



grass valley

A **BELDEN** BRAND

GV NODE

IP AGGREGATION, PROCESSING AND EDGE ROUTING
PLATFORM

User Manual v1.2

M6103-9800-125

2016-12-23

www.grassvalley.com

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Title	GV Node User Manual
Part Number	M6103-9800-125
Revision	2016-12-23, 11:22

Important Safeguards and Notices

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

Symbols and Their Meanings



Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



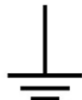
Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.



This is a prompt to note the fuse rating when replacing fuses. The fuse referenced in the text must be replaced with one having the ratings indicated.



Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.



Indicates that static sensitive components are present, which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.



Indicates that the equipment has more than one power supply cord, and that all power supply cords must be disconnected before servicing to avoid electric shock.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Intertek Testing Services regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley product means that it complies with all applicable European Union (CE) directives.



The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

Warnings



A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the mains voltage at either 120 V AC or 240 V AC.
- This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for 120 V AC or 240 V AC is used on the phase conductors.
- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.
- Do not operate the equipment in wet or damp conditions.
- This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- High leakage current may be present. Earth connection of product is essential before connecting power.
- Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.
- To avoid fire hazard, use only the fuse type and rating specified in the service instructions for this product, or on the equipment.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Use proper lift points. Do not use door latches to lift or move equipment.
- Avoid mechanical hazards. Allow all rotating devices to come to a stop before servicing.
- Have qualified service personnel perform safety checks after any service.

Cautions



A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- This equipment is meant to be installed in a restricted access location.

- When installing this equipment, do not attach the power cord to building surfaces.
- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.
- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.
- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Servicing should be done in a static-free environment.
- This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.
- Follow static precautions at all times when handling this equipment.

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.

Battery Handling



This product includes a backup battery. There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Before disposing of your Grass Valley equipment, please review the *Disposal and Recycling Information* appendix.

Cautions for LCD and TFT Displays



Excessive usage may harm your vision. Rest for 10 minutes for every 30 minutes of usage.

If the LCD or TFT glass is broken, handle glass fragments with care when disposing of them. If any fluid leaks out of a damaged glass cell, be careful not to get the liquid crystal fluid in your mouth or skin. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all times.

Mesures de sécurité et avis importants

La présente section fournit des consignes de sécurité importantes pour les opérateurs et le personnel de service. Des avertissements ou mises en garde spécifiques figurent dans le manuel, dans les sections où ils s'appliquent. Prenez le temps de bien lire les consignes et assurez-vous de les respecter, en particulier celles qui sont destinées à prévenir les décharges électriques ou les blessures.

Signification des symboles utilisés



Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.



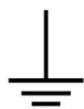
Avertit l'utilisateur, l'opérateur ou le technicien de maintenance que des instructions importantes relatives à l'utilisation et à l'entretien se trouvent dans la documentation accompagnant l'équipement.



Invite l'utilisateur, l'opérateur ou le technicien de maintenance à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.



Identifie une borne de mise à la terre de protection. Il faut relier cette borne à la terre avant d'effectuer toute autre connexion à l'équipement.



Identifie une borne de mise à la terre externe qui peut être connectée en tant que borne de mise à la terre supplémentaire.



Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.



Le symbole ci-contre signifie que l'appareil comporte plus d'un cordon d'alimentation et qu'il faut débrancher tous les cordons d'alimentation avant toute opération d'entretien, afin de prévenir les chocs électriques.



La marque C-CSA-US certifie que l'appareil visé a été testé par l'Association canadienne de normalisation (CSA) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque C-UL-US certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque ETL Listed d'Intertek pour le marché Nord-Américain certifie que l'appareil visé a été testé par Intertek et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



Le marquage CE indique que l'appareil visé est conforme aux exigences essentielles des directives applicables de l'Union européenne en matière de sécurité électrique, de compatibilité électromagnétique et de conformité environnementale.



Le symbole ci-contre sur un appareil Grass Valley ou à l'intérieur de l'appareil indique qu'il est conforme aux normes applicables en matière de sécurité laser.

Avertissements



Les avertissements signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire fatales. Veuillez vous familiariser avec les avertissements d'ordre général ci-dessous :

- Un cordon d'alimentation dûment homologué doit être utilisé pour connecter l'appareil à une tension de secteur de 120 V CA ou 240 V CA.
- La protection de ce produit contre les courts-circuits (surintensités) dépend de l'installation électrique du bâtiment. Assurez-vous qu'un fusible ou un disjoncteur pour 120 V CA ou 240 V CA est utilisé sur les conducteurs de phase.
- Dans le présent manuel, toutes les instructions qui nécessitent d'ouvrir le couvercle de l'équipement sont destinées exclusivement au personnel technique qualifié.
- N'utilisez pas cet appareil dans un environnement humide.
- Cet équipement est mis à la terre par le conducteur de mise à la terre des cordons d'alimentation. Pour éviter les chocs électriques, branchez les cordons d'alimentation sur une prise correctement câblée avant de brancher les entrées et sorties de l'équipement.
- Acheminez les cordons d'alimentation et autres câbles de façon à ce qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.
- Coupez l'alimentation avant de nettoyer l'équipement. Ne pas utiliser de nettoyeurs liquides ou en aérosol. Utilisez uniquement un chiffon humide.
- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.

- Avant de procéder à toute opération d'entretien ou de dépannage, enlevez tous vos bijoux (notamment vos bagues, votre montre et autres objets métalliques).
- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués sur l'équipement ou dans la documentation qui l'accompagne.
- Ne pas utiliser cet appareil dans une atmosphère explosive.
- Présence possible de courants de fuite. Un raccordement à la masse est indispensable avant la mise sous tension.
- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

Mises en garde



Les mises en garde signalent des conditions ou des pratiques susceptibles d'endommager l'équipement. Veuillez vous familiariser avec les mises en garde ci-dessous :

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.
- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.
- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.
- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.
- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire. Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.
- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.

Protection contre les décharges électrostatiques (DES)



Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Remplacement et élimination des piles



L'appareil renferme une pile. Pour réduire le risque d'explosion, vérifiez la polarité et ne remplacez la pile que par une pile du même type, recommandée par le fabricant. Mettez les piles usagées au rebut conformément aux directives du fabricant. Avant de vous défaire de l'équipement, assurez-vous d'avoir lu l'appendice *Disposal and Recycling Information*.

Précautions pour les écrans LCD et TFT



Regarder l'écran pendant une trop longue période de temps peut nuire à votre vision. Prenez une pause de 10 minutes, après 30 minutes d'utilisation.

Si l'écran LCD ou TFT est brisé, manipulez les fragments de verre avec précaution au moment de vous en débarrasser. veillez à ce que le cristal liquide n'entre pas en contact avec la peau ou la bouche. En cas de contact avec la peau ou les vêtements, laver immédiatement à l'eau savonneuse. Ne jamais ingérer le liquide. La toxicité est extrêmement faible, mais la prudence demeure de mise en tout temps.

Recycling

Visit www.grassvalley.com for recycling information.

Certification and Compliance

Safety Compliance



c

This equipment complies with the requirements of CSA/UL/IEC/EN 60950-1, 2nd Ed. + AM1, Safety of information technology equipment.

us The power cords supplied with this equipment meet the appropriate national standards for the country of destination.

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

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/EC:

- EN 55022 Class A Radiated and conducted emissions
- EN 61000-3-2 Limits for harmonic current emissions
- EN 61000-3-3 Limitation of voltage fluctuations and flicker
- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity
- EN 61000-4-4 Electrical fast transient immunity
- EN 61000-4-5 Surge transient immunity
- EN 61000-4-6 Conducted disturbances immunity
- EN 61000-4-8 Power frequency magnetic field immunity
- EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity

Environmental Compliance

部件名称 Part name	有毒有害物质或元素 (Toxic or hazardous substances and elements)					
	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						
电路模块 Circuit modules						
显示装置 Display assemblies						

部件名称 Part name	有毒有害物质或元素 (Toxic or hazardous substances and elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
组装风扇 Fan assemblies						
金属零件 Metal parts						
塑料和聚合物零件 Plastic and polymeric parts						

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 GB/T 26572-2011 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 GB/T 26572-2011.

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 GB/T 26572-2011 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 GB/T 26572-2011.

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Technical explanations: This statement is based on the information provided by our suppliers of components and collected through our 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.

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1 Getting Started

About this Document

The GV Node User Manual is intended to help you set up your GV Node to maximize its flexibility and efficiency in the most common scenarios.

Note: In line with our commitment to environmental preservation, only minimal documentation (e.g. welcome letters, warranty cards) are distributed in printed form. You can obtain the latest version of the User Manual (this document), the Release Notes, as well as software and useful data, from the *Documentation Library* section, and from the *Downloads* section of Grass Valley's website.

If your GV Node is equipped with one or more KMX-4911 multiviewer cards, you must consult the **KMX-4911 Quick Start Guide** for their initial configuration.

Summary

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About GV Node

Frame

The 4 RU GV Node frame incorporates dual redundant power supplies, a frame controller and the fabric module, as well as 16 modular card slots. All signal and control connections are made on the rear panel. The front door opens to provide access to the controller, fabric module and power supplies for maintenance, and also to the modular card slots. The controller card's touch screen interface is accessible through an aperture in the door.

Power supplies and modular cards are hot-swappable. The frame is front-to-back air-cooled and all modules, redundant PSUs and fans are monitored to provide status via GPI or the Ethernet port.

Controller

The GVN-CPU-ETH3 controller installed in the GV Node frame supports all in-frame communication between cards, and incorporates a touch-screen panel for local control and

adjustment of the frame and installed cards. The GVN-CPU-ETH3 controller serves as the communications port for control and alarm information entering and leaving the frame. The GVN-CPU-ETH3 controller features two Ethernet ports for system-wide monitoring and control of the frame. This controller card is compatible with the TCP/IP protocol and can support polling or report on error modes (unsolicited messaging).

Fabric Module

The IFM-2T fabric module is the internal router of the GV Node. It is configured as a 288 × 288 video router, along with a 4608 × 4608 audio router. This provides 9 inputs and 9 outputs for each of the 16 slots in the frame (i.e. 144 total in and 144 total out) allowing full routing capacity between all of the frame's GV Node modular cards. In addition, the GV Node incorporates 12 40 GigE aggregation ports, available on the rear panel. These ports are accessed by 144 outputs and 144 inputs to the fabric card, in order to interface multiple GV Nodes together via Point-to-Point or COTS Switch, allowing the GV Node to be integrated into larger distributed routing systems. The IFM-2T is operated by an external control solution: Grass Valley's NV9000 or GV Convergent.

XIO-4901 SDI I/O Interface Card

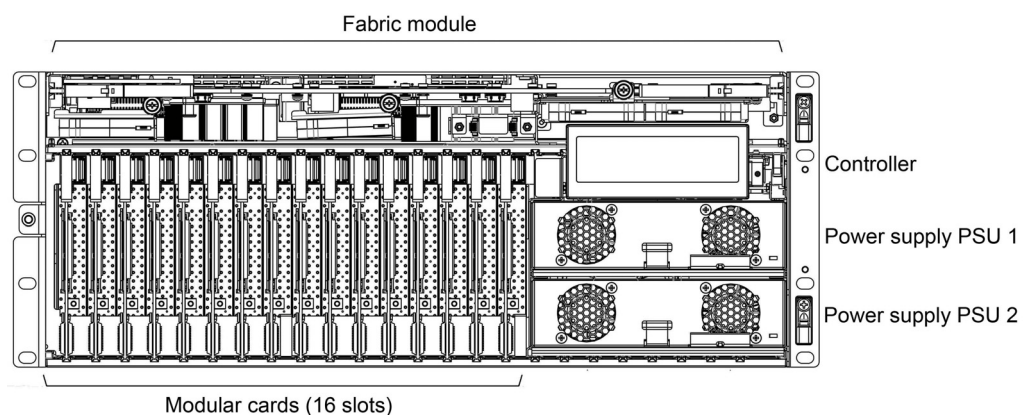
The XIO-4901 SDI interface modular card provides 9 SDI inputs and 9 SDI outputs to the GV Node. It includes timing alignment for synchronous signals and format detection and management, plus probing and status reporting.

KMX-4911 Multiviewer Card

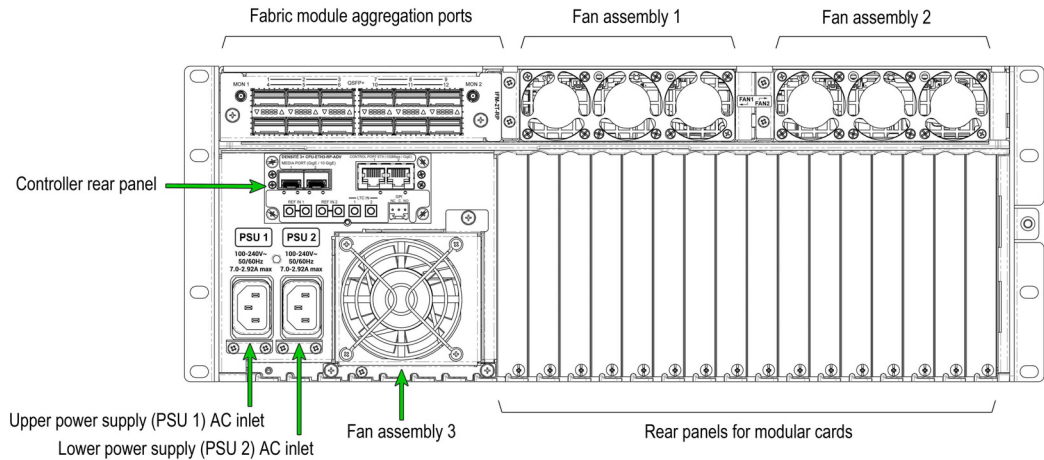
The KMX-4911 is a member of the Kaleido family of multiviewers, designed to be integrated into GV Node. Its inputs are sourced from the fabric module, and thus from any SDI input or IP input to the GV Node. Its outputs appear on the rear panel of the GV Node, but may also be routed back through the fabric module to an aggregation port for IP distribution.

Part Locations

The following images identify the front and rear panel components and features of the GV Node frame.



Part locations—front of frame (door removed)



Part locations—rear of frame

Getting Organized

This section provides information about system requirements, and items shipped with your GV Node.

Required Materials

Your GV Node package includes the following:

- GV Node frame, with the following components factory-installed:
 - Power supplies (2)
 - GVN-CPU-ETH3 Controller and rear connector panel
 - IFM-2T fabric module and aggregation port rear panel
 - Modular cards per order
 - Fan assemblies (3)
- Rear rack adapters (2)
- Power cords (2)
- Power cord retaining clips (2)
- Thumb drive with documentation and other support materials.

These items are required but are not supplied:

- Rack-mounting screws (8)

Modular cards and their rear panels that are part of your order are **installed** in the GV Node when shipped. Modular cards ordered separately must be user-installed. See [Install the Optional Modular Cards](#), on page 6, for modular card installation instructions.

Physical Installation

Follow these steps to install and power up your GV Node:

- [Open and Remove the Front Door](#), on page 4.

- [Install the GV Node in a Rack](#), on page 4.
- [Verify that the Cards and Power Supplies are Properly Seated](#), on page 5.
- [Install the Optional Modular Cards](#), on page 6.
- [Install the Power Cords with their Retaining Clips](#), on page 7.
- [Power Up the GV Node](#), on page 7.

Open and Remove the Front Door

The front door of the GV Node frame is hinged on the right-hand side, and latched by a captive thumbscrew on the left-hand side. There are no electrical connections to the door.

To open and remove the door

- 1 Turn the thumbscrew counterclockwise until it releases, and pull the door open.
- 2 Slide the door vertically off the hinge pins on the right-hand side to remove it.

Install the GV Node in a Rack

Note: You may choose to install the GV Node in a rack either before or after the other steps in this section, whichever is most convenient. However, power up the frame last.

The GV Node housing frame occupies 4 RU in a standard 19-inch rack.

The GV Node is supplied with a pair of rear rack adapters that provide additional support for the GV Node frame when it is installed in a rack. Their use is optional.

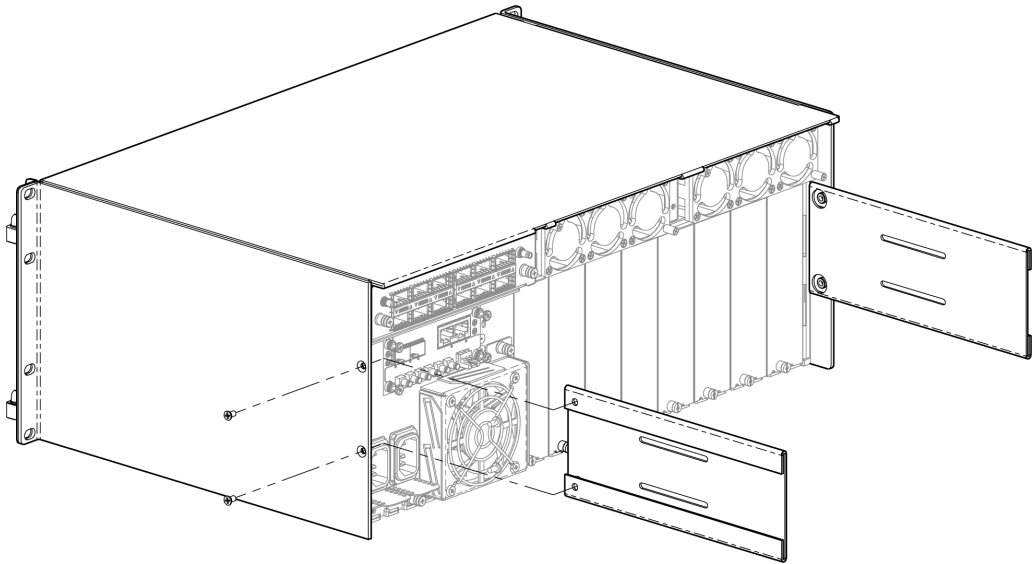
To mount the frame

- Position the frame in the rack and secure it in place using 8 standard rack-mounting screws (not supplied) .

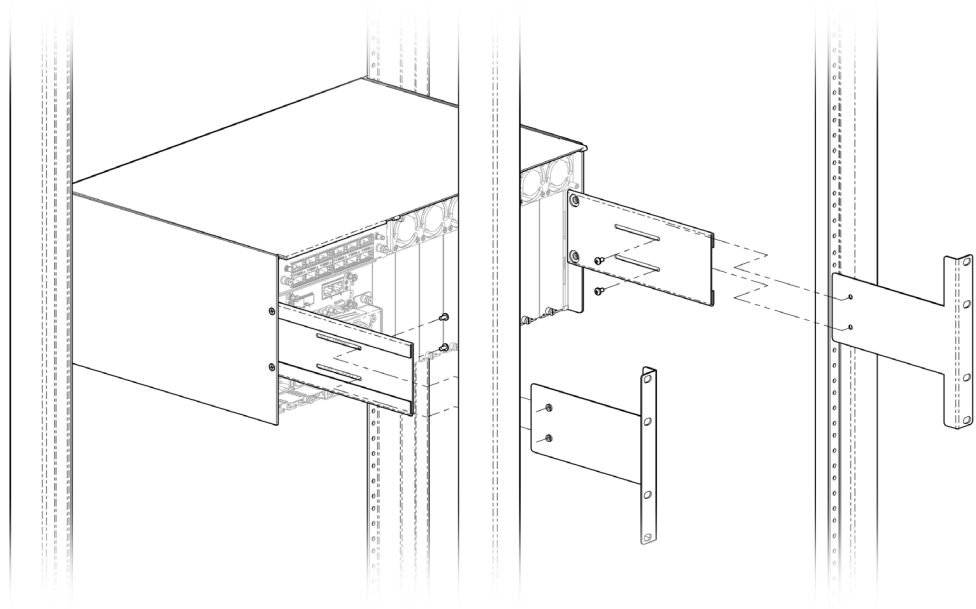
To install the rear rack adapters

- 1 Install the 2 extender sections on the rear of the frame, using the supplied screws.

Note: You will need a T15 (Torx) bit or screwdriver to install the screws supplied with the adapters.



- 2 Starting from outside the rear rack columns, slide the two bracket sections into the slots of the extender sections.
- 3 Secure the bracket sections to the rack using rack mounting screws (not supplied).
- 4 Fasten the extender and bracket sections together using the supplied screws.



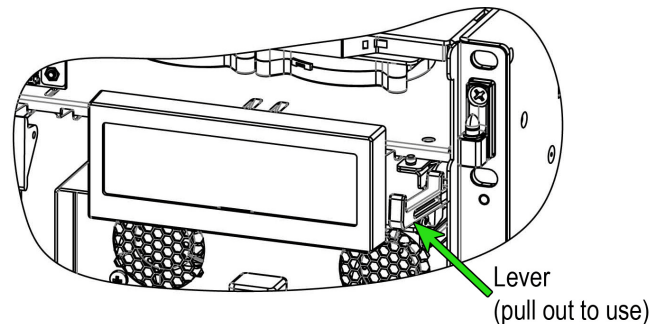
Verify that the Cards and Power Supplies are Properly Seated

Despite solid packaging, pre-installed components may have been disturbed in transit. Take a moment to verify that the power supplies, fabric module, modular cards and controller are securely installed.

To verify that components are securely installed

- 1 Open the front door of the frame.

- 2 Inspect the components for signs that they are not properly installed.
- 3 Attempt to move them with your fingers; they should feel solid and stable.
- 4 If a power supply is loose, push it gently back into position.
- 5 If the fabric module is loose, push gently on the two handles located on outside corners of the card until it is fully engaged in its slot.
- 6 If a modular card is loose, push gently on the swivel handle at the top to reseat it.
- 7 If the controller module is loose, do not push on the display to reseat it. Instead, proceed as follows:
 - a Grasp the lever on the lower right-hand side of the controller beside the display, and pull it straight out until it is fully extended.



- b Firmly push the lever down to seat the card in its connectors.
- c Slide the lever back into the chassis.

Install the Optional Modular Cards

Each modular card has an associated rear panel for inputs and outputs.

IMPORTANT

The rear panel must be installed before the card is inserted into the frame.

To install the rear connector panel

- 1 Remove any existing panel (either blank or belonging to an existing card that is being changed) by releasing the captive screw(s) on the bottom.
- 2 Slide the top edge of the new panel under the lip at the top of the empty space and secure the panel in place with the captive screw(s) on the bottom.

To install the modular card

- 1 Open the front door of the frame.
- 2 Position the card with the swivel handle at the top.
- 3 Slide the card into the slot and push gently on the swivel handle to seat the connectors.

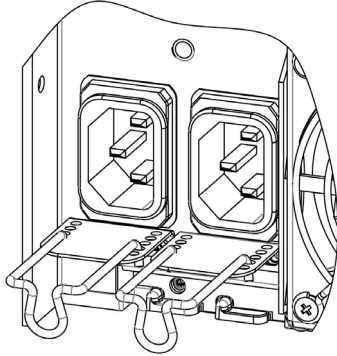
Note: If the card requires a double-width rear panel or larger, it should be inserted into the rightmost slot (as seen from the front of the frame). Inserting the card into the wrong slot will not damage the card, but will be flagged by the on-card status LED flashing red when power is applied, to indicate that there is no connection to the rear panel.

Install the Power Cords with their Retaining Clips

Each power inlet has a retaining clip that holds the power cord in place to prevent inadvertent disconnections.

