IPG-4901

WAN IP I/O Gateway for GV Node

Guide to Installation and Operation

13-3036-360-AB-M00

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Document History

Document Number	Date of Publication	Notes
13-3036-360-AA-M00	2017-10-18	Initial Release.
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Electrostatic Discharge (ESD) Protection

Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

Recycling

Visit www.grassvalley.com for recycling information.

Certification and Compliance

Safety of Laser Modules

This equipment incorporates modules containing Class 1 lasers. These modules are certified by the manufacturer to comply with:

- IEC/EN 60825-1 Safety of laser products
- IEC 60950-1 Safety of information technology equipment

Restriction on Hazardous Substances (RoHS)

IPG-4901	有毒有害物质或元素 (Toxic or Hazardous Substances and Elements)					
部件名称 Part name	铅 (Pb)	汞(Hg)	镉(Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
电缆及电缆组件 Cables and Cable Assemblies	O	O	O	O	O	O
电路模块 Circuit Modules	X	O	O	O	O	O
组装风扇 Fan Assemblies	X	O	O	O	O	O
IPG-4901-4SRP	有毒有害物质或元素 (Toxic or Hazardous Substances and Elements)					
部件名称 Part name	铅 (Pb)	汞(Hg)	镉(Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
电路模块 Circuit Modules	X	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006规定的限量要求以下。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006规定的限量要求。

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006.

技术条款解释：

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Technical explanations:

This statement is based on the information provided by our suppliers of components and collected through Grass Valley's environmental management system. Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy as it is based on data received from sources outside our company. All specifications are subject to change without notice.

Electromagnetic Compatibility

This equipment has been tested for verification of compliance with FCC Part 15, Subpart B requirements for Class A digital devices.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment has been tested and found to comply with the requirements of the EMC directive 2004/108/CE:
- EN 55022 Class A radiated and conducted emissions
- EN 61000-3-2 Harmonic current emission limits
- EN 61000-3-3 Voltage fluctuations and flicker limitations
- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated electromagnetic field immunity – RF
- EN 61000-4-4 EFT immunity
- EN 61000-4-5 Surge immunity
- EN 61000-4-6 Conducted immunity
- EN 61000-4-8 EMP immunity
- EN 61000-4-11 Voltage-dips, short-interruption and voltage variation immunity

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1   IPG-4901 WAN IP I/O Gateway for GV Node

1.1   Introduction

The GV Node IP Gateway (IPG-4901) plug-and-play module from Grass Valley, a Belden Brand, is a 3 RU single slot module for the GV Node frame, which offers bidirectional fiber IP connectivity.

Not all IP signals are created equal. While Grass Valley provides a very complete IP solution, there will still be requirements to provide conversion to/from other equipment that supports IP standards that are incompatible. The IPG-4901 IP Gateway provides a robust feature set for normalizing variances in IP signals sent to GV Node or GV Matrix I/O.

WAN IP connectivity: The IPG-4901 leverages the full SMPTE ST 2022-7 Class A specification to ensure uninterrupted reception of high jitter signals from remote sources and SW based transmitters. The IPG-4901 can be fitted with multimode or singlemode SFPs to provide connectivity up to 10 km (6.21 mi.).

Signal conversion with audio DEM/EMB: In conjunction with the GV Node 40G aggregation ports, the IPG-4901 can be used to convert SMPTE ST 2022-6 and AES67 signals from the WAN to SMPTE ST 2110-20/30/40 signals on the LAN. Each IPG- 4901 module has bidirectional 10G Ethernet ports that support up six 3 Gb/s sources or nine HD sources with AES67 audio DEM/EMB.

Signal Alignment: The IPG-4901 provides a full alignment capability with up to two frames with respect to the GV Node switching fabric, and is available for any SMPTE ST 2022-6 signals and AES67 audio, in both aggregation and redundancy modes.

Alignment capability provides a clean switching of any of the sources from the IPG-4901.

The IPG-4901 I/O module may be combined in the same chassis with other GV Node or GV Matrix modules to create an even more versatile distributed edge-routing node.

The GV Node IP Gateway can be controlled by the advanced GV Convergent SDN platform, offering unified control across COTS IP switches and SDI routing/processing infrastructures, as well as by the proven iControl systems.

1.2   Features

- Two dual-network interfaces supporting 10 GigE SFP+ ports with either:
    - o   Long range single-mode optical connectors.
    - o   Short range multi-mode optical connectors.
- In aggregation mode each module connects up to 6x6 3G or 9x9 HD SMPTE ST 2022-6 video sources along with AES67 de-embedding/embedding of up to 16 audio channels per source.
    - o   Augments SMPTE ST 2022-6 video payload with individual audio streams using VSF TR-04.
    - o   Supports bursty server-originated sources with SMPTE ST 2022-6 core.
- In redundancy mode each module connects up to 3x3 3G or 5x5 HD video sources along with AES67 de-embedding/embedding of up to 16 audio channels per source.
    - o   Full compliance to SMPTE ST 2022-7 Class A of all IP essences.
- Input signal alignment with up to 2 frames.
- Support of ATDM connection to the GV-Node through the IFM-2T (Internal fabric module with 2Tb switching capacity). This connection separates audio to GV-Node.
  There are 2 options: Pass-through & MDX, for audio embedding/de-embedding.
  GV Node audio option needs to be active in order to exploit this new feature of the IPG-4901.

- Support of PTP on the media port with fail-over redundancy for AES67 streams. Supports both AES67 and SMPTE ST 2059 profiles.
- Support of DiffServ for network traffic provides categorization of flows into QoS classes.
- Compatible with GV Node and GV Matrix platforms.
- Configured and controlled by Grass Valley's GV Convergent SDN platform, or by the proven iControl system.
- Uses Universal Reference Signal from the frame controller.

1.3   Functional Block Diagrams

1.3.1   Aggregation Mode
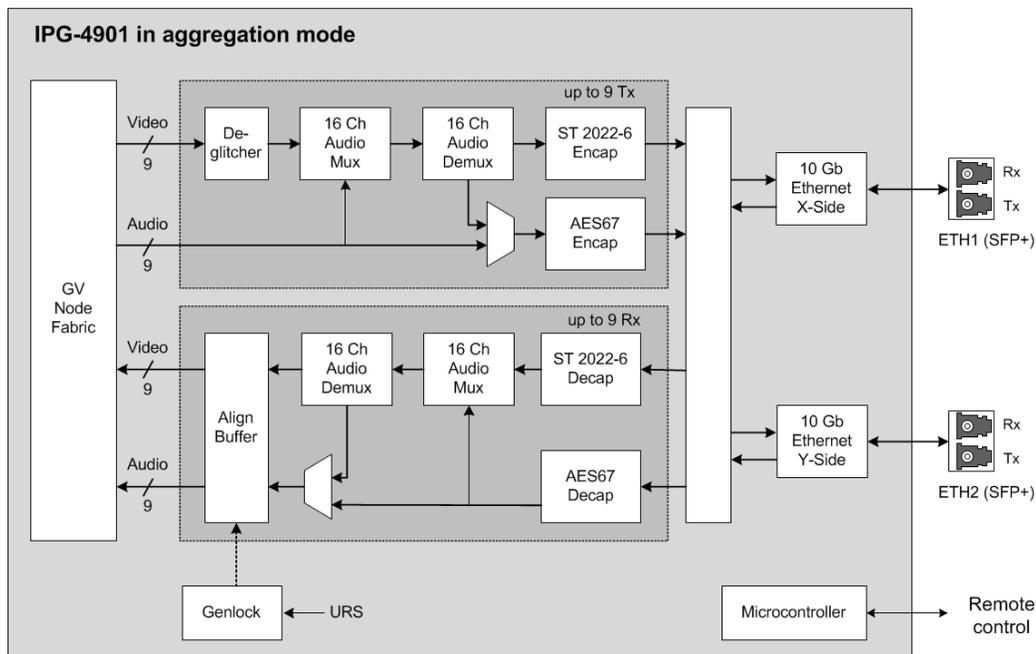
Figure 1-1 *IPG-4901 Functional Block Diagram - Aggregation mode with GV-Node audio option enabled*

1.3.2   Redundancy Mode
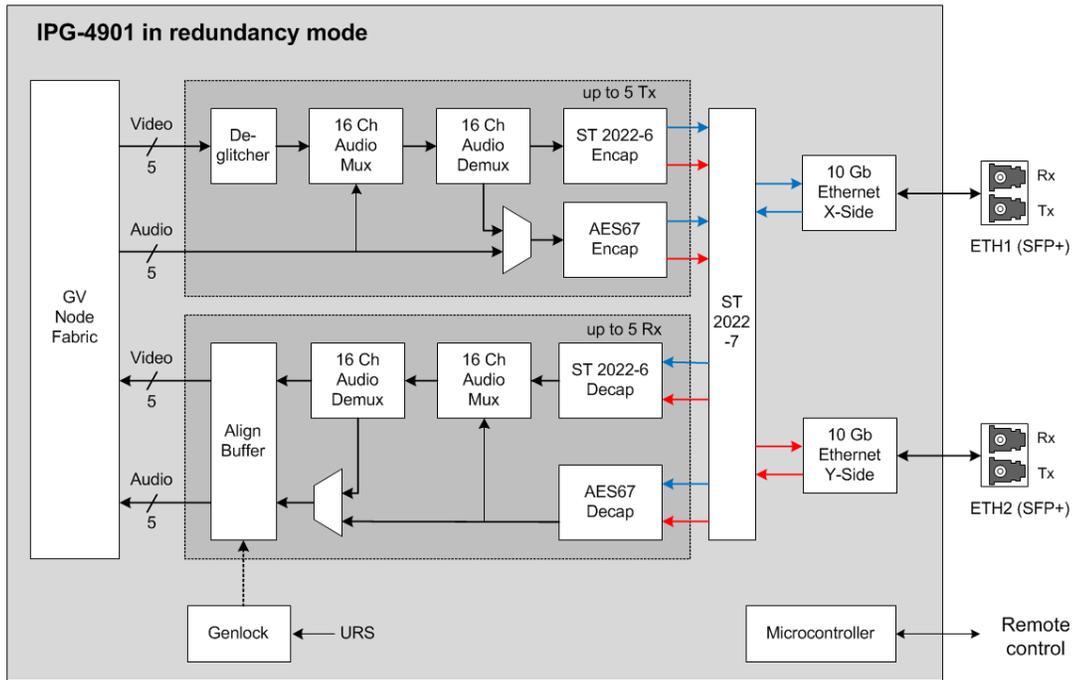
Figure 1-2 *IPG-4901 Functional Block Diagram - Redundancy mode with GV-Node audio option enabled*

1.4 Front Card-edge Interface

The front card-edge of the IPG-4901 incorporates
two elements:

- Status LED
- Select Button

These items duplicate features accessed from the
GV Node local control panel.
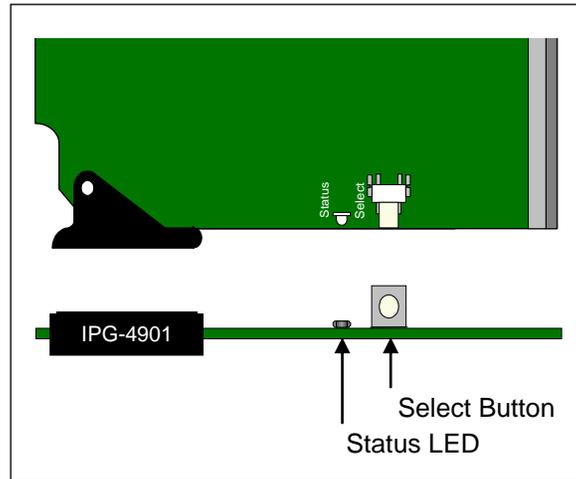
Figure 1-3 *Front card-edge layout*

1.5 Control options

The IPG-4901 can be controlled in two different ways:

- The local control panel on the GV Node can be used to move through a menu of status reports and parameter settings (see section 3).
- Grass Valley's iControl system can be used to access the card's operating parameters from a remote computer, using a convenient graphical user interface (GUI) (see section 4).

2   Installation

2.1   Installation of Rear Connector Panel

The IPG-4901 card is designed to fit into Grass Valley's GV Node IP aggregation, processing and edge routing platform. Each modular card designed for this platform is associated with a rear connector panel that provides both internal and external connectivity for the card.

A single rear connector panel is available for the IPG-4901:

- IPG-4901-4SRP   Single-slot-width panel for GV Node

The card and the rear panel can be installed with the frame power on.

⚠️   ***The rear connector panel must be installed with the card out of the frame.***

To install the connector panel:

1. If a card is installed in the slot whose rear panel is being changed, remove it by tilting the swivel handle on the front of the card to lever the connectors apart, then using the handle to pull the card straight out of the slot.

2. Remove the existing rear panel (either blank or belonging to an existing card that is being changed) by releasing the captive screw at the bottom of the panel.

3. Position the new panel and secure it in place with the captive screw(s) at the bottom.

2.2   IPG-4901 Card Installation

Once the rear connector panel is in place, install the IPG-4901 card as follows:

1. Open the front door of the GV Node frame.

2. Slide the IPG-4901 card into the slot (swivel handle at the top) and push gently on the handle to seat the connectors.

