series offers a comprehensive range of video distribution amplifiers and gateways designed for reliable signal management across diverse broadcast workflows, this lineup ensures robust, scalable, and high-quality signal distribution and processing to meet the demands of modern broadcast environments.

HDA-1941 HDA-3941

Single Channel 3G/HD/SD SDI Video Distribution Amplifiers

HDA-1951 HDA-3951

Dual Channel 3G/HD/SD SDI Video Distribution Amplifiers

HDA-1911 HDA-3911

3G/HD/SD SDI Distribution Amplifier (DA) with Optional Fiber Connectivity

HDA-1931 HDA-3931

Dual 3G/HD/SD SDI Distribution Amplifier (DA) with Optional Fiber Connectivity

HDA-1851

HD/SD/ASI DA with EQ

SDA-1402

ASI Distribution Amplifier with EQ and Reclocking

HDA-3962

Single/Dual 12G/3G/HD/SD-SDI Distribution Amplifier (DA) with Optional Fiber Connectivity and 12G Relay Input Bypass

IRG-3401

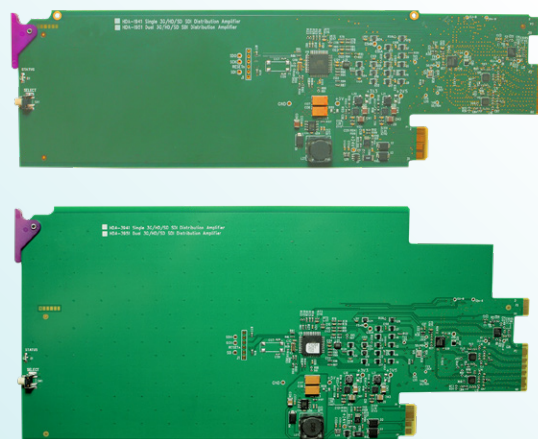
High Density ASI/IP Gateway

UCP-3901

Universal Compute Processor for Densité 3+

HDA-1941 HDA-3941

Single Channel 3G/HD/SD SDI Video Distribution Amplifiers



Single Channel DAs for Densité 2 and Densité 3 frames.

The HDA-1941 (for Densité® 2 series) and HDA-3941 (for Densité 3, Densité 3+ and GV Node™ series) are single channel 3G/HD/SD SDI video distribution amplifiers from Grass Valley®, designed for broadcast and production facilities. The two cards are functionally identical.

The HDA-1941/3941 DAs support a variety of compressed and uncompressed serial digital video

signals. They provide up to nine reclocked outputs with automatic input equalization for up to 185 meters (656 feet) of cable using Belden 1694A at 1.5 Gb/s and up to 100 meters (328 feet) at 3 Gb/s.

Critical application protection is provided by optional bypass relays available on selected rears.

The HDA-1941 and HDA-3941 are single channel DAs, while the complementary HDA-1951 and HDA-3951 are dual channel DAs sharing the same performance quality, but with a higher density by doubling the number of DAs per slots for projects that do not require as many outputs per DA. See the HDA-1951/3951 datasheet for more information.

Key Features

- 3G/HD/SD SDI inputs
- Supports bit rates up to 2.97 Gb/s
- Automatic format detection and cable equalization
- All outputs are DVB-ASI compatible
- Up to 9 3G/HD/SD SDI outputs on the HDA-1941 (2 RU)
- Up to 9 3G/HD/SD SDI outputs on the HDA-3941 (3 RU)
- 2 RU and 3 RU versions have the same functionality and performance
- Optional bypass relay protection available

Specifications

Electrical Inputs (1 or 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)
EN50 83-9 DVI-ASI (270 Mb/s)

Cable length:

350m (1312 ft.) Belden 1694A at 270 Mb/s
185m (656 ft.) Belden 1694A at 1.485 Gb/s
100m (328 ft.) Belden 1694A at 2.970 Gb/s

Return loss:

>15 dB up to 1.5 GHz
>10 dB from 1.5 GHz to 3 GHz

Electrical Outputs (Up to 10)

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)
EN50 83-9 DVI-ASI (270 Mb/s, all outputs)

Return loss:

>15 dB up to 1.5 GHz
>10 dB from 1.5 GHz to 3 GHz

Jitter (wideband): <0.2 UI p-p

Rise/fall time:

Reclocker on:

<135 ps, 20% to 80%, for HD and 3G
400 – 800 ps, 20% to 80%, for SD

Reclocker off: <135 ps for all formats (3G, HD, SD)

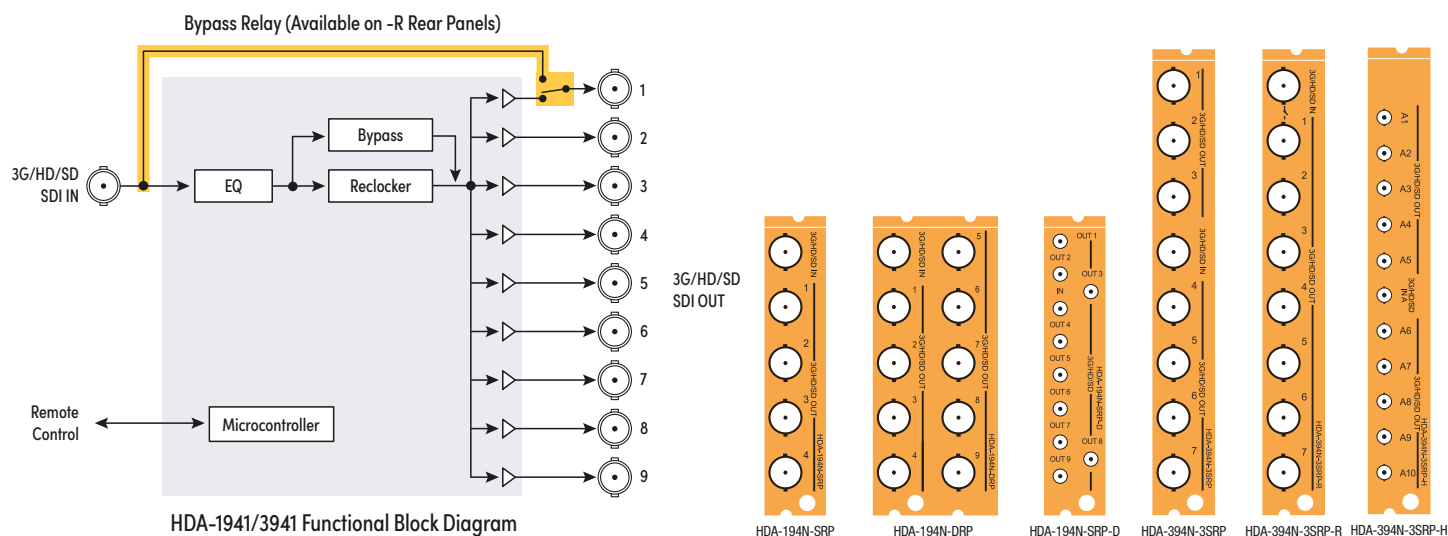
Processing Performance

Signal path: 10 bits

Processing delay: 7 ns typical

Electrical

Power: 2.4W max.



HDA-194N-SRP-D-3RU not shown.

Ordering

Densité 2 frame

HDA-1941
HDA-194N-SRP
HDA-194N-DRP
HDA-194N-SRP-D

Densité 3 frame

HDA-3941

HDA-194N-SRP-D-3RU
HDA-394N-3SRP
HDA-394N-3SRP-R
HDA-394N-3SRP-H

Description

Single Channel 3G/HD/SD SDI Video Distribution Amplifiers
Single rear for 1x4 operating mode with BNC connectors
Double rear for 1x9 operating mode with BNC connectors
Single rear for 1x9 operating mode with DIN connectors
Single rear for 1x7 operating mode with BNC connectors
Single rear for 1x7 operating mode, with bypass relay and BNC connectors
Single rear for 1x9 operating mode with HD-BNC connectors

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

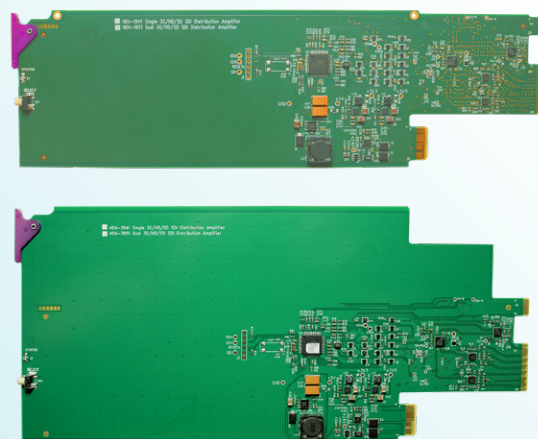
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HDA-1951 HDA-3951

Dual Channel 3G/HD/SD SDI Video Distribution Amplifiers



Dual Channel DAs for Densité 2 and Densité 3 frames.

The HDA-1951 (for Densité® 2 series) and HDA-3951 (for Densité 3, Densité-3+ and GV Node™ series) are dual channel 3G/HD/SD SDI video distribution amplifiers from Grass Valley®, designed for broadcast and production facilities. The two cards are functionally identical.

The HDA-1951/3951 DAs support a variety of compressed and uncompressed serial digital video

signals, with up to dual 1x5 outputs. The HDA-1951/3951 provides up to ten reclocked outputs with automatic inputs equalization for up to 185 meters (656 feet) of cable using Belden 1694A at 1.5 Gb/s and up to 100 meters (328 feet) at 3 Gb/s.

Critical application protection is provided by optional bypass relays available on selected rears.

The HDA-1951 and HDA-3951 are dual channel DAs, while the complementary HDA-1941 and HDA-3941 are single channel DAs sharing the same performance quality, but with a lower density and more outputs per DA. See the HDA-1941/3941 datasheet for more information.

Key Features

- Dual 3G/HD/SD SDI inputs
- Supports bit-rates up to 2.97 Gb/s
- Automatic format detection and cable equalization
- All outputs are DVB-ASI compatible
- Up to 8 3G/HD/SD SDI outputs on the HDA-1951 (2 RU)
- Up to 10 3G/HD/SD SDI outputs on the HDA-3951 (3 RU)
- 2 RU and 3 RU versions have the same functionality and performance
- Optional bypass relay protection on both inputs available

Specifications

Electrical Inputs (1 or 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)
EN50 83-9 DVI-ASI (270 Mb/s)

Cable length:

350m (1312 ft.) Belden 1694A at 270 Mb/s
185m (656 ft.) Belden 1694A at 1.485 Gb/s
100m (328 ft.) Belden 1694A at 2.970 Gb/s

Return loss:

>15 dB up to 1.5 GHz
>10 dB from 1.5 GHz to 3 GHz

Electrical Outputs (Up to 10)

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)
EN50 83-9 DVI-ASI (270 Mb/s, all outputs)

Return loss:

>15 dB up to 1.5 GHz
>10 dB from 1.5 GHz to 3 GHz

Jitter (wideband): <0.2 UI p-p

Rise/fall time:

Reclocker on:

<135 ps, 20% to 80%, for HD and 3G
400 – 800 ps, 20% to 80%, for SD

Reclocker off: <135 ps for all formats (3G, HD, SD)