To install a retaining clip and power cord

- 1 Slip both ends of the retaining clip into a pair of holes in the plate that extends out beneath the power inlet on the rear of the frame. Use the holes that position the clip closest to the body of the power cord connector.



- 2 Position the clip horizontally and insert the power cord connector into the inlet.
- 3 Rotate the clip up and press the cord into the gripping loop of the clip.

Power Up the GV Node

- To power up the GV Node, connect the two power supply cords to AC power.

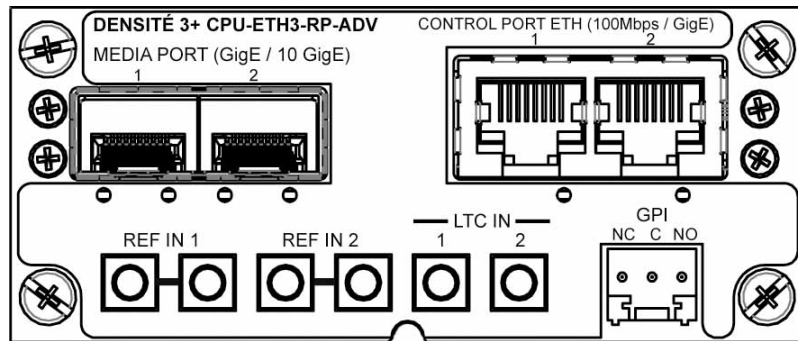
Notes

- There is no Power switch; the GV Node is powered up as soon as either power supply is plugged into an AC source.
 - Connect the two (redundant) power supplies to separate circuits, if available, for enhanced failure protection.
-

Connections

All of GV Node's inputs and outputs are connected on the rear of the frame.

Controller Panel

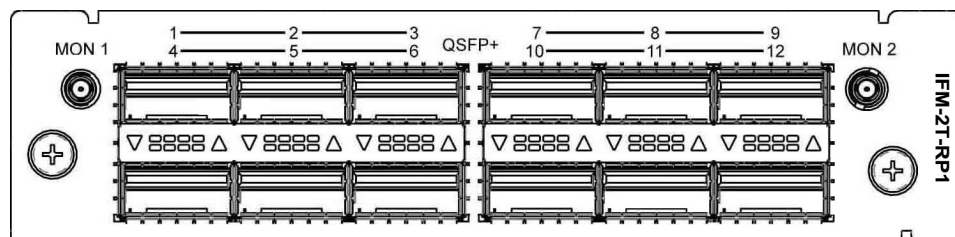


The following signal connections are available on the panel:

Connector Name	Function
CONTROL PORT ETH 1, 2	Dual GigE Ethernet ports for connection to external control systems (e.g. , iControl, GV Convergent) on RJ45 connectors. <ul style="list-style-type: none"> • ETH1 is the primary control port. • ETH2 is used for ethernet link redundancy.
MEDIA PORT (GigE / 10 GigE) 1, 2	Dual streaming ports for internal/external connectivity to the modular cards, on SFP+ interfaces. <i>(Future use)</i>
REF IN 1 (2 connectors)	External reference signal for the frame, with a loop-through, on DIN connectors.
REF IN 2 (2 connectors)	<i>(Future use)</i>
LTC IN 1	External time code on DIN connector.
LTC IN 2	<i>(Future use)</i>
GPI	Alarms generated on the controller card may be reported on this GPI connector.

Aggregation Ports

The aggregation ports, located on the IFM-2T-RP1 rear panel, provide IP connectivity for the GV Node.



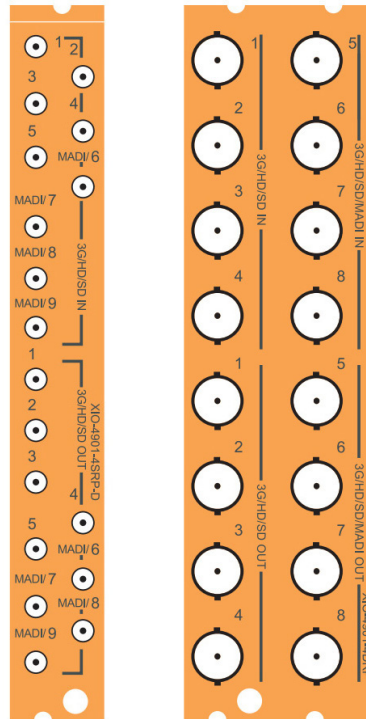
The 12 numbered ports each support a 40 GigE QSFP+ interface module for fiber connectivity.

The two DIN monitor ports MON 1 and MON 2 carry an SDI monitoring signal that is selected through the router controller. The two ports carry exactly the same signal.

- The MON 2 output is placed near the modular card slots, and could be connected to a Grass Valley SME-1901 Streaming Media Encoder located in slot 16 to provide an H.264 streaming version of the monitoring channel.

XIO-4901 Rear Panel

Two rear panels are available for the XIO-4901SDI I/O module.



XIO-4901-4SRP-D

XIO-4901-4DRP

	XIO-4901-4SRP-D	XIO-4901-4DRP
Width - # slots	1	2
SDI IN	9 DIN	8 BNC
SDI OUT	9 DIN	8 BNC
MADI I/O channels	8 & 9	7 & 8

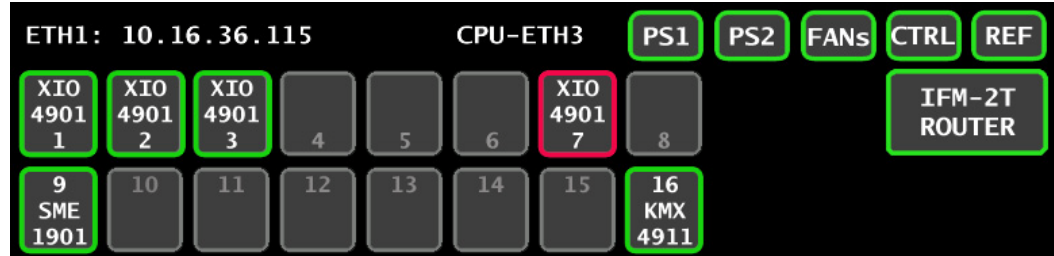
The MADI-enabled I/O channels can be assigned to function as MADI inputs and outputs through the GV Node Manager in iControl. Otherwise, they function as normal SDI I/O channels. They are indicated by the white-on-black channel labels.

GV Node User Interfaces

Users can configure, align and operate their GV Node through several available user interfaces. This section will give an overview and explanation of all of the available interface resources. Later sections will describe typical scenarios and outline the step-by-step process of setting up the GV Node for those situations.

The Local Control Panel

The local control panel provides a touch screen interface, and is accessible through an aperture in the GV Node front door.



Local Control Panel - Home screen

The IP addresses of control ports ETH1 and ETH2 are displayed alternately in the top left corner of the home screen.

Access buttons with integrated status monitoring are provided for:

- Each of the 16 modular card slots [*SLOT NUMBER, INSTALLED CARD TYPE*].
- The IFM-2T fabric module [*IFM-2T ROUTER*].
- The CPU-ETH3 controller [*CTRL*].
- The controller's integrated reference module [*REF*].

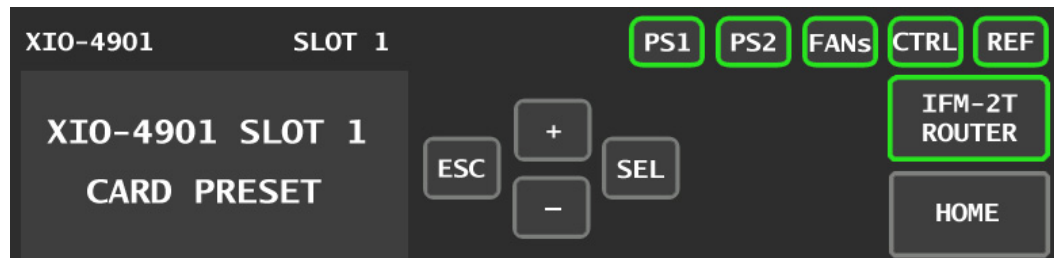
In addition, status monitoring is shown for each of the two power supplies PS1 and PS2, and for the frame's cooling fans.

The status of each of these elements is shown by the color of the button outline.

Color	Meaning
Green	Status OK
Yellow	Warning
Red	Error
Flashing Red	Critical error
Gray	No card in the slot (modular card slots only)

Status and alarm reporting is configured independently for each module, through its iControl interface. See [Alarm Configuration](#) on page 84 for information about status and alarm reporting and configuration.

Touching an access button brings up the local control menu for the selected module.



Menu screen for selected module

The current menu page is displayed in the lower left section of the screen.

You can navigate the menu by using the four virtual buttons on the touch display:

- Touch the [+] and [-] buttons to navigate between menu options or between parameter values.
- Touch SEL to access the next menu level. When a parameter value is shown on the display, modify the value by using the [+] and [-] buttons, and then touch SEL to apply the value.
- Touch ESC to go back to the previous menu level.

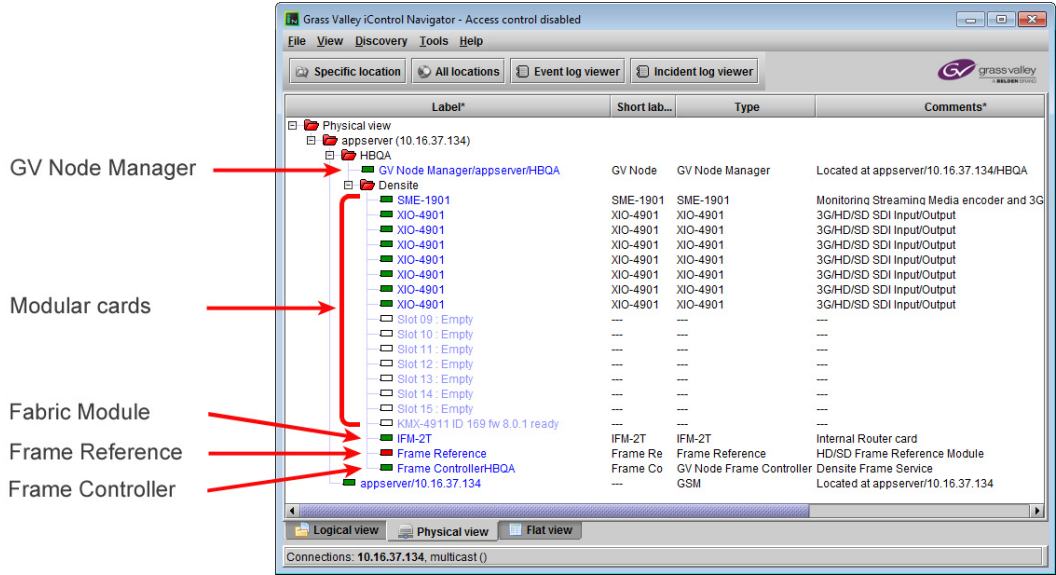
Once you have completed your changes, touch HOME to exit the menu and return to the home screen.

The iControl Interface

Once your GV Node is registered to iControl (see the Quick Start Guide for detailed instructions), you have access to interactive control panels that allow you to configure nearly all aspects of the GV Node.

In iControl Navigator (use the Physical view to display all the elements for your GV Node together), you will see icons representing:

- The CPU-ETH3 controller.
- The controller’s integrated frame reference.
- The IFM-2T fabric module.
- The GV Node manager.
- All of the installed modular cards.



iControl Navigator display of GV Node components

Double-click on an icon to open the iControl service panel for that module.

Detailed descriptions of the iControl panels for each component of the GV Node are given below.

The Controller Web Page

The CPU-ETH3 controller serves a web page that provides complete configuration tools for the controller itself.

- The integrated frame reference, the IFM-2T fabric module, and the modular cards cannot be configured through this interface.
- See [Configure the Controller](#) on page 16 for instructions on accessing and using this page.

Networking and Control Setup

For the GV Node to join a TCP/IP network, it must be configured with an IP address, a network mask, and a gateway. Use the local control panel to configure ethernet port ETH1 so that you can connect to the GV Node online.

GV Node is shipped with the following default settings:

System IP address	192.168.3.1
Network mask	255.255.0.0
Gateway	0.0.0.0

See [Setting the GV Node's IP Address](#), on page 13 for instructions on replacing these with settings that apply to your local network, so that the GV Node can be located by control applications such as Grass Valley's iControl.

Note: The GV Node should be located in the same subnet as the iControl Application Server that will control it.

Once the ETH1 port settings have been configured, you can connect your GV Node to the network via the rear controller connection panel. See [Connecting the GV Node to your Network](#), on page 14.

You must install and configure iControl or iControl Solo before you can configure your GV Node.

Notes

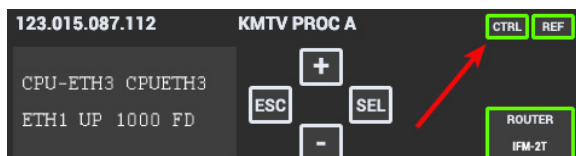
- For detailed information about iControl, refer to the iControl User Guide, available from the Documentation Library section of Grass Valley's website.
 - For detailed information about iControl Solo, refer to the iControl Solo User Guide, available from the the Documentation Library section of Grass Valley's website.
iControl Solo is available from the Downloads section of the Grass Valley website.
 - GV Node is compatible with iControl version 7.20 and later, and iControl Solo version 7.20 build 52 and later.
-

Once the GV Node is connected to the network, you can use iControl or iControl Solo to configure the GV Node. See [Registering your GV Node to iControl](#), on page 14, for detailed instructions on setting up the connection between your GV Node and iControl.

Setting the GV Node's IP Address

To set the GV Node's IP Address

- 1 On the GV Node control panel, touch **CTRL**.



The GV Node controller menu appears on the display.

Note: You can navigate the menu by using the four virtual buttons on the touch display:

- Touch the [+] and [-] buttons to navigate between menu options or between parameter values.
- Touch SEL to access the next menu level. When a parameter value is shown on the display, modify the value by using the [+] and [-] buttons, and then touch SEL to apply the value.
- Touch ESC to go back to the previous menu level.
- Once you have completed your changes, touch CTRL again to exit the menu.

- 2 Touch [-] repeatedly until ETH1 OPTIONS appears on the display, and then touch SEL. IP ADDRESS appears on the display.
- 3 Touch SEL.
The current IP address value appears on the display.
- 4 Change the current values using the virtual buttons:
 - Touch [+] and [-] to change the value at the current input position.
 - Touch SEL to move one position to the right, and to accept the current value.
 - Touch ESC to move one position to the left and leave the current value unchanged.

Note: Touching ESC when the input focus is in the first position returns you to the previous menu level.

- 5 Once you have accepted all values in the desired address, touch ESC repeatedly to move to the first position, and then touch ESC again to move back to the previous level. IP ADDRESS appears on the display.
- 6 Touch [-] until NETWORK MASK appears on the display, and then touch SEL.
The current network mask value appears on the display.
- 7 Repeat [step 4](#) and [step 5](#) to change the network mask values.
- 8 Touch [-] until GATEWAY appears on the display, and then touch SEL.
The current gateway value appears on the display.

- 9 Repeat [step 4](#) and [step 5](#) to change the gateway values.
- 10 Touch CTRL on the display to exit the Controller menu.

Notes

- If you do not touch any buttons on the local control panel, the controller will revert to its normal standby mode after 30 seconds.
 - If you changed a parameter from the control menu, but have not applied your change (you did not touch the SEL button on the control panel), once the 30-second timeout has occurred, the parameters will be confirmed as if you had touched the SEL button.
-

You have changed the IP settings for the ETH1 port.

Connecting the GV Node to your Network

To connect the GV Node to your network

- 1 Connect CONTROL PORT ETH1 to your local TCP/IP network via an RJ45 connector.
- 2 Connect a local reference signal (black burst or tri-level sync) to REF IN 1.
You may use either of the two connectors; the second connector is a loop-through and does not require termination.

Registering your GV Node to iControl

To register your GV Node to iControl

- 1 Open iControl Navigator.
- 2 In **Logical** view, open the **Managers** folder.
- 3 In the **Managers** folder, locate the Densité Manager associated with your application server and double-click its icon.
The Densité Manager window opens.
- 4 In the **Configuration** tab, click **Add**.
The **Target Information** window opens.
- 5 In **Target Information**, enter the IP address that you have given your GV Node, and a Densité name for the GV Node (e.g., DNAME).
- 6 Click **OK**.
The **Target Information** window closes.
Your GV Node appears in the **Configuration** tab.
The GV Node's status is Online, and its icon is green.
- 7 Close the Densité Manager window.
The frame and its cards are now accessible from iControl Navigator.
- 8 Look for these four devices in iControl Navigator :
 - The GV Node frame controller.

By default, the controller is identified as follows:

Label	Frame ControllerDNAME
Short label	Frame Co
Type	GV Node Frame Controller
Comments	Densite Frame Service
Frame	DNAME

DNAME is the Densité name you created in [step 5](#) on page 14.

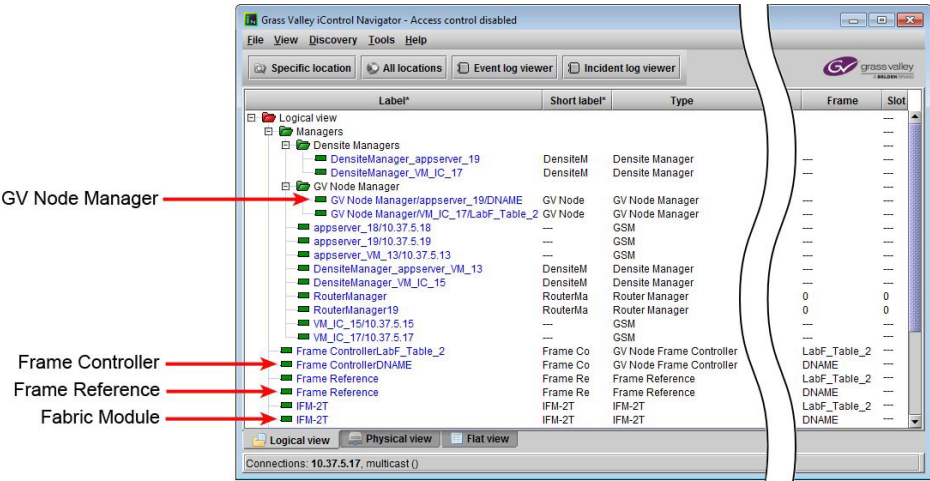
- The GV Node frame reference module, incorporated into the controller, but with its own control panel.

Label	Frame Reference
Short label	Frame Re
Type	Frame Reference
Comments	HD/SD Frame Reference Module
Frame	DNAME

- IFM-2T - the GV Node fabric module.

Label	IFM-2T
Short label	IFM-2T
Type	IFM-2T
Comments	Internal Router card
Frame	DNAME

- The GV Node Manager associated with your GV Node is found in the GV Node Manager folder.



The modular cards installed in the GV Node are also now available in the iControl Navigator window.

Together, these devices make up the iControl presence of your GV Node.

GV Node Initial Configuration

You will configure three elements of your GV Node in this initial setup:

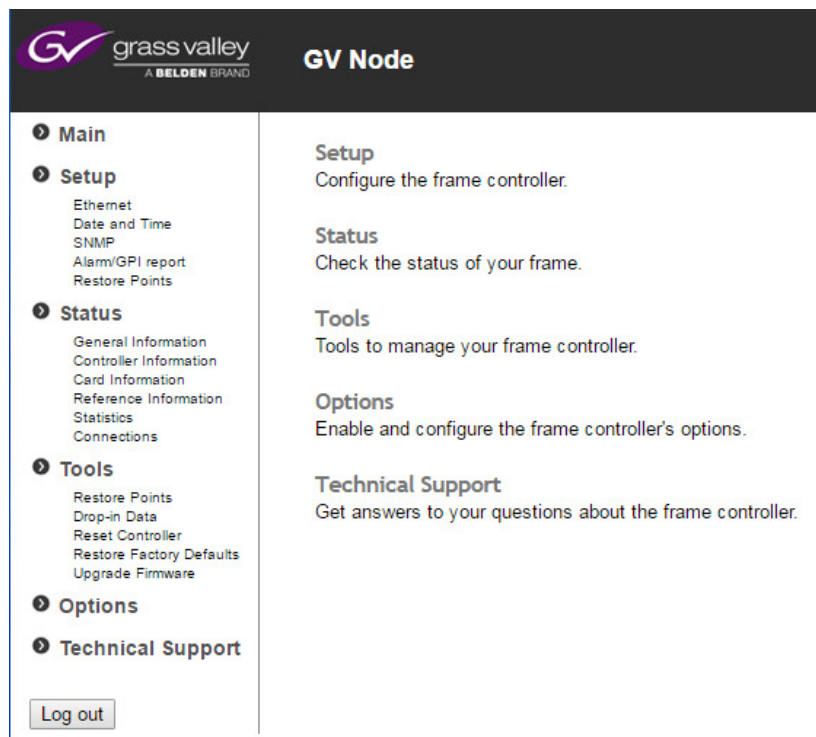
- [Configure the Controller](#), on page 16.
- [Configure the Frame Reference](#), on page 17.
- [Configure the Fabric Module](#), on page 18.

Configure the Controller

Use the CPU-ETH3 Web client application to perform the configuration steps that follow.

To configure the GV Node controller

- 1 Open a Web browser window and enter your GV Node's IP address in the address bar. The home page of the CPU-ETH3 Web client appears.



- 2 Under Setup, in the navigation area on the left of the page, click **Ethernet**. The Ethernet setup page appears.
- 3 Modify the Hostname for the GV Node's controller, if needed.
- 4 If you plan to use Channel Bonding for ethernet link redundancy, select **Enabled** in the Channel Bonding section. See [Ethernet Link Redundancy \(Channel Bonding\)](#) for more details about this feature.
- 5 Verify that MII status for eth1 is set to AUTONEGOTIATION.

- 6 Click **Apply** to save your changes.
- 7 Click **Setup - Time/Date** in the navigation area.
The Time/Date setup page appears.
 - If you have an NTP server's IP address, enter it and select **Enabled**.
 - If you do not have an NTP server's IP address, manually enter the current date and time, and select **Disabled**.
- 8 Click **Apply**.
- 9 Click **Alarm/GPI Report** in the navigation area.
The Alarm/GPI Report setup page appears.
- 10 Set the values shown in this table:

Include power supply failure in Alarm Report	Enabled
Include fan failure in Alarm Report	Enabled
Report card alarm on GPI	Disabled

- 11 Click **Apply**.
 - 12 Click **Restore Points** in the navigation area.
The Restore Points setup page appears.
 - 13 Set the values shown in this table:
- | | |
|----------------------------------|--------------------|
| Default action for card inserted | Keep card settings |
| Auto save | Disabled |
- 14 Click **Apply**.
 - 15 Click **Options** in the navigation area.
 - 16 **Verify** that the Ethernet Link Redundancy option, which is standard on the GV Node, is present and activated. If it is not, please contact Customer Support.

This completes the initial configuration of the frame controller.

Configure the Frame Reference

- 1 In iControl Navigator, locate the GV Node's frame reference and double-click its icon.

Note: In the presence of multiple frame references, locate yours by checking the Frame column—it will have the DNAME you chose for your GV Node. See [step 5](#) under [Registering your GV Node to iControl](#).

The frame reference module's iControl panel opens.