3. Close the front door of the frame.

2.3   Rear Panel Layout and Connectors
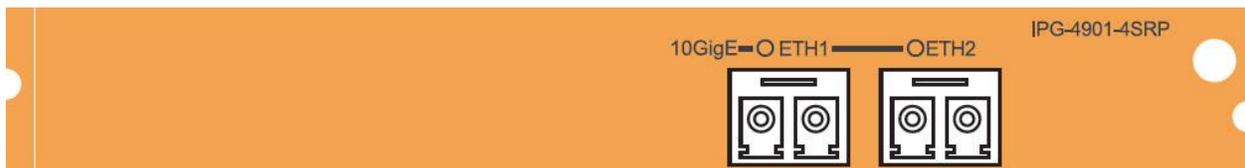
Figure 2-1 *IPG-4901-4SRP Rear Panel*

Two 10 Gb Ethernet interfaces (each with Tx and Rx) on optical fiber or twinax cable. SFP+ modules and matching fiber or electrical connectors are required for the interface.

3 Local control using the GV Node's control panel

The GV Node's local control panel is fastened to the front of the controller card, and accessed through an aperture in the frame door.

To access the menu for this IPG-4901, touch the virtual button corresponding to the card (identified by card type and slot number) in the home screen.
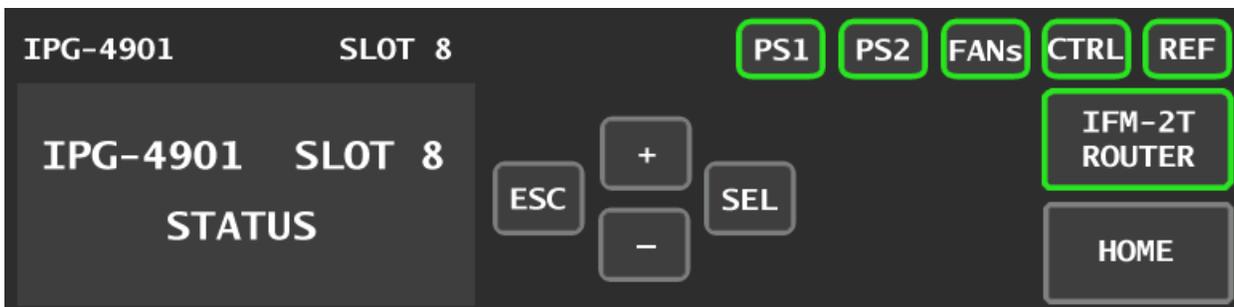
The control section of the panel displays two lines of text, each 16 characters in length, and four virtual pushbuttons. The functionality of the pushbuttons is as follows:

[+] [–]   Used for up/down menu navigation and value modification

[SELECT]   Gives access to the next menu level. When a parameter value is shown, pushing this button once enables modification of the value using the [+] and [–] buttons; a second push confirms the new value

[ESC]   Cancels the effect of parameter value changes that have not been confirmed; pushing [ESC] causes the parameter to revert to its former value.

Pushing [ESC] moves the user back up to the previous menu level. At the main menu, [ESC] does *not* exit the menu system. To exit, re-push the [SELECT] button for the card being controlled.

If no controls are operated for 30 seconds, the controller reverts to its normal standby status, and the selected card's STATUS reverts to its normal operating mode.

Use the control panel buttons to navigate through the menu, as described above.

- The complete menu structure is shown in

3.1   Status Monitoring

The status of the IPG-4901 is reported by the outline of the card's access button in the home page. The outline's color indicates error status:

To determine the type of error that causes the error status, select the card and scroll down the status items in the menu.

The panel will always show the most severe detected error status that it is configured to display, with green representing no error, and flashing red the most severe error.

* Note – the color associated with most errors can be configured in the iControl interface – see Alarm Config Panel on page 40.

The chart shows how the various error conditions that can be flagged on the IPG-4901 affect the status report.

* If a cell is gray, the error condition cannot cause the LED to assume that status
* If more than one LED status is possible for a particular error condition, the status is configurable.
* The factory default status, if available, is shown by a ✪

Error Condition	Status Report			
	Green	Yellow	Red	Flashing Red
Hardware failure – cooling fans				✪
Wrong or missing Rear				✪
Ethernet Port 1 Link Status			✪	
Ethernet Port 2 Link Status	✪			
Internal test pattern enabled		✪		
Overall Gateway Status			✪	

4   Remote control using iControl

The IPG-4901 can be remotely controlled using Grass Valley's iControl system.

- This manual describes the control panels associated with the IPG-4901 and their use.
- Please consult the iControl User's Guide for information about setting up and operating iControl.

In iControl Navigator or iControl Websites, double-click on the IPG-4901 icon to open the control panel.

4.1   The iControl graphic interface window

The basic window structure for the IPG-4901 is shown in Figure *4-6*. The window identification line gives the card type (IPG-4901) and the slot number where the card is installed in its Densité frame.

There are four main sections in the window itself, as identified in the figure:
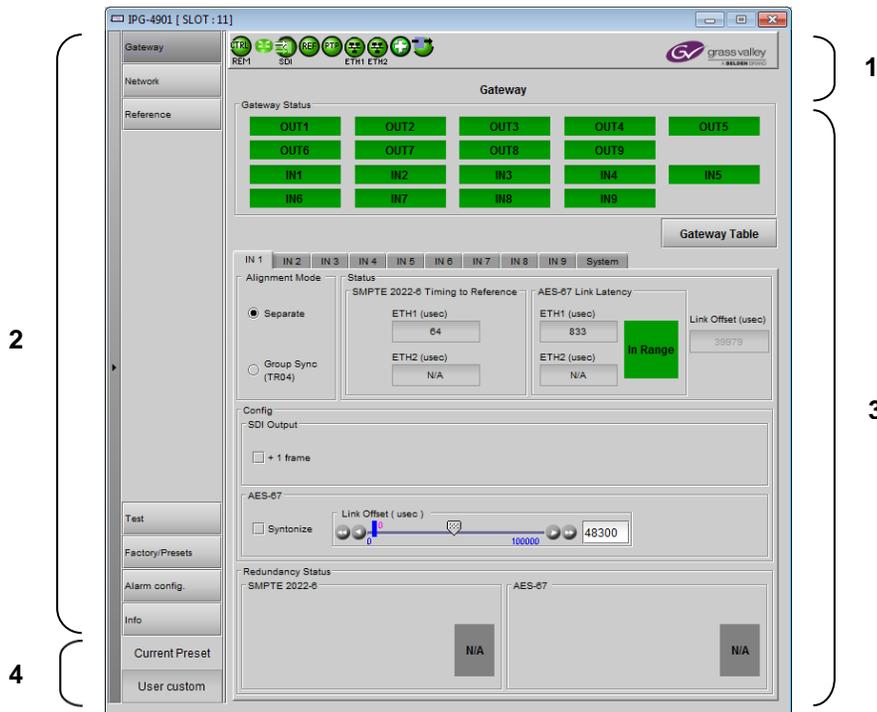
Figure 4-1 *IPG-4901 iControl graphic interface window*

Section 1.   The top section displays nine icons on the left. These icons report different statuses such as card communication status, gateway status, health status, and card operation mode.

| Icon # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Move the mouse over an icon and a status message appears below the icon providing additional information.
If there is an error, the error status message appears in the message area without mouse-over.

- If there are multiple errors, the error messages cycle so all can be seen.

- The icon whose status or error message is shown is highlighted with a mauve background.

The table below describes the various status icons that can appear, and how they are to be interpreted.

- In cases where there is more than one possible interpretation, read the error message in the iControl window to see which applies.

Table – iControl Status Icon interpretation

Icon #1 – Manual Card Configuration	
(green)	Remote card control activated. The iControl interface can be used to operate the card.
(yellow)	Local card control active, The card is being controlled using the GV Node's local control panel, as described in section 4. Any changes made using the iControl interface will have no effect on the card.
Icon #2 – Gateway status	
(green)	All gateways are OK.
(red)	At least one gateway is down.
Icon #3 – SDI Input Status	
(green)	All SDI inputs from fabric detected and valid.
(red)	At least one SDI input from fabric is in error. Reference mismatch. Video/TRS error.
Icon #4 – Reference Status	
(green)	Reference present, supported and locked.
(red)	Reference missing. Not locked.

Icon #5 – PTP Status	
(green)	Selected PTP (ETH1 or ETH2) present, valid and locked
(red)	Selected PTP not present Selected PTP not valid Selected PTP not locked
Icon #6 – ETH1 Status	
(green)	IP link up and active.
(red)	No link (port down).
Icon #7 – ETH2 Status	
(green)	IP link up and active.
(red)	No link (port down).
(gray)	Ethernet port not used.
Icon #8 – Health Monitoring	
(green)	Hardware OK.
(red)	Hardware Health Monitoring (Hardware fault detected). If this icon appears flashing red, you need to call Technical Support
Icon #9 – Operation Mode	
(green)	Operation mode: process – normal processing of the input signal.
(yellow)	Operation mode: Enabled, but no signal to process.
(yellow)	Operation mode: TEST – color bar and audio test tones enabled on at least one gateway.

Section 2. The left portion of the window contains selection buttons for all of the individual panels, which become highlighted when they are selected. The main window section (3) then displays the selected panel, all of which are described in detail below.

Section 3. The main section displays the panel selected in section 2. It may contain multiple tabs to access any appropriate sub-panels.

Section 4. The lower left corner of the window identifies the Preset currently in use or "Custom" if none is applicable.

4.2 Gateway panel

The Gateway panel provides resources for configuring and managing the gateways on the IPG-4901.

Figure 4-2 Gateway panel – upper portion

The *Gateway Status* icons at the top of the panel show the current status of all eighteen gateways on the IPG-4901:

- Top two rows: the nine OUT-from-fabric gateways
- Bottom two rows: the nine IN-to-fabric gateways

Click the **Gateway Table** button to open the pop-up *Gateway Config* window

4.2.1 Gateway Availability

Although the IPG-4901 has 18 gateways (9 IN and 9 OUT), not all are always available, due to bandwidth and configuration requirements. See <u>Section 5.3.1 - Network Config Panel - Settings tab</u> to select the operation mode.

ETH2		Available Gateways		Notes
Enable	Operation Mode	OUT	IN	
OFF	N/A	1-5	10-14	Only ETH1 gateways in use.
ON	Redundancy	1-5	10-14	Each gateway uses both ETH1 and ETH2 with identical stream addresses.
	Aggregation	All (1-9)	All (10-18)	ETH1 and ETH2 gateways in use.

Gateway-to-ETH port associations:

OUT Gateways	IN Gateways	ETH Port
1-5	10-14	ETH1
6-9	15-18	ETH2

⚠️ **NOTE** – a Gateway must be ENABLED in the GV Node Manager before it can be controlled from the iControl interface. See page 46 for instructions.

4.2.2 Gateway Config window

This window shows the current configuration and status of all gateways on the card, and provides controls to modify their settings.

Figure 4-3 Gateway Config table

Enter data and configure settings as shown in this figure:

OPERATING MODE	Gateway	Dir.	Fabric I/O	Str. Address	Str. Port	IGMPv3 Source	Format	P. ETH	En.	
				Color indicates status						
Aggregation	OUT2 from fabric / GATEWAY 2	→	1080i50	238.10.10.2	10000	-	HD	ETH1	✔	SMPTE 2022-6
				233.10.10.2	5004	-	125 usec, 16ch, ...	ETH1	✔	AES-67
	IN4 to fabric / GATEWAY 13	←	1080i50	235.10.10.4	50000	0.0.0.0	HD	ETH1	✔	SMPTE 2022-6
				0.0.0.0	5004	0.0.0.0	125 usec, 16ch, ...	ETH1	☐	AES-67
Redundancy	OUT1 from fabric / GATEWAY 1	→	1080i59.94	239.111.7.10	10010	-	HD	ETH1 ETH2	✔	SMPTE 2022-6
				239.201.34.10	10010	-				
				234.111.7.11	5004	-	1 msec, 2ch, L24	ETH1 ETH2	✔	AES-67
				234.110.6.11	5004	-				
	IN2 to fabric / GATEWAY 11	←	1080i59.94	237.203.43.5	10000	0.0.0.0	HD	ETH1 ETH2	✔	SMPTE 2022-6
				237.203.44.5	10000	0.0.0.0				
				237.203.43.5	5004	0.0.0.0	125 usec, 16ch, ...	ETH1 ETH2	✔	AES-67
				237.203.44.5	5004	0.0.0.0				

Text gives format and status message

Type addresses directly into the data boxes

Type the Gateway name directly into the panel.

Click to select format

Click to enable the streaming format

Figure 4-4 Gateway Table data entry

Gateway Name

Each Gateway is linked to a GV Node fabric input or output. In the **Gateway** column, we have the fabric I/O identification on the 1st line and the gateway name on the 2nd line. The gateway name can be edited – select the text and type a new name (up to 19 characters).

- Default names are GATEWAY 1 through GATEWAY 18.
- Changed value is pending prior to acceptance

Gateway Direction

The arrow in the **Dir** column shows the direction of signal flow through the gateway.