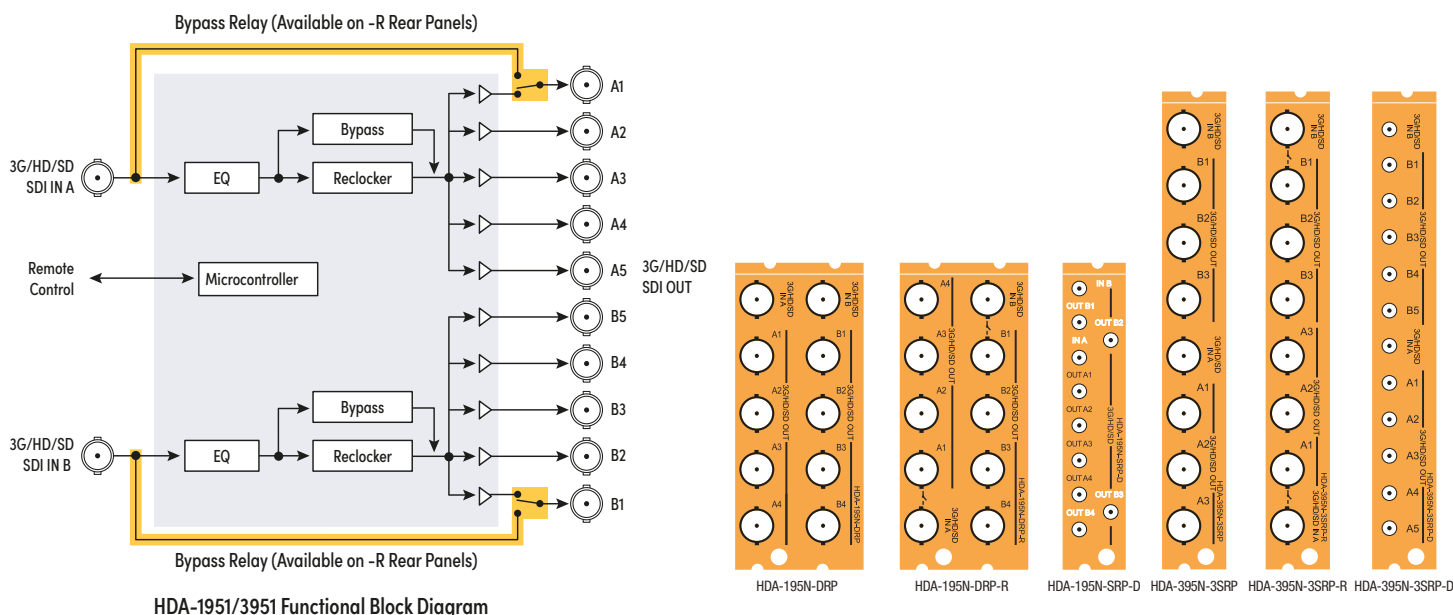
Processing Performance

Signal path: 10 bits

Processing delay: 7 ns typical

Electrical

Power: 2.1W max.



Ordering

Densité 2 frame

HDA-1951
HDA-195N-DRP
HDA-195N-DRP-R
HDA-195N-SRP-D

Densité 3 frame

HDA-3951

HDA-395N-3SRP
HDA-395N-3SRP-R
HDA-395N-3SRP-D

Description

Dual Channel 3G/HD/SD SDI Video Distribution Amplifiers
Double rear for dual 1x4 operating mode with BNC connectors
Double rear for dual 1x4 operating mode with bypass relays and BNC connectors
Single rear for dual 1x4 operating mode with DIN connectors
Single rear for dual 1x3 operating mode, with BNC connectors
Single rear for dual 1x3 operating mode, with bypass relays and BNC connectors
Single rear for dual 1x5 operating mode, with DIN connectors

Remote control

GV Orbit®, iControl™, iControl Solo

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HDA-1911 HDA-3911

3G/HD/SD SDI Distribution Amplifier (DA) with Optional Fiber Connectivity

Space-saving, modular platform for advanced signal distribution.

The HDA-1911 and HDA-3911 from Grass Valley® are 3G/HD/SD SDI video distribution amplifiers (DAs) that support a variety of compressed and uncompressed serial digital video signals.

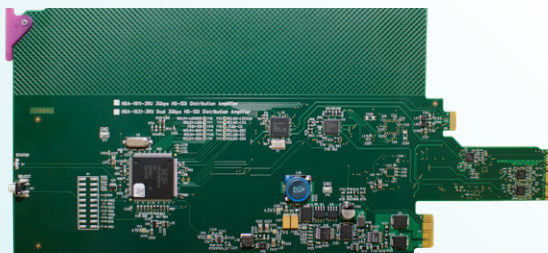
The HDA-1911 and HDA-3911 provide up to nine reclocked outputs with automatic equalization for up to 200 meters (656 feet) of cable using

Belden 1694A at 1.5 Gb/s and up to 100 meters (328 feet) at 3 Gb/s.

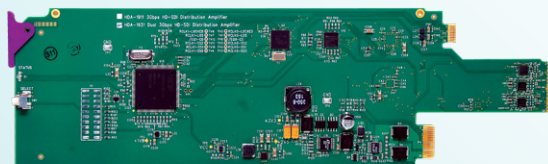
The HDA-1911 and HDA-3911 offer fiber connectivity, making it ideal for longer cable lengths. Critical applications protection is provided by a protection bypass relay available on selected rears.

The HDA-1911 and HDA-3911 share the same feature set and

specifications, except that HDA-1911 is a 2 RU card built for the Densité® 2 frame while the HDA-3911 is a 3 RU card made for the Densité 3 frame series. Each product has its specific rears as illustrated in the Key Features section and in the ordering information.



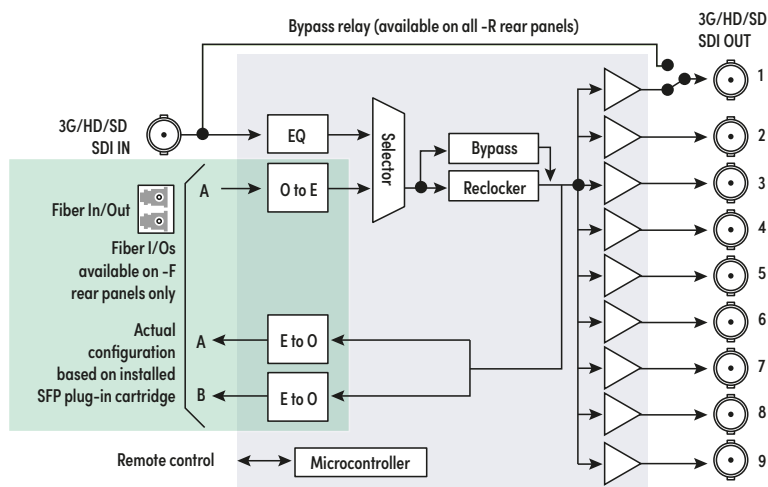
HDA-3911



HDA-1911

Key Features

- 3G/HD/SD SDI input
- Up to 9 3G/HD/SD SDI outputs
- Supports bit rates all the way up to 3 Gb/s
- Automatic format detection and cable equalization
- Optional fiber I/O



HDA-1911 / HDA-3911 Functional Block Diagram

Options Optical option: Refer to the ordering info to see different options

Specifications

Electrical Input

Signal:

3G/HD/SD SDI SMPTE ST 424, 292, and 259-C compliant

Supports data rates of 270, 1483.5, 1485, 2967, 2970 Mb/s

EN50 83-9 DVB-ASI 270 Mb/s

Cable length* (Belden 1694A):

3G: 100m (328 ft.) at 3 Gb/s

HD: 200m (656 ft.) at 1.5 Gb/s

SD: 400m (1,312 ft.) at 270 Mb/s

Return loss*:

>15 dB for up to 1.5 GHz

>10 dB from 1.5 GHz to 3 GHz

Electrical Outputs (9)

Signal:

3G/HD/SD SDI SMPTE ST 424, 292, and 259-C compliant

Supports data rates of 270, 1483.5, 1485, 2967, 2970 Mb/s

EN50 83-9 DVB-ASI 270 Mb/s (5 outputs only)

Return loss:

>15 dB up to 1.5 GHz

>10 dB from 1.5 GHz to 3 GHz

Jitter (wideband):

HD/SD: <0.2 UI

3G: <0.3 UI

Rise/fall time:

135 ps max., 20% to 80%, for HD

400 – 800 ps, 20% to 80%, for SD

Processing Performance

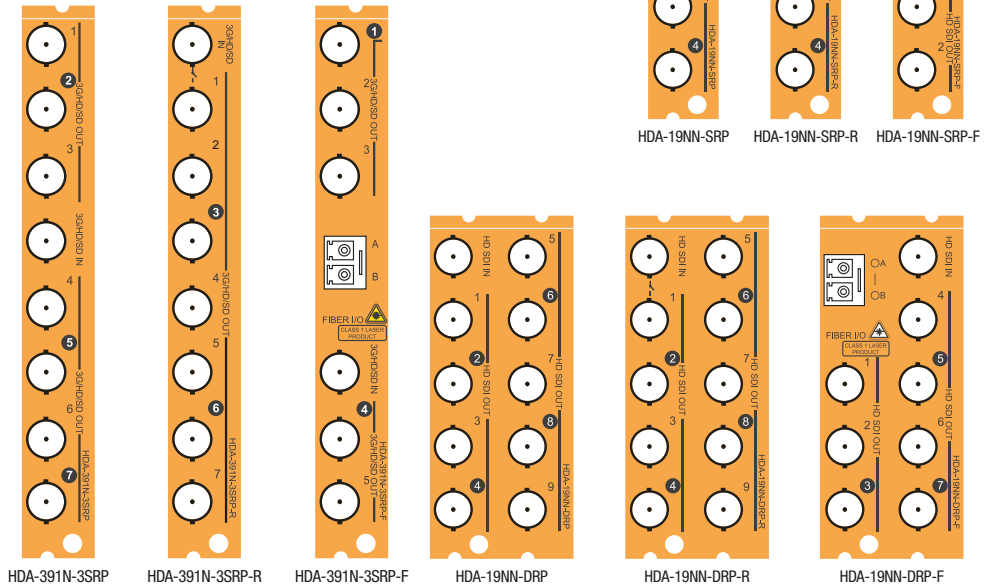
Signal path: 10 bits

Latency: <6 ns

Electrical

Power: 5W

* Cable length and return loss specifications will be reduced when using the output protected by the bypass relay on HDA-19NN-SRP-R, HDA-19NN-DRP-R and HDA-391N-3SRP-R. Refer to the manual for more details.



Note: Numbered outputs marked with black circles are not suitable for DVB-ASI distribution.

Ordering

Densité 2 frame	Densité 3 frame	Description	Densité 2 frame	Densité 3 frame	Description
HDA-1911	HDA-3911	3G/HD/SD distribution amplifier with EQ and reclocking		HDA-391N-3SRP-F	Single rear connector panel for single 1x5 operation mode with fiber option support
HDA-19NN-SRP		Single rear connector panel to be used in single 1x4 operation mode		HDA-391N-3SRP-R	Single rear connector panel for single 1x7 operation mode with bypass protection relay
HDA-19NN-SRP-R		Single rear connector panel to be used in single 1x4 operation mode with bypass protection relay			
HDA-19NN-SRP-F		Single rear connector panel to be used in single 1x2 operation mode with fiber option support	Fiber options	Description	
HDA-19NN-DRP	HDA-19NN-DRP-3RU	Double rear connector panel to be used in single 1x9 operation mode	SFP-R-LC	Single fiber RX (input) cartridge with LC/PC connector	
HDA-19NN-DRP-R	HDA-19NN-DRP-R-3RU	Double rear connector panel to be used in single 1x9 operation mode with bypass protection relay	SFP-T-S13-LC	Single fiber TX (output) cartridge at 1310 nm with LC/PC connector	
HDA-19NN-DRP-F	HDA-19NN-DRP-F-3RU	Double rear connector panel to be used in single 1x7 operation mode with fiber option support	SFP-RT-S13-LC	Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector	
	HDA-391N-3SRP	Single rear connector panel to be used in single 1x7 operation mode	Note: This product can also make use of SFP Optical Plug-in Cartridges from the WDM and CWDM series. Other types of SFP Optical Plug-In Cartridges may be available for this product.		
			Remote control	GV Orbit®, iControl™, iControl Solo	

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HDA-1931 HDA-3931

Dual 3G/HD/SD SDI Distribution Amplifier (DA) with Optional Fiber Connectivity

Space-saving, modular platform for advanced signal distribution.