- 2 To set the timecode and reference sources:
 - a Click the **Input** tab.
 - b In the **Reference Source** list, select **Auto**.
 - c In the **Timecode Source** list, select **Auto**.

Changes are applied immediately.

- 3 To set the URS Generation Mode:

- a Select the **Mode** tab.
- b In the **URS Generation Mode** list, select **Normal**.

Note: The URS (Universal Reference Signal) is the timing reference distributed within the GV Node to all modular cards.

Changes are applied immediately.

Configure the Fabric Module

- 1 In iControl Navigator, locate the GV Node's Fabric Module and double-click its icon. The Fabric Module's control panel opens.

Note: In the presence of multiple Fabric Modules, locate yours by checking the Frame column—it will have the DNAME you chose for your GV Node. See [step 5](#) under [Registering your GV Node to iControl](#).

- 2 To set the switching alignment:
 - a Click **Global Configuration** and then click the **Timing** tab.
 - b Select **Module Slots** from the **Switching Alignment** list.

Changes are applied immediately.

- 3 To enable options you have purchased:
 - a Click **Options** and then click the tab for the purchased option.
 - b Enter the key you received for the option into the data box and then click **Enable Option**.

The status box turns green and reports that the option is activated.

- 4 To manage the inputs and outputs between the Fabric Module and the modular cards:
 - a In iControl Navigator, locate the GV Node Manager associated with your GV Node and double-click its icon.

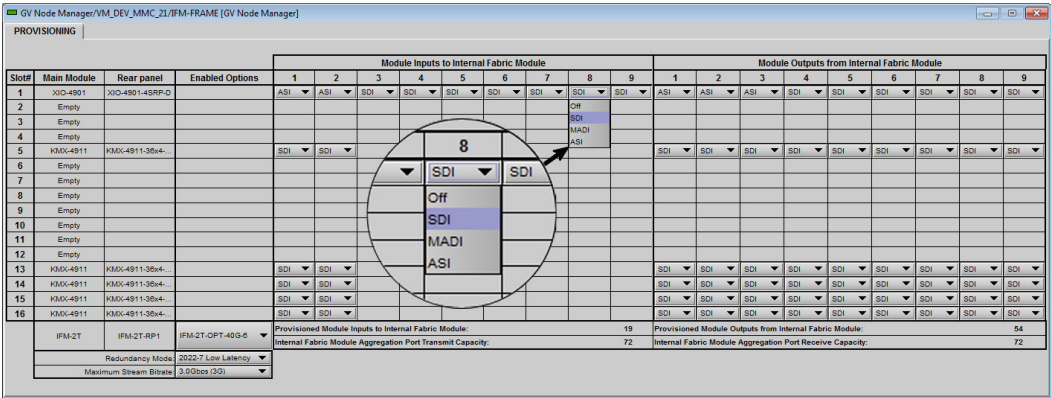
The GV Node's **GV Node Manager** panel opens.

Note: In the presence of multiple GV Node managers, locate yours by checking the Comments column—the DNAME you chose for your GV Node will be the last element in the comment. See [step 5](#) under [Registering your GV Node to iControl](#).

- b In the row beside each GV Node modular card, select the status of each of the 9 inputs to the fabric module and 9 outputs from the fabric module from the pull-down lists..

XIO-4901: The available choices depend on whether the MDX option is activated on the XIO-4901 card.

MDX Option	I/O CH 1-7	I/O CH 8 & 9
NOT ACTIVATED	OFF SDI ASI	OFF SDI MADI ASI
ACTIVATED	OFF SDI MDX	OFF SDI MDX



Changes are applied immediately.

- 5 To set the 2022-7 redundancy status and stream bitrate:
 - a Ensure that the **OPT-40G-6 option** is activated (per [step 3](#) above).
 - b Use the **Redundancy Mode** pulldown to set redundancy on on off.
 - c Use the **Maximum Stream Bitrate** pulldown to select 1.5 Gbps (HD) and 3Gbps (3G) maximum bitrates.

See [To configure redundancy and stream bitrate at the aggregation ports](#), on page 82 for a more detailed explanation.

Ethernet Link Redundancy (Channel Bonding)

GV Node incorporates ethernet link redundancy as a standard feature.

Channel Bonding uses the controller’s ETH2 port as a redundant active backup for the ETH1 port.

When Channel Bonding is enabled, the two Ethernet interfaces are seen as one:

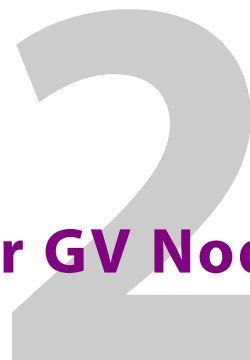
- ETH2 settings are disabled, and both ports are configured using the ETH1 settings.
- The controller communicates through one port only.
- If the port in use fails, communication is automatically switched over to the backup port.

Getting Started

Ethernet Link Redundancy (Channel Bonding)

The feature is OFF by default, and can only be turned ON through the controller's web client. See [step 4](#) on page 16 under [Configure the Controller](#).

Configuring Your GV Node



GV Node User Interfaces

This chapter describes the user interfaces for the components of the GV Node.

<i>CPU-ETH3 Controller User Interface</i>	21
<i>Frame Reference User Interface</i>	32
<i>IFM-2T Fabric Module User Interface</i>	39
<i>XIO-4901 User Interface</i>	64
<i>GV Node Manager</i>	81
<i>Alarm Configuration</i>	84
<i>Local Control Menus</i>	87

CPU-ETH3 Controller User Interface

This section describes the controls and information displays available in the CPU-ETH3 user interface.

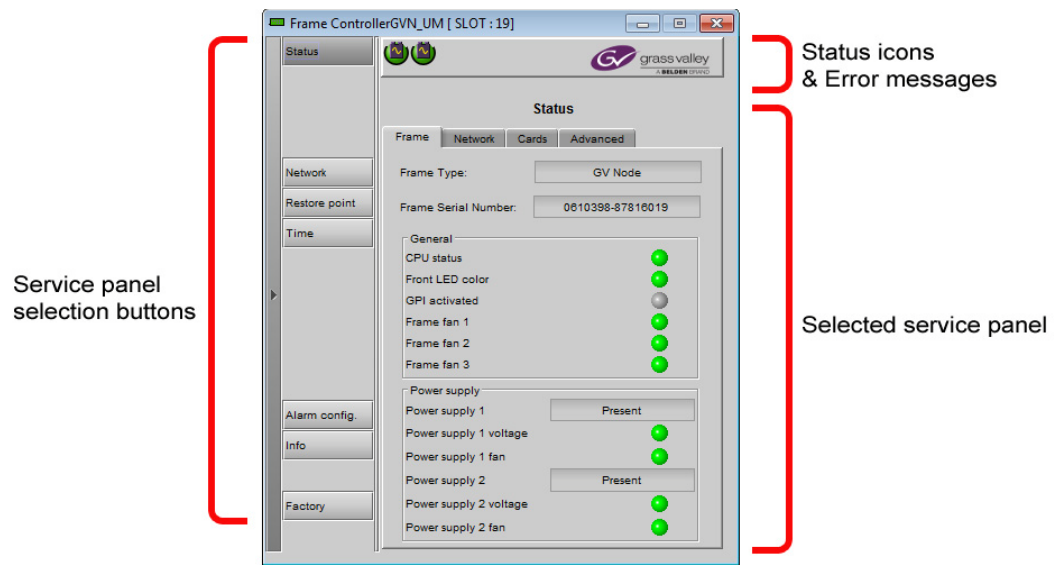
Note: The web page served by the controller card provides an alternative method of making most of these adjustments. You may prefer this approach to the use of the iControl panels described here. See [Configure the Controller](#), on page 16 for information about accessing the web page.

See [CPU-ETH3 Menu](#) on page 87 for a complete listing of the local control menu.

Summary

<i>Identification</i>	22
<i>Status Monitoring</i>	23
<i>Network Settings</i>	26
<i>SNMP Functionality</i>	27
<i>Data Restoration</i>	27
<i>Factory Alignment</i>	29
<i>Time Management</i>	30
<i>Alarms</i>	31

In iControl Navigator, double-click the **Frame Controller** icon to open the service panel.



Identification

Click the **Info** button.

Info	
Label:	Frame ControllerGVN_UM
Short label:	Frame Co
Source ID:	
Device type:	GV Node Frame Controller
Comments:	Densite Frame Service
Manufacturer:	Grass Valley, a Belden Brand.
Vendor:	Grass Valley, a Belden Brand.
Service version:	1.3.1.RC-1
	Details...
Advanced...	Remote system administration...

The CPU-ETH3 controller is accessible on a network, and must be identifiable in order to function in the iControl environment. The identification data is entered in the iControl Info control panel. This panel also shows other data that is not user-accessible.

Default information was created when you registered your GV Node in iControl. You can modify information appearing in the white-background data boxes by clicking and typing in the data box:

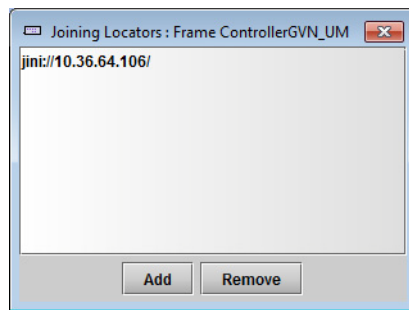
Data Box	Use	Default
Label	Identifies this device in iControl applications; usually device type and identification	FrameControllerDNAME
Short Label	8-character short label used in iControl	Frame Co

Data Box	Use	Default
Source ID	Any text	[no text]
Comments	Any text	Densite Frame Service

The remaining data boxes show manufacturing information about this card.

Three buttons in the panel give access to other information:

- **Details:** Reports the Firmware version, service version, and panel version for this card
- **Advanced:** Shows the LongID for this card. The LongID is the address of this CPU-ETH3 controller in the iControl network.
- **Remote system administration:** Opens the Joining Locators data box, which lists remote lookup services to which this CPU-ETH3 is registered.



- **Add:** Force the iControl service for this CPU-ETH3 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.
Remove: select one of the services listed in the window by clicking on it, and then click Remove to open a query box allowing you to delete it from the window.

Using the menu

None of this data can be accessed via the local control panel menu, except to read the Firmware version.

Status Monitoring

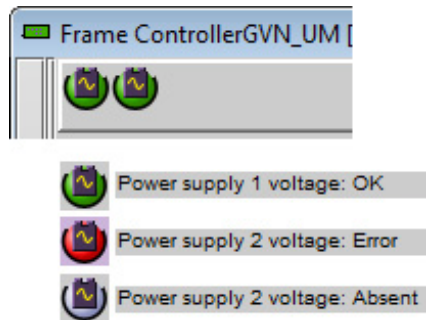
The CPU-ETH3 controller continuously monitors the operating condition and status of the housing frame's power supplies and ventilating fans. It also monitors the status and usage of its two ethernet ports, and the status of its on-board memory, as well as the data throughput of all cards installed in the frame.

In addition to the status displayed by the CTRL icon on the local control panel screen (see page), status information acquired by the controller can be viewed in the iControl interface, and on the local controller display through the menu.

iControl Dashboard Status Icons

The iControl interface for the CPU-ETH3 always displays two icons in the upper left of the window. These report the status of the two power supplies (PS1 on the left, PS2 on the right).

The graphic shows the possible icon displays and the associated messages that appear below them. Error messages are always displayed; other status messages appear only upon mouse-over of the icon.



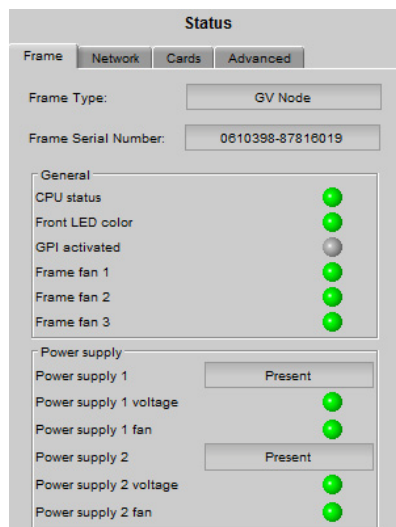
iControl Status Panel

Click the **Status** button.

The iControl Status panel shows status information in four categories, each accessed by clicking the appropriate tab.

Status - Frame

Select the **Frame** tab to see a report on the status of the frame's CPU, fans and power supplies.



Status - Network

Select the **Network** tab to see a report on the status of the two Ethernet ports on the CPU-ETH3 card.

The screenshot shows the 'Status' window with the 'Network' tab selected. It displays a table of network status for two Ethernet interfaces, ETH 1 and ETH 2.

	ETH 1	ETH 2
Link status	OK	Absent
Duplex	Full	Absent
Speed	1 GigE	Absent
Rx throughput	10880 bps	0 bps
Tx throughput	14592 bps	0 bps

Status - Cards

Select the **Cards** tab to see a chart of the current send (Tx) and receive (Rx) data rates, and speed, for all cards installed in the GV Node frame.

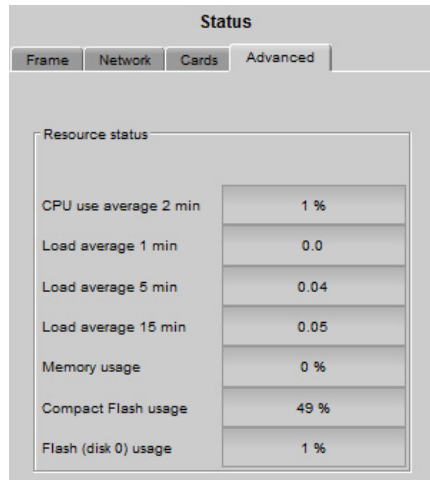
The screenshot shows the 'Status' window with the 'Cards' tab selected. It displays a table titled 'Cards throughput' with columns for Slot, Rx [bps], Tx [bps], and Speed. The table lists data for 17 slots.

Slot	Rx [bps]	Tx [bps]	Speed
Slot 1	240	56	1x
Slot 2			
Slot 3			
Slot 4	0	0	1x
Slot 5	0	0	1x
Slot 6	120	272	1x
Slot 7	0	0	1x
Slot 8	120	272	1x
Slot 9	0	0	1x
Slot 10			
Slot 11			
Slot 12	120	272	1x
Slot 13	0	0	1x
Slot 14	0	0	1x
Slot 15	0	0	1x
Slot 16	0	0	1x
Slot 17	0	0	1x

For a more detailed report on the status of a specific card, open that card’s control panel in iControl.

Status - Advanced

Select the **Advanced** tab to view a report on the usage of the controller’s resources:



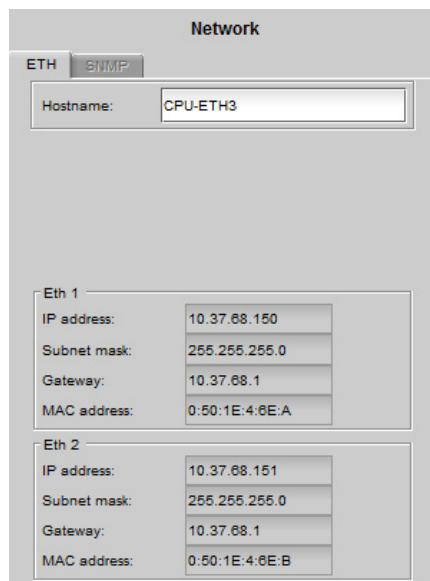
Using the Menu

Select STATUS and then [SEL] to cycle through the list of current faults. The information shown on the Network, Cards and Advanced tabs is not available through the menu.

Network Settings

Network - ETH

iControl - click the Network button and select the ETH tab



Enter the HOSTNAME in the box at the top.

- The hostname is the unique name by which this GV Node CPU-ETH3 is known on the network. The hostname should be 15 characters or less, and may contain only the ASCII letters 'a' through 'z' (case-insensitive), the digits '0' through '9', and the hyphen.

The current configuration of the CPU-ETH3 controller’s two Ethernet ports is shown in the panel.

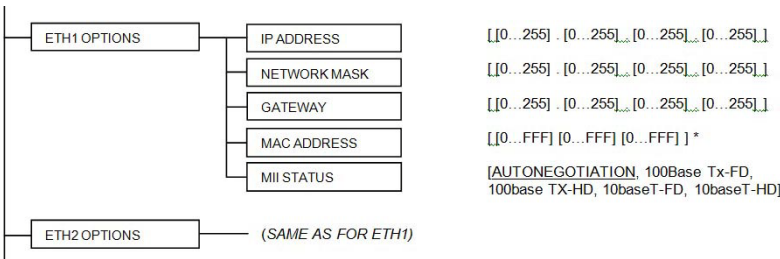
- The configuration cannot be changed here; you must use the Local Control menu, or the controller’s web page to modify the settings.

The MAC (Media Access Control) address is reported in the data box.

- The MAC address is not user-configurable.

Using the Menu

To change the IP address



Note: The Host Name and the MAC address are reported in the menu but cannot be changed from there.

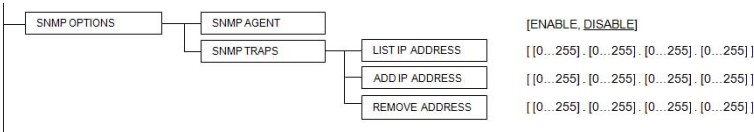
SNMP Functionality

The CPU-ETH3 card can function as an SNMP agent, sending SNMP traps to designated targets.

You must use the Menu or the web page to enable the SNMP functionality, and to enter the IP addresses of up to three SNMP trap targets.

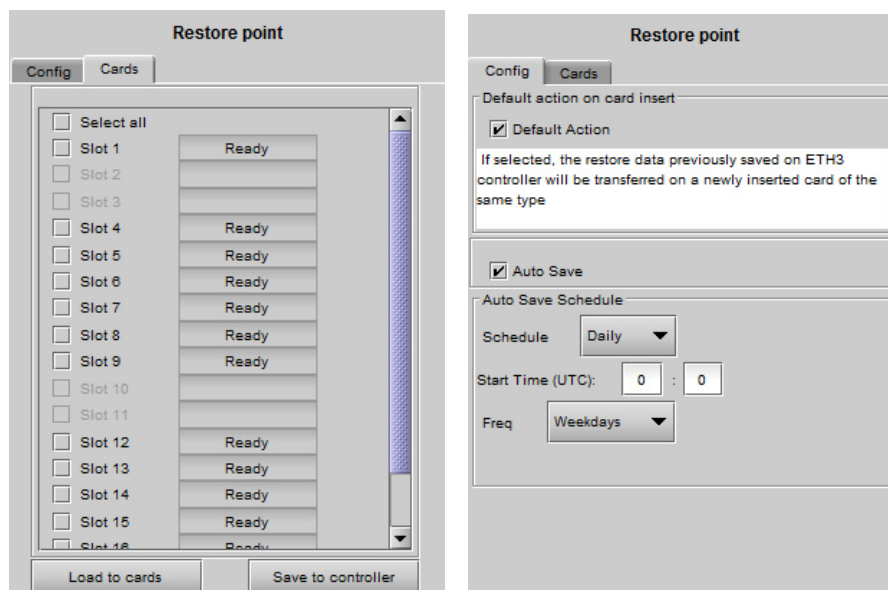
Using the Menu

SNMP activation and up to three target IP addresses can be entered in the menu via the **SNMP OPTIONS** item.



Data Restoration

Many of the modular cards that can be installed in the GV Node frame are complex and have a lot of data stored on-board related to their configuration and parameter values. The CPU-ETH3 controller provides a backup of this data, which can be restored to the card when needed. This is valuable if the card is inadvertently reconfigured, or is replaced after failure with a new card of the same type. The saving of the current data into the controller’s memory, and restoring the data onto the Densité-series card, can be done manually or automatically.



For manual operation

- 1 Click the **Restore Point** button and view the **Cards** tab.
The tab show a list of the slots available in the GV Node frame, with a check box, name, and status box for each.
- 2 Click the check box to activate the Restore Point feature for the card in that slot,
-or-
Click the **Select All** box at the top to activate the feature for all slots in the frame.
- 3 Click **Save to controller** to copy all restorable data from the cards in the selected slots into the memory on board the CPU-ETH3 controller.
- 4 Click **Load to cards** to load the cards in the selected slots with data from the controller's memory.

Note: A data restore will only work if the card in the slot is the same type as the card that was there when the data was saved.

For automatic restore and save

- 1 Click the **Restore Point** button and view the **Config** tab.

Restore: The CPU-ETH3 can be set up to automatically update a card when it is inserted in a slot previously occupied by a card of the same type whose data was saved. Thus, a new card can be configured automatically to replace the card that was removed, saving a lot of time when cards are swapped.

- 2 Click the **Default Action** box to enable the auto restore function for all the cards in the frame.

Save: The CPU-ETH3 card can be configured to automatically back up the data on the cards in its slots according to a programmed schedule.

- 3 Click the **Auto Save** box to enable the automatic save function.
- 4 Set up the schedule for data backup using the controls provided:

Schedule: Daily, Weekly, Monthly

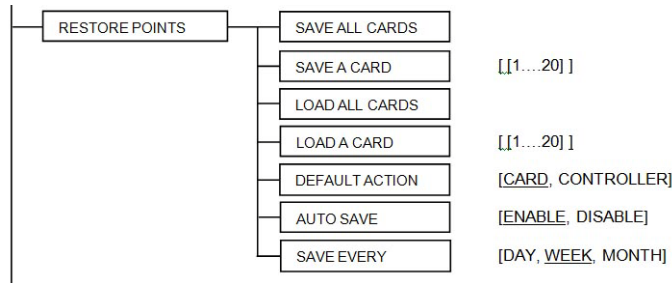
Start Time (UTC): Time in hours (24-hour clock) and minutes

The label and function of the pulldown at the bottom changes to follow the **Schedule** selection. A second pulldown appears when Monthly is selected:

Schedule	Label	Options
Daily	Freq	Everyday, Weekdays
Weekly	Day	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday
Monthly	Week	Week 1, Week 2, Week 3, Week 4, Last Week
	Day	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

Using the menu:

Configure the data restoration functions, including default action and auto save, from the Restore Points menu item.



Factory Alignment

There may be times when the CPU-ETH3 settings have been adjusted and it is useful to restore them to a normalized condition. The CPU-ETH3 controller maintains a “Factory Default” alignment in its memory, to which it can be restored at any time.

Note: Ethernet settings are not included in the Factory data set, and are not changed when the Factory Default alignment is installed.

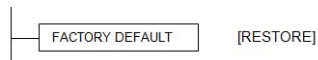
- 1 Click the **Factory** button.



- 2 Click the **Load Factory** button to restore the card to the Factory default alignment.

Using the menu

The factory default values can be loaded from the FACTORY DEFAULT menu item.



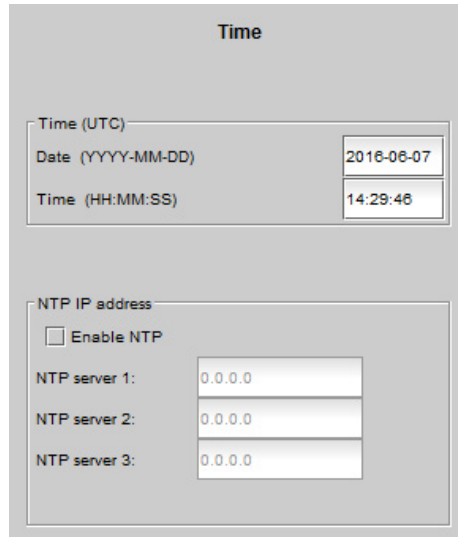
The default values are shown underlined in the menu listing beginning on page 36.