- There are nine OUT gateways that connect the fabric output to the rear-panel IP stream outputs:
- There are nine IN gateways that connect the rear-panel IP streams to the GV Node fabric inputs:

→	Fabric-to-IP Gateway (OUT)	Gateways 1 - 9
←	IP-to-fabric gateway (IN)	Gateways 10 - 18

Stream Address:
- When ETH2 is disabled or in Aggregation mode, we only have one IP stream associated with each Gateway.
- When ETH2 Operation mode is set to Redundancy, we have two IP streams associated with the Gateway – Primary Stream and Redundancy stream. The gateway will be linked to the primary stream when it is valid. If the main stream is in error, the gateway will fall back to the redundancy stream. The fallback may generate an error on the SDI output.

Stream Port: Shows the port associated with the stream. Edit the port by selecting the text and typing a new value.

IGMPv3 Source: On IN-to-fabric (gateways 10-18) we have an additional setting: IGMPv3 source. This is used when receiving multicast streams. In this protocol, the card deals with a switch to subscribe to one or many streams that are coming from different IP addresses.
- When receiving multicast streams, the "stream address" is used to talk to a "group" while the "IGMPv3 source" indicates the exact source from which we want to receive the stream.
- When receiving unicast streams, IGMPv3 protocol is not used.
- When this field is set to 0.0.0.0, IGMPv3 protocol will request multicast streams for all sources.

Type directly into the data boxes to enter stream addresses and port numbers.
- Enter values for both SMPTE 2022-6 and AES-67 streams as required.
- Changed value is pending prior to acceptance

Parameter	Values	Default value	Notes
Stream Address (SMPTE 2022-6 and AES-67)	0.0.0.0 to 255.255.255.255	0.0.0.0	OUT from fabric to IP 255.255.255.255 is refused (not applied). Unicast addresses are accepted. If the ARP is not resolved, it will be highlighted in Orange. IP to IN to fabric Multicast addresses are accepted (224.0.0.0 through 239.255.255.255). Only ETH1 IP address and ETH2 IP address are accepted as the Unicast address.
Stream Port (S. Port) (primary and redundancy stream)	0 to 65535	SMPTE 2022-6: 10000 AES-67: 5004	
IGMPv3 Source (primary and redundancy stream) (SMPTE 2022-6 and AES-67)	0.0.0.0 to 255.255.255.255	0.0.0.0	IP to IN to fabric only. This is used when receiving multicast streams. In this protocol, the card deals with a switch to subscribe to one or many streams that are coming from different IP addresses. • When receiving multicast streams, the "stream address" is used to talk to a "group" while the "IGMPv3 source" indicates the exact source from which we want to receive the stream. • When receiving unicast streams, IGMPv3 protocol is not used. • When this field is set to 0.0.0.0, IGMPv3

			protocol will request multicast streams for all sources.

Stream Formats

You may independently enable or disable the two streaming types supported by the IPG-4901, using the EN checkboxes for each gateway:

- SMPTE 2022-6   Video with embedded audio
- AES-67   Multichannel AES audio

NOTE – the gateway must be enabled from the GV Node manager before the streams can be enabled here. See page 46

OUT from fabric gateway behavior

Stream Type	EN	Str. Address	Stream settings	SDI input	Stream Output
SMPTE 2022-6	Enable	≠ 0.0.0.0	Valid	Valid	Generated
				Not Valid	Killed
			Not Valid		Killed
		= 0.0.0.0			Killed
	Disable				Killed
AES-67	Enable	≠ 0.0.0.0	Valid	Valid	Generated
				Not Valid	Killed
			Not Valid		Killed
		= 0.0.0.0			Killed
	Disable				Killed

AES-67 Audio

Embedded Audio		AES-67	
SDI Input	Audio Group	IP Stream	Audio Channel
Valid	Present	Generated	Embedded Audio
	Not Present	Generated	Silence
Not valid		Killed	

IN to fabric gateway behavior

There is only one fabric input per gateway, and its embedded audio may be sourced from either the SMPTE 2022-6 streaming input or the AES-67 streaming input, depending on the enabled streams. In some cases, silence or no audio groups may be embedded.

SMPTE 2022-6			AES-67			SDI output	
Enable (En)	Str. Address	Stream Validity	Enable (En)	Str. Address	Stream validity	Video	Embedded audio
Enable	≠ 0.0.0.0 ≠ 0.0.0.1	Valid	Enable	≠ 0.0.0.0 ≠ 0.0.0.1	Valid	SMPTE 2022-6	AES-67
					Not Valid	SMPTE 2022-6	Embed silence
				= 0.0.0.0 = 0.0.0.1		SMPTE 2022-6	SMPTE 2022-6
			Disable			SMPTE 2022-6	SMPTE 2022-6
		Not Valid	Enable	≠ 0.0.0.0 ≠ 0.0.0.1	Valid	SLATE *	AES-67
					Not Valid	SLATE	Embed silence
				= 0.0.0.0 = 0.0.0.1		SLATE	Embed silence
			Disable			SLATE	None
	= 0.0.0.0 = 0.0.0.1		Enable	≠ 0.0.0.0 ≠ 0.0.0.1	Valid	SLATE	AES-67
					Not Valid	SLATE	Embed silence
				= 0.0.0.0 = 0.0.0.1		SLATE	Embed silence
			Disabled			SLATE	Embed silence
Disable			Enable	≠ 0.0.0.0 ≠ 0.0.0.1	Valid	SLATE	AES-67 Bug : Embed silence
					Not Valid	SLATE	Embed silence
				= 0.0.0.0 = 0.0.0.1		SLATE	Embed silence
			Disable			KILL	KILL

* The SLATE output is specified on the [Gateway–System](#) tab

Profile Selection

Use the pulldown in the **Format** column to select the video and audio formats.

Streaming Format	Available options	Notes
SMPTE 2022-6	SD HD 3G	
AES-67	1 msec, 1ch, L24 1 msec, 2ch, L24 1 msec, 8ch, L24 250 µsec, 8ch, L24 125 µsec, 2ch, L24 125 µsec, 8ch, L24 125 µsec, 16ch, L24	

ETH port.: This column shows the ETH port on which we are receiving or transmitting an IP stream.

- When the ETH2 port is not used (**ETH2 disabled**) this column is hardcoded to ETH1.
- When the ETH2 port is used to send or receive more IP Streams (**ETH2 Operation mode = Aggregation**), ETH port has to be set to either ETH1 or ETH2.
- When the ETH2 port is used for redundancy (**ETH2 Operation mode = Redundancy**), the primary stream is always received from or sent to ETH1 and the redundant stream is always received from or sent to ETH2

Bandwidth Limitations per ETH Port

Gateways	Stream	Total Stream Limitation	Comments
OUT from fabric to IP	SMPTE 2022-6	Up to 5 x SD/HD Up to 3 x 3G	3G SMPTE 2022-6 uses twice HD bandwidth
	AES-67	Up to 5	
IP to IN to fabric	SMPTE 2022-6	Up to 5 x SD/HD Up to 3 x 3G	3G SMPTE 2022-6 uses twice HD bandwidth
	AES-67	Up to 5	

Changed Values Pending Acceptance

When you have entered new values into the table that do not trigger immediate changes (you can change multiple parameters on different gateways), the changed values are highlighted, and the Apply and Cancel buttons at the top of the table are active.

- Click **Apply,** or **Enter** on your keyboard to accept your changes
- Click **Cancel** to discard your changes and leave the original values unchanged

Status

The status of the IP stream is shown by the background color of the Stream Address column.

| Gateway Direction	Color	Stream Address Status
IP Stream to IN to fabric	Green	IP stream is valid.
	Red	Invalid IP address. No IP stream. Errors in IP stream. Missing PTP (for AES-67 only when Syntonize mode is OFF)
	Grey	Gateway disabled.

OUT from fabric to IP Stream	Green	SDI is valid.
		IP Stream settings are valid.
	Orange	Not a valid multicast.
		Unicast address not resolved by ARP.
	Red	No SDI from fabric.
		SDI from fabric not valid.
		SDI from fabric scan rate error.
		SDI format does not match gateway format.
	Grey	Gateway disabled.

The status of fabric I/O is shown by the background color of the fabric I/O column:

Gateway Direction	Color	SDI I/O Status
IP Stream to IN to fabric	Green	IP Stream is valid.
	Red	No IP Stream.
		IP Stream on error.
		Incoming SDI Video does not match gateway format.
		SDI from fabric scan rate error.
	Grey	Gateway is disabled.
OUT from fabric to IP Stream	Green	SDI input present and valid.
	Red	No SDI from fabric.
		SDI from fabric not valid.
	Grey	Gateway disabled.

4.2.3 Gateway – IN tab

Each IN-to-fabric gateway (Gateways 10-18) has an active tab in the **Gateway** panel, labeled IN 1 through IN 9.
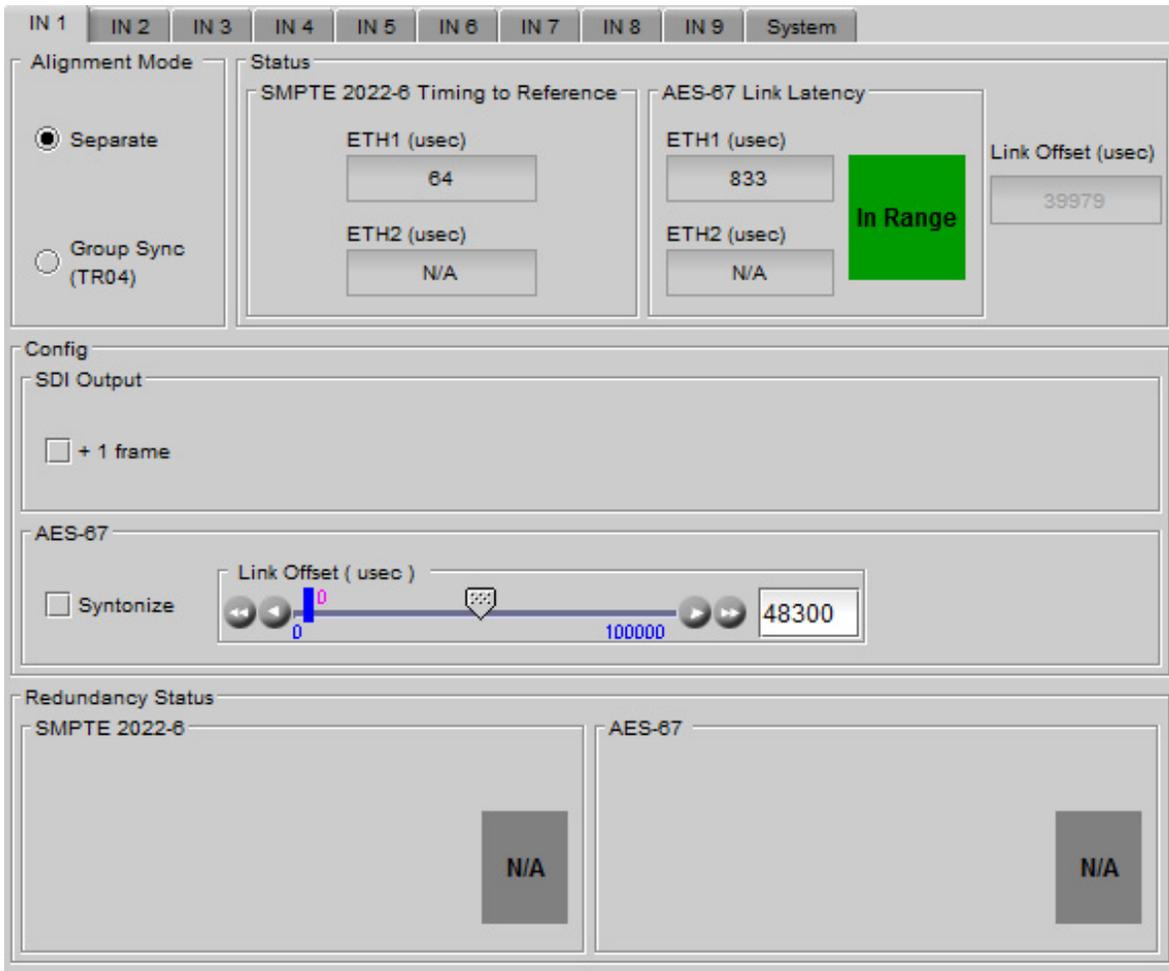
Figure 4-5 Gateway panel - lower portion – SDI output configuration

The controls and indicators in these tabs allow the user to set up audio and video output timing.

Alignment Mode

Two Alignment modes are available, selected by the radio buttons in the top left of the tab:

Alignment Mode	Description
Separate	Video and audio are treated independently of each other and have separate controls. The **Link Offset** indication is inactive.
Group Sync (TR-04)	Video and audio are synced together. Both streams must have valid RTP timestamps inserted for correct alignment according to TR-04. Only the **Video Config** controls are active; the **AES-67** controls are disabled. This is the **default** mode.

Status

- SMPTE 2022-6 Timing To Reference

  The ETH1 and ETH2 timings are measured by taking the time difference between reference and the marker bits in the S2022-6 streams. These values are displayed as values (in µsec).

  o Measurement less than a field in interlaced format and less than ½ frame for progressive format will be seen as "input is late to Reference " (positive value).

  o Measurement higher than a field in interlaced format and higher than ½ frame for progressive format will be seen as "input is early to reference" (negative value)

  The timing of both ETH1 and ETH2 ports is reported, in µsec. The range varies with the video format:

SDI Format	Range
525, 1080i59	-16683 to 16680 µsec
720p59, 1080p59	-8342 to 8342 µsec
625, 1080i50	-20000 to 20000 µsec
720p50, 1080p50	-10000 to 10000 µsec

  The measured value is only displayed when the both the reference and the 2022-6 stream are present and valid; otherwise N/A is displayed.