The HDA-1931 and HDA-3931 from Grass Valley® are dual 3G/HD/SD SDI video distribution amplifiers (DAs) that support a variety of compressed and uncompressed serial digital video signals.

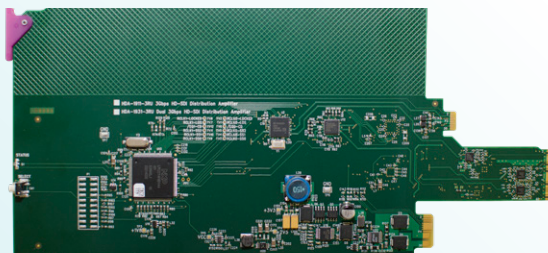
The HDA-1931 and HDA-3931 provide up to eight reclocked outputs with automatic equalization for up to

150 meters (492 feet) of cable using Belden 1694A at 1.5 Gb/s and up to 90 meters (295 feet) at 3 Gb/s.

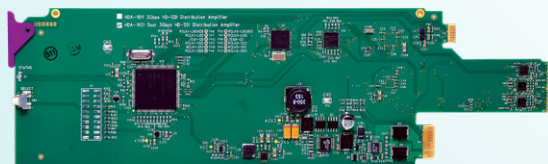
The HDA-1931 and HDA-3931 offer fiber connectivity, making it ideal for longer cable lengths.

The HDA-1931 and HDA-3931 share the same feature set and

specifications, except that HDA-1931 is a 2 RU card built for the Densité® 2 frame while the HDA-3931 is a 3 RU card made for the Densité 3 frame series. Each product has its specific rears as illustrated in the Key Features section and in the ordering information.



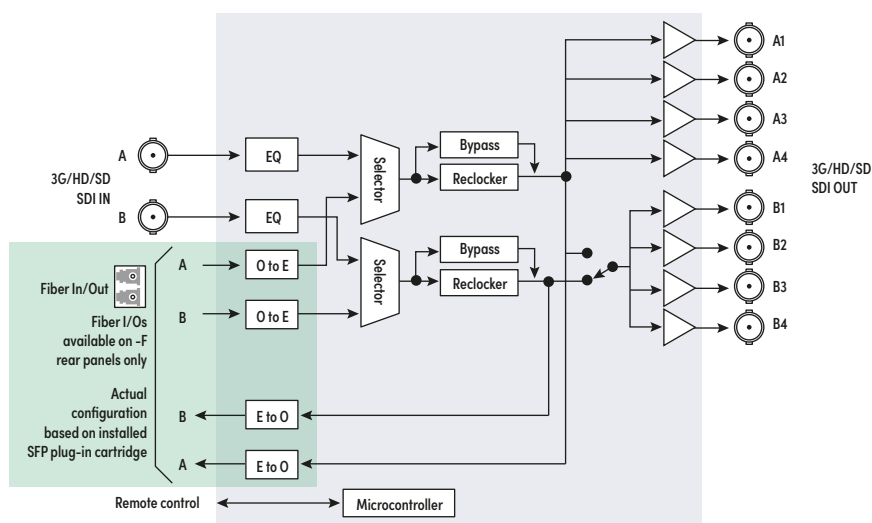
HDA-3931



HDA-1931

Key Features

- Two 3G/HD/SD SDI inputs
- Up to 8 3G/HD/SD SDI outputs
- Supports bit rates all the way up to 3 Gb/s
- Backup input available in single channel mode
- Automatic format detection and cable equalization
- Optional fiber I/O



HDA-1931 Functional Block Diagram

Options

Optical option: Refer to the ordering info to see different options

Specifications

Electrical Inputs (2)

Signal:

3G/HD/SD SDI ST SMPTE 424, 292 and 259-C compliant

Supports data rates of 270, 1483.5, 1485, 2967, 2970 Mb/s

EN50 83-9 DVB-ASI 270 Mb/s

Cable length (Belden 1694A):

3G: 90m (295 ft.) at 3 Gb/s

HD: 150m (492 ft.) at 1.5 Gb/s

SD: 300m (984 ft.) at 270 Mb/s

Return loss:

>15 dB up to 1.5 GHz

>10 dB from 1.5 GHz to 3 GHz

Electrical Outputs (9)

Signal:

3G/HD/SD SDI SMPTE ST 424, 292, and 259-C compliant

Supports data rates of 270, 1483.5, 1485, 2967, 2970 Mb/s

EN50 83-9 DVB-ASI 270 Mb/s (5 outputs only)

Return loss:

>15 dB up to 1.5 GHz

>10 dB from 1.5 GHz to 3 GHz

Jitter (wideband):

HD/SD: <0.2 UI

3G: <0.3 UI

Rise / fall time:

135 ps max., 20% to 80%, for HD

400 - 800 ps, 20% to 80%, for SD

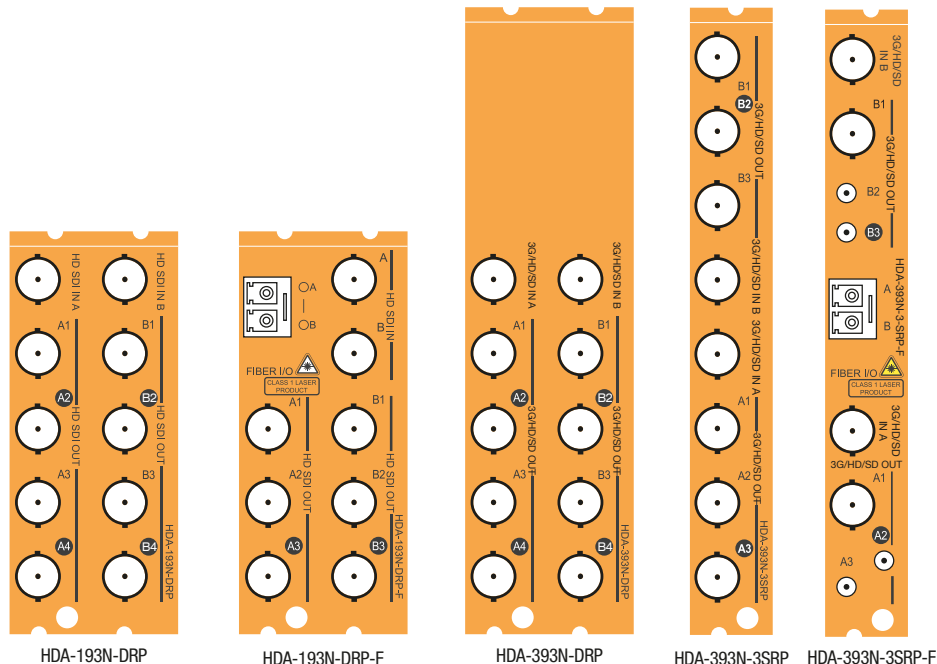
Processing Performance

Signal path: 10 bits

Latency: <6 ns

Electrical

Power: 5W



Ordering

Densité 2 frame	Densité 3 frame	Description	Fiber options	Description
HDA-1931	HDA-3931	3G/HD/SD distribution amplifier with EQ and reclocking	SFP-R-LC	Single fiber RX (input) cartridge with LC/PC connector
HDA-193N-DRP		Double rear for dual 1x4 operating mode	SFP-T-S13-LC	Single fiber TX (output) cartridge at 1310 nm with LC/PC connector
	HDA-393N-3DRP	Double rear for dual 1x4 operating mode	SFP-RT-S13-LC	Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector
HDA-193N-DRP-F		Double rear for dual 1x3 operating mode with fiber option support		
	HDA-393N-3SRP-F	Single rear for dual 1x3 operating mode with fiber option support		
	HDA-393N-3SRP	Single rear for dual 1x3 operating mode		

Note that the HDA-393N-3SRP-F panel uses DIN1.0/2.3 connectors on outputs A2/A3 and B2/B3. All other electrical connectors on all panels are BNC.

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

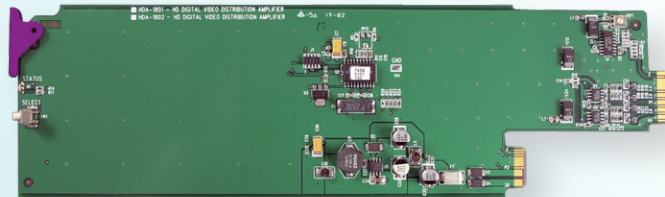
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HDA-1851

HD/SD/ASI DA with EQ



Space-saving, modular platform for advanced signal processing.

The HDA-1851 from Grass Valley® is an HD/SD/ASI DA with up to nine outputs and automatic equalization for up to 140 meters (459 feet) using Belden 1694A.

The HDA-1851 DA supports both HD-SDI (SMPTE ST 292) and SDI (SMPTE ST 259-C). It also offers signal presence detection and remote reporting. The card's multiformat features make it ideal for applications where HD and SD signals may co-exist.

Key Features

- HD-SDI input
- Supports HD-SDI (1.485, 1.485/1.001 Gb/s)
- 140m (459 ft.) automatic cable equalization
- 9 HD-SDI outputs
- Supports SD-SDI 270 Mb/s (rise/fall time at HD speed only)
- Signal presence detection with remote reporting

Specifications

Input

Signal:

SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
SMPTE ST 259-C (270 Mb/s)
EN50 083-9 DVB-ASI (270 Mb/s)
SMPTE ST 310/DVB-SSI

Cable length:

HD: 140m (459 ft.) Belden 1694A
SD: 300m (984 ft.) Belden 1694A

Return loss: >15 dB up to 1.5 GHz

Output

Signal:

SMPTE ST 292 (1.485, 1.485/1.001 Gb/s)
SMPTE ST 259-C (270 Mb/s), rise/fall time at HD speed only)

Return loss: >15 dB up to 1.5 GHz

Jitter: <0.2 UI p-p (wideband)