Time Management

The CPU-ETH3 controller is time-aware, and its internal clock can be updated manually or via NTP.

To update the internal clock

- 1 Click the **Time** button



The screenshot shows a web interface titled "Time". It is divided into two main sections. The first section, "Time (UTC)", contains two input fields: "Date (YYYY-MM-DD)" with the value "2016-06-07" and "Time (HH:MM:SS)" with the value "14:29:46". The second section, "NTP IP address", contains a checkbox labeled "Enable NTP" which is currently unchecked. Below the checkbox are three input fields for "NTP server 1:", "NTP server 2:", and "NTP server 3:", each containing the value "0.0.0.0".

Time (UTC) section: The data boxes in this section display the time and date currently held in the card.

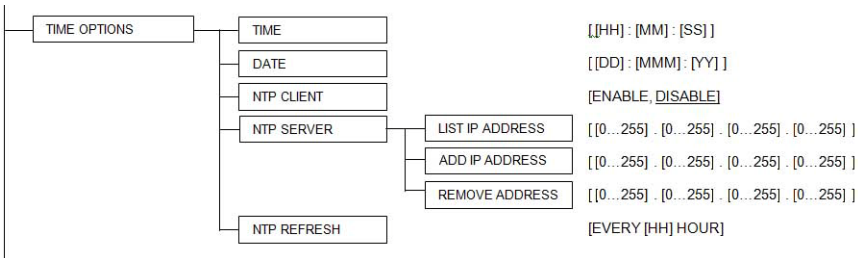
- 2 Enter new values in these boxes to change the current setting. If an automatic update via NTP is not enabled, the clock will continue to run using an on-board reference, but precision is not guaranteed.

NTP IP address section:

- 3 Click the **Enable NTP** box to use an NTP (Network Time Protocol) source.
- 4 Enter up to three IP addresses of NTP servers. The CPU-ETH3 card will use the first source of valid time it finds in this list.

Using the menu

You can enter the current time and date, and activate the NTP time sourcing through the TIME OPTIONS menu item.



Note: The NPT REFRESH item, setting the interval at which the local clock is refreshed from the NTP server, is ONLY available from the menu or the web page, and does not appear on the iControl interface

Alarms

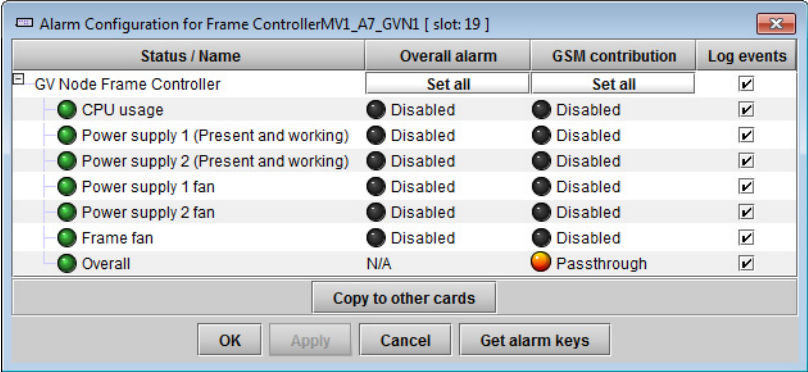
The CPU-ETH3 controller generates alarms for the frame in which it is installed when error conditions are detected. These alarms are used to set the home screen status display and the status icon in the top left of the iControl window.

The alarms are reported to the iControl network, and can be reported locally on the frame's GPI port.

- GPI reporting can only be accessed from the menu, as described below.

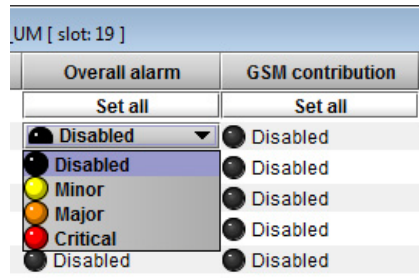
To Configure the alarms

- 1 Click Alarm Config.



The iControl Alarm Configuration panel opens in a new window. It can be resized if needed.

- 2 For each line in the Status/Name column:
 - a Click on the icon in the Overall Alarm column.
 - b Click to select the appropriate alarm status from the drop-down list.

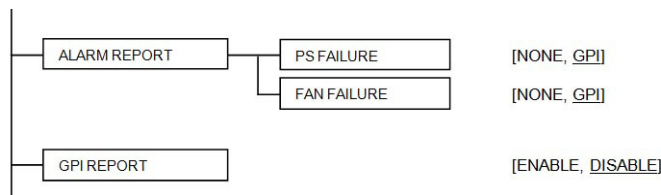


- c Click on the icon in the GSM Contribution column.
 - d Click to select the appropriate alarm status from the drop-down list.
- 3 Click **OK** to accept the settings, or **Cancel** to discard the changes.

See [Alarm Configuration](#), on page 84 for a more detailed description of the contents of this panel.

Using the Menu

Access the Alarm Report menu item, and scroll through the list of available alarms, setting each to OFF or to report through GPI. Use the GPI Report item to turn GPI reporting on or off.



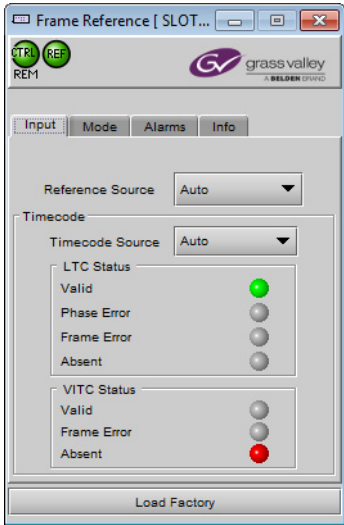
Frame Reference User Interface

Summary

<i>Reference</i>	33
<i>URS Generation</i>	33
<i>Timecode</i>	34
<i>Alarms</i>	35
<i>Information</i>	36
<i>Factory Settings</i>	38

The frame reference module is physically integrated into the CPU-ETH3 module, but it presents its own interface to the user.

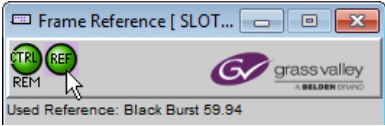
In iControl Navigator, double-click on the Frame Reference icon to open the service panel.



Reference

To see the reference format currently in use

- 1 Mouse-over the **REF** icon in the dashboard area at the top left of the panel.
- 2 The current reference format will be identified in the text area.



To select the reference source

- 1 Select the **Input** tab.
- 2 Click the **Reference Source** pulldown.
- 3 Click to select the reference source:

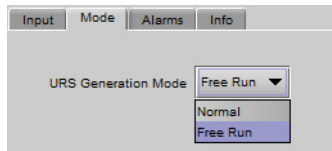
Selection	Detail
Auto	Use the External reference; if it's not available, use the Internal reference.
External	Use the signal on the REF connector on the controller rear panel.
Internal	Use the signal from the internal generator.

Note: In this release, only **EXTERNAL** is supported, no matter what is selected in the pulldown.

URS Generation

To select the URS generation mode

- 1 Select the **Mode** tab.



- 2 Click the URS Generation Mode pulldown.
- 3 Click to select the URS Generation mode:

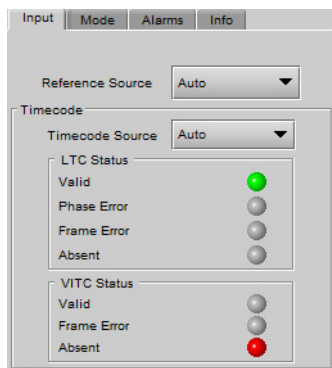
Mode	Means
Normal	The URS frame rate matches the selected reference input, i.e. only 29.97 or 25 Hz.
Free Run	All URS synchronization signals are generated, even the frame-rate-mismatched ones. So, in the same frame, some cards can work in 25Hz frame rate and other cards in 29.97Hz. The phase relation between these two frame rates will be arbitrary, thus the name "free run"

Note: In this release, only **NORMAL** is supported, no matter what is selected in the pulldown.

Timecode

To select the timecode source

- 1 Select the **Input** tab



- 2 Click the **Timecode Source** pulldown
- 3 Click to select the source of timecode:

Source	Function
Auto	Use LTC if available, if not, VITC.
LTC	Use the timecode connected to the LTC input on the rear panel.
VITC	Extract timecode from the reference input.
OFF	Do not insert timecode into the URS signal.

The current status of timecode available to the reference module is shown in the LTC Status and VITC Status areas:

Status	Icon	Details
Valid	Green	Valid timecode detected at the input.
Phase Error	Red	SMPTE-12 specifies the phase relation between LTC and video. If the LTC received does not match this alignment window, the card will flag this error.
Frame Error	Red	The time code must match the input reference frame rate. If not, an error is flagged.
Absent	Red	No time code detected at the input.

Note: The error detection algorithm uses the current reference format. So, when using internal reference, all information extracted from the input is out of phase, and the card may flag errors even if there are none.

To configure timecode logging

- 1 Select the Alarms tab
- 2 Select the checkboxes to send the indicated time codes (LTC, VITC) to the iControl GSM, where it can be used by other network devices.

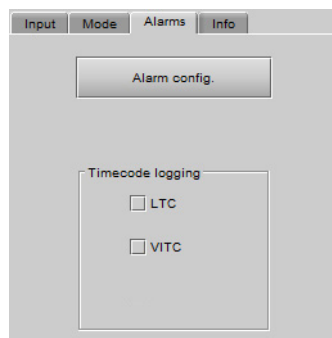
Note: This uses network resources, so you should leave these boxes unchecked if there is no need to use the time code in this way.

Alarms

The Frame Reference generates alarms that are sent to the GV Node controller card when error conditions are detected. These alarms are used to set the control panel status display, and the status icon in the top left of the iControl window.

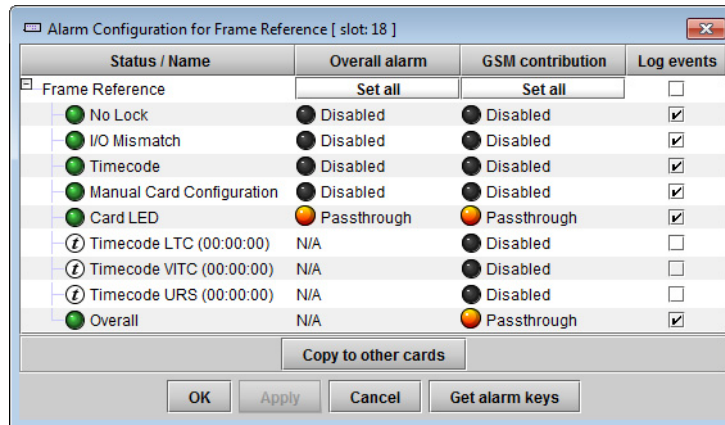
To configure alarms

- 1 Select the **Alarms** tab

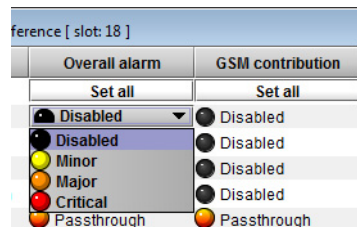


- 2 Click **Alarm Config**

The **Alarm Configuration for Frame Reference** window opens.



- 3 For each line in the Status/Name column:
 - a Click on the icon in the Overall Alarm column.
 - b Click to select the appropriate alarm status from the drop-down list.



- c Click on the icon in the GSM Contribution column.
 - d Click to select the appropriate alarm status from the drop-down list.
- 4 Alternatively:
 - a Click the **Set All** box at the top of the Overall Alarm column.
 - b Click to select the appropriate alarm status from the drop-down list.
All alarms in the column will be set to the selected status.
 - c Repeat steps a and b for the GSM contribution column.
- 5 Click **OK** to accept the settings, or **Cancel** to discard the changes.

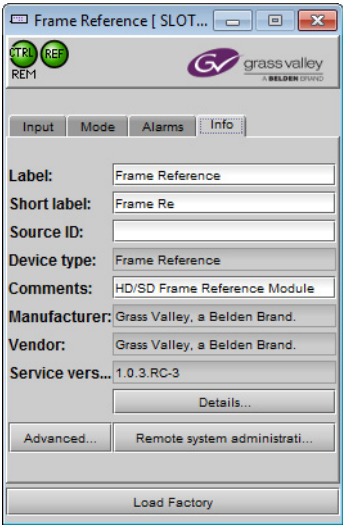
See [Alarm Configuration](#) on page 84 for a more detailed description of the contents of this panel.

Information

The user can enter labels and comments to make this frame reference easy to identify in a complex iControl setup. This information is entered into data boxes in the Info panel.

To enter labels and text descriptions

- 1 Select the **Info** tab.

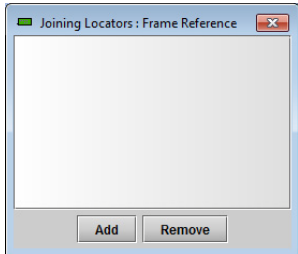
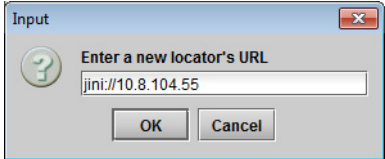


2 Enter appropriate text in the white data boxes (the image shows the default values):

Data	Usage
Label	The label that is shown for this card in iControl applications.
Short Label	The short-form label that iControl uses in some cases (8 characters).
Source ID	A descriptive name for this frame reference.
Comments	Any desired text.

The remaining data boxes show manufacturing information about this device. Three buttons in the panel give access to other information.

Button	
Details...	Reports the Firmware version, service version, and panel version for this card.

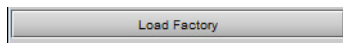
Button	
Advanced...	Shows the LongID for this device. The LongID is the address of this frame reference in the iControl network.
Remote System Administration	<p data-bbox="626 380 1357 443">Opens the Joining Locators window, which lists remote lookup services to which this frame reference is registered.</p> <div data-bbox="626 453 922 705"></div> <p data-bbox="626 726 940 758">To add additional services</p> <ol data-bbox="643 768 1289 915" style="list-style-type: none">1 Click Add2 Enter the IP address of a server running a Jini look-up service, using this syntax: jini://<ip_address> <div data-bbox="675 926 1057 1083"></div> <ol data-bbox="643 1094 1273 1157" style="list-style-type: none">3 Click OK to add the service, or Cancel to discard the information. <p data-bbox="626 1178 980 1209">To remove an existing service</p> <ol data-bbox="643 1220 1357 1367" style="list-style-type: none">1 Click a service in the Joining Locators window to select it.2 Click Remove.3 Click OK in the pop-up confirmation window to remove the service, or Cancel to leave it in place.

Factory Settings

The frame reference maintains a set of factory-installed settings, to which it can be restored at any time.

To restore the factory default settings

- 1 Click the **Load Factory** button at the bottom of the service panel.



- 2 Click **OK** in the pop-up confirmation window to perform the factory restore, or **Cancel** to leave the settings unchanged.

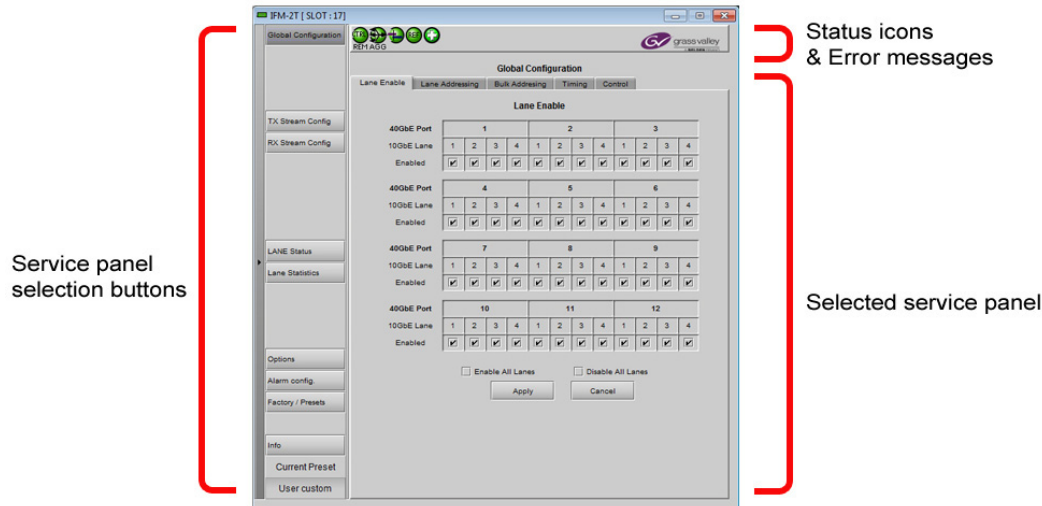
IFM-2T Fabric Module User Interface

The fabric module installed in the GV Node is managed and configured through the iControl interface.

Summary

- Identification 40
- Options 42
- Port and Lane Configuration 43
- Stream Redundancy 46
- Stream Bitrate 46
- Transmit Stream Addressing - Redundancy OFF 46
- Receive Stream Addressing - Redundancy OFF 48
- Transmit Stream Addressing - Redundancy ON 51
- Receive Stream Addressing - Redundancy ON 53
- Bulk Addressing Utility 55
- Lane Status Monitoring 56
- Lane Statistics Reporting 57
- Lane Statistics Reporting 57
- Timing 58
- Alarms 60
- User Presets 61
- Factory Configuration 62
- Technical Support 62
- Edge Device Control 63

In iControl Navigator or iControl Websites, double-click on the icon of the fabric module to open its control panel.



Identification

The user can enter labels and comments to make this fabric module easy to identify in a complex iControl setup. This information is entered into data boxes in the Info panel.

To enter labels and text descriptions

- 1 Click the **Info** button and select the **Info** tab.

The screenshot shows the 'Info' tab in the iControl interface. It contains the following fields and values:

- Rear Type: IFM-2T-RP
- Label: IFM-2T
- Short label: IFM-2T
- Source ID: (empty)
- Device type: IFM-2T
- Comments: Internal Router card
- Manufacturer: Grass Valley
- Vendor: Grass Valley
- Service version: 1.2.0 BUILD-39

Buttons at the bottom include 'Advanced...', 'Details...', and 'Remote system administration...'.

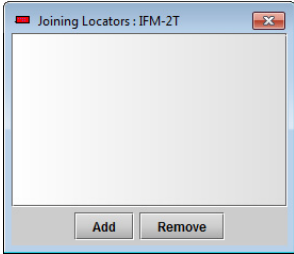
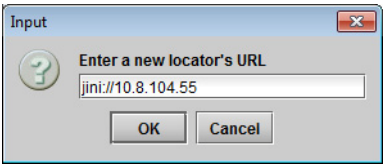
- 2 Enter appropriate text in the white data boxes (the image shows the default values):

Data	Usage
Label	The label that is shown for this module in iControl applications.
Short Label	The short-form label that iControl uses in some cases (8 characters).
Source ID	A descriptive name for this IFM-2T.
Comments	Any desired text.

The remaining data boxes show manufacturing information about this device.

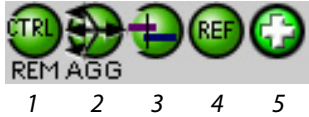
Three buttons in the panel give access to other information.

Button	
Details...	Reports the Firmware version, service version, and panel version for this card.

Button	
Advanced...	Shows the LongID for this device. The LongID is the address of this IFM-2T in the iControl network.
Remote System Administration	<p data-bbox="570 373 1325 451">Opens the Joining Locators window, which lists remote lookup services to which this IFM-2T is registered.</p> <div data-bbox="581 457 873 709" style="border: 1px solid gray; padding: 5px; margin-bottom: 10px;">  </div> <p data-bbox="570 724 893 756">To add additional services</p> <ol data-bbox="592 766 1242 913" style="list-style-type: none"> 1 Click Add 2 Enter the IP address of a server running a Jini look-up service, using this syntax: jini://<ip_address> <div data-bbox="630 924 1010 1087" style="border: 1px solid gray; padding: 5px; margin-bottom: 10px;">  </div> <ol data-bbox="592 1092 1226 1165" style="list-style-type: none"> 3 Click OK to add the service, or Cancel to discard the information. <p data-bbox="570 1176 933 1207">To remove an existing service</p> <ol data-bbox="592 1218 1315 1365" style="list-style-type: none"> 1 Click a service in the Joining Locators window to select it. 2 Click Remove. 3 Click OK in the pop-up confirmation window to remove the service, or Cancel to leave it in place.

Status

The iControl service panel for the IFM-2T displays five icons in the top left. These icons report the status of card functions.



Icon #	Significance
1	Card control status for this IFM-2T <ul style="list-style-type: none">• Green (REM): Remote control via this iControl service panel.• Yellow (LOC): Local control of this card from the GV Node's local control panel.
2	Status of the aggregation ports: <ul style="list-style-type: none">• Green: All ports OK.• Red: At least one port is down.
3	Status of the SDI Outputs: <ul style="list-style-type: none">• Green: Outputs OK.• Red: At least one output is in error.
4	Timing status: <ul style="list-style-type: none">• Green: Timing is OK.• Red: Timing error.
5	Card health: <ul style="list-style-type: none">• Green: Card OK.• Red: Card failure.

When an error is flagged, an error status message will be shown beneath the dashboard icons. Multiple error messages will cycle in the display.

- You can always check the current status of an icon by mousing over; the status will be shown in the message area.

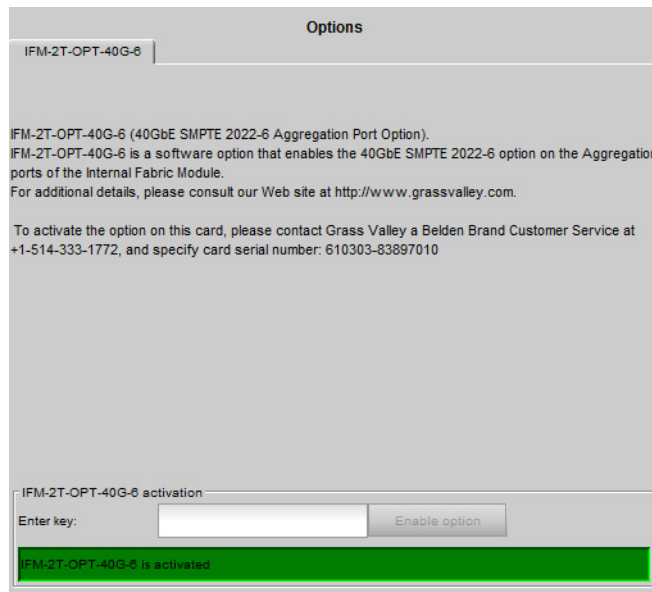
Options

There is one option available for the IFM-2T.

IFM-2T-OPT-40G-6 is a software option that enables 40GbE SMPTE 2022-6 on the aggregation ports. If this option is not enabled, the aggregation ports are non-functional, and the GV Node is limited to intra-frame operation.

To enable this option

- 1 Purchase the option from Grass Valley.
You will be provided with an activation key
- 2 Click **Options**.



- 3 Enter the activation key in the Enter Key data box.
- 4 Click **Enable Option**.
The status window beneath the data box will show that the option is active.