Selected Reference	SMPTE 2022-6 (SDI I/O Status)	ETH2 Operation Mode	P. ETH	Input Timing ETH1	Input Timing ETH2
Present and valid	Present and valid	OFF		Value	"N/A"
		Redundancy		Value	Value
		Aggregation	ETH1	Value	"N/A"
			ETH2	"N/A"	Value
	Any Error			"N/A"	"N/A"
Not present or not valid				"N/A"	"N/A"

- AES-67 Link Latency

  The two windows (ETH1 and ETH2) display the time difference between RTP timestamps in the AES-67 streams and the system PTP time. Values are shown in µsec.

PTP	ETH2 Operation Mode	P. ETH	Input Timing ETH1	Input Timing ETH2
Present and valid	OFF		Value	"N/A"
	Redundancy		Value	Value
	Aggregation	ETH1	Value	"N/A"
		ETH2	"N/A"	Value
Not present or not valid			"N/A"	"N/A"

  An *In Range* indicator shows status by color. See Section 4.2.4.

- Link Offset

    The Link Offset value is used when configuring the AES-67 in TR04 mode. See the Configuration section below for details.

Configuration Controls

Two configuration control sections are provided. These are used, in conjunction with the Status data from the ETH1 and ETH2 status displays, to configure the SDI output timing, and to correctly integrate AES-67 audio into the SDI outputs.

Separate Mode – SDI Output Config

Control	Function
+ 1 frame: checkbox	Adds an extra frame to the startup buffer to deal with high-jitter streams; e.g. from server-based systems.

Separate Mode – AES-67

Control	Function
Link Offset: Slider	Sets the time at which audio is output with respect to the PTP time. Range: 0 to 100000 μsec (default is 0 μsec). Adjustable in steps of 1 μsec or 1000 μsec.
Syntonize: checkbox	Minimum Latency mode that over-rides the Link Offset control. Packets are played out after a fixed number of packets. This mode is a **debug aid** for commissioning purposes only.

Group Sync (TR-04) Mode

Use this mode for TR-04 operation.

- Only the video controls are available; audio controls are disabled.
- This mode requires PTP.

The IPG-4901 measures the timing of the delayed video using its RTP timestamps with respect to the system PTP time. From this it calculates a link offset which is applied to the audio.

- This applied link offset value is displayed in the Status area of the panel, beside the AES-67 link Latency status.

Video and audio are automatically aligned.

4.2.4 How to set up the timing on the IPG-4901

AES-67 Timing

You can use the values presented in the ETH1 and ETH2 Link Latency displays, in conjunction with the following information, to calculate the minimum value for the Link Offset.

- The calculation depends on the selected audio profile
- The IN RANGE status display simplifies the adjustment process.

Audio Profile	Packet time	Minimum Processing Delay (= 12 x packet time)
1 msec, 1 ch, L24 1 msec, 2 ch, L24 1 msec, 8 ch, L24	1 ms	12 msec
125 µsec, 2 ch, L24 125 µsec, 2 ch, L24 125 µsec, 2 ch, L24	125 µsec	1.5 msec
250 µsec, 8 ch, L24	250 µsec	3 msec

A. Separate Mode

Adjust the **Link Offset** slider to meet this criterion:

- Link Offset Slider > Link Latency (MAX ETH1, ETH2) + Minimum Processing Delay

If the IN RANGE status is RED, you must increase the Link Offset slider.

B. TR04 Mode

Observe the **Link Offset** status, and adjust the **Output Timing** slider to meet this criterion:

- Link Offset status > Link Latency (MAX ETH1, ETH2) + Minimum Processing Delay

If the IN RANGE status is RED, you can enable the +1 Frame checkbox. If the status is still RED, you have to operate in separate mode and control the audio timing manually.

Note that the IN RANGE status must be GREEN for audio to be inserted in the SDI output.

4.2.5 Gateway – System tab
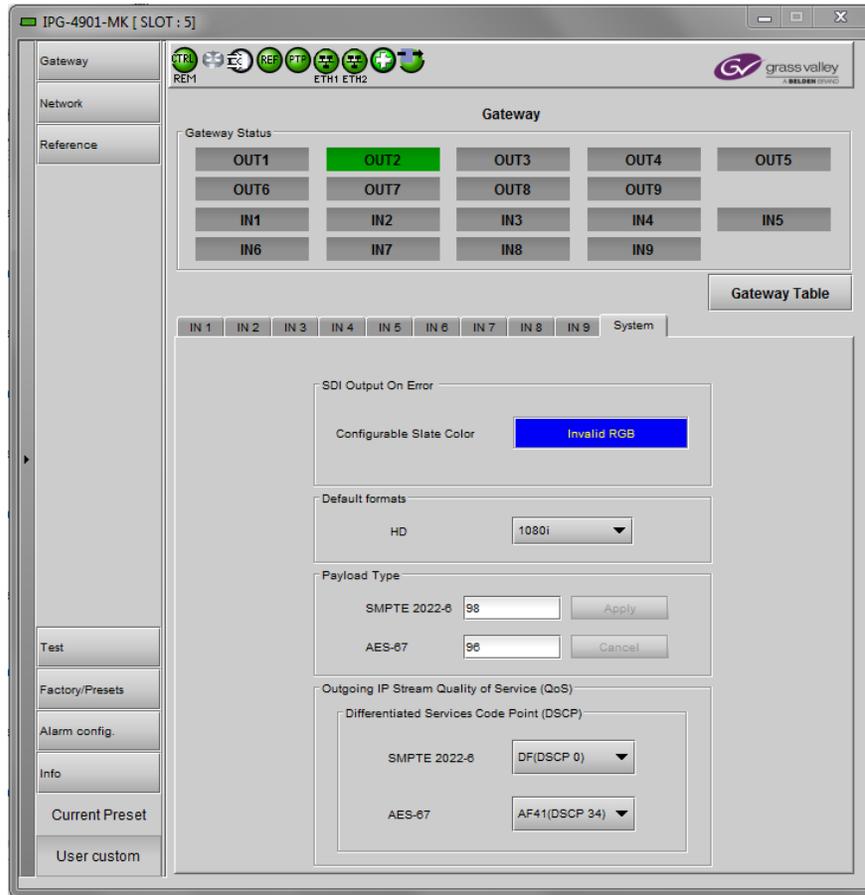
Figure 4-6 Gateway - System

SDI Output on Error: Specify the SDI output behavior when the related gateway is on error.

Behavior
Output a signal in the appropriate format, with the picture being a full-screen color slate as shown in the sample box.

The color is configurable:
1. Click on the color sample to open the Color Selection window.
2. In the Color Selection window, use the sliders, or type directly into the data boxes, to select a color.

Component	Range	Default
Y	1-254	16
Cb	1-254	128
Cr	1-254	128

3. If the selected color is an invalid system color it will be flagged in the Color Selection window and in the color sample box.
4. Select *Default* to choose the system default color (Black: 12, 128, 128) and leave the Color Selection window open.
5. Select *Apply* to accept the selected color and leave the Color Selection window open.
6. Select *OK* to accept the selected color and close the Color Selection window.
7. Select Cancel to close the Color Selection window without making changes.

Note – On SDI-to-IP, the IP stream is automatically killed when the related gateway is on error.

Default Formats: The assignment of a default HD format controls an output HD stream when no valid SMPTE 2022-6 has yet to be detected. Following the reception of a valid signal, this takes priority over the default value.

Payload Type: Video and audio payload type identifier values, defaulted to SMPTE recommended values, but editable for the user. The fields are used only for output only, being written into output header fields.

Outgoing IP Stream Quality of Service (QoS): The Differentiated Service Code Point (DSCP) of transmitted media can be changed. This is a global setting for each type of media handled and is written into an IPv4 Header.

4.3   Network panel

4.3.1   Network panel – Settings tab

Network Configuration

Enter the IP Address, Mask and Gateway for the two ethernet ports (ETH1 and ETH2) on the IPG-4901 into the data boxes.

- After any change, you must click *Apply* to confirm the new values, or *Cancel* to leave the existing values unchanged. Pending changes are displayed in pink.

Operation Mode: The ETH 2 port is used to provide Redundancy or Aggregation.

- Select the **Enable** checkbox to activate the ETH2 port

- Use the pulldown to select the operation mode:
  - ○ Redundancy
  - ○ Aggregation
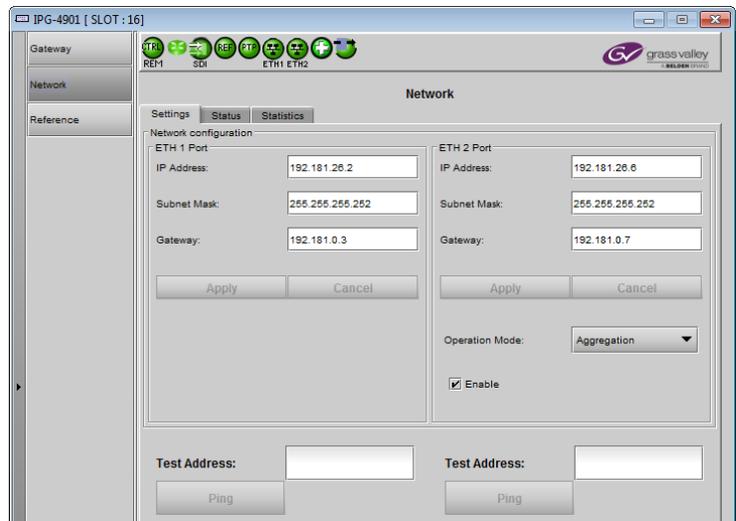
Figure 4-7 Network panel – Settings tab

See [Gateway Config window](#) for more information about the ETH2 Operation mode.

Test Address
Type a proposed destination address into the data box, and click *Ping* to check whether the destination can be seen by this port.

4.3.2   Network panel – Status tab

This tab reports on the status of the ETH1 and ETH2 ports.

Status	Details
Link	The icon indicates the link status: Green – up and valid Grey - down
IP Address	As set in the Settings tab
Subnet Mask	As set in the Settings tab
Gateway	As set in the Settings tab
MAC Address	Each port has a separate MAC address, factory-set and non-configurable.

It also reports the status of SFP modules installed in the IPG-4901 rear panel.

Status	Details
Presence	Green – Supported SFP module detected Grey – No supported SFP module
Type	Fiber or Copper
Vendor	Name
Part Number	Vendor's part number
Serial Number	#
Data Code	#
Wavelength	Operating wavelength (nm)

There are no operating controls or settings on this tab.
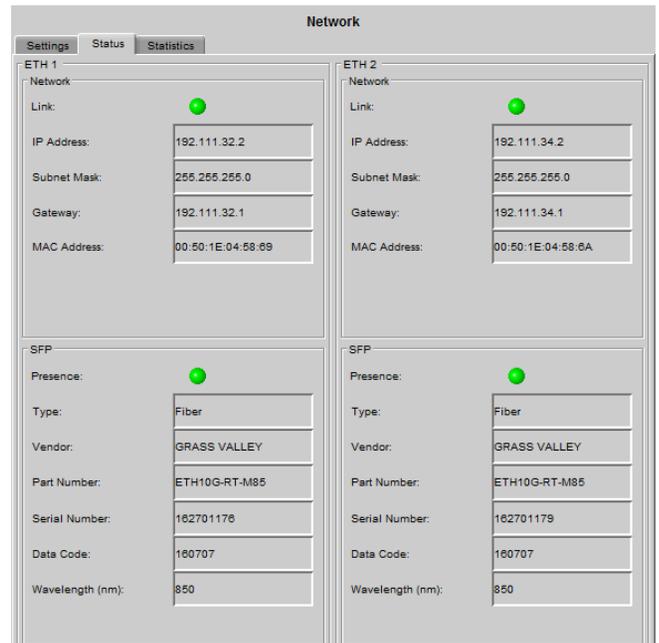
Figure 4-8 *Network panel – Status tab*

4.3.3   Network Config panel – Statistics tab

This tab displays continuously-updated statistics about the data passing through each of the ethernet ports.

- Packets: The total number of Ethernet packets transmitted and received since the last reset on each port.

- Errors: The total number of Rx and Tx errors detected on each ethernet port since the last reset.

The accumulated statistics can be reset for a fresh start by clicking the *Reset ETH Statistics* button
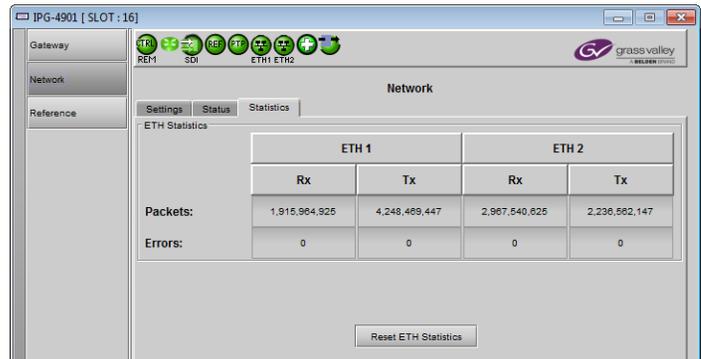
Figure 4-9 Network panel – Statistics tab

4.4   Reference Panel

This panel allows the selection of the reference to be used by the IPG-4901.