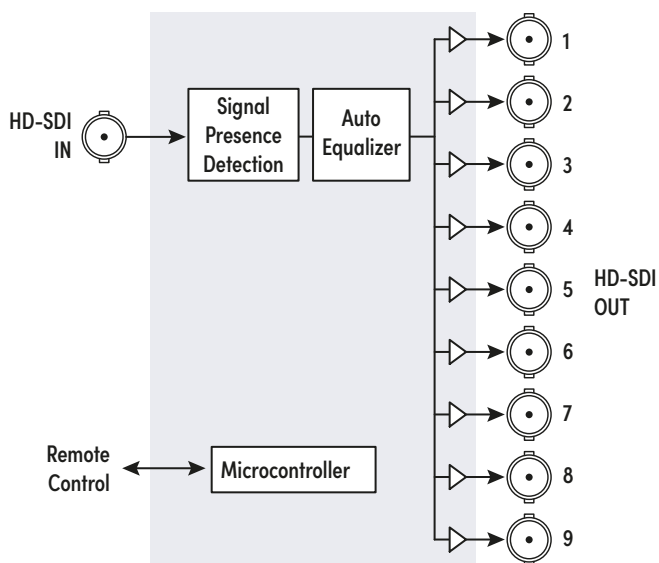
Processing Performance

Signal path: 10 bits

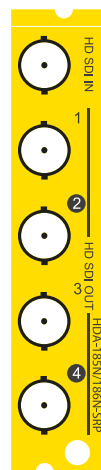
Latency: 3 ns

Electrical

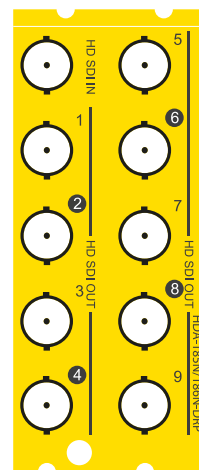
Power: 2W



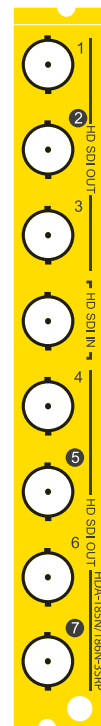
HDA-1851 Functional Block Diagram



HDA-185N/186N-SRP



HDA-185N/186N-DRP



HDA-185N/186N-3SRP

Ordering

Densité® 2 frame

HDA-1851
HDA-185N/186N-SRP
HDA-185N/186N-DRP

Remote control

Densité 3 frame

HDA-1851-3RU
HDA-185N/186N-DRP-3RU
HDA-185N/186N-3SRP

GV Orbit®, iControl™, iControl Solo

Description

HD/SD/ASI DA with EQ
Single rear connector panel with 4 outs
Double rear connector panel
Single rear connector panel with 7 outs

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

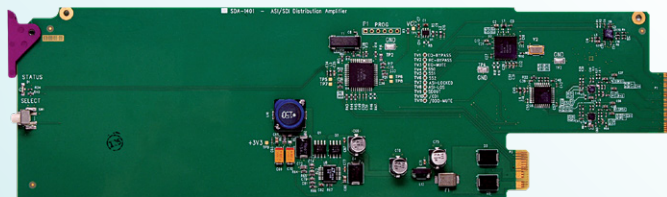
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SDA-1402

ASI Distribution Amplifier with EQ and Reclocking



Space-saving, modular platform for advanced signal processing.

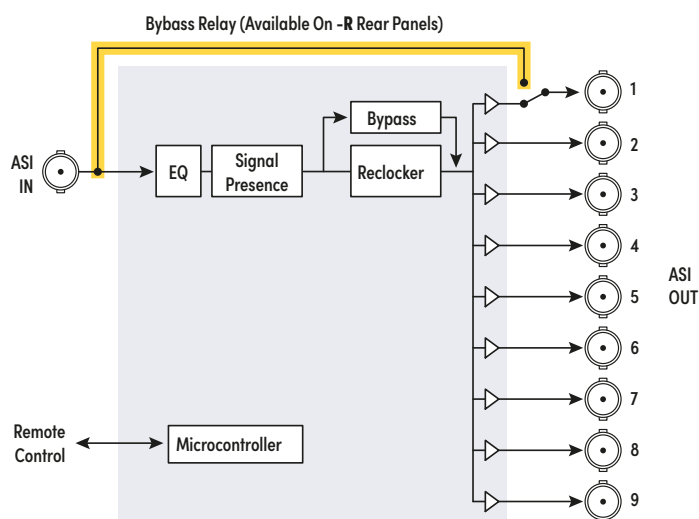
The SDA-1402 from Grass Valley® is an ASI distribution amplifier that provides up to nine reclocked outputs with automatic equalization for up to 350 meters (1,148 feet) of cable (Belden 1694A).

The amplifier offers signal presence detection, remote reporting and includes reclocking — providing an additional level of signal integrity in long cable length applications.

The SDA-1402 also supports other compressed formats such as SMPTE ST 310/DVB-SSI.

Key Features

- DVB-ASI input
- Up to 9 DVB-ASI outputs
- Automatic format detection and cable equalization
- Optional bypass relay protection
- DVB-ASI and SMPTE ST 310/DVB-SSI formats supported
- Bitrate of 270 Mb/s
- Status LED and alarm reporting



SDA-1402 Functional Block Diagram

Specifications

Input

Signal:

SMPTE ST 259-C (270 Mb/s)
EN 50083-9 DVB-ASI (270 Mb/s)
DVB-SSI/SMPTE ST 310

Cable length:

350m (1,148 ft.) at 270 Mb/s (Belden 1694A or equivalent)
275m (902 ft.) with bypass relay rears at 270 Mb/s (Belden 1694A or equivalent)

Return loss: >15 dB up to 270 MHz

Outputs

Signal (4/7/9):

SMPTE ST 259-C (270 Mb/s)
EN 50083-9 DVB-ASI (270 Mb/s)
DVB-SSI/SMPTE ST 310

Cable Length:

350m (1,148 ft.) at 270 Mb/s (Belden 1694A or equivalent)
275m (902 ft.) for OUT1 with bypass relay rears at 270 Mb/s (Belden 1694A or equivalent)

Return loss: >15 dB up to 270 MHz

Jitter: <0.2 UI p-p (wideband)

Processing Performance

Signal path: 10 bits

Latency: 10 ns

Electrical

Power: 5W

Ordering

Densité® 2 frame

SDA-1402
SDA-1402-SRP
SDA-1402-SRP-R
SDA-1402-DRP
SDA-1402-DRP-R

Densité 3 frame

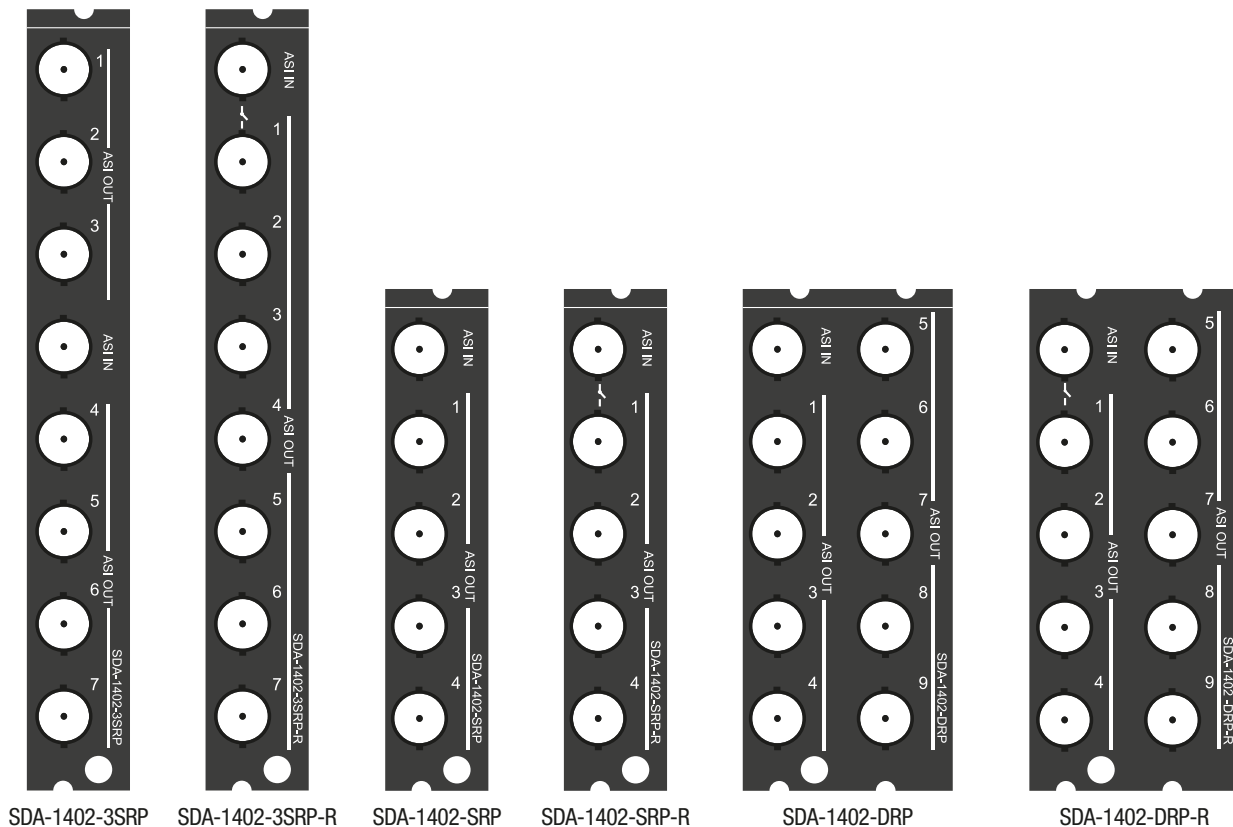
SDA-1402-3RU
SDA-1402-DRP-3RU
SDA-1402-DRP-R-3RU
SDA-1402-3SRP
SDA-1402-3SRP-R

Description

ASI DA with EQ and reclocking
Single rear connector panel with 4 outs
Single rear connector panel with bypass protection relay with 4 outs
Double rear connector panel
Double rear connector panel with bypass protection relay
Single rear connector panel with 7 outs
Single rear connector panel with bypass protection relay with 7 outs

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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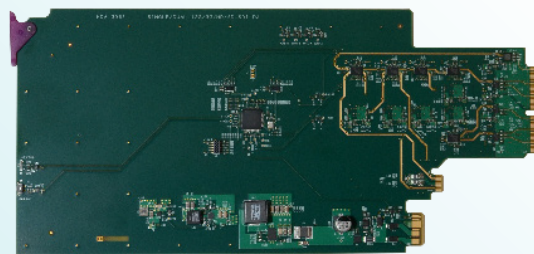
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DENSITÉ HDA-3962

Single/Dual 12G/3G/HD/SD-SDI Distribution Amplifier (DA) with Optional Fiber Connectivity and 12G Relay Input Bypass

Single and dual channel distribution for 12G/3G/HD/SD-SDI signals.



The HDA-3962 from Grass Valley® provides single and dual channel distribution for 12G/3G/HD/SD-SDI signals with flexible routing of inputs to outputs. Flexible output selection enables the HDA-3962 to be used either as a single channel DA with up to 10 outputs, or in dual channel mode with up to five outputs per input.

The HDA-3962 provides up to ten reclocked outputs with automatic equalization for up to 60 meters (197 feet) of cable using Belden 4794R at 12 Gb/s, and 100m (328 feet) at 3 Gb/s and up to 150 meters (492 feet) at 1.5 Gb/s using Belden 1694A cable.

The HDA-396N-3SRP-HF rear offers fiber connectivity, making it ideal for longer cable lengths. The HDA-3962

provides a user-configurable fiber optic transceiver for bidirectional conversion of 12G, 3G, HD and SD-SDI signals to 1310 nm optical signals. Ideal for mixed coax and fiber workflows, the HDA-3962 allows users to configure the inputs and outputs to match their infrastructure needs.

The HDA-3962-3DRP-HR rear provides a 12G relay input bypass feature, ideal for signal protection in critical applications.

Based on the proven Densité® modular framework of over 100 functional cards, the HDA-3962 provides a space-efficient signal distribution solution. With the flexibility to configure up to 20 HDA-3962 module per Densité 3 frame,

with each module carrying 12 12G single outputs or six 12G dual outputs, this platform scales to a density of 240 12G signals in a 3 RU frame. The HDA-3962 also support the Densité 3+ FR1 frame with four modules in 1 RU, the Densité 3+ FR4 frame with 24 modules in 4 RU and the Densité 3 mini frame with two modules in 1/2 RU.

The HDA-3962 can be configured and monitored by the proven GV Orbit® Network Orchestration solution.