Port and Lane Configuration

Each 40GbE port incorporates four 10GbE lanes, and each of these 48 lanes can be enabled and assigned addresses individually.

Note: The GV Node reserves bandwidth for each enabled lane, so you should only enable lanes that you plan to occupy with program streams.

To enable individual lanes

- 1 Click **Global Config** and select the **Lane Enable** tab.

Global Configuration

Lane Enable | Lane Addressing | Bulk Addressing | Timing | Control

Lane Enable

40GbE Port	1				2				3			
10GbE Lane	1	2	3	4	1	2	3	4	1	2	3	4
Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

40GbE Port	4				5				6			
10GbE Lane	1	2	3	4	1	2	3	4	1	2	3	4
Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

40GbE Port	7				8				9			
10GbE Lane	1	2	3	4	1	2	3	4	1	2	3	4
Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

40GbE Port	10				11				12			
10GbE Lane	1	2	3	4	1	2	3	4	1	2	3	4
Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Enable All Lanes Disable All Lanes

Apply Cancel

- 2 Select the **Enabled** checkbox for every lane that you want to enable.
You may use the **Enable All Lanes** or **Disable All Lanes** checkboxes as a shortcut.
- 3 Click **Apply** to confirm, or **Cancel** to discard your changes.

To set the Source IP Address for each Lane

- 1 Click **Global Config** and select the **Lane Addressing** tab.

Global Configuration

Lane Enable | Lane Addressing | Bulk Addressing | Timing | Control

Configure Addresses and Port numbers

40GbE Port 1-6 40GbE Port 7-12

10GbE Lane	40GbE Port	IP Address	Subnet Mask	Gateway
1	1	10.10.10.1	255.255.255.0	0.0.0.0
2	1	10.10.10.2	255.255.255.0	0.0.0.0
3	1	10.10.10.3	255.255.255.0	0.0.0.0
4	1	10.10.10.4	255.255.255.0	0.0.0.0
1	2	10.10.10.5	255.255.255.0	0.0.0.0
2	2	10.10.10.6	255.255.255.0	0.0.0.0
3	2	10.10.10.7	255.255.255.0	0.0.0.0
4	2	10.10.10.8	255.255.255.0	0.0.0.0
1	3	10.10.10.9	255.255.255.0	0.0.0.0
2	3	10.10.10.10	255.255.255.0	0.0.0.0
3	3	10.10.10.11	255.255.255.0	0.0.0.0
4	3	10.10.10.12	255.255.255.0	0.0.0.0
1	4	10.10.10.13	255.255.255.0	0.0.0.0
2	4	10.10.10.14	255.255.255.0	0.0.0.0
3	4	10.10.10.15	255.255.255.0	0.0.0.0
4	4	10.10.10.16	255.255.255.0	0.0.0.0
1	5	10.10.10.17	255.255.255.0	0.0.0.0
2	5	10.10.10.18	255.255.255.0	0.0.0.0
3	5	10.10.10.19	255.255.255.0	0.0.0.0
4	5	10.10.10.20	255.255.255.0	0.0.0.0
1	6	10.10.10.21	255.255.255.0	0.0.0.0
2	6	10.10.10.22	255.255.255.0	0.0.0.0
3	6	10.10.10.23	255.255.255.0	0.0.0.0
4	6	10.10.10.24	255.255.255.0	0.0.0.0

Apply Cancel

- 2 Click the **40GbE Port x-y** tab corresponding to the group of six 40GbE ports you want to configure.

Note: If you have selected the **1.5Gbps maximum stream bitrate** option using GV Node Manager (See [To configure redundancy and stream bitrate at the aggregation ports](#) on page 82), only the **Port 1-6 tab** is available because only 6 ports are needed to carry all 144 streams.

- 3 For each 10GbE Lane, enter the Source Address (IP Address, Subnet Mask and Gateway) into the three data boxes.
 - The IP address must be a valid IPv4 address
 - Duplicate addresses are not allowed
- 4 Click **Apply** to confirm, or **Cancel** to discard your changes.

Individually setting the addresses for 48 lanes can be time-consuming. The **Bulk Addressing Utility** allows the addresses to be configured quickly if a sequential, structured addressing scheme is desired.

To address many lanes at once using the Bulk Addressing Utility

- 1 Click **Global Config** and select the **Bulk Addressing - Lanes** tab

	Starting Point	Ending Point
40GbE Port	1	12
10GbE Lane	1	4
# of impacted Lanes		48

	Auto Increment	Starting Point	Ending Point
Lane IP Address	4th Octet	10.10.10.1	10.10.10.48
Lane Subnet Mask	None	255.255.255.0	255.255.255.0
Lane Gateway	None	0.0.0.0	0.0.0.0

- 2 Use the **Starting Point** and **Ending Point** pulldowns to choose the range of ports and lanes that you will address.
- 3 Enter a Starting Point value for **Lane IP Address**, **Lane Subnet Mask** and **Lane Gateway** in the Starting Point data boxes.
 - The IP address must be a valid IPv4 address
- 4 Use the **Auto Increment** pulldown in the **Lane IP Address** line to select the octet that will be incremented in the IP address:
[None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]
- 5 The **Lane Subnet Mask** and **Lane Gateway** values must be the same for all lanes, so the only option available in those pulldowns is [None].

- 6 Click **Apply** to modify the lane addresses, or **Cancel** to leave the lane addresses unchanged.
- 7 You can see the results of your changes by looking at the **Global Config - Lane Addressing** panel.

Stream Redundancy

When the **IFM-2T-OPT-40G-6 option** is active (See [Options](#) on page 42), you can choose to enable **2022-7 Low Latency redundancy** on the aggregation ports, using the GV Node manager. See [To configure redundancy and stream bitrate at the aggregation ports](#) on page 82.

When enabled, this feature combines inputs and outputs into redundant pairs, halving the number of available streams, but providing feed security through redundancy.

In basic terms, two copies of the data stream are transmitted, each sent from one of the redundant pair of ports (labeled A and B). At the receiver end, receive port A receives the stream from transmit port A and receive port B receives the stream from transmit port B. These streams have been sent via different paths, and will be subject to different dropouts, jitter, and other degradations. At the receiver, they are combined back into a single stream, with errors minimized by having two streams available from which to select valid data.

The transmit and receive stream addressing panels change depending on whether the 2022-7 feature is active (Redundancy ON) or inactive (Redundancy OFF).

Stream Bitrate

When the **IFM-2T-OPT-40G-6 option** is active (See [Options](#) on page 42), you can choose the **stream bitrate** to be 1.5Gbps (HD) or 3Gbps (3G), using the **GV Node Manager**. See [To configure redundancy and stream bitrate at the aggregation ports](#) on page 82.

The bitrate you choose affects how the outputs are allocated to the aggregation ports .

Stream Bitrate	Streams per 10Gb Lane	Streams per 4-lane Port	Ports needed for 144 streams
3Gbps	3	12	12
1.5Gbps	6	24	6

Therefore, when 1.5 (HD) is selected, only ports 1-6 are needed to carry all 144 streams. Ports 7-12 are not used.

Transmit Stream Addressing - Redundancy OFF

There are 144 outputs from the Fabric Module to the aggregation ports. Each active output requires a stream address and stream port to be specified.

- Set individual transmit stream addresses using the procedure below.
- Set many transmit stream addresses at once using the Bulk Addressing Utility.

To set the Transmit Stream destination address and port

- 1 Click **TX Stream Config**.
- 2 Click on the tab that refers to the output that you want to configure.
 - Fabric module outputs are numbered 145 through 288.
 - The assignment of fabric module outputs to aggregation ports and lanes is determined by the selected redundancy mode and stream bitrate, as shown in the tables. The iControl panel reflects the selected mode.

Standard 2022-6 / 3GB signals (3G)					
QSFP1 145 ... 156	QSFP2 157 ... 168	QSFP3 169 ... 180	QSFP7 217 ... 228	QSFP8 229 ... 240	QSFP9 241 ... 252
QSFP4 181 ... 192	QSFP5 193 ... 206	QSFP6 207 ... 216	QSFP10 253 ... 264	QSFP11 265 ... 276	QSFP12 277 ... 288

Standard 2022-6 / 1.5GB signals (HD)					
QSFP1 145 ... 168	QSFP2 169 ... 192	QSFP3 193 ... 216	QSFP7 (not used)	QSFP8 (not used)	QSFP9 (not used)
QSFP4 217 ... 240	QSFP5 241 ... 264	QSFP6 265 ... 288	QSFP10 (not used)	QSFP11 (not used)	QSFP12 (not used)

TX Stream Config

Configure Multicast Addresses on the tabs below.

TX 145-168
TX 169-192
TX 193-216
TX 217-240
TX 241-264
TX 265-288

Output#	10GbE Lane#	40GbE Port#	TX Stream Address	TX Stream Port	Available Bandwidth
145	1	1	1.1.1.1	10001	3 Gbps
146	1	1	1.1.1.2	10002	3 Gbps
147	1	1	1.1.1.3	10003	3 Gbps
148	2	1	1.1.1.4	10004	3 Gbps
149	2	1	1.1.1.5	10005	3 Gbps
150	2	1	1.1.1.6	10006	3 Gbps
151	3	1	1.1.1.7	10007	3 Gbps
152	3	1	1.1.1.8	10008	3 Gbps
153	3	1	1.1.1.9	10009	3 Gbps
154	4	1	1.1.1.10	10010	3 Gbps
155	4	1	1.1.1.11	10011	3 Gbps
156	4	1	1.1.1.12	10012	3 Gbps
157	1	2	1.1.1.13	10013	3 Gbps
158	1	2	1.1.1.14	10014	3 Gbps
159	1	2	1.1.1.15	10015	3 Gbps
160	2	2	1.1.1.16	10016	3 Gbps
161	2	2	1.1.1.17	10017	3 Gbps
162	2	2	1.1.1.18	10018	3 Gbps
163	3	2	1.1.1.19	10019	3 Gbps
164	3	2	1.1.1.20	10020	3 Gbps
165	3	2	1.1.1.21	10021	3 Gbps
166	4	2	1.1.1.22	10022	3 Gbps
167	4	2	1.1.1.23	10023	3 Gbps
168	4	2	1.1.1.24	10024	3 Gbps

Apply
Cancel

- 3 Enter a Stream Address and Stream Port for each output that you want to configure. You may use Multicast in some cases, so select your Address and Port accordingly.
 - IP addresses in the range 224.0.0.1 to 239.255.255.255 are dedicated for multicast, but note that some within this range are reserved.
- 4 Click Apply to confirm, or Cancel to discard your changes.

To address many transmit streams at once using the Bulk Addressing Utility

- 1 Click **Global Config** and select the **Bulk Addressing - TX Streams** tab

Global Configuration			
Bulk Addressing Utility			
Lanes TX Streams RX Streams			
Network		Single Path	
Starting Stream		Ending Stream	
Output#	145	288	
# of impacted Streams			144
Auto Increment		Starting Point	Ending Point
Destination Address (TX)	4th Octet	1.1.1.1	1.1.1.144
Destination Port (TX)	No	10001	10001
Apply		Cancel	

The Network pulldown shows **Single Path** and cannot be changed.

- 2 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 288].
- 3 Enter a Starting Point value for **Destination Address (TX)** and **Destination Port (TX)** in the Starting Point data boxes.
- 4 Use the **Auto Increment** pulldown in the **Destination Address (TX)** line to select the octet that will be incremented in the IP address:
[None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]
- 5 Use the **Auto Increment** pulldown in the **Destination Port (TX)** line to select whether the port address will be indexed:
[No, Yes]
- 6 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.
- 7 You can see the results of your changes by looking at the **TX Stream Config** panel.

Receive Stream Addressing - Redundancy OFF

There are 144 inputs to the Fabric Module from the aggregation ports. Each active input requires a stream address and stream port to be specified, and requires an IGMPv3 source address when receiving multicast streams.

- Set individual receive stream addresses using the procedure below.
- Set many receive stream addresses at once using the Bulk Addressing Utility.

To set the Receive Stream source address and port

- 1 Click **RX Stream Config**.
- 2 Click on the tab that refers to the input that you want to configure.
 - Fabric module inputs are numbered 145 through 288.
 - The assignment of fabric module inputs to aggregation ports and lanes is determined by the selected redundancy mode and stream bitrate, as shown in the tables. The iControl panel reflects the selected mode.

Standard 2022-6 / 3GB signals (3G)					
QSFP1 145 ... 156	QSFP2 157 ... 168	QSFP3 169 ... 180	QSFP7 217 ... 228	QSFP8 229 ... 240	QSFP9 241 ... 252
QSFP4 181 ... 192	QSFP5 193 ... 206	QSFP6 207 ... 216	QSFP10 253 ... 264	QSFP11 265 ... 276	QSFP12 277 ... 288

Standard 2022-6 / 1.5GB signals (HD)					
QSFP1 145 ... 168	QSFP2 169 ... 192	QSFP3 193 ... 216	QSFP7 (not used)	QSFP8 (not used)	QSFP9 (not used)
QSFP4 217 ... 240	QSFP5 241 ... 264	QSFP6 265 ... 288	QSFP10 (not used)	QSFP11 (not used)	QSFP12 (not used)

RX Stream Config

Configure Multicast and IGMPv3 Source Addresses on the tabs below.

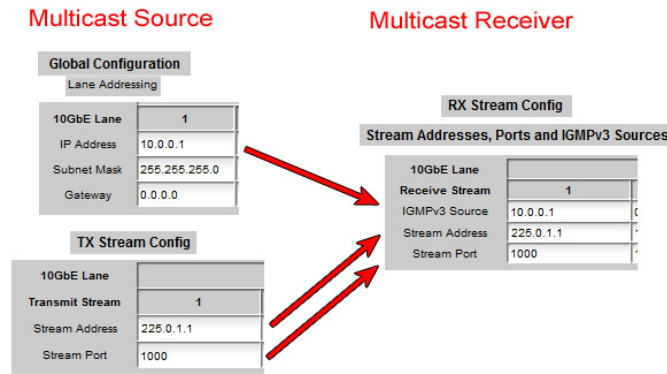
RX 145-168
RX 169-192
RX 193-216
RX 217-240
RX 241-264
RX 265-288

Input#	10GbE Lane#	40GbE Port#	IGMPv3 Source	RX Stream Address	RX Stream Port	Available Bandwidth
145	1	1	30.30.30.1	225.1.1.1	0	3 Gbps
146	1	1	30.30.30.2	192.168.0.2	3002	3 Gbps
147	1	1	30.30.30.3	192.168.0.3	3003	3 Gbps
148	2	1	30.30.30.4	192.168.0.4	3004	3 Gbps
149	2	1	30.30.30.5	192.168.0.5	3005	3 Gbps
150	2	1	30.30.30.6	192.168.0.6	3006	3 Gbps
151	3	1	30.30.30.7	192.168.0.7	3007	3 Gbps
152	3	1	30.30.30.8	192.168.0.8	3008	3 Gbps
153	3	1	30.30.30.9	192.168.0.9	3009	3 Gbps
154	4	1	30.30.30.10	192.168.0.10	3010	3 Gbps
155	4	1	30.30.30.11	192.168.0.11	3011	3 Gbps
156	4	1	30.30.30.12	192.168.0.12	3012	3 Gbps
157	1	2	30.30.30.13	192.168.0.13	3013	3 Gbps
158	1	2	30.30.30.14	192.168.0.14	3014	3 Gbps
159	1	2	30.30.30.15	192.168.0.15	3015	3 Gbps
160	2	2	30.30.30.16	192.168.0.16	3016	3 Gbps
161	2	2	30.30.30.17	192.168.0.17	3017	3 Gbps
162	2	2	30.30.30.18	192.168.0.18	3018	3 Gbps
163	3	2	30.30.30.19	192.168.0.19	3019	3 Gbps
164	3	2	30.30.30.20	192.168.0.20	3020	3 Gbps
165	3	2	30.30.30.21	192.168.0.21	3021	3 Gbps
166	4	2	30.30.30.22	192.168.0.22	3022	3 Gbps
167	4	2	30.30.30.23	192.168.0.23	3023	3 Gbps
168	4	2	30.30.30.24	192.168.0.24	3024	3 Gbps

Apply
Cancel

- 3 Enter information for each input according to the type of stream you wish to receive.

- a To receive unicast streams, enter a stream address and stream port, and leave the IGMPv3 Source address as 0.0.0.0.
- b To receive multicast streams, fill in the data boxes as indicated in the diagram:



Note that "IGMPv3 source" is not required in IGMPv2 networks.

- 4 Click **Apply** to confirm, or **Cancel** to discard your changes.

Note: If the data boxes are read-only, you may have enabled Edge Device Control. See [Edge Device Control](#), on page 63 , for more information.

To address many receive streams at once using the Bulk Addressing Utility

- 1 Click **Global Config** and select the **Bulk Addressing - RX Streams** tab

Global Configuration
 Lane Enable | Lane Addressing | **Bulk Addressing** | Timing | Control

Bulk Addressing Utility
 Lanes | TX Streams | **RX Streams**

Network: Single Path

Starting Stream: 145 | Ending Stream: 288
 # of impacted Streams: 144

	Auto Increment	Starting Point	Ending Point
IGMPv3 Source (RX)	4th Octet	30.30.30.1	30.30.30.144
Source Address (RX)	4th Octet	225.1.1.1	225.1.1.144
Source Port (RX)	No	0	0

Apply | Cancel

The Network pulldown shows **Single Path** and cannot be changed.

- 2 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 288].
- 3 Enter a Starting Point value for **IGMPv3 Source (RX)**, **Source Address (RX)** and **Source Port (RX)** in the Starting Point data boxes.
- 4 Use the **Auto Increment** pulldown in the **IGMPv3 Source (RX)** line to select the octet that will be incremented in the IGMPv3 source address:
 [None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]

- 5 Use the **Auto Increment** pulldown in the **Source Address (RX)** line to select the octet that will be incremented in the source IP address:
[None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]
- 6 Use the **Auto Increment** pulldown in the **Source Port (RX)** line to select whether the port address will be indexed:
[No, Yes]
- 7 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.
- 8 You can see the results of your changes by looking at the **RX Stream Config** panel.

Transmit Stream Addressing - Redundancy ON

There are 144 outputs from the Fabric Module to the aggregation ports. When Redundancy is ON, they are designated as 72 pairs of outputs, labeled, e.g.145-A and 145-B. Each active output requires a stream address and stream port to be specified.

- Set individual transmit stream addresses using the procedure below.
- Set many transmit stream addresses at once using the Bulk Addressing Utility.

To set the Transmit Stream destination address and port

- 1 Click **TX Stream Config**.
- 2 Click on the tab that refers to the outputs that you want to configure.
 - Fabric module outputs are numbered 145-A & -B through 216-A & -B.
 - The assignment of fabric module outputs to aggregation ports and lanes is determined by the selected redundancy mode and stream bitrate, as shown in the tables. The iControl panel reflects the selected mode.

Redundant 2022-7 / 3GB signals (3G)					
QSFP1 145-A...156-A	QSFP2 157-A...168-A	QSFP3 169-A...180-A	QSFP7 181-A...192-A	QSFP8 193-A...204-A	QSFP9 205-A... 216-A
QSFP4 145-B...156-B	QSFP5 157-B...168-B	QSFP6 169-B...180-B	QSFP10 181-B...192-B	QSFP11 193-B...204-B	QSFP12 205-B... 216-B

Redundant 2022-7 / 1.5GB signals (HD)					
QSFP1 145-A...168-A	QSFP2 169-A...192-A	QSFP3 193-A...216-A	QSFP7 (not used)	QSFP8 (not used)	QSFP9 (not used)
QSFP4 145-B...168-A	QSFP5 169-B...192-B	QSFP6 193-B...216-B	QSFP10 (not used)	QSFP11 (not used)	QSFP12 (not used)

TX Stream Config

Configure Multicast Addresses on the tabs below.

TX 145-156 TX 157-168 TX 169-180 TX 181-192 TX 193-204 TX 205-216

Output#	10GbE Lane#	40GbE Port#	TX Stream Address	TX Stream Port	Available Bandwidth
145-A	1	1	50.50.50.1	50001	3 Gbps
145-B	1	4	60.60.60.1	60001	3 Gbps
146-A	1	1	50.50.50.2	50002	3 Gbps
146-B	1	4	60.60.60.2	60002	3 Gbps
147-A	1	1	50.50.50.3	50003	3 Gbps
147-B	1	4	60.60.60.3	60003	3 Gbps
148-A	2	1	50.50.50.4	50004	3 Gbps
148-B	2	4	60.60.60.4	60004	3 Gbps
149-A	2	1	50.50.50.5	50005	3 Gbps
149-B	2	4	60.60.60.5	60005	3 Gbps
150-A	2	1	50.50.50.6	50006	3 Gbps
150-B	2	4	60.60.60.6	60006	3 Gbps
151-A	3	1	50.50.50.7	50007	3 Gbps
151-B	3	4	60.60.60.7	60007	3 Gbps
152-A	3	1	50.50.50.8	50008	3 Gbps
152-B	3	4	60.60.60.8	60008	3 Gbps
153-A	3	1	50.50.50.9	50009	3 Gbps
153-B	3	4	60.60.60.9	60009	3 Gbps
154-A	4	1	50.50.50.10	50010	3 Gbps
154-B	4	4	60.60.60.10	60010	3 Gbps
155-A	4	1	50.50.50.11	50011	3 Gbps
155-B	4	4	60.60.60.11	60011	3 Gbps
156-A	4	1	50.50.50.12	50012	3 Gbps
156-B	4	4	60.60.60.12	60012	3 Gbps

Apply Cancel

- 3 Enter a Stream Address and Stream Port for each output that you want to configure. You may use Multicast in some cases, so select your Address and Port accordingly.
 - IP addresses in the range 224.0.0.1 to 239.255.255.255 are dedicated for multicast, but note that some within this range are reserved.
- 4 Click Apply to confirm, or Cancel to discard your changes.

To address many transmit streams at once using the Bulk Addressing Utility

- 1 Click **Global Config** and select the **Bulk Addressing - TX Streams** tab

Global Configuration

Lane Enable Lane Addressing Bulk Addressing Timing Control

Bulk Addressing Utility

Lanes TX Streams RX Streams

Network Redundant Path A

Starting Stream Ending Stream

Output# 145 216

of impacted Streams 72

Auto Increment Starting Point Ending Point

Destination Address (TX) 4th Octet 50.50.50.1 50.50.50.72

Destination Port (TX) No 50001 50001

Apply Cancel

- 2 Use the **Network** pulldown to select **Redundant Path A**

- 3 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 216].
- 4 Enter a Starting Point value for **Destination Address (TX)** and **Destination Port (TX)** in the Starting Point data boxes.
- 5 Use the **Auto Increment** pulldown in the **Destination Address (TX)** line to select the octet that will be incremented in the IP address:
[None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]
- 6 Use the **Auto Increment** pulldown in the **Destination Port (TX)** line to select whether the port address will be indexed:
[No, Yes]
- 7 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.
- 8 Repeat [step 2](#) to [step 7](#) but select **Redundant Path B** in step 2.
- 9 You can see the results of your changes by looking at the **TX Stream Config** panel.

Receive Stream Addressing - Redundancy ON

There are 144 inputs to the Fabric Module from the aggregation ports. When Redundancy is ON, they are designated as 72 pairs of inputs, labeled, e.g.145-A and 145-B. Each active input requires a stream address and stream port to be specified, and requires an IGMPv3 source address when receiving multicast streams.