4.4.1   Reference Panel - Selection Tab

System-wide Scan Rate: Use the radio buttons to select the scan rate for the system.

Scan rate
59.94 Hz
50 Hz

- Any input not matching this rate will be considered invalid.

- Any reference not matching this rate will be considered a ref-mismatch.

Reference Presence – the only reference available for the IPG-4901 is the Universal Reference Signal (URS) generated by the GV Node frame controller's reference module.
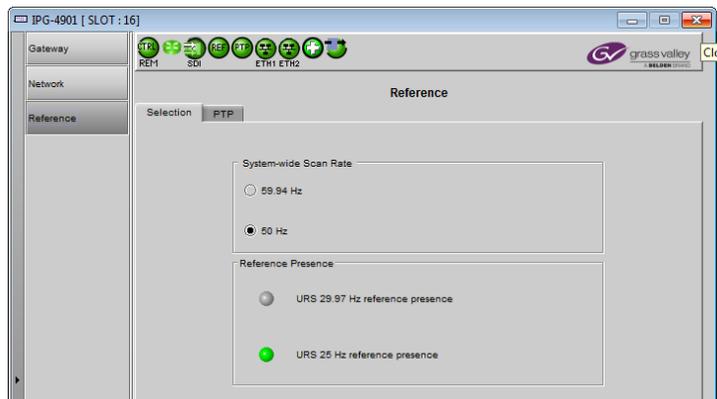
Figure 4-10 Reference panel

The reference may be available in 50 Hz and/or 59.94 Hz – a green icon indicates the presence of each format.

4.4.2   Reference Panel – PTP tab

IPG-4901 extracts PTP (Precision Time Protocol) data for streaming (RTP Timestamp) and AES-67 reception. The card still needs the GV Node's URS reference.

Config

Control	Values	Description
Domain Number	Range: 0 to 127 Default: 127	Set the timing domain in which this IPG-4901 and its associated network are operating.

Announce Interval (sec)	0.125 0.250 0.500 1 2 4* 8* 16* Default: 1	Time interval between Announce messages sent by the Master clock. * These values apply to AES profiles only.
Announce Receipt Timeout Count	Range: 2 to 10 Default: 3	The number of expected announce messages from the Master Clock that this IPG-4901 will miss before an Announce Timeout is flagged.

Figure 4-11 Reference panel - PTP tab

Status

The PTP status of each ETH port is reported separately.

PTP Presence	Status
Present	🟢
Not present	🔴

PTP presence is also displayed on the dashboard.

Selected PTP	Status
Present & locked	🟢
Not present	🔴
Not locked	🔴

Master ID: Reports the address of the master clock to which this IPG-4901 is synchronized.

Step: Reports whether the timing is being controlled through a 1-step or 2-step process.

4.4.3 PTP Failover

In general, the PTP arriving on ETH1 port is used by the IPG-4901.

If the PTP on ETH1 is lost, the card will enter Flywheel mode, and then switch over to the PTP from ETH2 once the Announce Receipt Timeout has been reached.

The card will switch back to ETH1 using the same process once a valid PTP has been detected on ETH1.

Failover and return should be glitch-free on IP reception and transmission if PTP configuration respects this rule:

IPG4901 announce Interval x IPG4901 Announce Receipt Timeout Count ≤ 2s

4.5 Test panel

The test generator can be selected by the user to appear on any output (SDI and stream).

Test Pattern Generator Format

Select the test pattern format using the pulldown.

Format	SD, 720p, 1080i, 1080p

The pattern will be generated at the [System-wide Scan Rate](#), as specified in the *Reference - Selection* panel.

- The current value is displayed in this panel at the top of the table, for reference

- The generator will be synchronous to the REF IN if available; otherwise it will be free-run.

Select the **Test Pattern** checkbox beside a gateway to force the test pattern onto that output.

Select the **Force All** checkbox to force the test pattern onto all outputs.
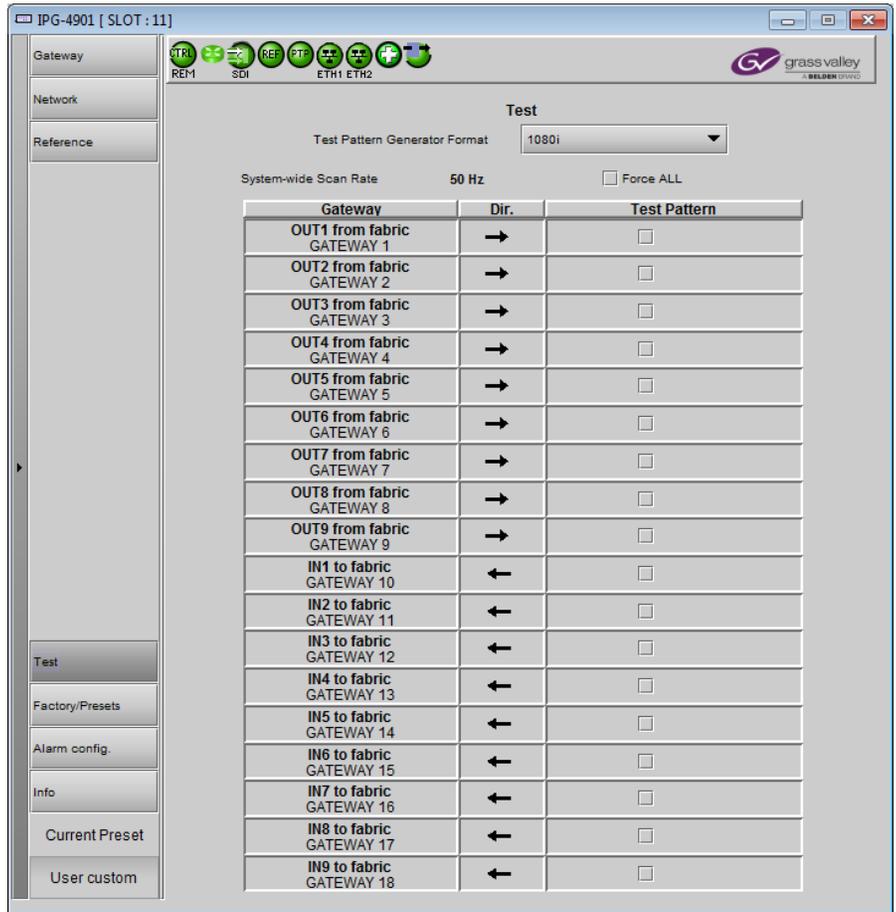
Figure 4-12 *Test panel*

4.6 Factory/Presets Panel

User Presets

The IPG-4901 has memory registers which can hold up to 5 user-defined parameter settings.

Select any one of the five presets using the Card Preset Select pull-down.

Click **Load** to load the contents of the selected User Preset into the IPG-4901. All parameter settings and values will be replaced by the contents of the selected User Preset.

A confirmation box will pop up to allow you to proceed or cancel the load.
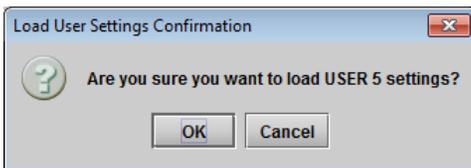
Click **Save** to store the current parameter settings and values from the IPG-4901 into the selected User Preset. The existing contents of the preset will be overwritten. A confirmation box will pop up to allow you to proceed or cancel the save.

Figure 4-13 Factory/Presets Panel

You can edit the name assigned to each user preset.
- Click *Edit Presets Label* to open the Presets window.
- Double-click on a name in the Label column
- Type a new name in the window.
- Click OK

The text you have entered (up to 16 characters) will be appended to the label name in the selection pulldown

4.6.1   Factory

Clicking the Load Factory button will restore the card to a factory default state. Four checkboxes enable the user to choose whether to include Card Parameters, Card Alarms, Network Settings and Presets in the restoration process Note – Card Alarms only are reset to factory values; iControl Alarms and GSM alarms are not reset. With reference to the Alarm Configuration panel:
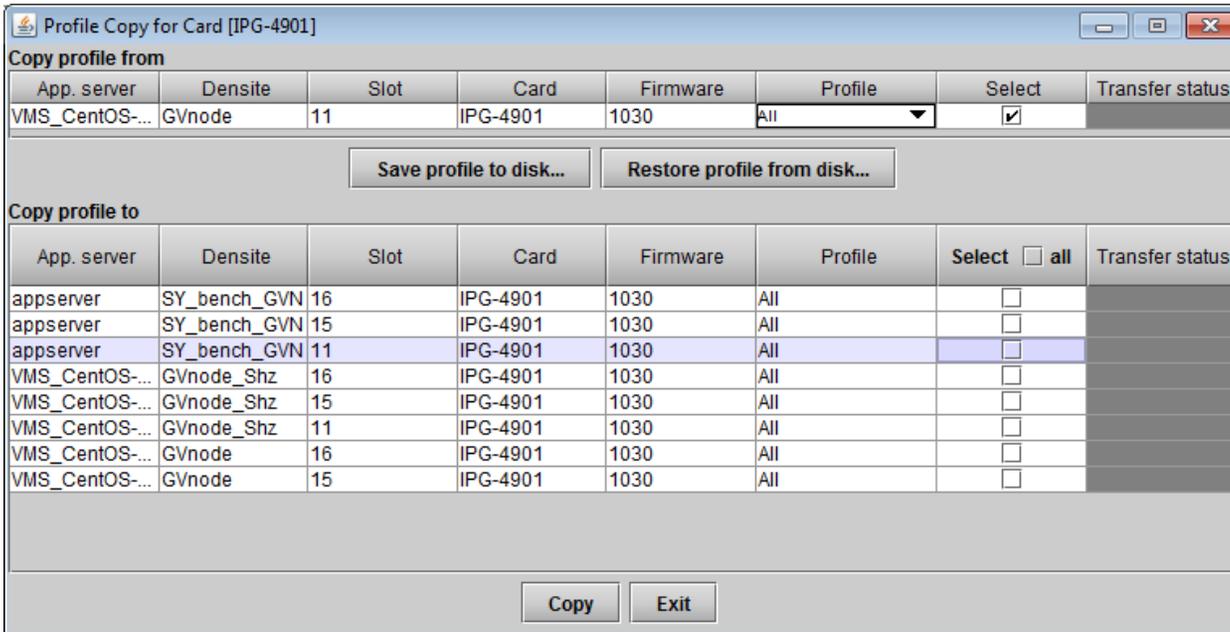
Reset by Load Factory?   Yes   No   No
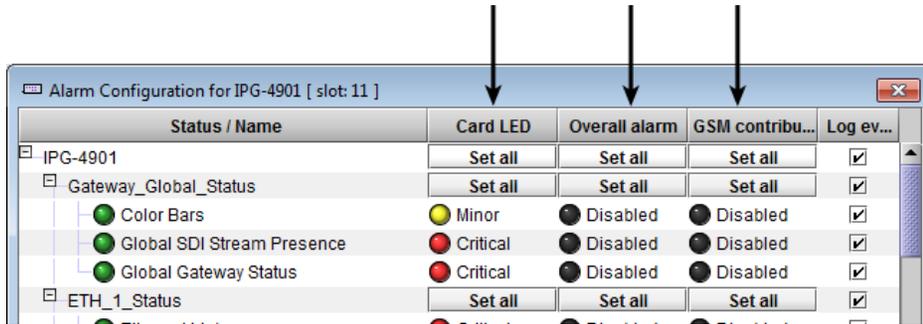
4.6.2   Profiles

Use *Profiles* to save or recover the entire card configuration (including user presets if desired) on an external disk, or to copy it to another IPG-4901 card.

Click on *Profiles* to open the Profile Copy window.

Figure 4-14 *Profile Copy for Card*

Copy profile from

This line shows this IPG-4901 card, and identifies it by App server, Densité frame and slot number, card type and firmware version.

The *Profile* column has a pulldown that allows you to select which profiles you will work with, and gives these choices:

- All, Current, User1, User2, User3, User4, User5

Profile	Values	Default
ALL	Current configuration of the card and all presets will be copied or saved on disk	
Current	Only the current configuration of the card is copied or saved on disk	ALL
User1 ...User5	Only the selected preset will be copied or saved on disk	

The *Select* column includes a checkbox (preselected checked) to confirm that you want to work with the current card.

Save Profile to Disk…

After selecting which profiles you want to save, click this button to open a Save dialog allowing you to specify a file name and location to which the selected profiles for this card will be saved.

Hint - It is a good idea to create a folder for these files, because they are not explicitly identified as IPG-4901 profiles, and will be difficult to find and identify if not clearly named and conveniently located.

- Click the save button once the name and location have been identified in the Save box. The Transfer Status box on the right of the *Copy profile from* line will indicate *In progress* against a yellow background.

- If the file is saved correctly, the Transfer Status box will indicate *Succeeded* against a green background.
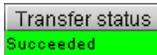
- If the file was not saved for some reason, the Transfer Status box will indicate *Failed* against a red background.

Figure 4-15 *Save Profile to Disk dialog*

Restore profile from disk…

Click this button to open an *Open* dialog box within which you can locate and select a valid IPG-4901 profile file.

