

HCO-3931

12G/3G/HD Change-over with Clean Switch and Automatic Loudness Control

Space-saving, modular platform for advanced signal processing.

The HCO-3931 from Grass Valley is a 4x1 12G/3G/HD SDI change-over that supports 16 channels of embedded audio and metadata. The module can perform a video and audio “clean and quiet switch” between sources. In the event of a power failure, the PGM signal is protected by a bypass circuit fitted on the rear module, maintaining the integrity of the selected MAIN or BACKUP signals at the output, and it is fully controllable via GPI. Two rear modules are available with different bypass circuits, the HCO-3931-3DRP-H offers an active bypass that retains PGM signals for at least 48 hours while the HCO-3931-3TRP-HR uses 12G SDI rated bypass relays for extended protection.

At the core of the HCO-3931 versatility, a powerful automatic mode rules engine takes the guesswork out of establishing which input will be routed to the outputs. By simply selecting which signal analysis probes to enable, configuring the severity of each probe’s impact and optionally removing one or both Emergency inputs from the rules engine’s consideration, you effectively instruct the card how to compute the relative health of each input based on its weight and the probes statuses. This in turn enables you to effortlessly create a wide variety of failover mechanisms.

Change-over between inputs selection can also be performed manually, where any four sources can be selected from the Densité controller, the

iControl/GV Orbit software, or simply by using a GPI. A GPI can be connected to an automation system or any simple GPI control panel. The GPI outputs give the status of the selected source, allowing tallies to be triggered.

The HCO-3931 provides two 12G/3G/HD outputs: Program (PGM) and Preview (PVW). Each output is available on two connectors (signal copy). The PVW output is user selectable to follow the main PGM output or any of four video inputs.

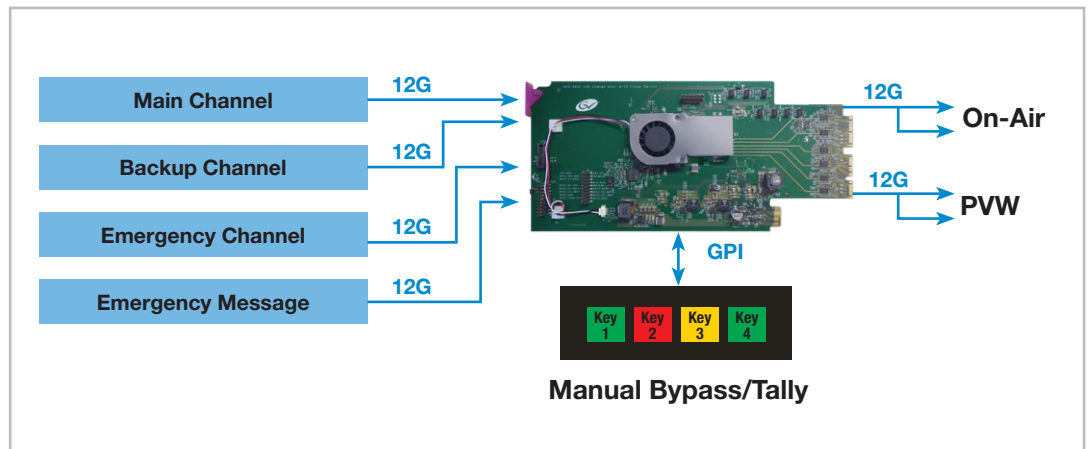
Grass Valley’s next generation 16-channel automatic loudness control (ALC) option, HCO-3931-OPT-ALC, can eliminate objectionable loudness variations between programs and commercials even better than with previous ALC versions, thanks to the addition of an independent dynamic stage consisting of a fully configurable input compressor and a new true peak output limiter with 1 ms buffer protection.

The HCO-3931 targets emerging needs to provide changeover with clean switch and optional Automatic Loudness Control for single-stream 4K UHD signals using 12G SDI. The HCO-3931 is designed for a wide range of applications where bullet-proof mission critical signal distribution is required for OB trucks, production studios and playout facilities as shown here:

Configurable Probes

Video	
No Video	✓
Video Reference Mismatch	✓
Video Format Mismatch	✓
Video Error	✓
Black Detect	✓
Freeze Detect	✓
Audio	
Silence Detect (per channel)	✓
Audio Presence (per group)	✓