- Set individual receive stream addresses using the procedure below.
- Set many receive stream addresses at once using the Bulk Addressing Utility.

To set the Receive Stream source address and port

- 1 Click **RX Stream Config**.
- 2 Click on the tab that refers to the input that you want to configure.
 - Fabric module inputs are numbered 145-A & -B through 216-A & -B.
 - The assignment of fabric module inputs to aggregation ports and lanes is determined by the selected redundancy mode and stream bitrate, as shown in the tables. The iControl panel reflects the selected mode.

Redundant 2022-7 / 3GB signals (3G)					
QSFP1 145-A...156-A	QSFP2 157-A...168-A	QSFP3 169-A...180-A	QSFP7 181-A...192-A	QSFP8 193-A...204-A	QSFP9 205-A... 216-A
QSFP4 145-B...156-B	QSFP5 157-B...168-B	QSFP6 169-B...180-B	QSFP10 181-B...192-B	QSFP11 193-B...204-B	QSFP12 205-B... 216-B

Redundant 2022-7 / 1.5GB signals (HD)					
QSFP1 145-A...168-A	QSFP2 169-A...192-A	QSFP3 193-A...216-A	QSFP7 (not used)	QSFP8 (not used)	QSFP9 (not used)
QSFP4 145-B...168-A	QSFP5 169-B...192-B	QSFP6 193-B...216-B	QSFP10 (not used)	QSFP11 (not used)	QSFP12 (not used)

Configuring Your GV Node
 Receive Stream Addressing - Redundancy ON

RX Stream Config

Configure Multicast and IGMPv3 Source Addresses on the tabs below.

RX 145-156 RX 157-168 RX 169-180 RX 181-192 RX 193-204 RX 205-216

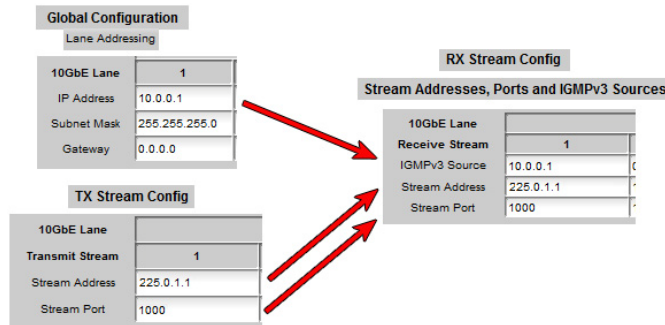
Input#	10GbE Lane#	40GbE Port#	IGMPv3 Source	RX Stream Address	RX Stream Port	Available Bandwidth
145-A	1	1	70.70.70.1	80.80.80.1	8001	3 Gbps
145-B	1	4	90.90.90.1	0.0.0.0	59901	3 Gbps
146-A	1	1	70.70.70.2	80.80.80.2	8002	3 Gbps
146-B	1	4	90.90.90.2	100.100.100.2	59902	3 Gbps
147-A	1	1	70.70.70.3	80.80.80.3	8003	3 Gbps
147-B	1	4	90.90.90.3	100.100.100.3	59903	3 Gbps
148-A	2	1	70.70.70.4	80.80.80.4	8004	3 Gbps
148-B	2	4	90.90.90.4	100.100.100.4	59904	3 Gbps
149-A	2	1	70.70.70.5	80.80.80.5	8005	3 Gbps
149-B	2	4	90.90.90.5	100.100.100.5	59905	3 Gbps
150-A	2	1	70.70.70.6	80.80.80.6	8006	3 Gbps
150-B	2	4	90.90.90.6	100.100.100.6	59906	3 Gbps
151-A	3	1	70.70.70.7	80.80.80.7	8007	3 Gbps
151-B	3	4	90.90.90.7	100.100.100.7	59907	3 Gbps
152-A	3	1	70.70.70.8	80.80.80.8	8008	3 Gbps
152-B	3	4	90.90.90.8	100.100.100.8	59908	3 Gbps
153-A	3	1	70.70.70.9	80.80.80.9	8009	3 Gbps
153-B	3	4	90.90.90.9	100.100.100.9	59909	3 Gbps
154-A	4	1	70.70.70.10	80.80.80.10	8010	3 Gbps
154-B	4	4	90.90.90.10	100.100.100.10	59910	3 Gbps
155-A	4	1	70.70.70.11	80.80.80.11	8011	3 Gbps
155-B	4	4	90.90.90.11	100.100.100.11	59911	3 Gbps
156-A	4	1	70.70.70.12	80.80.80.12	8012	3 Gbps
156-B	4	4	90.90.90.12	100.100.100.12	59912	3 Gbps

Apply Cancel

- 3 Enter information for each input according to the type of stream you wish to receive.
 - a To receive unicast streams, enter a stream address and stream port, and leave the IGMPv3 Source address as 0.0.0.0.
 - b To receive multicast streams, fill in the data boxes as indicated in the diagram:

Multicast Source

Multicast Receiver



Note that "IGMPv3 source" is not required in IGMPv2 networks.

- 4 Click **Apply** to confirm, or **Cancel** to discard your changes.

Note: If the data boxes are read-only, you may have enabled Edge Device Control. See [Edge Device Control](#), on page 63, for more information.

To address many receive streams at once using the Bulk Addressing Utility

- 1 Click **Global Config** and select the **Bulk Addressing - RX Streams** tab

	Auto Increment	Starting Point	Ending Point
IGMPv3 Source (RX)	4th Octet	0.0.0.0	ERR.reserved values
Source Address (RX)	4th Octet	0.0.0.0	ERR.reserved values
Source Port (RX)	No	8001	8001

- 2 Use the **Network** pulldown to select **Redundant Path A**
- 3 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 216].
- 4 Enter a Starting Point value for **IGMPv3 Source (RX)**, **Source Address (RX)** and **Source Port (RX)** in the Starting Point data boxes.
- 5 Use the **Auto Increment** pulldown in the **IGMPv3 Source (RX)** line to select the octet that will be incremented in the IGMPv3 source address:
[None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]
- 6 Use the **Auto Increment** pulldown in the **Source Address (RX)** line to select the octet that will be incremented in the source IP address:
[None, 1st Octet, 2nd Octet, 3rd Octet, 4th Octet]
- 7 Use the **Auto Increment** pulldown in the **Source Port (RX)** line to select whether the port address will be incremented:
[No, Yes]
- 8 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.
- 9 Repeat [step 2](#) to [step 8](#), but select **Redundant Path B** in the network pulldown.
- 10 You can see the results of your changes by looking at the **RX Stream Config** panel.

Bulk Addressing Utility

Entering the many addresses required to configure the twelve 40GbE ports, each with four lanes of three streams, can be time-consuming. The Bulk Addressing Utility allows the addresses to be configured quickly if a sequential, structured addressing scheme is desired. The use of this utility to address lanes, transmit streams and receive streams is described in the appropriate sections.

- Lanes: See [To address many lanes at once using the Bulk Addressing Utility](#) on page 45
- TX streams - See [To address many transmit streams at once using the Bulk Redundancy OFF: Addressing Utility](#) on page 48
- RX streams - See [To address many receive streams at once using the Bulk Redundancy OFF: Utility](#) on page 50
- TX streams - See [To address many transmit streams at once using the Bulk Redundancy ON: Addressing Utility](#) on page 52.
- RX streams - See [To address many receive streams at once using the Bulk Redundancy ON: Utility](#) on page 55

Lane Status Monitoring

The current status of all four lanes in each of the twelve 40GbE ports (48 lanes in all) can be viewed in the Lane Status panel.

To view the status of a lane

- 1 Click **Lane Status** panel
- 2 Select the tab for the 40GbE port containing the Lane to be examined.

LANE Status				
40GbE Port 1-3	40GbE Port 4-6	40GbE Port 7-9	40GbE Port 10-12	
40GbE Port	1			
10GbE Lane	1	2	3	4
Link				
Speed	10 Gbps	10 Gbps	10 Gbps	10 Gbps
MAC Address	0:50:1E:4:6C:A8	0:50:1E:4:6C:A9	0:50:1E:4:6C:AA	0:50:1E:4:6C:AB
40GbE Port	2			
10GbE Lane	1	2	3	4
Link				
Speed	10 Gbps	10 Gbps	10 Gbps	10 Gbps
MAC Address	0:50:1E:4:6C:AC	0:50:1E:4:6C:AD	0:50:1E:4:6C:AE	0:50:1E:4:6C:AF
40GbE Port	3			
10GbE Lane	1	2	3	4
Link				
Speed	10 Gbps	10 Gbps	10 Gbps	10 Gbps
MAC Address	0:50:1E:4:6C:B0	0:50:1E:4:6C:B1	0:50:1E:4:6C:B2	0:50:1E:4:6C:B3

The status report for each lane includes the following:

- 40GbE port #.
- 10GbE lane #.

- Link Status

Icon	Meaning
Green	Link OK
Red	Link down

- Speed
- MAC Address

Lane Statistics Reporting

Statistics on lane usage are compiled and can be viewed on the Lane Statistics panel.

To view the lane statistics

- 1 Click **Lane Statistics**.
- 2 Select the tab for the 40GbE port containing the Lane to be examined.

Lane Statistics							
40GbE Port 1-3		40GbE Port 4-6		40GbE Port 7-9		40GbE Port 10-12	
40GbE Port	10GbE Lane	Tx/Rx	Bandwidth [B/s]	Bytes	Packets	Errors [packets]	
1	1	Rx	0	0	326	0	
1	1	Tx	0	388,696,492	4,094,893,712	0	
1	2	Rx	0	0	0	0	
1	2	Tx	0	0	0	0	
1	3	Rx	0	0	0	0	
1	3	Tx	0	0	0	0	
1	4	Rx	0	0	0	0	
1	4	Tx	0	0	0	0	
2	1	Rx	0	388,696,826	4,094,893,772	0	
2	1	Tx	0	0	326	0	
2	2	Rx	0	0	0	0	
2	2	Tx	0	0	0	0	
2	3	Rx	0	0	0	0	
2	3	Tx	0	0	0	0	
2	4	Rx	0	0	0	0	
2	4	Tx	0	0	0	0	
3	1	Rx	0	0	330	0	
3	1	Tx	0	388,696,508	4,075,506,428	0	
3	2	Rx	0	0	0	0	
3	2	Tx	0	0	0	0	
3	3	Rx	0	0	0	0	
3	3	Tx	0	0	0	0	
3	4	Rx	0	0	0	0	
3	4	Tx	0	0	0	0	

Reset Port Statistics Last Reset: 0

The table shows, for each of the 12 lanes:

- 40GbE port #.
- 10GbE lane #.
- Tx/Rx - one row per **lane** (not per stream) for each.
- Bandwidth.
- Bytes - throughput in Mbps.
- Packets - number of packets passed.
- Error - number of errors counted.

All dynamic statistics (Bytes, Packets and Errors) are compiled since the last reset.

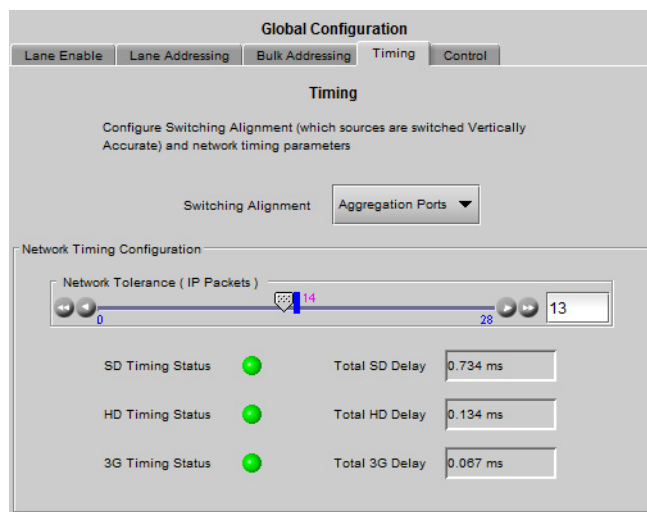
- The counters are reset by default each time the card is started,
- Click **Reset Port Statistics** to immediately reset the statistics.
- The date and time of the last reset is displayed beside the Reset button.

Timing

Clean vertically-accurate switches between sources in the fabric module require the sources to be time-aligned. There are two signal entry planes in GV Node - the SDI inputs on the XIO-4901 cards, and the IP inputs on the aggregation ports. Generally speaking, it is not possible to ensure that signals arriving at both of these are time-aligned, so switching between an SDI input and an IP input will almost certainly be a dirty switch. However, you can clean-switch between SDI inputs, and between IP inputs, if you have set up your internal network timing. You must select which of these signal entry planes will be the switching reference.

To select the switching alignment plane for clean switches

- 1 Click **Global Config** and select the **Timing** tab



- 2 Select the Switching Alignment plane using the pulldown list:

Alignment Plane	Details
Module Slots	Align on the SDI inputs from the XIO-4901 cards.
Aggregation Ports	Align on the IP inputs from the aggregation ports.

When you have selected the **Aggregation Ports**, you will be dealing with IP signals, and will need to configure the network timing.

About the Network Tolerance setting

Receiving video over IP requires the receiver to absorb variations in the arrival rate of pixels (i.e. packets). The Ethernet cloud is built by non-deterministic equipment (e.g. switches) that uses probabilistic analysis to move packets around. Unlike SDI, the result is variability in the total latency point-to-point. As a result, momentary bursts of packets (therefore

pixels) occur at 10Gbps. Since SDI is at 1.5Gbps (HD), those bursts need to be stored in a buffer. In addition, video flows can take different network paths, arriving with an arbitrary phase error with respect to each other, and creating a need for alignment before being switched as per RP-168.

Each receiver in GV Node has a buffer, tasked with two functions:

- 1 Absorb packet bursts [aka jitter or PDV- Packet Delay Variation]
- 2 Provide alignment of videos altogether to a common reference (TOF)

The simple solution would be to set the buffer operating level high enough to accommodate large bursts and large jitter. The downside to higher buffering is higher latency, which is something critical in video production environments. Grass Valley understands this requirement and therefore provides an adjustment to allow the user to minimize the latency based on the quality of the network.

The Network Tolerance setting allows the user to indirectly set the operating buffer level of each receiver, hence providing a simultaneous control over jitter/PDV, skew tolerance, and total latency.

The Tolerance buffer is a 32 packet buffer. The 3 leading and 3 trailing packets are reserved for stability. This provides a 26 packet static sized buffer wherein source-to-source skew and network jitter/PDV can be compensated for. As this is a fixed 26 packet window, the skew and jitter/PDV size needs are limited to the shared resource. E.g. If total skew between sources is 23 packets, 3 packets are available for jitter/PDV compensation. There is no separate adjustment for skew and jitter/PDV buffer usage.

The Top Of Frame (TOF) reference pulse location is derived from the Network Tolerance adjustment. As the tolerance is adjusted, the TOF moves with it. This adjustment provides the ability to advance or delay the 26 packet buffer, with regards to reference. Moving the packet buffer affects the latency of the signals. Increasing the Network Tolerance setting increases latency. The latency is presented in the GUI in msec for SD, HD, and 3G.

An incoming signal whose TOF does not line up with the set boundary of the Network Tolerance window will not be able to be aligned to the TOF reference pulse, and will be considered Asynchronous.

The object is to achieve error-free video with the lowest buffer size.

To configure network timing



CAUTION - adjusting the Network Tolerance will force all 2022 receivers to relock, which will result in a glitch on all outputs fed by Aggregation sources

- 1 Click **Global Config** and select the **Timing** tab.
- 2 Slide the **Network Tolerance (IP packets)** slider to its maximum value (27 packets).
The three **Timing Status icons** below the slider should all be green. If they are not, you will need to verify the condition of your network.
- 3 Move the slider back towards the zero setting, until you see icons flashing Red.
- 4 Move the slider incrementally up until the red flashing stops.
This setting should be satisfactory for your network as it is now configured. If you change the network, or add a new source with a different timing parameter, you may need to repeat this process.

You can see the latency you have added in the three **Total Delay** windows (SD, HD, 3G). The time values are different because of the different data rates between the standards.

Alarms

The fabric module generates alarms that are sent to the GV Node controller card when error conditions are detected. These alarms are used to set the control panel status display, and the status icon in the top left of the iControl window.

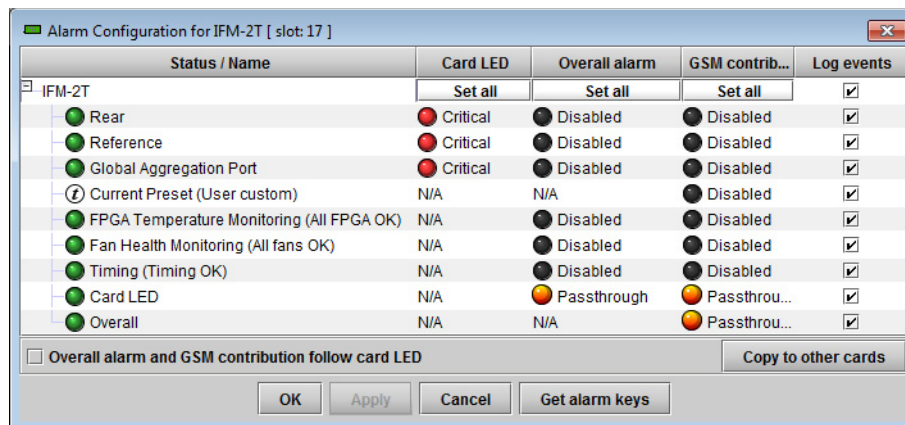
The alarms are reported to the iControl network, and can be reported locally on the frame's GPI port.

GPI reporting can only be accessed from the menu, as described at the end of this section (page 32).

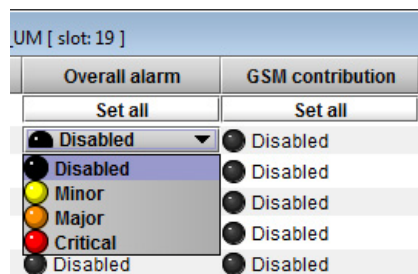
To configure the alarms

- 1 Click **Alarm Config**.

The Alarm Configuration panel opens in a new window, and can be resized if needed. It allows the alarm reporting of the module to be configured. The panel is organized in columns.



- 2 For each line in the Status/Name column:
 - a Click on the icon in the Overall Alarm column
 - b Click to select the appropriate alarm status from the drop-down list



- c Click on the icon in the GSM Contribution column
- d Click to select the appropriate alarm status from the drop-down list

Shortcut: if you click on "Set All" at the top of one of these columns, you will open a pulldown list that lets you assign a level to all alarms in that column simultaneously.

- e Click on an icon in the Card LED column

You may find that some of these alarms have been hard-wired to a specific level, or can only be reset using the Set All pulldown

- f Click to select the appropriate alarm status from the drop-down list, if available.
- 3 Click **OK** to accept the settings and close the window, **Apply** to accept the settings and keep the window open, or **Cancel** to discard the changes and close the window.

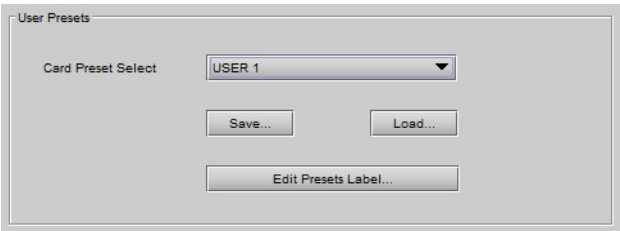
See [Alarm Configuration](#) on page 84 for a more detailed description of the contents of this panel.

User Presets

The IFM-2T has 5 memory registers that can hold user-defined parameter settings. You can save the current settings to a register, or reload the IFM-2T with the contents of a register

To manage User Presets

- 1 Click **Factory / Presets**.

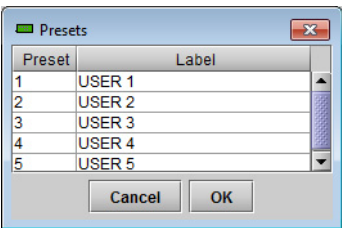


- 2 Select a register using the **Card Preset Select** pulldown.
- 3 Click **Save** to save the card's parameter values in the selected memory register.
A pop-up will allow you to proceed or cancel the action.
Note that this action will overwrite the existing register contents.
- 4 Click **Load** to load the card with the contents of the selected memory register.
A pop-up will allow you to proceed or cancel the action.
Note that this action will overwrite the card's existing parameter settings and values.

To re-name a user preset

- 1 Click **Edit Presets Label**.

The Presets window opens.



- 2 Double-click on a name in the Label column.
- 3 Type a name in the data box.
- 4 Click **OK**.

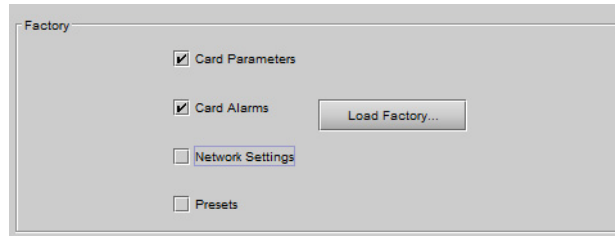
The text you have entered (up to 16 characters) will be appended to the label name in the selection pulldown.

Factory Configuration

The IFM-2T maintains a set of factory-specified settings in memory, and can be restored to that state at any time. You can select which groups of parameters are restored.

To reset the IFM-2T to the factory default status

- 1 Click **Factory / Presets**.



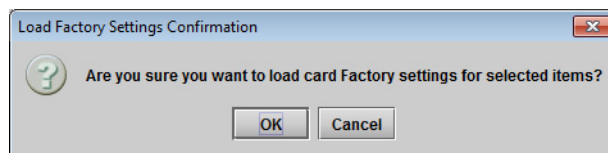
- 2 Click the checkboxes corresponding to the parameters that you want to restore to factory default values:

Checkbox	Restores (i.e. overwrites current values with factory defaults)
Card Parameters	All operating parameters you have configured via the user interface.
Card Alarms	The alarm settings you have made on the Alarms panel.
Network Settings	
Presets	The user presets that you have stored on the card.

If the box is not checked, the current card settings remain unchanged.

- 3 Click **Load Factory**

The Load Factory Settings Confirmation window opens.



- 4 Click **OK** to restore the factory settings, or **Cancel** to leave the settings unchanged.

Hot Swap to Maintain Routes

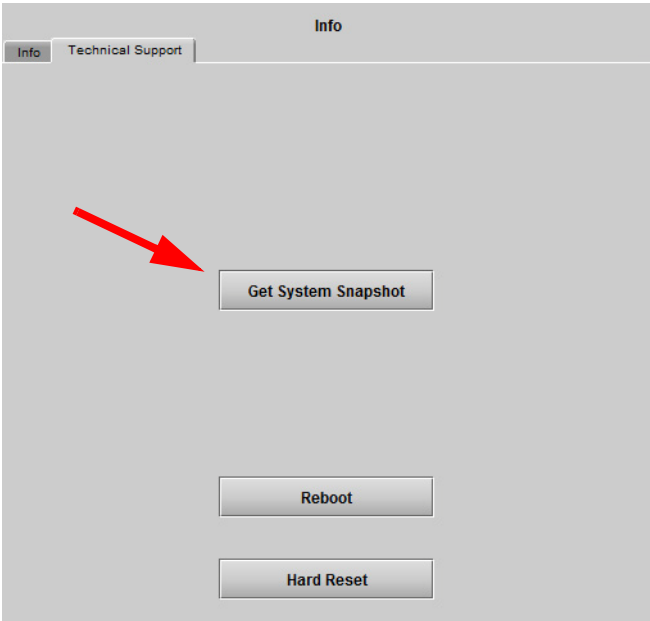
If you need to swap the IFM card for any reason, and want to keep any programmed routes, you should leave the **GV Node ON** (specifically, the CPU-ETH3 on and plugged in) while you remove the old IFM-2T and insert a new one.