- Click Open to read the contents of the file and to reconfigure this IPG-4901's profiles according to its contents
- While the reconfiguration is in progress, the Transfer Status box on the right of the *Copy profile from* line will indicate *Working* against a yellow background
- When the reconfiguration is complete, the Transfer Status box will indicate *Succeeded* against a green background
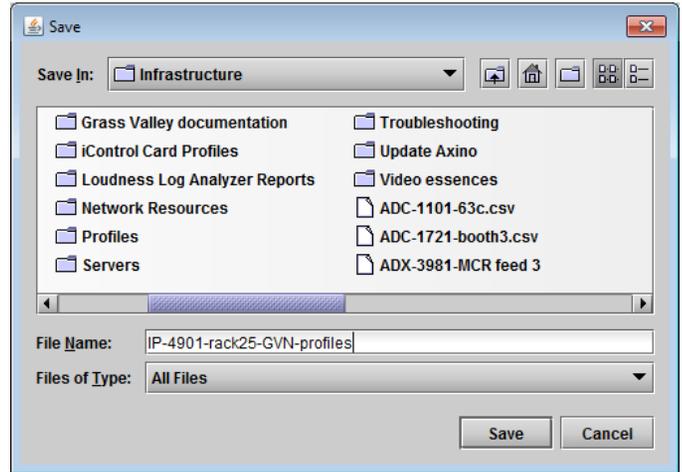
On a restore profile from disk, there is no need to select a profile type (ALL, Current, User1 to User5). All the profile contents of the file will be restored.

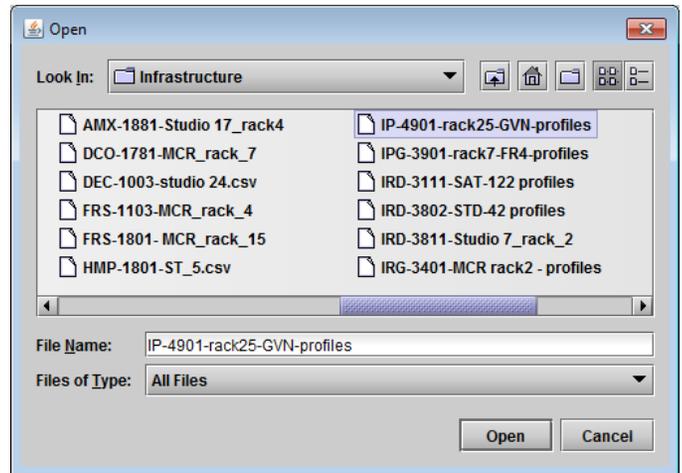***Figure 4-16*** *Restore Profiles from Disk dialog*

Copy profile to

This section shows other IPG-4901 cards that are available on the iControl network, each identified by App server, Densité frame and slot number, card type and firmware version.

The *Profile* column shows the same information as is shown for the current card in the Copy profile from line, i.e. one of the following:

- All, Current, User1, User2, User3, User4, User5

The *Select* column includes a checkbox to identify which IPG-4901 cards you wish to copy profiles into from the current card.

- For convenience, a *Select all* checkbox is provided in the column header

Click *Copy* to copy the selected profiles from this card into the selected other IPG-4901 cards

- While the profile copy operation is in progress, the Transfer Status box on the right of the *Copy profile to* line will indicate *Working* against a yellow background
- When the profile copy operation is complete, the Transfer Status box on the right of the *Copy profile to* line will indicate *Succeeded* against a green background

Note – the source and destination cards must have the same firmware version, so any destination cards with a different firmware version that are shown in the *Copy profile to* list cannot be selected, and their transfer status is always N/A on a yellow background
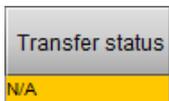
4.7   Alarm Config Panel

This panel allows the alarm reporting of the IPG-4901 to be configured. The panel opens in a new window when the button is clicked, and can be resized if needed.

The panel is organized in columns.

Status/Name
This contains an expandable tree listing all the alarms reported by this IPG-4901 card.

- Each alarm name includes an icon that shows its current status
- Some alarms may be text-only and the alarm status is shown in the name and not by a status icon

The **Card LED**, **Overall Alarm and GSM Contribution** columns contain pulldown lists that allow the level of contribution of each individual alarm to the alarm named in the column heading to be set.

➤ Click on the alarm icon to see the available levels; then click on one to select it.

Card LED

This column allows configuration of the contribution of selected individual alarms to the status LED located on the front card edge. The Card LED status is shown at the bottom of the alarm tree in the Status/Name column.

Overall Alarm

This column allows configuration of the contribution of each individual alarm to the Overall Alarm associated with this card. The Overall Alarm is shown in the upper left corner of the iControl panel, and also appears at the bottom of the Status/Name column.

GSM Contribution

This column allows configuration of the contribution of each individual alarm to the GSM Alarm Status associated with this card. GSM is a dynamic register of all iControl system alarms, and is also an alarm provider for external applications. The possible values for this contribution are related to the Overall alarm contribution:

- If the Overall alarm contribution is selected as Disabled, the GSM alarm contribution can be set to any available value.

- If the Overall alarm contribution is selected as any level other than disabled, the GSM contribution is forced to follow the Overall Alarm.

Log Events

iControl maintains a log of alarm events associated with the card. The log is useful for troubleshooting and identifying event sequences. Click in the checkbox to enable logging of alarm events for each individual alarm.
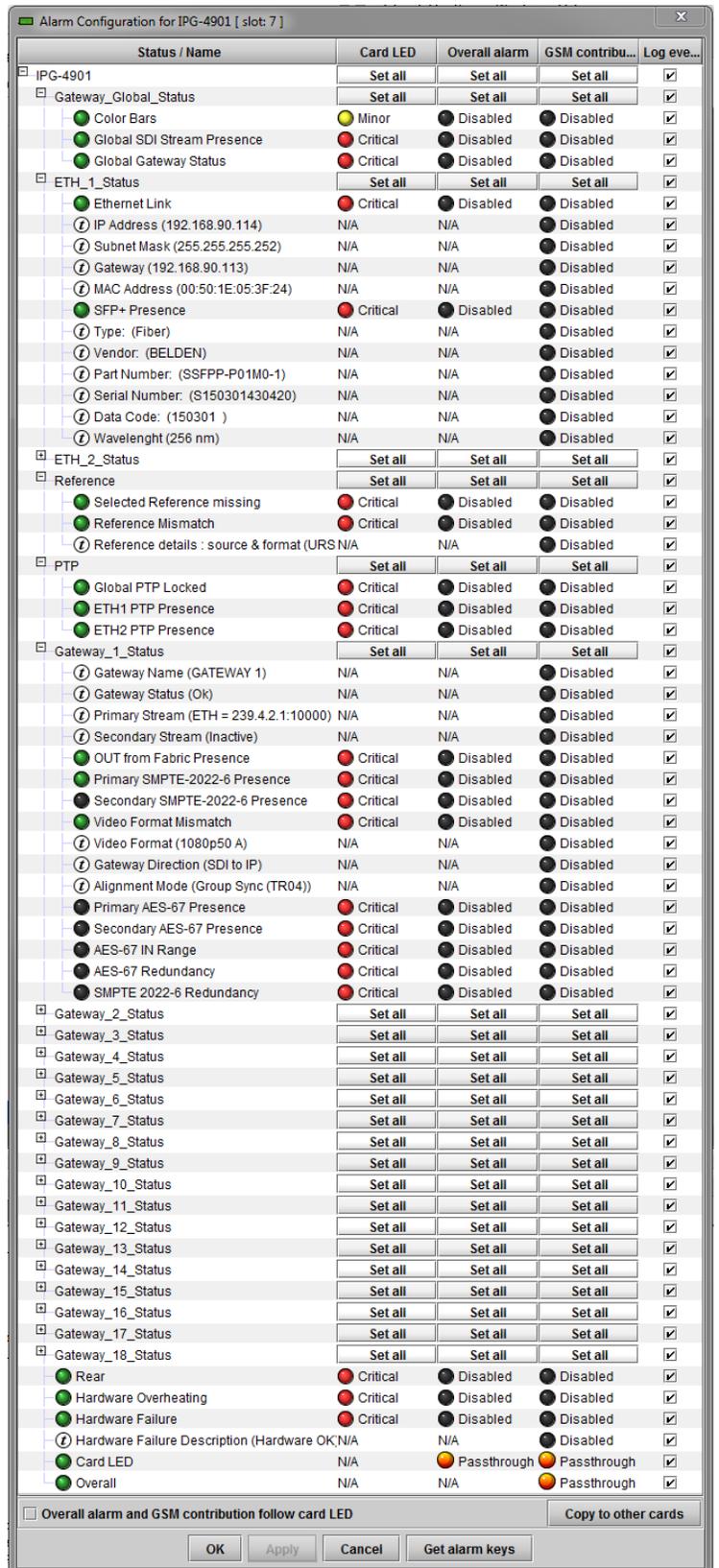

Figure 4-17 Alarm Configuration

Once the alarms are configured, you may accept the changes or discard them:

Overall alarm and GSM contribution follow card LED

Click in the checkbox to force the Overall alarm and GSM contribution to be identical to the Card LED status

- All Overall alarms and GSM contributions for which there is a Card LED alarm will be forced to match the Card LED alarm
- All Overall Alarms and GSM contributions for which there is no Card LED alarm will be forced to Disabled

A warning box will open allowing you to confirm the action, since it will result in changes to the configuration and there is no *undo* function.
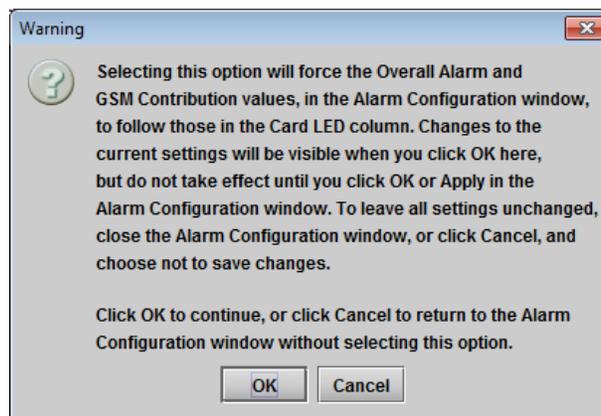
Figure 4-18 Warning for Follow LED change

Copy to other cards

Click this button to open a panel that allows the alarm configuration set for this card to be copied into another IPG-4901 card.

- Select one or more destination cards from the list in the window by clicking in the checkboxes, or all of them by clicking in the *All* checkbox

- Note that when you copy a profile for this card (see page 37), the alarm configuration is copied along with all the other settings.
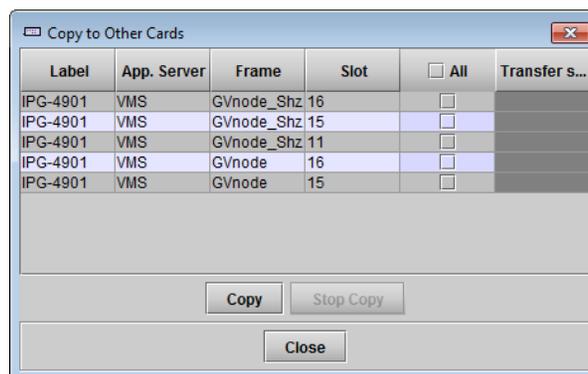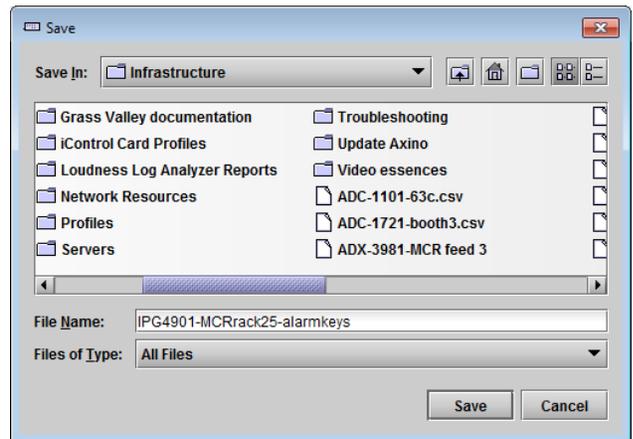

Figure 4-19 Copy to Other Cards window

Get alarm keys

Click this button to open a save dialog where you can save a file containing a list of all alarms on this card and their current values, along with an Alarm Key for each. The alarm keys are useful for system integration and troubleshooting.

- The file is saved in .csv format

Figure 4-20 *Get Alarm Keys dialog*

OK, Apply, Cancel

- **OK** accepts the settings and closes the window once the card confirms that there are no errors.
- **Apply** accepts the settings, but leaves the window open
- **Cancel** closes the window without applying any changes, and leaves the previous settings intact.

4.8   Info Panel

4.8.1   Info Panel – Info tab

When the IPG-4901 is included in an iControl environment, certain information about the card should be available to the iControl system. The user can enter labels and comments that will make this card easy to identify in a complex setup. This information is entered into data boxes in the Info control panel.