Key Features

- Single/dual 12G/3G/HD/SD-SDI inputs
- Flexible selection of inputs allows single or dual channel operation on some rear panels
- Supports bitrates up to 11.88 Gb/s
- Automatic format detection and cable equalization
- Up to 10 12G/3G/HD/SD-SDI with one bypass HD-BNC outputs on the HDA-3962-3DRP-HR rear
- Up to 7 12G/3G/HD/SD-SDI BNC outputs on the HDA-396N-3SRP rear
- Up to 6 12G/3G/HD/SD-SDI BNC outputs on the HDA-396N-3SRP-2IN rear
- Up to 10 12G/3G/HD/SD-SDI HD-BNC outputs on the HDA-396N-3SRP-HF rear
- Optional fiber I/O on the HDA-396N-3SRP-HF rear

Specifications

Electrical Inputs and Outputs

Physical:

8 BNC Connectors:

- 1 in, 7 out (HDA-396N-3SRP)
- 2 in, 6 out (HDA-396N-3SRP-2IN)

12 HD-BNC Connectors:

- 2 in, 10 out (HDA-396N-3SRP-HF)
- 1 in, 10 out with relay bypass for in 1 to out 1 (HDA-3962-3DRP-HR)

SDI standards:

- 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)
- SMPTE ST 2082-1:2015 (2.970, 2.970/1.001 Gb/s)

Cable length (Belden 1694A cable):

- 365m (1197 ft.) at 270 Mb/s
- 150m (492 ft.) at 1.485 Gb/s
- 100m (328 ft.) at 2.970 Gb/s

Cable length (Belden 4794R cable):

- 60m (197 ft.) at 11.88 Gb/s

Return loss:

- >15 dB up to 1.5 GHz
- >10 dB from 1.5 GHz to 3 GHz

Jitter (wideband): <0.2 UI p-p

Rise/fall time:

- <135 ps, 20% to 80%, for HD and 3G
- 400-800 ps, 20% to 80%, for SD

Processing Performance

Processing delay: 7 ns typical

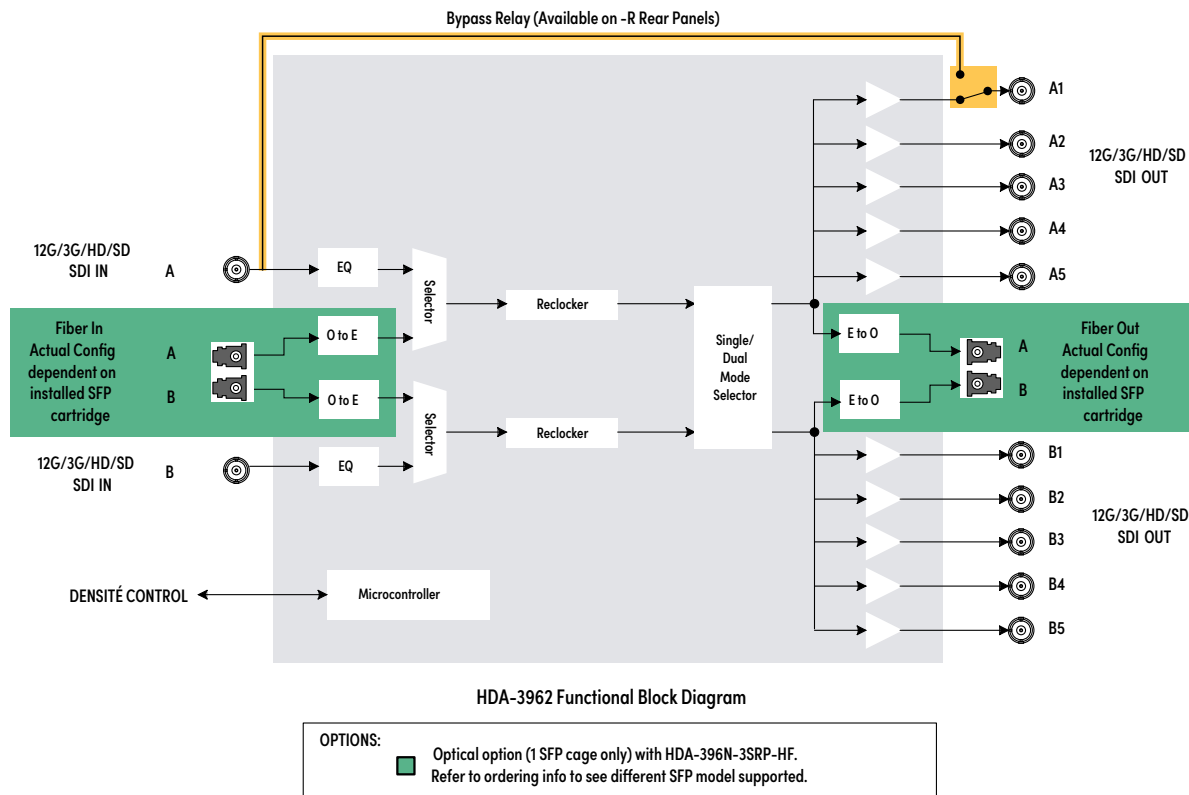
Electrical

Power: less than 12.5W max

NOTE: When using a rear panel that is equipped with a bypass relay (model: HDA-3962-3DRP-HR), performance will be reduced for equipment connected to the output protected by the bypass relay (Output 1).

The total cable length of the bypass relay protected path must not be greater than the maximum input cable length requirement of the receiving equipment. For this, add the cable length of the equipment connected to the card's input to the cable length of the receiving equipment connected to the output protected by the bypass relay.

The return loss specifications of the bypass relay protected path will be reduced as it depends on the return loss of the receiving equipment connected to the output protected by the bypass relay.



Ordering

Densité 3 Frame

HDA-3962

Single/dual 12G SDI distribution amplifier with EQ and reclocking

HDA-396N-3SRP

Single rear panel with single 1x7 BNCs

HDA-396N-3SRP-2IN

Single rear panel with single 1x6 or dual 1x3 BNCs

HDA-396N-3SRP-HF

Single rear panel with single 1x10 or dual 1x5 HD-BNC with fiber option support

HDA-3962-3DRP-HR

Double rear panel with single 1x10 HD-BNC with relay bypass support on output 1

Fiber Options

SFP-U-R-LC

12G Single RX Fiber with LC/PC

SFP-U-RR-LC

12G Dual Rx Fiber with LC/PC

SFP-U-RT-S13-LC

12G Dual Rx/Tx Fiber 1310 nm with LC/PC

SFP-U-T-S13-LC

12G Single Tx Fiber 1310 nm with LC/PC

SFP-U-TT-S13S13-LC

12G Dual Tx Fiber 1310 nm with LC/PC

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

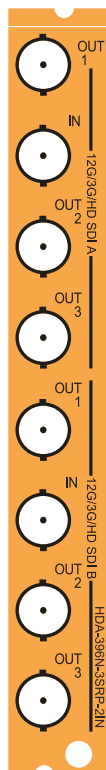
Dual fiber Rx/Tx (input/output) cartridge 1310 nm with LC/PC connector

NOTE: The HDA-3962 can also make use of SFP optical plug-in cartridges from the WDM and CWDM series. Other types of SFP optical plug-in cartridges may be available.

Remote control: GV Orbit, iControl or iControl Solo (version 7.10 or higher required)



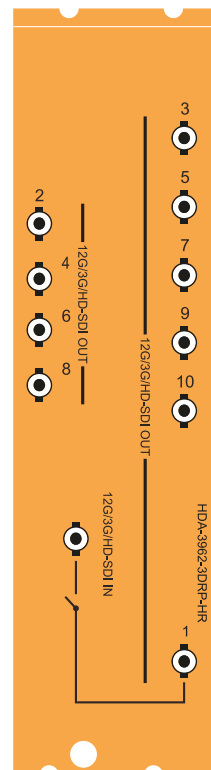
HDA-396N-3SRP



HDA-396N-3SRP-2IN



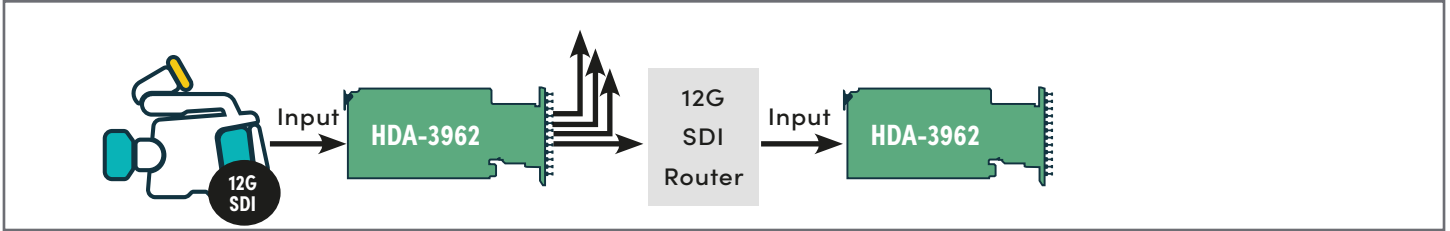
HDA-396N-3SRP-HF



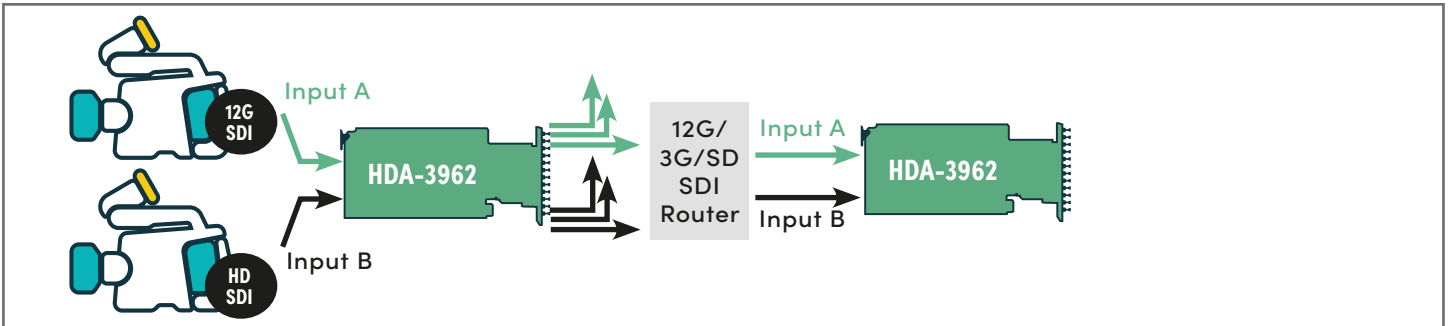
HDA-3962-3DRP-HR

Typical Applications

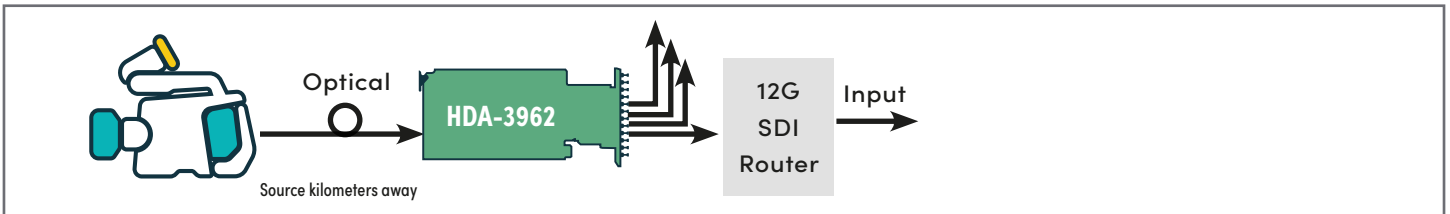
1) Simple router fan-in/fan-out application