Technical Support

If you are troubleshooting the IFM-2T with the assistance of Grass Valley's technical support team, they may ask you to supply a system snapshot.

To obtain a system snapshot

- 1 In iControl, open the IFM-2T service panel and select **Info | Technical Support**



- 2 Click **Get System Snapshot**.
- 3 Technical support will assist you in extracting the file and sending it to Grass Valley.

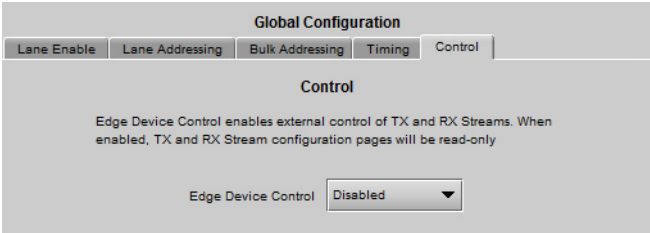
Edge Device Control

Edge Device Control enables external control of the TX and RX streams.

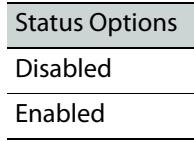
Edge Device Control	TX and RX Stream Addressing
Disabled	TX and RX stream addresses are static, set in the RX Stream configuration page
Enabled	TX and RX stream addresses are dynamically configurable, set by an external controller. The TX and RX stream Configuration pages are disabled.

To set the Edge Device Control status

- 1 Click **Global Config** and select the **Control** tab



- 2 Select the edge device control status from the pulldown list:



XIO-4901 User Interface

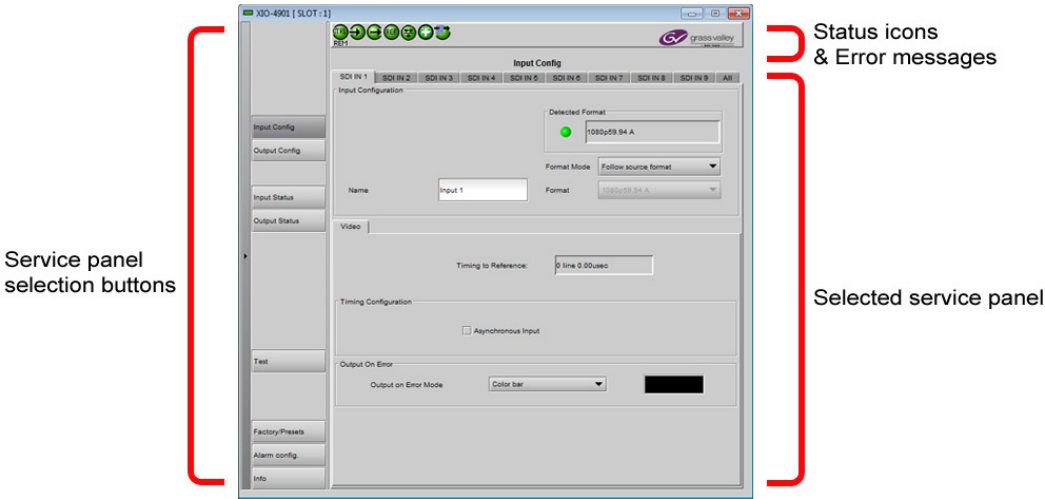
The XIO-4901SDI I/O modular card provides SDI, ASI and MAD1 inputs and outputs on the GV Node frame. It can be configured and managed using its iControl interface.

Summary

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The iControl Service Panel

Locate your XIO-4901 in iControl Navigator, and double-click its icon to open the service panel.

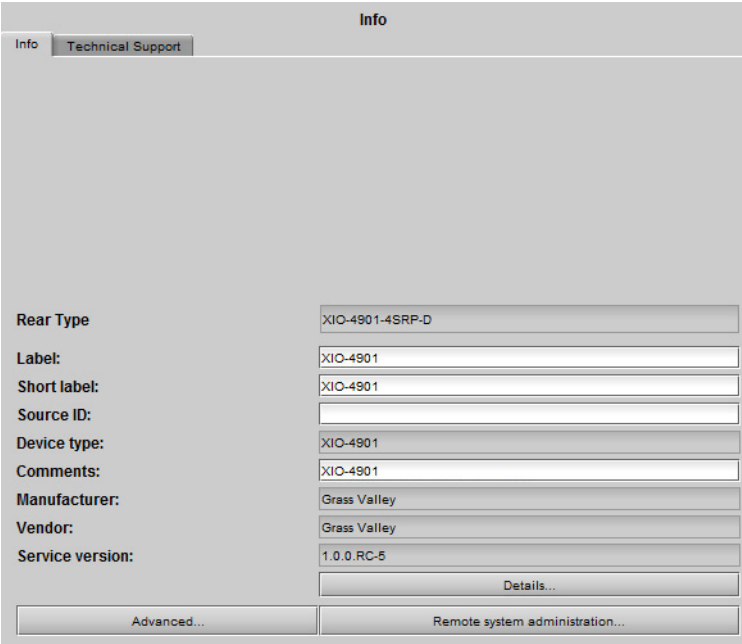


Identification

The user can enter labels and comments to make this XIO-4901 easy to identify in a complex iControl setup. This information is entered into data boxes in the Info panel.

To enter labels and text descriptions

- 1 Click the **Info** button and select the **Info** tab.



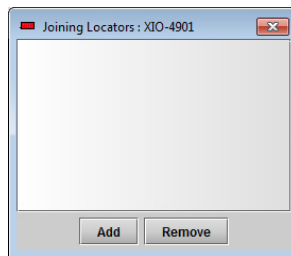
- 2 Enter appropriate text in the white data boxes (the image shows the default values):

Data	Usage
Label	The label that is shown for this module in iControl applications.
Short Label	The short-form label that iControl uses in some cases (8 characters).

Data	Usage
Source ID	A descriptive name for this XIO-4901.
Comments	Any desired text.

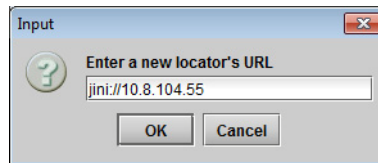
The remaining data boxes show manufacturing information about this device. Three buttons in the panel give access to other information.

Button	
Details...	Reports the Firmware version, service version, and panel version for this card.
Advanced...	Shows the LongID for this device. The LongID is the address of this XIO-4901 in the iControl network.
Remote System Administration	Opens the Joining Locators window, which lists remote lookup services to which this XIO-4901 is registered.



To add additional services

- 1 Click **Add**
- 2 Enter the IP address of a server running a Jini look-up service, using this syntax:
jini://<ip_address>



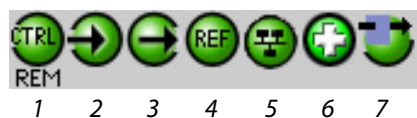
- 3 Click **OK** to add the service, or **Cancel** to discard the information.

To remove an existing service

- 1 Click a service in the Joining Locators window to select it.
- 2 Click **Remove**.
- 3 Click **OK** in the pop-up confirmation window to remove the service, or **Cancel** to leave it in place.

Status

The iControl service panel for the XIO-4901 displays seven icons in the top left. These icons report the status of card functions.



Icon #	Significance
1	Card control status for this XIO-4901: <ul style="list-style-type: none"> Green (REM): Remote control via this iControl service panel. Yellow (LOC): Local control of this card from the GV Node's local control panel.
2	Status of the SDI Inputs: <ul style="list-style-type: none"> Green: Inputs OK. Red: At least one input is in error.
3	Status of the SDI Outputs: <ul style="list-style-type: none"> Green: Outputs OK. Red: At least one output is in error.
4	Status of the GV Node's frame URS arriving at the XIO-4901: <ul style="list-style-type: none"> Green: URS OK. Red: URS fault.
5	Status of the Ethernet connection (via the controller rear panel) <ul style="list-style-type: none"> Green: Ethernet OK Red: Ethernet fault.
6	Card health: <ul style="list-style-type: none"> Green: Card OK. Red: Card failure.
7	Processing Mode: <ul style="list-style-type: none"> Green: Normal operation. Yellow: Test signal activated on at least one input or output.

When an error is flagged, an error status message will be shown beneath the dashboard icons. Multiple error messages will cycle in the display.

- You can always check the current status of an icon by mousing over; the status will be shown in the message area.

Input Configuration - ASI

The **Input Config** panel provides resources to configure the processing of the nine rear-panel inputs before they are sent to the IFM-2T fabric module.

If an input has been configured for ASI input using the [GV Node Manager](#), the tab for that input in the Input Config panel will be labeled ASI IN n (n = 1 through 9).

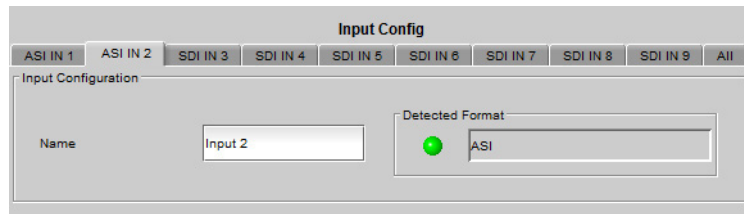
Note: ASI input is **not supported** if the **MDX option is enabled** for the XIO-4901 card.

ASI inputs are passed through without processing, so this tab only allows you to assign a name to the input, and reports the status of the detected format at the input.

To assign a name to an input

- Click **Input Config** and select an **ASI IN** tab.

2 Type a name for this input in the **Name** data box



Detected Format	Status icon
ASI	Green
All other formats	Red

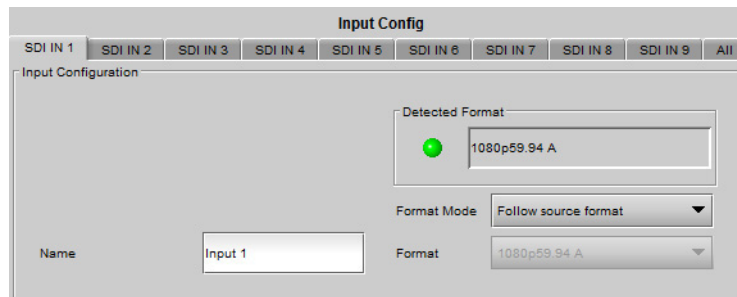
Input Configuration - SDI

The **Input Config** panel provides resources to configure the processing of the nine rear-panel inputs before they are sent to the IFM-2T fabric module.

If an input has been configured for SDI input using the [GV Node Manager](#), the tab for that input in the Input Config panel will be labeled SDI IN n (n = 1 through 9).

To assign a name to an input

- 1 Click **Input Config** and select one of the **SDI IN** tabs.



- 2 Type a name for this input in the **Name** data box.

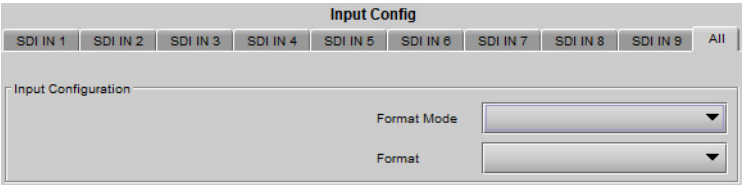
To select the format that the XIO-4901 input will lock to

- 1 Click the **Format Mode** pulldown
- 2 Click to select the desired format mode:

Selection	Details
Follow source format	The XIO input format follows the currently-detected input.
Lock to initial format detected	The input format locks to the initial format detected, and remains unchanged even if the source format changes.
Manual	Forces the input processing to use a specific format. Use the Format pulldown to select one of these supported formats: 525i, 625i, 1080p59.94A, 1080p50A, 1080i59.94, 1080i50, 720p50.

To select the input format for all nine SDI Inputs at once

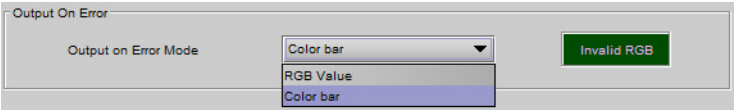
- 1 Click **Input Config** and select the **All** tab.



- 2 Click the **Format Mode** pulldown
- 3 Click to select the desired format mode, per [step 2](#) in the previous procedure.

To select the output from the XIO-4901 to the IFM-2T when the input is in error

- 1 Click **Input Config** and select one of the **SDI IN** tabs.
- 2 In the **Video** tab, click the **Output on Error Mode** pulldown.

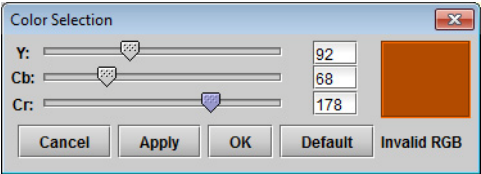


- 3 Click to select the desired output.

Output	Details
Color bar	Feed a standard color bar to the fabric module.
RGB value	Feed a full-frame color patch to the fabric module.

To choose the color for the RGB value

- 1 Click the color patch in the screen beside the Output on Error Mode pulldown.
The Color Selection window opens.



- 2 Click **Default** to select and apply the default color (Black: Y=16; Cb=Cr=128)
- 3 Move the sliders, or type into the data boxes, to adjust the color.
Invalid colors will be flagged as **Invalid RGB** beneath the color patch in this window, and inside the color patch in the SDI IN window.
- 4 Click **Apply** to confirm your changes, or **Cancel** to leave the color unchanged.

To select the Output on Error for all nine SDI Inputs at once

- 1 Click **Input Config** and select the **All** tab.



- 2 Click on the **Output on Error Mode** pulldown.
- 3 Click to select the desired output from the XIO-4901 to the IFM-2T when the SDI input is in error.

Output	Details
Blank	Use the selections made on the 9 individual Input tabs.
Color bar	Feed a standard color bar signal to the fabric module.
RGB value	Feed a full-frame color patch to the fabric module.

- 4 You must select the color patch individually for each of the nine outputs, as per [To choose the color for the RGB value](#), on page 69. You can use the color patches here instead of returning to the individual tabs - they are interconnected.

Input Timing - SDI

Input Timing to Reference

To see the timing relationship between an input and the GV Node's URS signal

- 1 Click **Input Config** and select the **SDI IN** tab for that input.
- 2 Select the **Video** tab and view the **Timing to Reference** data window.

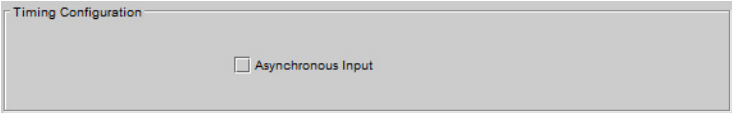
Asynchronous Input Signals

The input detection circuitry in XIO-4901 must be advised when the input signal is asynchronous to the system timing as defined by the GV Node's URS signal generated in the CPU-ETH3 controller. This is because an asynchronous signal will occasionally be nearly in phase with the reference, causing the the detection circuitry to lock it, only to have the signal drift away from the reference, unlocking the input circuits. The lock/unlock cycle will raise error messages, and interfere with system operation.

Defining this input as asynchronous allows the system to ignore the occasional in-phase situation. The signal can pass through the system, but of course clean switching will be compromised.

To identify an input signal as asynchronous

- 1 Click **Input Config** and select the **SDI IN** tab for that input
- 2 Select the **Video** tab and view the **Timing Configuration** section.



- 3 Click the **Asynchronous Input** box to select it.
This input will now be considered asynchronous by the system, and processed accordingly.

Input Status

You can check the current status of the nine inputs by selecting **Input Status**.

The screenshot shows the "Input Status" panel with a table listing the status of nine inputs. The table has columns for Input #, Status, Name, Format, and Physical Address. The status is indicated by a colored circle: green for good, red for error, and yellow for warning.

Input #	Status	Name	Format	Physical Address
1	Green	Input 1hk	ASI	
2	Red	Input 2	None	
3	Yellow	Input 3	625i	
4	Green	Input 4	1080i59.94	
5	Green	Input 5	1080i59.94	
6	Green	Input 6	1080i59.94	
7	Green	Input 7	1080i59.94	
8	Green	Input 8	1080i59.94	
9	Red	Input 9	625i	

Input Audio

For a complete discussion of audio (including MADI) in the XIO-4901 and GV Node, see [GV Node Audio](#), on page 95.

Output Configuration - ASI

The **Output Config** panel provides resources to configure the processing of the nine signals received from the IFM-2T fabric module before they are sent to the rear-panel outputs.

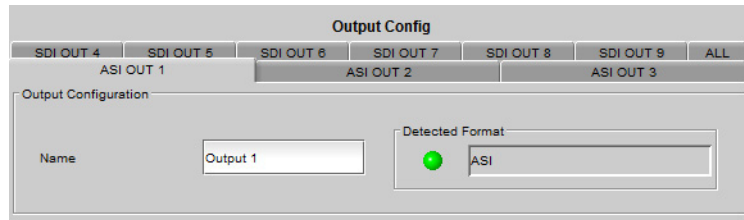
If an output has been configured for ASI output using the GV Node Manager, the tab for that output in the Output Config panel will be labeled ASI OUT n (n = 1 through 9).

Note: ASI output is **not supported** if the **MDX option is enabled** for the XIO-4901 card.

ASI streams are passed through without processing, so this tab only allows you to assign a name to the output, and reports the status of the detected format at the output.

To assign a name to an output

- 1 Click **Output Config** and select an **ASI OUT** tab.
- 2 Type a name for this output in the **Name** data box.



Detected Format	Status icon
ASI	Green
All other formats	Red

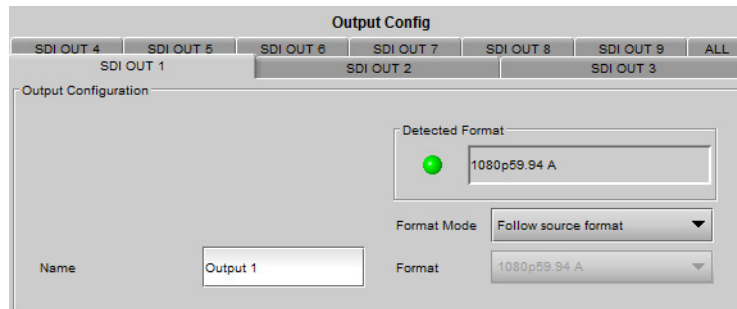
Output Configuration - SDI

The **Output Config** panel provides resources to configure the processing of the nine signals received from the IFM-2T fabric module before they are sent to the rear-panel outputs.

If an output has been configured for SDI output using the GV Node Manager, the tab for that output in the Output Config panel will be labeled SDI OUT n (n = 1 through 9).

To assign a name to an output

- 1 Click **Output Config** and select one of the **SDI OUT** tabs.



- 2 Type a name for this output in the **Name** data box.

To select how the output format of the XIO-4901 is determined

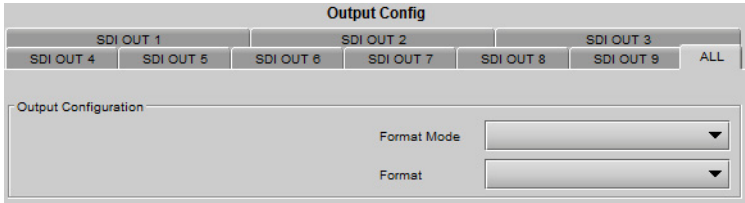
- 1 Click the **Format Mode** pulldown

2 Click to select the desired format mode:

Selection	Details
Follow source format	The XIO-4901 output format follows the currently-detected input.
Lock to initial format detected	The output format locks to the initial format detected, and remains unchanged even if the source format changes.
Manual	Forces the output processing to use a specific format. Use the Format pulldown to select one of these supported formats: 525i, 625i, 1080p59.94A, 1080p50A, 1080i59.94, 1080i50, 720p50.

To select the output format for all nine outputs at once

1 Click **Output Config** and select the **All** tab.



- 2 Click the **Format Mode** pulldown
- 3 Click to select the desired format mode, per [step 2](#) in the previous procedure.

To select the SDI output from the XIO-4901 when the input from the IFM-2T is in error

- 1 Click **Output Config** and select one of the nine **SDI OUT** tabs.
- 2 In the **Video** tab, click the **Output on Error Mode** pulldown.

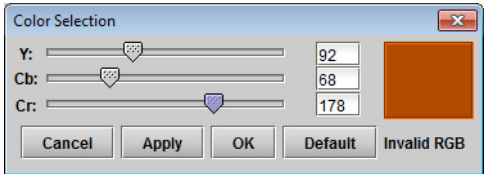


3 Click to select the desired output.

Output	Details
Color bar	Feed a standard color bar to the SDI output.
RGB value	Feed a full-frame color patch to the SDI output.

To choose the color for the RGB value

- 1 Click the color patch in the screen beside the Output on Error Mode pulldown. The Color Selection window opens.

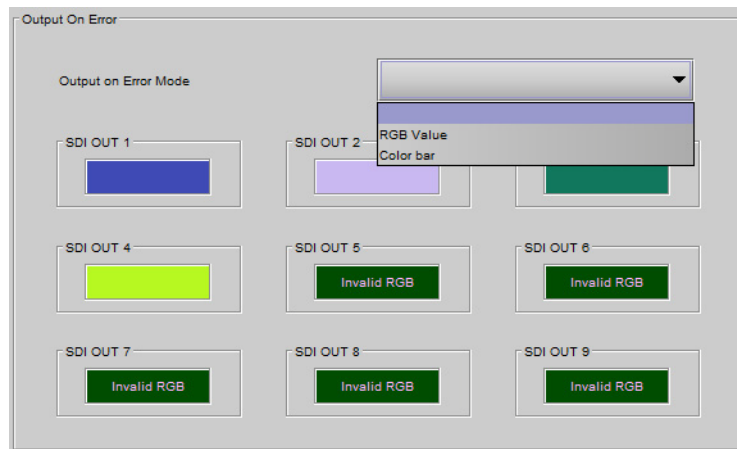


2 Click **Default** to select and apply the default color (Black: Y=16; Cb=Cr=128)

- 3 Move the sliders, or type into the data boxes, to adjust the color.
Invalid colors will be flagged as **Invalid RGB** beneath the color patch in this window, and inside the color patch in the SDI IN window.
- 4 Click **Apply** to confirm your changes, or **Cancel** to leave the color unchanged.

To select the Output on Error for all nine SDI Outputs at once

- 1 Click **Output Config** and select the **All** tab.



- 2 Click on the **Output on Error Mode** pulldown.
- 3 Click to select the desired SDI output from the XIO-4901 when the input from the the IFM-2T is in error.