Label: Type the label that is shown for this IPG-4901 when it appears in iControl applications

Short Label   Type the short-form label that iControl uses in some cases (8 characters)

Source ID   Type a descriptive name for this IPG-4901

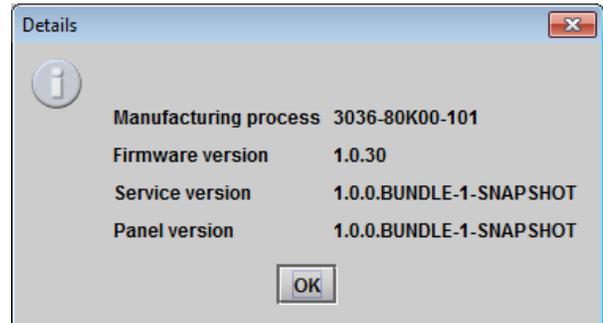Comments: Type any desired text

The remaining data boxes show manufacturing information about this card.

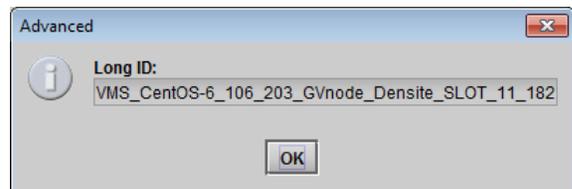Three buttons in the panel give access to other information.
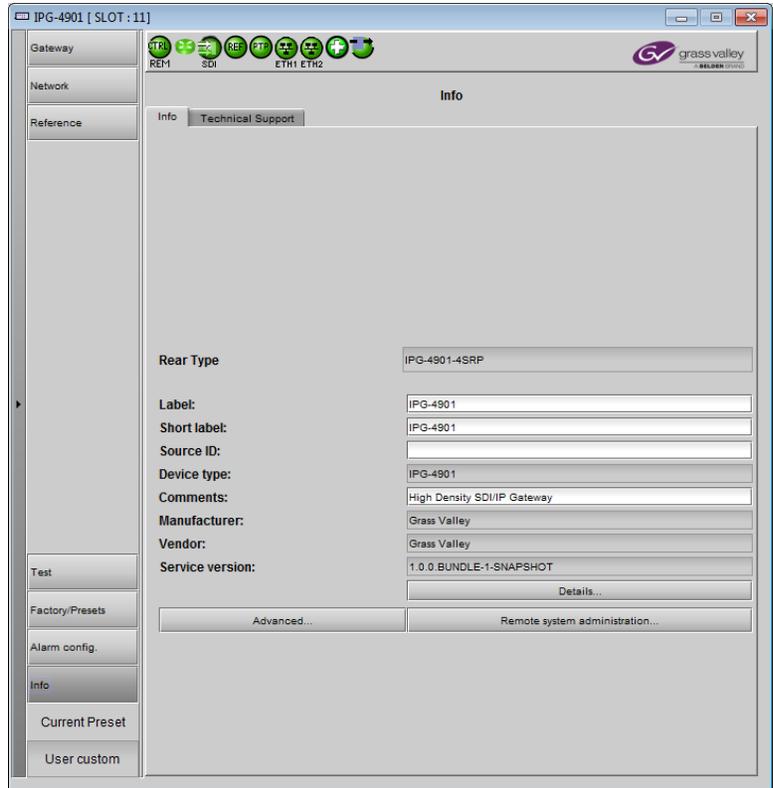
Figure 4-21 *Info Panel*

- Details…: Reports the Firmware version, service version, and panel version for this card

Figure 4-22 *Details window*

- Advanced…: Shows the Long ID for this card. The Long ID is the address of this IPG-4901 in the iControl network.


Figure 4-23 *Advanced window*

- Remote System Administration – opens the *Joining Locators* window, which lists remote lookup services to which this IPG-4901 is registered

   Add: Force the iControl service for this IPG-4901 to register itself on a user-specified Jini lookup service, using the following syntax in the data box:

   jini://<ip_address>

   where <ip_address> is the ip address of the server running the lookup service, e.g.:
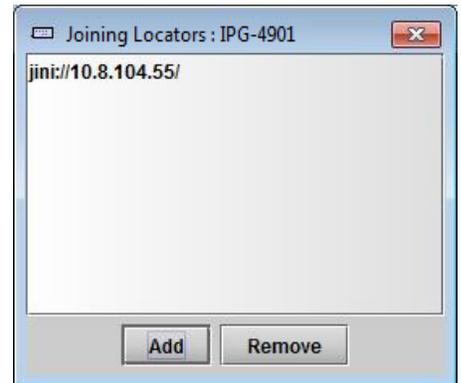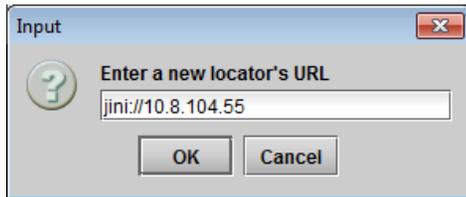
Figure 4-24 *Joining Locators window*

Remove: select one of the services listed in the window by clicking on it, and click *Remove* to open a query box allowing you to delete it from the window.

4.8.2 Info Panel – Technical Support tab

If technical support from Grass Valley is required for your IPG-4901, you may be requested to provide a system snapshot that will help Tech Support to troubleshoot your card.

1. Click the *Get System Snapshot* button.

2. In the Warning window that appears, click *Yes* to proceed with the snapshot, or *No* to decline.

3. If you clicked *Yes*, a system snapshot will be generated and saved on-board the card. Note that the snapshot creation process may take up to two minutes to complete.

4. Remove the on-board SD card from the IPG-3901 and use a PC to copy off the snapshot file.
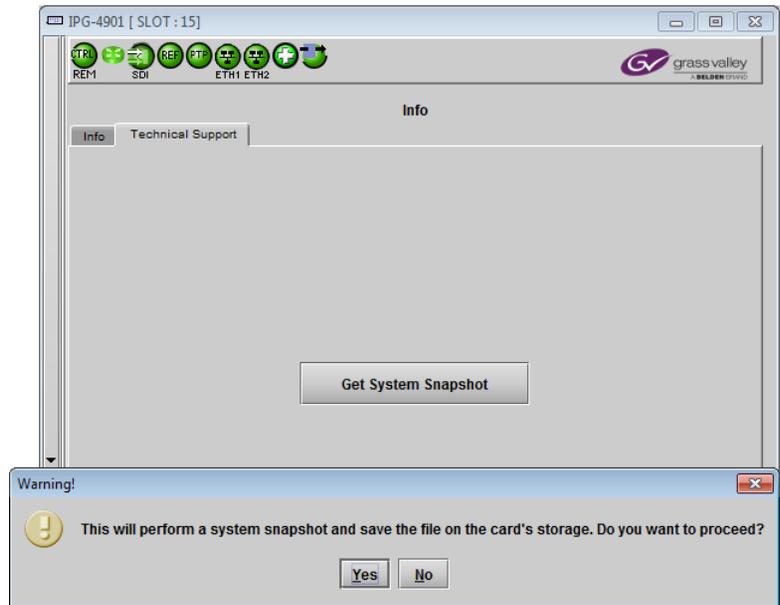

Figure 4-25 *Info Panel - Technical Support tab*

5 GV Node Manager

Because IPG-4901 is a card dedicated to GV Node, it appears in the GV Node Manager, and some aspects of its operation can be controlled from there.

See the GV Node User Manual for a full explanation of the GV Node Manager's features and functionality.

The consequence of the Enabled Options and each gateway's IO Control is defined in the tables below.

For the IPG-4901:

Each IPG-4901 IN and OUT presents a pulldown in the GV Node Manager window. The pulldown sets the status of the associated gateway.

- The setting of this pulldown determines whether SMPTE 2022-6 and AES67 streams can be enabled in the Gateway Config window

Pulldown Status	Gateway Status	Stream Enable in Gateway Config window
OFF	Disabled	Streams cannot be enabled
SDI / PASS, MDX	Enabled	Streams can be enabled

Module inputs to Internal Fabric Module (IP to GV node)

Enabled Options	IO control	To GV node - Video router	To GV node - Audio router
None	SDI	SMPTE 2022-6	No audio
	OFF	No video	No audio
MDX	PASS	SMPTE 2022-6	AES-67
	MDX	SMPTE 2022-6	SMPTE 2022-6 embedded audio or AES-67[1]
	OFF	No video	No audio

1. Refer to IPG-4901 behavior

Module Output from Internal Fabric Module (GV node to IP)

Enabled Options	IO control	From GV Node - Video router	From GV Node - Audio router
None	SDI	Video to SMPTE 2022-6 Video embedded audio to AES-67	No audio
	OFF	No video	No audio
MDX	PASS	Video to SMPTE 2022-6	Audio to AES-67
	MDX	Video to SMPTE 2022-6	Audio to SMPTE 2022-6 embedded audio Audio to AES-67
	OFF	No video	No audio

5.1 Possible Data Flow based GV Node Manager setting

5.1.1 Aggregation Mode

Enabled Options	IO control	Video & Audio Possible Data Flow
None	SDI	IPG-4901 in aggregation mode - SDI
MDX	PASS	IPG-4901 in aggregation mode - PASS

	MDX	**IPG-4901 in aggregation mode - MDX**

5.1.2 Redundancy Mode

Enabled Options	IO control	Video & Audio Possible Data Flow
None	SDI	IPG-4901 in redundancy mode - SDI
MDX	PASS	IPG-4901 in redundancy mode - PASS