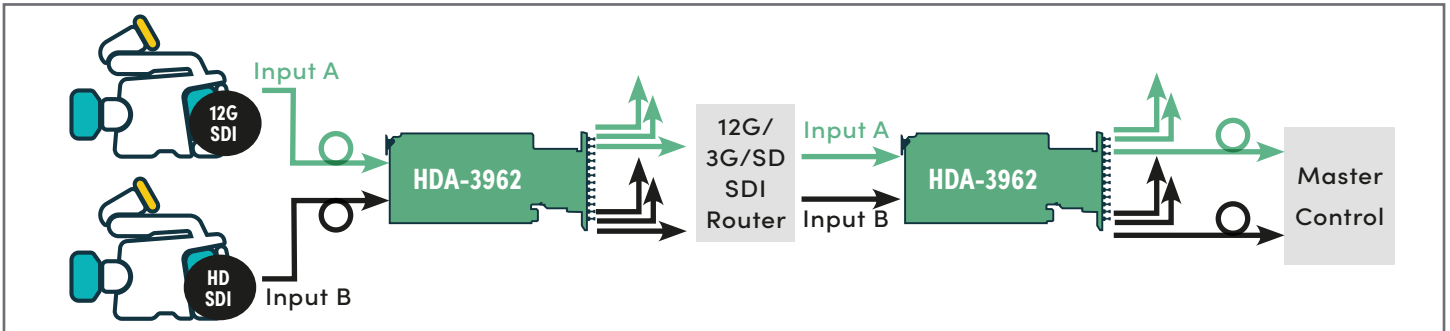
2) Dual channel, dual format multiformat fan-in/fan-out application



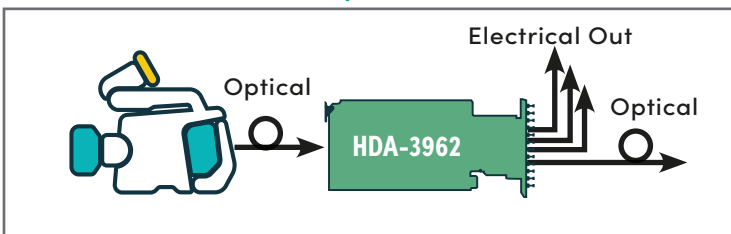
3) Simple channel fiber optic long distance router fan-in/fan-out



4) Dual channel fiber optic long distance router fan-in/fan-out



5) Fiber-to-fiber with electrical drop-down



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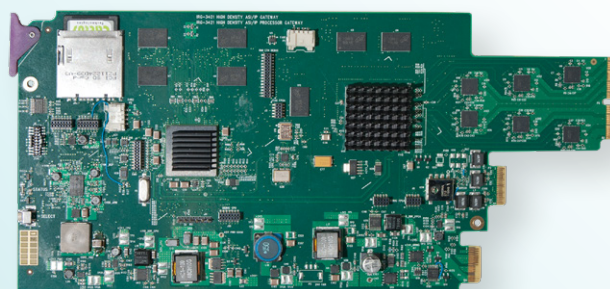
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IRG-3401

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.

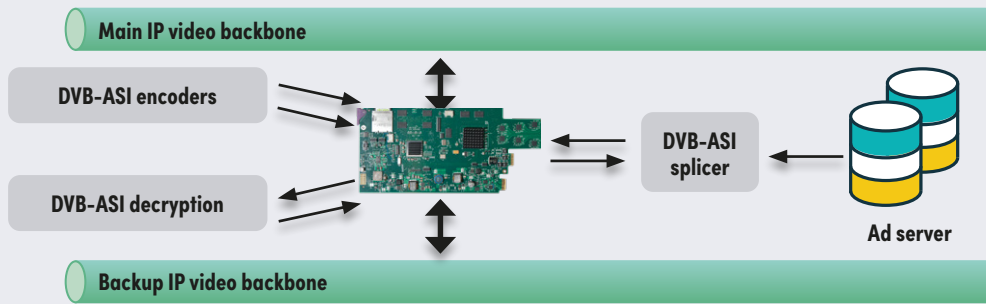
The dual Ethernet SFP sockets allow fiber or electrical connectivity to the main and backup video backbone to provide complete redundancy of MPEG transport streams. Each DVB-ASI I/O can also be paired in redundant mode. Combined together the IP and DVB-ASI redundant ports offer a robust solution to ensure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

Key Features

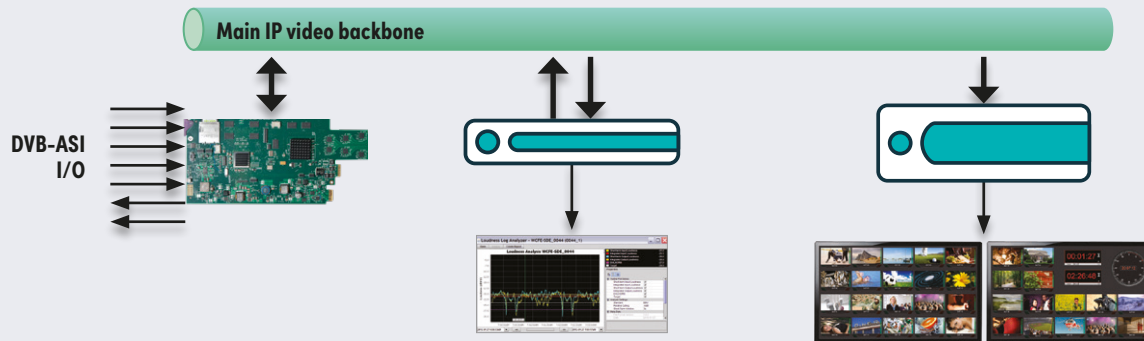
- Very high density with 12 gateways per card/120 gateways per 3 RU frame
- Handle most demanding streams:
 - Up to 213 Mb/s per DVB-ASI
 - Total of 800 Mb/s on Ethernet
- Configure each DVB-ASI as an input or output
- Convert legacy ASI devices to IP with simultaneous IP to ASI and ASI to IP conversions
- 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

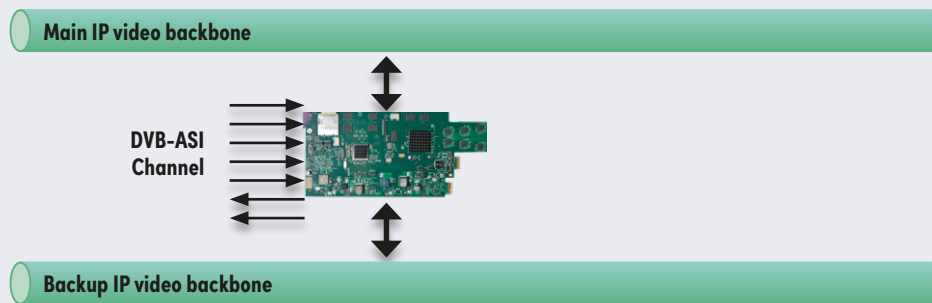
Connect any legacy DVB-ASI equipment to an IP video network



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-10-RT-W13-LC

Description

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

SFP-ETH-10-RT-W15-LC

Ethernet 10 km (6.21 mi.) cartridge / I/O 1550 nm with WDM with LC/PC connector

SFP-ETH-RT-1000-RJ45

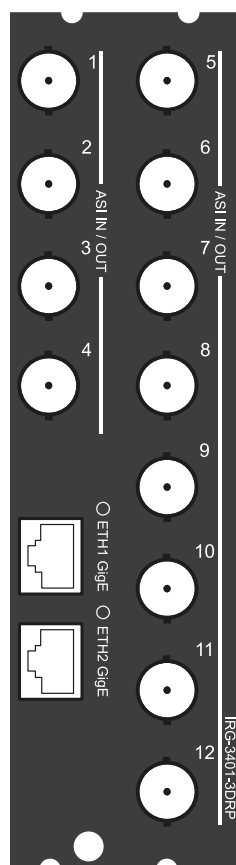
Ethernet electrical GigE cartridge RJ45 connector

SFP-ETH-10-S13-LC

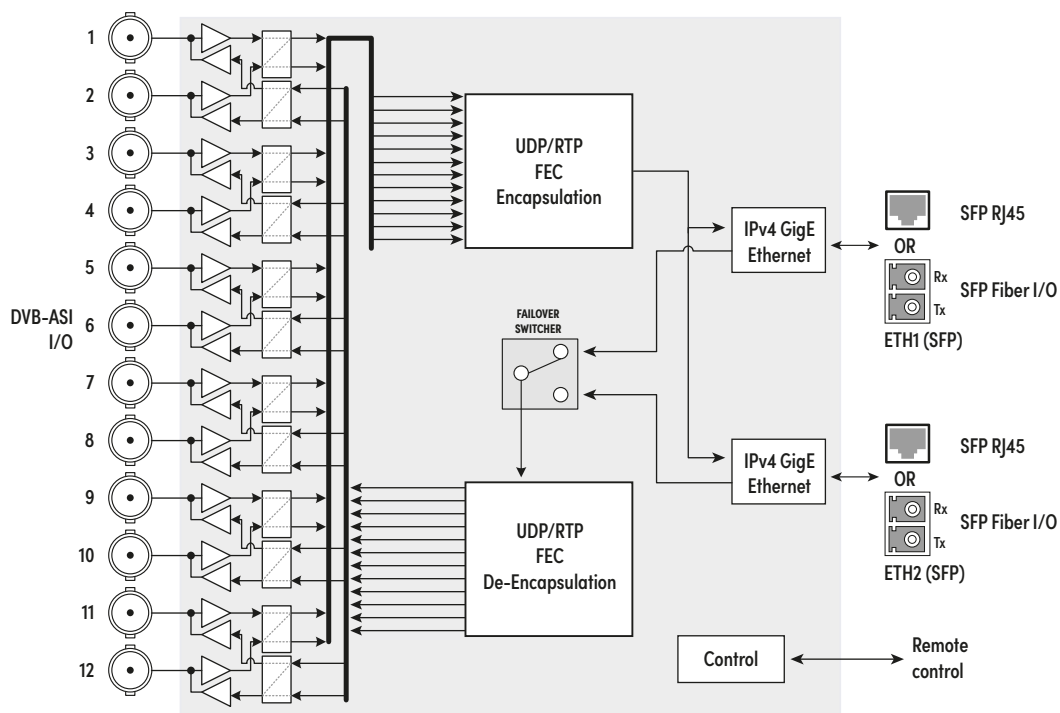
Ethernet 10 km (6.21 mi.) cartridge / 1310 nm with LC/PC connector

SFP-ETH-RT-M85-LC

Ethernet multimode cartridge / 850 nm with LC/PC connector



IRG-3401-3DRP



IRG-3401 Functional Block Diagram

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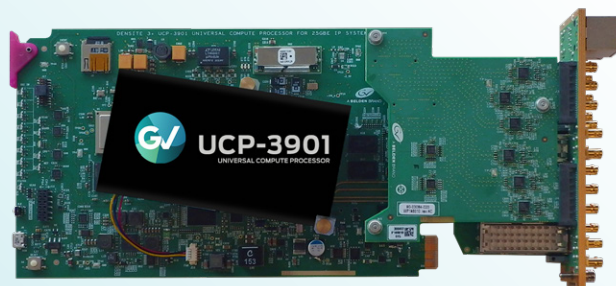
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UCP-3901

Universal Compute Processor for Densité 3+



The UCP-3901 is a user-configurable multichannel video/audio-over-IP transceiver developed for use within low-latency and high-bandwidth Ethernet IP networks. The UCP-3901 provides a hardware platform which can offer different functionality depending on the software option loaded. These options are known as *Software-Defined Cores* (SDCs), and can be purchased through a licensing mechanism and loaded as operational needs demand.