Bullet-proof On-air Protection



KEY FEATURES

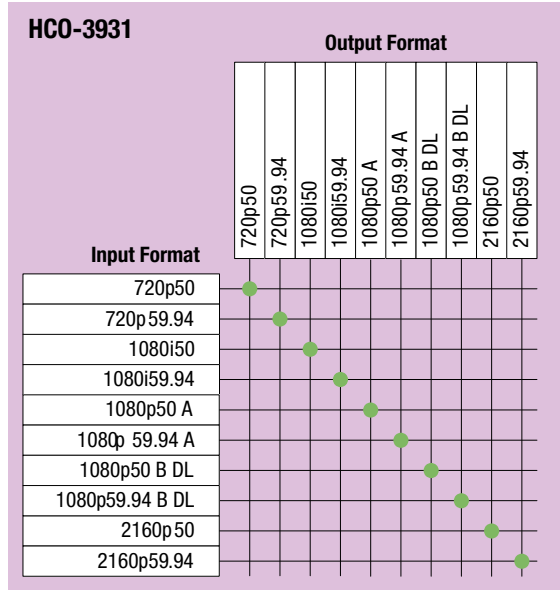
- 12G/3G/HD SDI input/output
- Main, Backup and two Emergency inputs
- On-Air Program and Preview outputs with two connectors each (signal copy)
- Choice of external or frame URS reference input
- Audio/video de-glitcher to handle video hot switch on every input
- Clean and quiet switch function of video and 16 channels of audio on Program output
- Optional 16-channel Automatic Loudness Control
- GPI – based inputs selection and tallies
- Electronic switching with two rear panels that maintain selected input upon power loss for Primary Main and Backup inputs:
 - HCO-3931-3TRP-HR triple rear with relay backups
 - HCO-3931-3DRP-H double rear with active bypass for a minimum of 48 hours of protection from a power loss
- Automatic change-over mode using internal signal analysis with configurable probes for all inputs
- Manual change-over by local frame controller, iControl/GV Orbit or GPI
- Alarm reporting to iControl/GV Orbit facility monitoring and control system
- iControl and GV Orbit for configuration, control and monitoring

This new Densité module fully complements our line-up of 12G SDI products such as the HDA-3961 single/dual 12G DA with optional fiber connectivity, MDX-3901 12G 16 audio channel AES/MADI embedder/de-embedder, XIP-3901 SDI/IP agile processing platform and our other Grass Valley products.

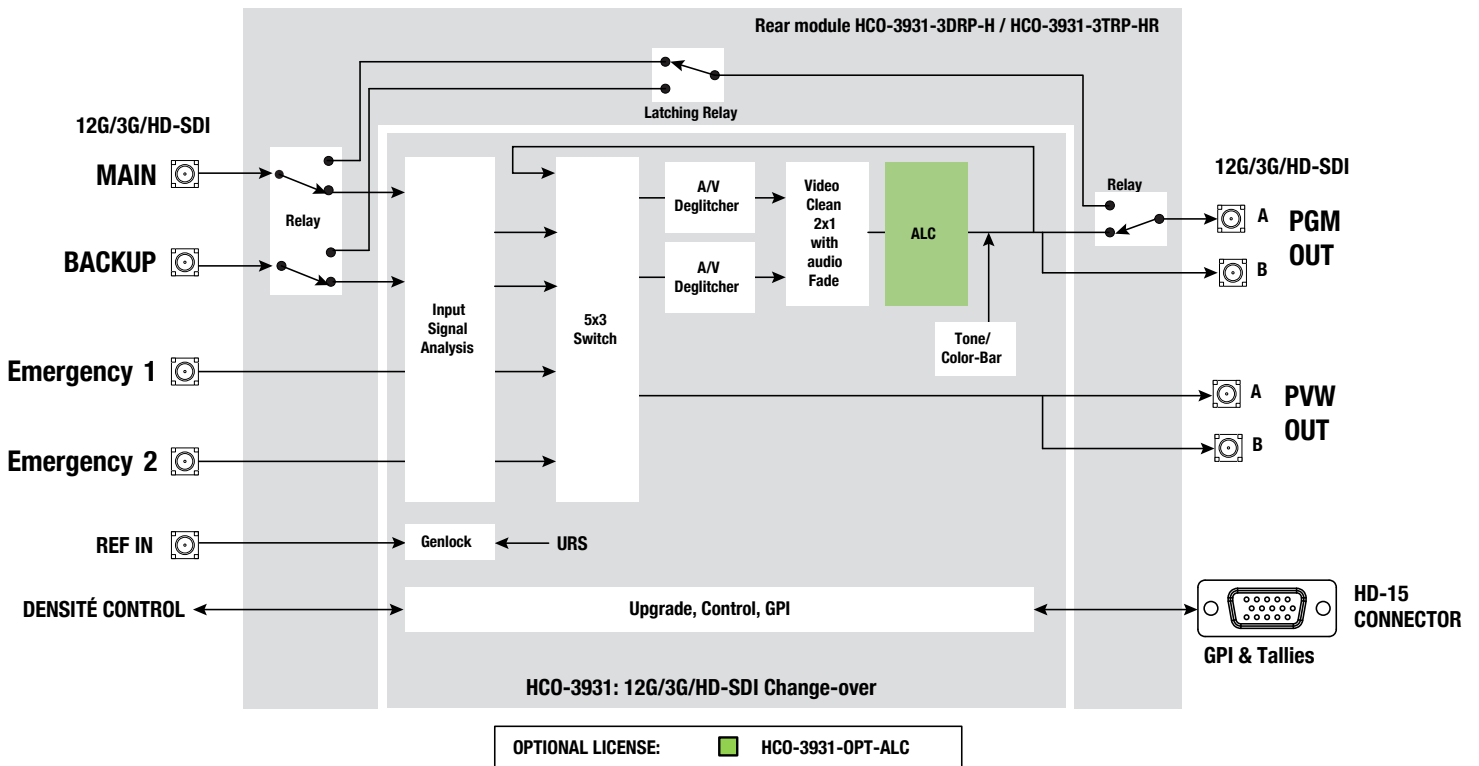
Based on the proven Densité modular framework of over 100 cards, the flexible, space-efficient HCO-3931 is a 3 RU card and is available with a two or three slots rear module. With flexibility to configure up to 12 HCO-3931 change-over cards per Densité 3+ FR4 frame with the two-slot rear module, the Densité platform scales to a density of twelve 12G SDI change-over modules in a 4 RU frame. This means space- and cost-efficient scaling for today and tomorrow.