| MDX | |
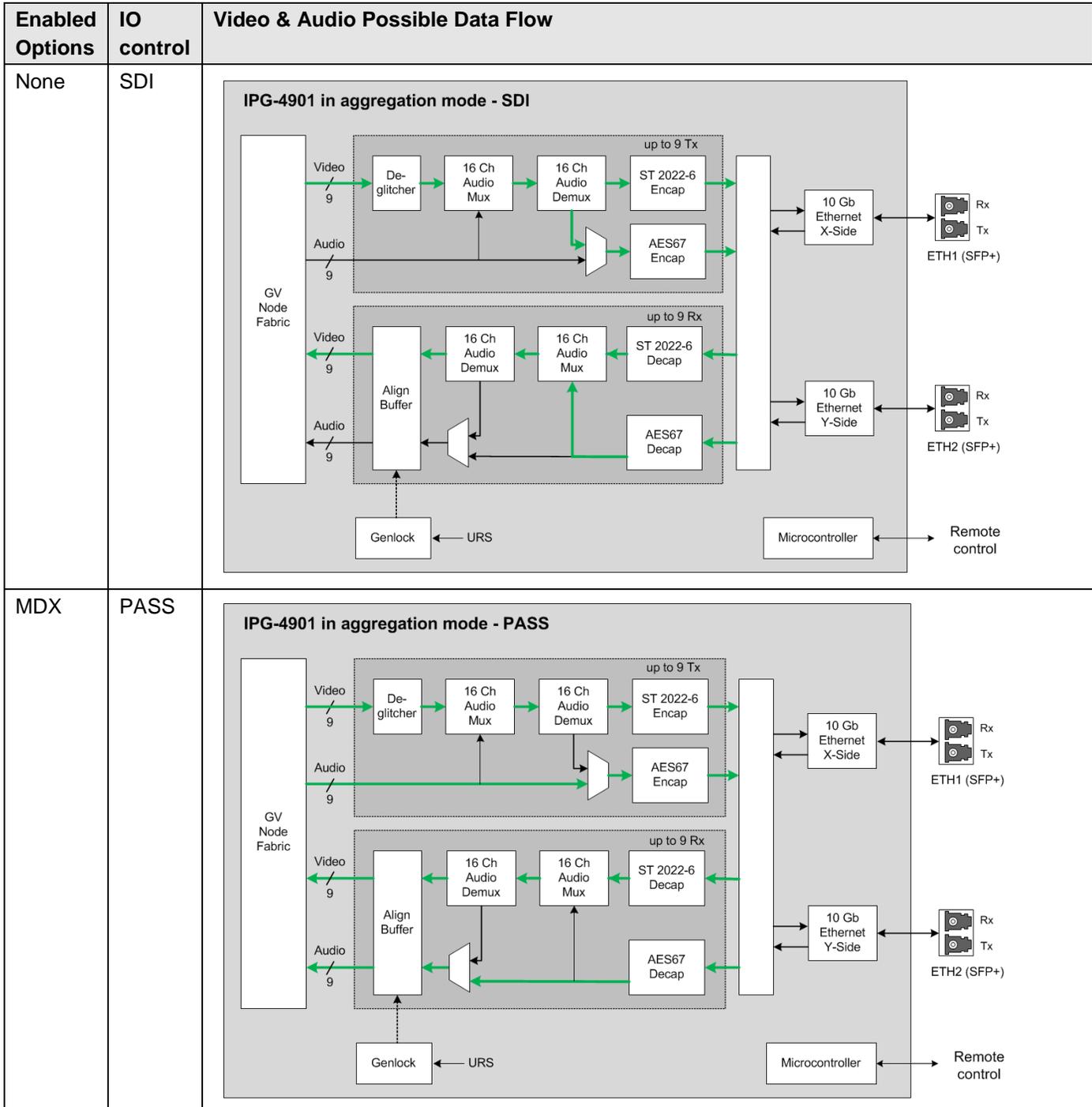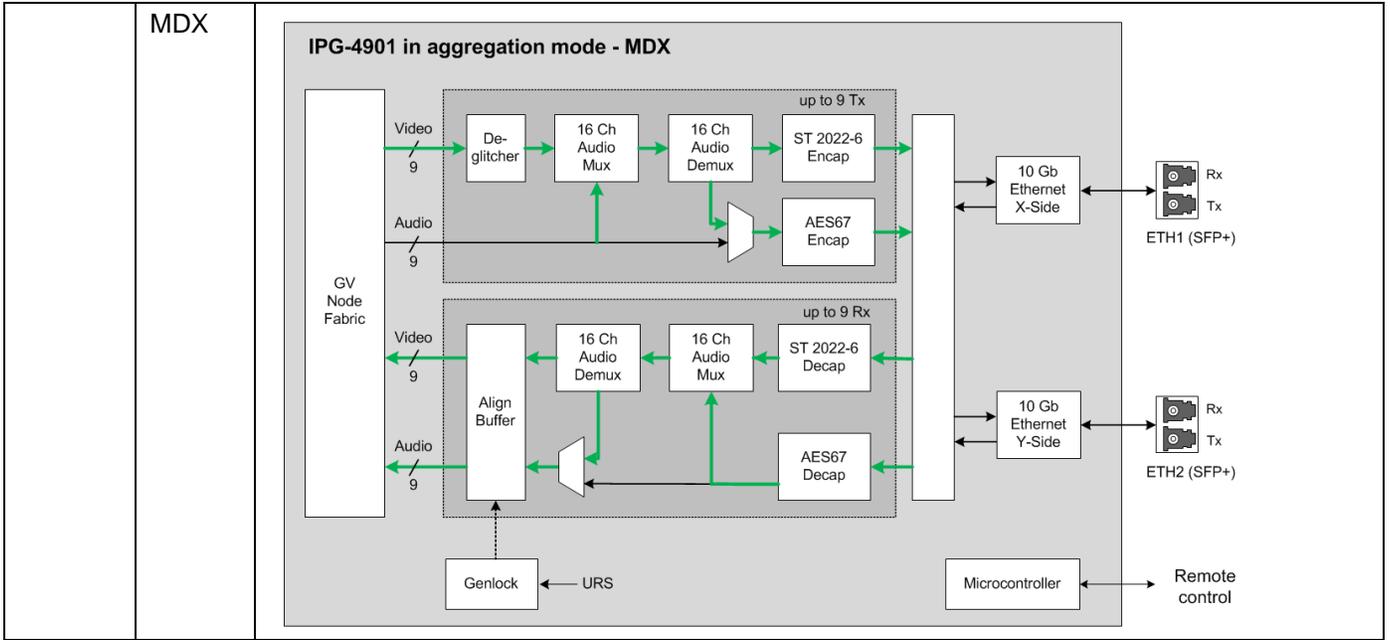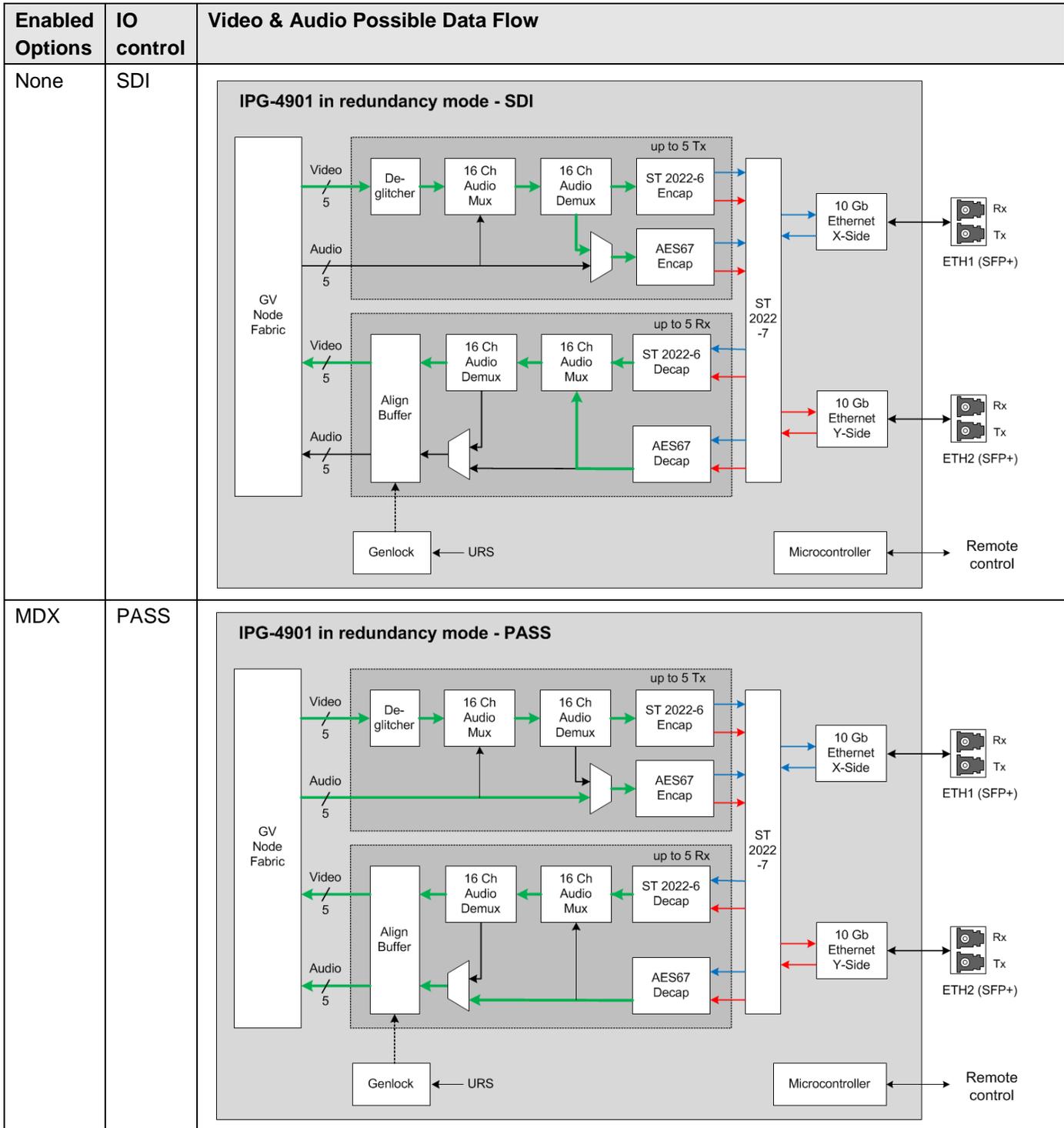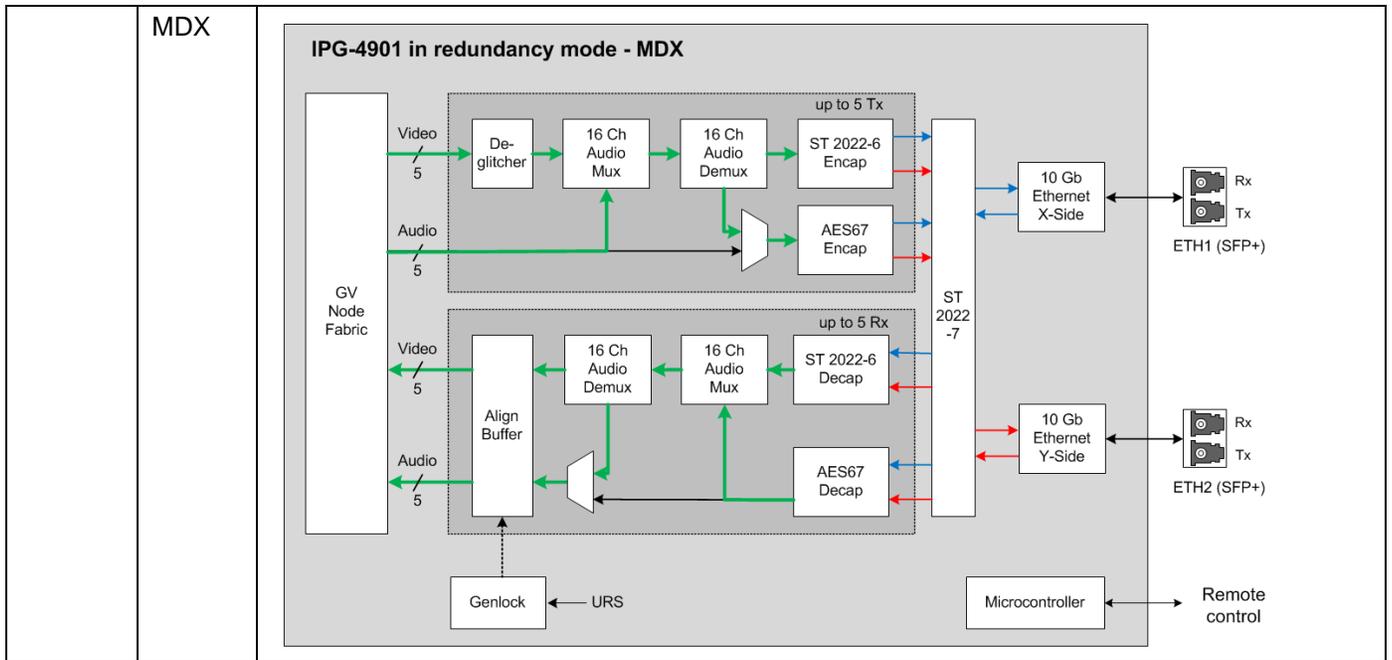
6 Specifications

SDI from/to fabric

Supported formats:	SD:	480i59.94, 576i50
	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

Transport Formats   VSF TR-04 = ST 2022-6 + AES67
                                                AES67 = ST 2110-30

Ethernet Port

Physical:	Two SFP+ sockets for copper, short reach and long reach fiber
Standard:	IEEE 802.3-2008 10 GigE
Transport:	SMPTE 2022-6 & AES67 IP Unicast or Multicast with IGMPv3 and SMPTE ST 2022-7 seamless protection
Performance:	Up to 9 Gb of streaming per direction

Electrical

| Power: | 30 W maximum |

* 3G level A signaling currently supported. 3G level B signaling will be supported at a later date with a firmware update

7   Contact Us

Grass Valley Technical Support

For technical assistance, contact our international support center, at
1-800-547-8949 (US and Canada) or +1 530 478 4148.

To obtain a local phone number for the support center nearest you, please consult the *Contact Us* section of Grass Valley's website (www.grassvalley.com).

An online form for e-mail contact is also available from the website.

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ANNEX 1 – Local Menu

1st level	2nd level	3rd level	4th level	Comments / Default Value
STATUS	GENERAL	REAR TYPE	IPG-4901-4SRP	
		SERIAL NUMBER	XXXXXX-XXXXXXXX	
	REFERENCE	MISSING REF URS 29 REF URS 25 NOT LOCKED		
	ETH1	LINK STATUS	LINK UP LINK DOWN	
		MAC ADDRESS	00:00:00:00:00:00	
	ETH2	LINK STATUS	LINK UP LINK DOWN	
		MAC ADDRESS	00:00:00:00:00:00	
	GATEWAY	[n]	ACTIVE INACTIVE DISABLED	Gives the global status for the gateway [n], where [n] is: • OUTn from fabric • INn to fabric.
			\<video format\>	Reports the video format of the gateway.
	HEALTH	HARDWARE	HARDWARE OK HARDWARE FAILURE	
		FAN	FAN OK FAN FAILURE	
		TEMPERATURE	TEMPERATURE OK TEMPERATURE FAILURE	
CARD PRESET	LOAD	\<name\>		Loads the user preset selected. \<name\> is the preset name
	SAVE	\<name\>		Save the user preset in the preset selected.

NETWORK CONFIG	ETH1	IP ADDRESS	0.0.0.0	192.168.3.31
		MASK	255.255.255.0	255.255.255.0
		GATEWAY	0.0.0.0	0.0.0.0
	ETH2	IP ADDRESS	0.0.0.0	192.168.2.32
		MASK	255.255.255.0	255.255.255.0
		GATEWAY	0.0.0.0	0.0.0.0
QOS - DSCP	SMPTE 2022			DF (DSCP 0)
	AES-67			AF41 (DSCP 34)
SYSTEM SCAN RATE	50 / 25Hz 59.94 / 29.97Hz			59.94 Hz
	PTP	DOMAIN	0 to 127	127
		INTERVAL	0.125s, 0.25s, 0.5s, 1s, 2s	1s
			For AES-67 profiles: 4s, 8s, 16s	
		RECEIPT TIMEOUT	2 to 10	3
RTP PAYLOAD TYPE	ST2022 PL TYPE			98
	AES67 PL TYPE			96
TEST PATTERN	FORMAT	1080p 1080i 720p SD		1080i
	FORCE ALL	ON OFF		OFF
	[n]	ON		OFF

		OFF		Gives the global status for the gateway [n], where [n] is: • OUTn from fabric • INn to fabric.
VERSION	vx.x.x bld xxxx			e.g.: v1.1.0 bld 134
	FPGA BUILD: xxx			Version of the FPGA
FACTORY DEFAULT	WITHOUT NETWORK	APPLY		If selected, everything but network configuration is restored to factory
	INCLUDE NETWORK	APPLY		If selected, everything is factory defaulted.

ANNEX 2 – Firmware upgrade

Upgrade both firmware and IControl service using the Densité Upgrade Manager (DUM).

Please consult the iControl User's Guide for information about the iControl Densité Upgrade Manager.