The UCP-3901 Universal Compute Processor can adopt different Software Cores to provide low-latency, high-bandwidth multichannel broadcast processing/routing for SDI, MADI and IP applications.

This flexible powerhouse can deliver up to 16 channels of 3G-SDI, four channels of UHD-SDI (12G or Quad-link) or 8 bidirectional MADI channels, while seamlessly integrating with Grass Valley's broadcast-centric IP routing and management solution GV Orbit to offer, fast, clean and quiet switching.

UCP-3901-25-EP and UCP-3901-50-EP are the Essence Processing core and act as a high-performance, versatile gateway which can encapsulate or de-encapsulate up to

16 SDI signals (depending on format) to/from uncompressed SMPTE ST 2110 and/or SMPTE ST 2022-6. Various modes of operation are available offering SDI to IP, IP to SDI or combinations of the two. UHD support is provided via Single Stream and/or Quad Stream for both SDI and SMPTE ST 2110, enabling a seamless transition from SDI<>IP for all system architectures. Multiple SMPTE ST 2110-30 audio flows per channel can be configured to support 1x16 channels, 2x8 channels or 4x4 channels embedding/de-embedding to/from SDI.

UCP-3901-MD is the MADI Gateway core that provides a multichannel MADI to/from IP interface and has been developed to allow high-density audio integration into SMPTE ST 2110 production network. It

handles up to 16 MADI signals (8 in & 8 out) over dual 10 GbE or 25 GbE IP links, with the option to provide MADI link redundancy. Up to 64 channels of uncompressed audio MADI can be transported using the SMPTE ST 2110-30 Level A, B and C. Multiple audio flows per MADI can be configured to support 1x64, 2x32 or 4x16 channels.

UCP-3901 is fully compatible with Grass Valley's new broadcast-centric IP routing and network management solution GV Orbit, designed to migrate broadcasters from a traditional baseband routing and control environment to new hybrid SDI and IP workflows.

Key Features

General Features

- Handles up to 16 SDI signals over dual or quad 25 GbE IP links (number of channels dependent on SDI signal format)
- Multiple SDI standards & formats supported including 12G Single-link & 4K UHD SDQS or 2SI 1080p (3G) modes
- SDI embed/de-embed of up to 4 audio flows per channel
- Configuration of Ethernet links to maximize signal distribution points using dual or quad SFPs, or for redundancy as per SMPTE ST 2022-7. When operating as a receiver will dynamically adapt to any stream presented to it (i.e., hitless switching)
- UHD Single Stream SMPTE ST 2110 and 12G SDI I/O
- Supports IGMPv3 source-specific multicast, allowing transmission in multicast groups
- Supports frame-synchronized SDI inputs and outputs, referenced using external blackburst/tri-level analog sync reference
- Fast, clean and quiet switching via make-before-break or break-before-make
- Low delay mode and independent H & V offset available for each channel along with up to two frames of video, and up to 255 ms of audio delay
- Seamless integration with GV Orbit Control, Configuration & Monitoring software including logging & reporting
- SMPTE ST 2022-7 Class A & D seamless protection switching
- SMPTE ST 2059-1 & -2 precision time protocol
- NMOS IS-04 discovery and registration with group hints tag support
- NMOS IS-05 device connection management
- In-band or out-of-band control of NMOS
- Support of DHCP, LLDP and DNS-SD for easy IP configuration
- Both FC-FEC (Fire Code) and RS-FEC (Reed Solomon IEEE) Forward Error Correction are supported
- Dual SFP28 Flexible Ethernet for 25 GbE SFP28 cage:
 - SFP-25G-SR for short-range multimode optical connections
 - SFP-25G-LR for long-range single-mode optical connections
 - 10GBASE-SR for short-range multimode optical connections supported for UCP-3901-25-MD essence only.
 - 10GBASE-LR for long-range single-mode optical connections supported for UCP-3901-25-MD essence only
- 4 x SFP28 used for 50 GbE Essence Processing operations

Essence Processing (EP) Features

- SMPTE ST 2110-20 video including UHD Single-stream
- SMPTE ST 2110-21 Wide/Narrow profile receivers and Narrow senders
- SMPTE ST 2110-30 PCM audio
- SMPTE ST 2110-40 metadata associated with SMPTE ST 2110-20 video stream
- SMPTE ST 2022-6 Transport of High Bit Rate Media Signals (HBRMT) (SDI) over IP Networks

MADI Essence (MD) Features

- Handles up to 16 MADI signals (8 in & 8 out) over dual 10/25 GbE IP links, with the option to provide MADI link redundancy
- Audio delay per IP output stream of up to 128 ms
- Uncompressed PCM audio transport using SMPTE ST 2110-30
- Audio tone generator available for MADI channels, with selectable tone frequencies of 1 kHz, 2 kHz, 4 kHz and 8 kHz
- Audio channel selection per IP stream from 1-64 channels, plus packet time selection of 125 µs, 250 µs, 500 µs, 1 ms and 4 ms
- Source/Destination audio channel shuffling

The UCP-3901 is installed in the established Densité modular frames. Due to their advanced architecture and power density, the UCP-3901 is supported in both the Densité 3+ FR1 and FR4 frames. Two UCP-3901 cards can be installed in the Densité 3+ FR1 frame, giving a density of 32 channels (HD/3G) in 1 RU. With flexibility to configure up to 12 UCP-3901 cards per Densité 3+ FR4 frame, the Densité platform scales to a market-leading density of 192 channels (HD/3G) in a 4 RU frame. The UCP-3901 can also be utilized in an existing GV Node frame. This means space and cost-efficient scaling today and tomorrow.

Densité 3+ FR4



4 RU

12x UCP-3901 = 192 HD/3G Channels
48 x UHD (12G) Channels
Up to 96 Bidirectional MADI Channels

Densité 3+ FR1



1 RU

2x UCP-3901 = 32 HD/3G Channels
Up to 8 x UHD (12G) Channels
Up to 16 Bidirectional MADI Channels

Why should you choose this module?

- Re-purpose existing hardware modules for alternate tasks as network requirements evolve
- Using 25 GbE transport allows multiple signals to be sent over a single fiber reducing link count and minimizing cost
- Improve signal transport efficiency by running multiple SDI signals over a single Ethernet connection enabling linking between existing SDI equipment and future IP network architectures
- Provides a flexible and cost-effective way to integrate MADI audio devices into Ethernet IP networks for efficient signal transport.
- Using IGMPv3 source-specific multicast allows fast configuration of network routes while enabling clean switching at the destination device
- Designed for use with GV Orbit, combined with compliance to IP Open Standards (AMWA NMOS), means easy integration with Grass Valley or third-party network orchestration & management systems

UCP-3901-25-EP Configurations

SD/HD/3G Mode of Operation			
SDI > IP	IP > SDI	Format	Capabilities
8	0	480i59.94, 576i50 720p50/59.94 1080i50/59.94 1080p23.98/25/29.97/50/59.94	1x SDI Frame Sync, 1x 2022-6, 1x 2110-20/30(x4)/40
16	0		1x SDI, 1x 2022-6, 1x 2110-20/30(x4)/40
8	8		
4	12		
0	16		
12	4		RS-FEC 1x SDI, 1x 2022-6, 1x 2110-20(RX)/30(x4)/40 1x SDI, 1x 2022-6(RX), 1x 2110-20/30(x4)/40 FC-FEC 1x SDI, 1x 2022-6, 1x 2110-20/30(x4)/40
UHD/12G Mode of Operation			
2	2	720p50/59.94 1080i50/59.94 1080p23.98/25/29.97/50/59.94	1x SDI, 1x 2110-20/30(x4)/40
2	2	2160p50/59.94	4x SDI (Quad Link 3G 2SI), 1x 2110-20/30(x4)/40 1x SDI (12G), 1x 2110-20/30(x4)/40 1x SDI (12G), Quad Stream 2110-20/30(x4)/40
2	2	2160p23.98/25/29.97	4x SDI (Quad Link HD 2SI), 1x 2110-20/30(x4)/40

SD/HD/3G Mode of Operation

SDI > IP	IP > SDI	Format	Capabilities
8	0	480i59.94, 576i50 720p50/59.94	1x SDI Frame Sync, 1x 2110-20/30(x4)/40 1x SDI Frame Sync, 1x 2022-6, 1x 2110-30(x4)/40
16	0	1080i50/59.94 1080p23.98/25/29.97/50/59.94	1x SDI, 1x 2110-20/30(x4)/40 1x SDI, 1x 2022-6, 1x 2110-30(x4)/40
12	4		1x SDI, 1x 2022-6(RX), 1x 2110-20/30(x4)/40 1x SDI, 1x 2022-6, 1x 2110-20(RX)/30(x4)/40(RX)
8	8		1x SDI, 1x 2022-6(RX), 1x 2110-20/30(x4)/40
4	12		1x SDI, 1x 2022-6, 1x 2110-20(RX)/30(x4)/40 1x SDI, 1x 2022-6(RX), 1x 2110-20/30(x4)/40
0	16		1x SDI, 1x 2022-6, 1x 2110-20/30(x4)/40

UHD/12G Mode of Operation

4	0	720p50/59.94 1080i50/59.94 1080p23.98/25/29.97/50/59.94	1x SDI, 1x 2110-20/30(x4)/40
2	2		
0	4		
4	0	2160p50/59.94	4x SDI (Quad Link 3G 2SI), 1x 2110-20/30(x4)/40 1x SDI (12G), 1x 2110-20/30(x4)/40 1x SDI (12G), Quad Stream 2110-20/30(x4)/40
2	2		
0	4		
4	0	2160p23.98/25/29.97	4x SDI (Quad Link HD 2SI), 1x 2110-20/30(x4)/40
2	2		
0	4		

Specifications**SDI (Inputs/Outputs)**

Physical: 16 HD-BNC/75Ω connectors

SDI Standards:

- SMPTE ST 259M-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)
- SMPTE ST 2082-1:2015 (In = BNCs 1 & 2, Out = BNCs 3 & 4)

Supported Formats:

- SD: 480i59.94, 576i50
- HD: SMPTE ST 274: 1080i59.94, 1080i50, 1080p23.98, 1080p29.97
- HD: SMPTE ST 296: 720p59.94, 720p50
- 3G: SMPTE ST 425 level A (mapping 1)
- UHD: Quad Link 2SI/SDQS 1080p (3G) SMPTE ST 425-5: 1080p59.94, 1080p50
- UHD: Quad Link 2SI/SDQS 1080p (1.5G) SMPTE ST 274: 1080p23.98, 1080p29.97
- 12G: SMPTE ST 2082-10: 2160p59.94, 2160p50

Cable length (Belden 1694A):

- SD: 400m (1300 ft.) at 270 Mb/s
- HD: 165m (540 ft.) at 1.485 Gb/s
- 3G: 120m (390 ft.) at 2.970 Gb/s

Cable length (Belden 4794A):

- 12G: 60m (195 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)

MADI Standards:

- AES10-2003 - 8 inputs, 8 outputs

Reference Input

Physical: HD-BNC/75Ω connector

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

Ethernet Port for Media

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

Standard: IEEE 802.3-2008 25 GbE

Performance: Up to 25 or 50 Gb of streaming per direction, dependent on the essence processing license