The HCO-3931 is configured, controlled and monitored by GV Orbit from Grass Valley. It can also be configured and controlled from iControl systems.

Supported Video Resolutions



HCO-3931 Functional Diagram



SPECIFICATIONS

SDI (Inputs/Outputs)

Physical: 8 HD-BNC connectors: 4 in, 4 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 (2.970, 2.970/1.001 Gb/s)

Supported 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
12G: SMPTE ST 2082-10: 2160p59.94, 2160p50

Cable length (Belden 1694A):

HD: 180m (590 ft.) at 1.485 Gb/s
3G: 100m (328 ft) at 2.970 Gb/s

Cable length (Belden 4794R):

12G: 30m (98 ft.) at 11.88 Gb/s

Reference Input

Physical: 1 HD-BNC connector

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

Return loss: >35 dB up to 5.75 MHz

GPI (10)

Connector: HD-15, opto-isolated, common ground

GPI IN (5): Contact closure to ground

GPI OUT (5): Contact closure to ground

External pull up voltage: 3.3V to 24V max.

External GPI power: 5V nominal

Video Processing Performance

Signal path: 10 bits

Latency:

0.5 lines without Clean Switch and ALC enabled
Maximum of 2.5 lines with Clean Switch or ALC enabled

Audio Processing Performance

Quantization: 20-24 bits

Sampling: 48 kHz, synchronous

Number of channels: 16, 4 groups

Audio latency:

1.8 ms without Clean Switch and ALC enabled
Add 42 μ s if Clean Switch is enabled
Add 21 μ s if ALC is enabled

Electrical

Power: 15W maximum

NOTE: Cable length specifications are for worst case scenario when outputs are protected by the active bypass or relay, refer to the manual for more details.

ORDERING

HCO-3931

12G/3G/HD Change-over with Clean Switch

HCO-3931-3DRP-H

Double rear panel active bypass HD-BNC. Active bypass offers a minimum of 48 hours of protection from a power loss

HCO-3931-3TRP-HR

Triple rear panel bypass relays HD-BNC. Bypass relay offers persistent passive protection from a power loss

Software Options

HCO-3931-OPT-ALC

16-channel on-board Audio Loudness Control option

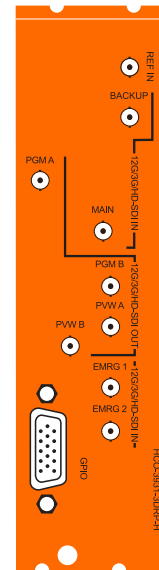
Hardware Options

NSH15M

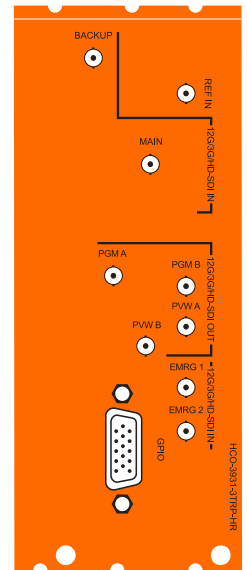
HD-15 to terminal block adapter

Remote Control

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



HCO-3931-3DRP-H



HCO-3931-3TRP-HR