Ethernet Port for Control

Physical: One electrical RJ45 port

Standard: IEEE 802.3 1000 Mb/s

Electrical

Power: 55W maximum

UCP-3901 UHD Modes

Outputs Inputs		UHD Single Stream		UHD Quad Stream (2SI)			UHD Quad Stream (SDQS)		
		1x 12G SDI	1x SMPTE ST 2110-20	4x 3G SDI	4x SMPTE ST 2022-6	4x SMPTE ST 2110-20	4x 3G SDI	4x SMPTE ST 2022-6	4x SMPTE ST 2110-20
UHD Single Stream	1x 12G SDI		●		●	●			
	1x SMPTE ST 2110-20	●		●					
UHD Quad Stream (2SI)	4x 3G SDI		●		●	●			
	4x SMPTE ST 2022-6	●		●					
	4x SMPTE ST 2110-20	●		●					
UHD Quad Stream (SDQS)	4x 3G SDI							●	●
	4x SMPTE ST 2022-6						●		
	4x SMPTE ST 2110-20						●		

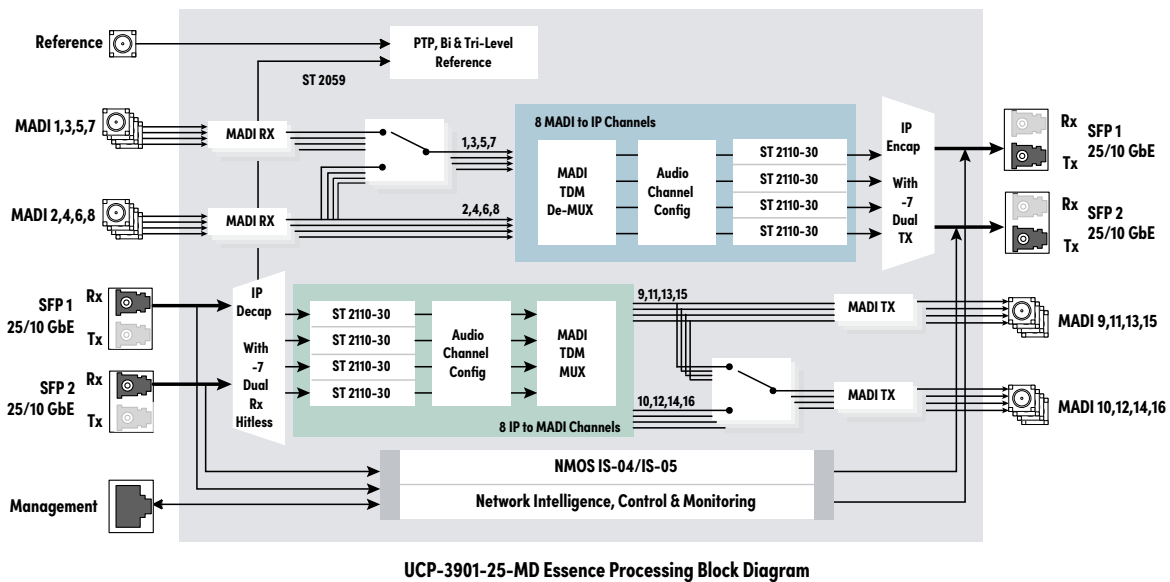
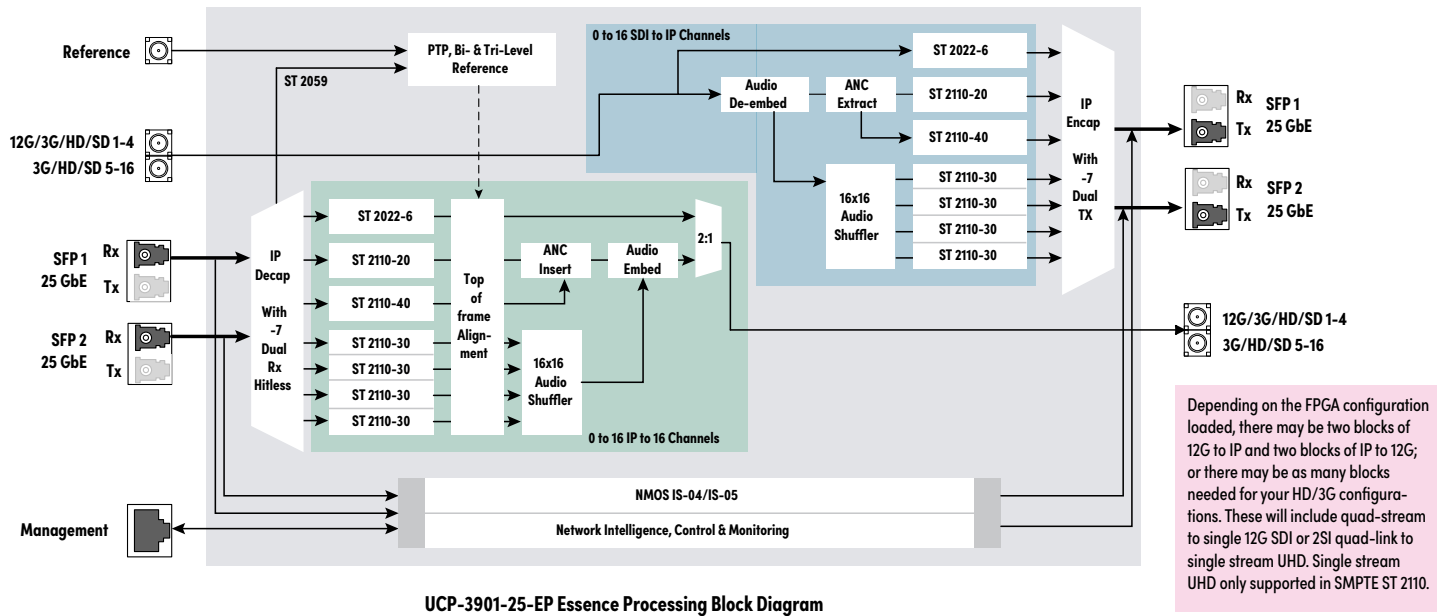
Mode	Formats	Density	Max Channels	Channel Order	SD/HD/3G	BNC Location
1:1 / 4:4*	SD – 3G	High	16x 3G	1-16	1-16	1-16 / 1-4, 5-8, 9-12, 13-16
1:1	SD – UHD	Low	4x UHD	1, 5, 9, 13	1, 5, 9, 13	1, 2, 3, 4
1:4**	SD – UHD	Low	4x UHD	1, 5, 9, 13	1, 5, 9, 13	1, 2, 3, 4
4:1*	SD – UHD	Low	4x UHD	1, 5, 9, 13	1, 5, 9, 13	1-4, 5-8, 9-12, 13-16

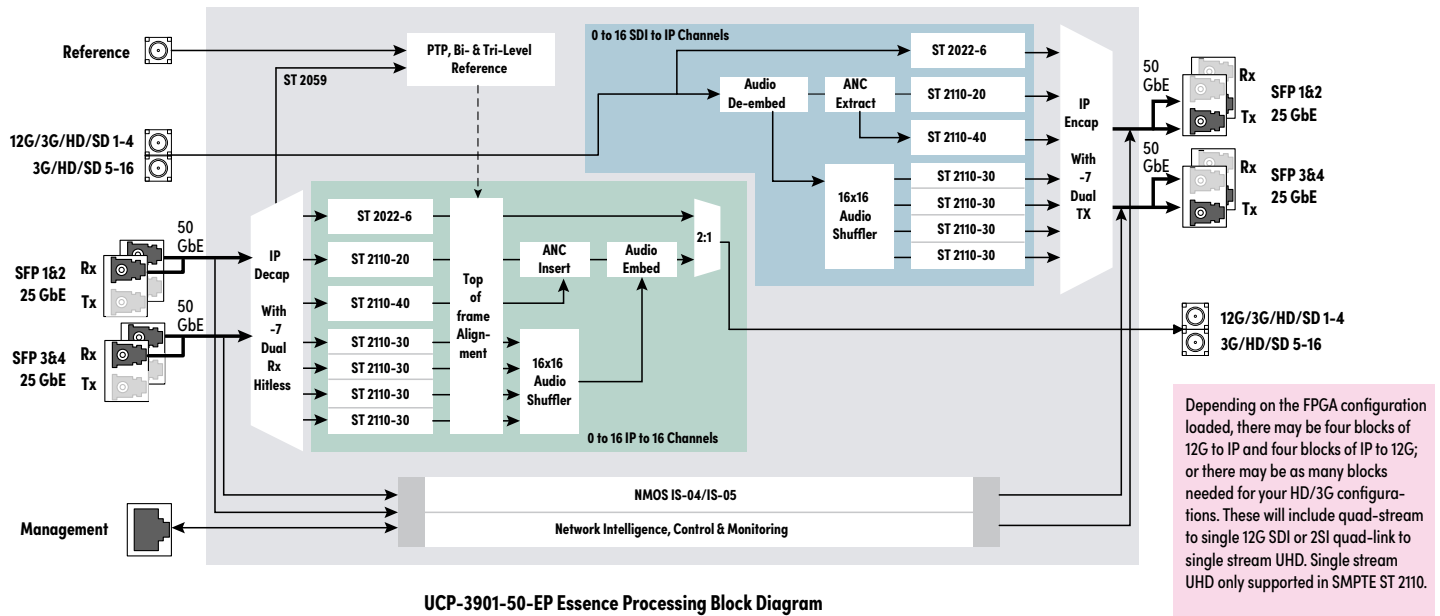
* 4:4 can be managed in quad groups using Link Control. In this mode, max. channels is reduced to 4.

** Quad groups occupy 4 channels, single stream (SDI or IP) will occupy master (1, 5, 9, 13) with slave controls/logging.

Bandwidth Considerations

Rx IP Format	Video Format	Max IP Rx Channels (static routing)	MBB Routing	BBM Routing
1x SMPTE ST 2110	1080p50	16	Max Rx reduced by 1 for each simultaneous MBB route	No loss of Rx channels
1x SMPTE ST 2110	1080p59	13		
1x SMPTE ST 2022-6	1080p50	14		
1x SMPTE ST 2022-6	1080p59	12		
1x SMPTE ST 2110	2160p50	4		
1x SMPTE ST 2110	2160p59	4		Max Rx reduced by 1 for each simultaneous BBM route





Ordering

Application Software

UCP-3901-25-EP

Essence processing license for SDI to/from IP with synchronization. For usage up to 25G option (2 x 25G SFP)

UCP-3901-25-MD

Essence processing license for MADI to/from IP for UCP-3901 with 25G or 10G SFPs

UCP-3901-50-EP

Essence processing license for SDI to/from IP with synchronization. For usage up to 50G option (4 x 25G SFP)

Densité 3+ Frame Hardware

UCP-3901

Universal Compute Platform

UCP-3901-3+DRP

Double rear panel for Densité 3+ with HD-BNC

SFP Options

One, two or four SFP28 modules required

SFP-25G-SR

SFP28 25GBASE optical transceiver MMF

SFP-25G-LR

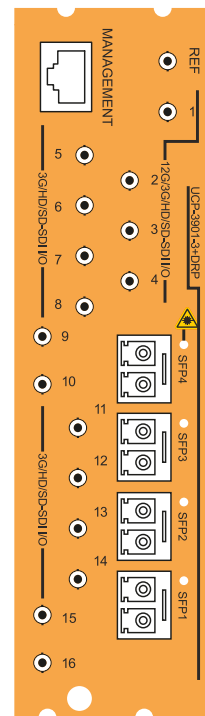
SFP28 25GBASE optical transceiver SMF

FCS-10GE-SR

10GBASE-SR short range SFP for MMF (multimode fiber) supported for UCP-3901-25-MD essence only

FCS-10GE-LR

10GBASE-LR long range SFP for SMF (single-mode fiber) supported for UCP-3901-25-MD essence only



UCP-3901-3+DRP

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

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