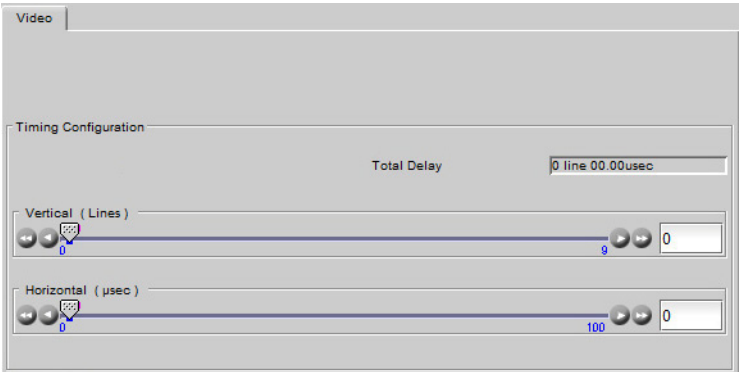
Output	Details
Blank	Use the selections made in the 9 individual channel tabs.
Color bar	Feed a standard color bar to the SDI output.
RGB value	Feed a full-frame color patch to the SDI output.

- 4 You must select the color patch individually for each of the nine outputs, as per [To choose the color for the RGB value](#), on page 69. You can use the color patches here instead of returning to the individual tabs - they are interconnected.

Output Timing - SDI

Timing Configuration

- 1 Click **Output Config** and select the **SDI OUT** tab for that output.
- 2 Select the **Video** tab and view the **Timing Configuration** section.



Delay (Vertical and Horizontal)

Use the sliders to add delay to the SDI output of the XIO-4901, if required for signal timing at downstream equipment. The total delay added using the two sliders is shown in the **Total Delay** data window.

Output Status

You can check the status of the nine SDI outputs by selecting **Output Status**:

Input #	Status	Name	Format	Physical Address
1	●		1080p59.94 A	
2	●		1080p59.94 A	
3	●		1080p59.94 A	
4	●		1080p59.94 A	
5	●		1080p59.94 A	
6	●		1080p59.94 A	
7	●		1080p59.94 A	
8	●		1080p59.94 A	
9	●		1080p59.94 A	

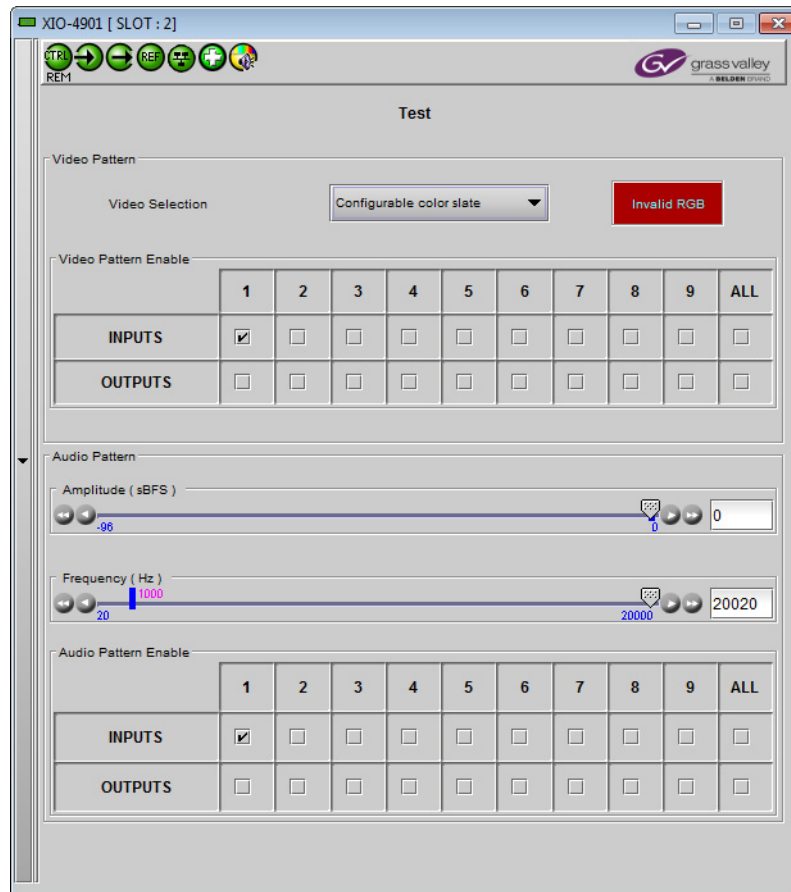
Output Audio

For a complete discussion of audio (including MADI) in the XIO-4901 and GV Node, see [GV Node Audio](#), on page 95.

Test

The Test panel allows you to place video and audio test signals on selected XIO-4901 inputs and outputs.

Note: The video and audio test patterns are **disabled** (the selection boxes are gray) for all inputs and outputs that are configured for **ASI format**.



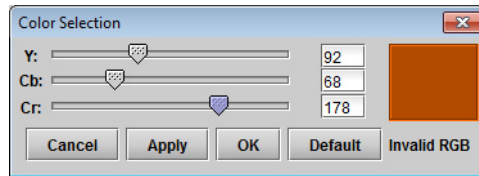
To select the video pattern for the test signal

- 1 In the **Test** panel, click the **Video Selection** pulldown.
- 2 Click to select the desired test signal.

Output	Details
Color bar	Use a standard color bar as the test signal.
Configurable color slate	Use a full-frame color patch as the test signal.

To choose the color for the full-frame color patch

- 1 Click the color patch in the screen beside the Video Selection pulldown.
The Color Selection window opens.



- 2 Click **Default** to select and apply the default color (Black: Y=16; Cb=Cr=128).
- 3 Move the sliders, or type into the data boxes, to adjust the color.
Invalid colors will be flagged as **Invalid RGB** beneath the color patch in this window, and inside the color patch in the Test panel window.
- 4 Click **Apply** to confirm your changes, or **Cancel** to close the window and leave the color unchanged.
- 5 Click **OK** to close the window after applying your changes.

To enable the video pattern on inputs and outputs

- 1 Click on a checkbox in the **Video Pattern Enable** grid to apply the video test pattern to that input or output.
- 2 Click on the appropriate checkbox in the **ALL** column to apply the pattern to all inputs or all outputs.

To configure the audio pattern for the test signal

- 1 Choose an amplitude by moving the slider or typing in the data box.
Range: -96 sBFS to 0 sBFS
- 2 Choose a frequency by moving the slider or typing in the data box.
Range: 20 Hz to 20000 Hz

To enable the audio pattern on inputs and outputs

- 1 Click on a checkbox in the **Audio Pattern Enable** grid to apply the audio test pattern to that input or output.
- 2 Click on the appropriate checkbox in the **ALL** column to apply the pattern to all inputs or all outputs.

Options

There is one option available for the XIO-4901.

XIO-4901-OPT-MDX is a software option that enables audio embedding / de-embedding on all SDI inputs and outputs on the XIO-4901 module.

To enable this option

- 1 Purchase the option from Grass Valley.
You will be provided with an activation key
- 2 Click **Options**.



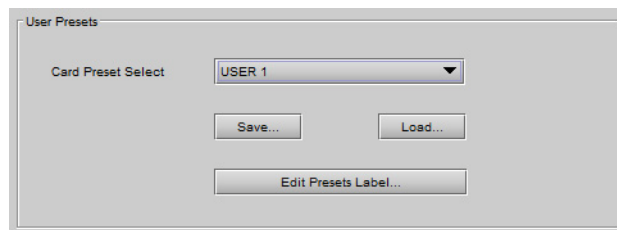
- 3 Enter the activation key in the **Enter Key** data box.
- 4 Click **Enable Option**.
The status window beneath the data box will show that the option is active.

User Presets

The XIO-4901 has 8 memory registers that can hold user-defined parameter settings. You can save the current settings to a register, or reload the XIO-4901 with the contents of a register

To manage User Presets

- 1 Click **Factory / Presets**.



- 2 Select a register using the **Card Preset Select** pulldown.
- 3 Click **Save** to save the card's parameter values in the selected memory register.

A pop-up will allow you to proceed or cancel the action.

Note that this action will overwrite the existing register contents.

- 4 Click **Load** to load the card with the contents of the selected memory register.

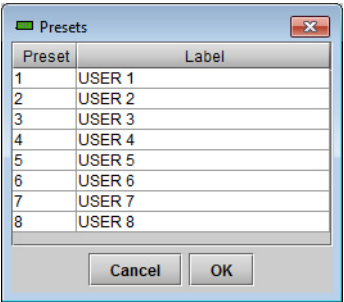
A pop-up will allow you to proceed or cancel the action.

Note that this action will overwrite the card's existing parameter settings and values.

To re-name a user preset

- 1 Click **Edit Presets Label**.

The Presets window opens.



- 2 Double-click on a name in the Label column.
- 3 Type a name in the data box.
- 4 Click **OK**.

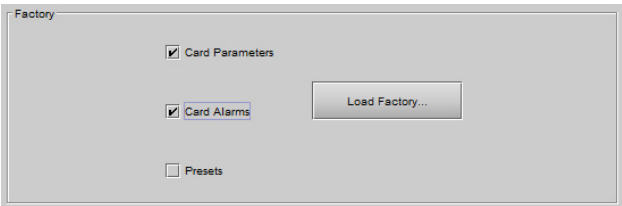
The text you have entered (up to 16 characters) will be appended to the label name in the selection pulldown.

Factory Configuration

The XIO-4901 maintains a set of factory-specified settings in memory, and can be restored to that state at any time. You can select which groups of parameters are restored.

To reset the XIO-4901 to the factory default status

- 1 Click **Factory / Presets**.



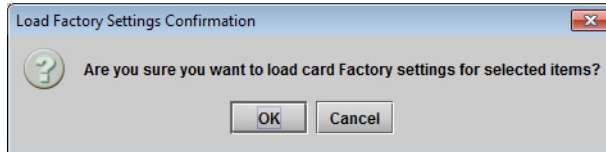
- 2 Click the checkboxes corresponding to the parameters that you want to restore to factory default values:

Checkbox	Restores (i.e. overwrites current values with factory defaults)
Card Parameters	All operating parameters you have configured via the user interface.
Card Alarms	The alarm settings you have made on the Alarms panel.
Presets	The user presets that you have stored on the card.

If the box is **not checked**, the current card settings will remain **unchanged**.

3 Click **Load Factory**

The Load Factory Settings Confirmation window opens.



4 Click **OK** to restore the factory settings, or **Cancel** to leave the settings unchanged.

Alarms

The XIO-4901 generates alarms that are sent to the GV Node controller card when error conditions are detected. These alarms are used to set the control panel status display, and the status icon in the top left of the iControl window.

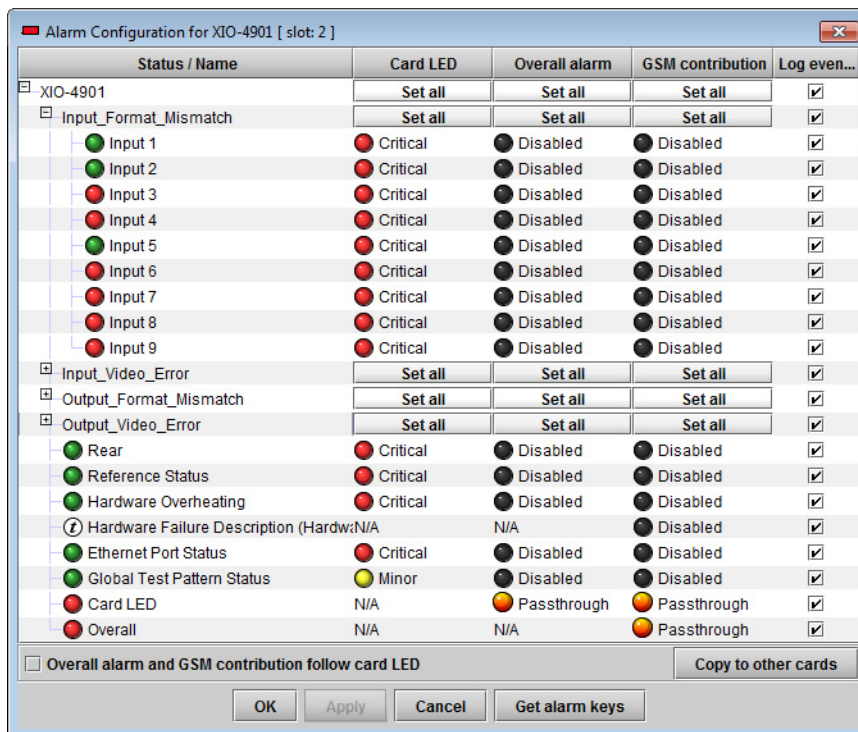
The alarms are reported to the iControl network, and can be reported locally on the frame's GPI port.

GPI reporting can only be accessed from the menu, as described at the end of this section (page 32).

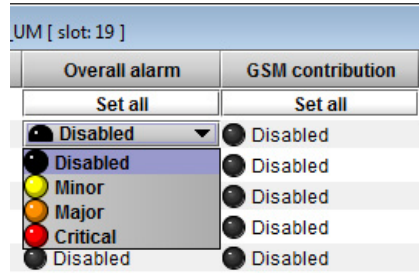
To configure the alarms

1 Click **Alarm Config**.

The Alarm Configuration panel opens in a new window, and can be resized if needed. It allows the alarm reporting of the module to be configured. The panel is organized in columns.



- 2 For each line in the Status/Name column:
 - a Click on the icon in the Overall Alarm column
 - b Click to select the appropriate alarm status from the drop-down list



- c Click on the icon in the GSM Contribution column
 - d Click to select the appropriate alarm status from the drop-down list

Shortcut: if you click on “Set All” at the top of one of these columns, you will open a pulldown list that lets you assign a level to all alarms in that column simultaneously.

- e Click on an icon in the Card LED column

You may find that some of these alarms have been hard-wired to a specific level, or can only be reset using the Set All pulldown

- f Click to select the appropriate alarm status from the drop-down list, if available.

- 3 Click **OK** to accept the settings and close the window, **Apply** to accept the settings and keep the window open, or **Cancel** to discard the changes and close the window.

See [Alarm Configuration](#) on page 84 for a more detailed description of the contents of this panel.

GV Node Manager

The GV Node Manager manages inputs and outputs between the IFM-2T fabric module and the modular cards in the GV Node’s 16 slots. It also configures redundancy and stream bitrate at the aggregation port IP interface.

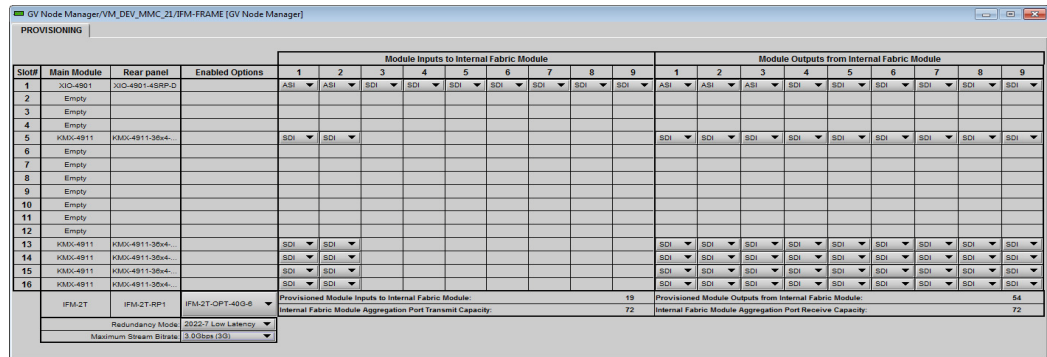
To manage the inputs and outputs between the Fabric Module and the modular cards

- 1 In iControl Navigator, locate the **GV Node Manager** associated with your GV Node and double-click its icon.

The GV Node’s **GV Node Manager** panel opens.

Note: In the presence of multiple GV Node managers, locate yours by checking the Comments column—the DNAME you chose for your GV Node will be the last element in the comment. See [step 5](#) on page 14 under Registering your GV Node to iControl.

Configuring Your GV Node GV Node Manager



- In the row beside each GV Node modular card, select the status of each of the 9 inputs to the fabric module and 9 outputs from the fabric module.

XIO-4901: The available choices depend on whether the MDX option is activated on the XIO-4901 card (See [Options](#) on page 77), and whether it is selected under the Options column in the GV Node Manager window.

XIO-4901 Card	GV Node Manager		
MDX Option	Options	I/O CH 1-7	I/O CH 8 & 9*
Not activated	(blank)	OFF SDI ASI	OFF SDI MADI ASI
Activated	None	OFF SDI ASI	OFF SDI MADI ASI
Activated	MDX	OFF SDI MDX	OFF SDI MDX

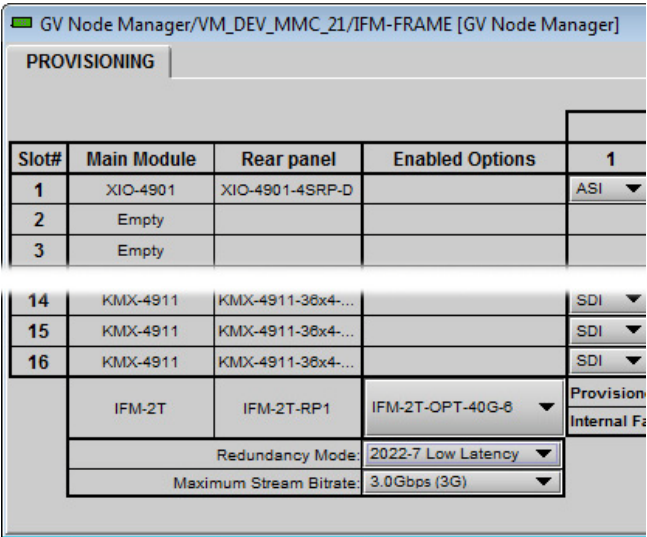
* When using the XIO-4901-4DRP rear panel (BNC connectors), there are only 8 I/O available, and MADI is enabled on I/O CH 7 & 8.

To configure redundancy and stream bitrate at the aggregation ports

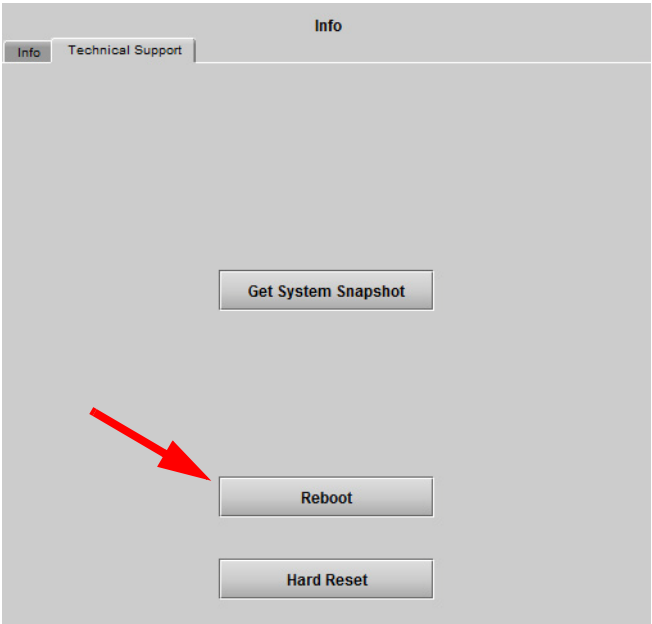
Note: These features require that the **IFM-2T-RP1** rear panel for the IFM-2T fabric module is installed.

- In iControl Navigator, locate the **GV Node Manager** associated with your GV Node and double-click its icon.

The GV Node's **GV Node Manager** panel opens.



- 2 In the row labeled "IFM-2T", ensure that **IFM-2T-OPT-40G-6** is selected under **Enabled Options**.
- 3 Use the **Redundancy Mode** pulldown to enable or disable 2022-7 Low-Latency redundancy.
- 4 Use the **Maximum Stream Bitrate** pulldown to select between 1.5 Gbps (HD) and 3Gbps (3G) maximum bitrates.
- 5 You must **reboot** the IFM-2T for the changes to take effect.
- 6 In **iControl**, open the IFM-2T service panel, and select **Info | Technical Support**.



- 7 Click **Reboot**.
The IFM-2T service will restart in the selected operating mode..
NOTE: All of the outputs will be interrupted during the reboot process.

The table summarizes the available configurations.

Enabled Option	Redundancy Mode	Maximum Stream Bitrate
None	Not available	Not available
IFM-2T-40G-6	None 2022-7 Low Latency	1.5Gbps (HD) 3Gbps (3G)

Redundant Port Pairing

When 2022-7 Low Latency redundancy is enabled, the QSFP ports on the IFM-2T-RP1 rear panel are paired as follows:

Port for I/O A	Port for I/O B
1	4
2	5
3	6
7	10
8	11
9	12

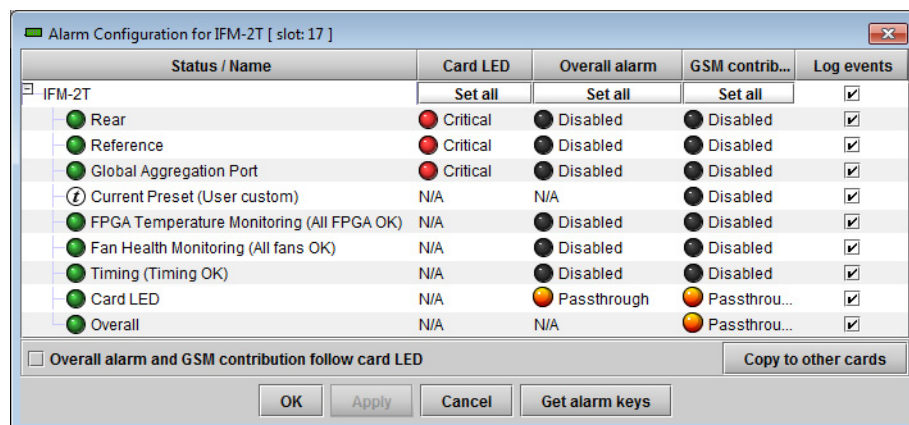
The **A port** and **B port** in each pair are physically located one above the other on the rear panel.

Alarm Configuration

All modules with an iControl interface provide an Alarm Configuration window. The specific display for each module is shown in its own section, but an overview of the elements of the display is given here.

Note: For a more detailed description of alarms in the iControl environment, see the iControl User Manual, available at the Grass Valley website, www.grassvalley.com.

Here is a typical Alarm Configuration panel:



Status/Name

This column contains an expandable tree listing all the alarms reported by this device.

Each alarm name includes an icon that shows its current status

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 status in either of these columns to show the status options that are available, then click on one to select it. If no options appear, the alarm is not user-configurable

Card LED

This column allows configuration of the contribution of selected individual alarms to the status displayed on the GV Node local control panel. Many cards also have a 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.

This column is not shown in all cases.

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.

Levels associated with these alarms:

Icon & status	Significance
 Disabled	The alarm makes no contribution (black icon)
 Minor	The alarm is of minor importance (yellow icon)
 Major	The alarm is of major importance (orange icon)
 Critical	The alarm is of critical importance (red icon)
 Passthrough	The alarm exists but has no effect (used for text and composite alarms)

Shortcut: if you click on **Set All** at the top of one of these columns, you will open a pulldown list that lets you assign a level to all alarms in that column simultaneously.

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

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 checkboxes to enable logging of alarm events for each alarm individually.
- Click the checkbox at the top of the column beside the card name to select all alarms.

At the bottom of the window are several other controls:

Copy to other cards

- 1 Click this button to open a panel that allows the alarm configuration set for this card to be copied into other cards of the same type.
- 2 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.
- 3 Click **Copy** to start the copy process.

The Transfer Status window reports on the status of the data transfer.

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.

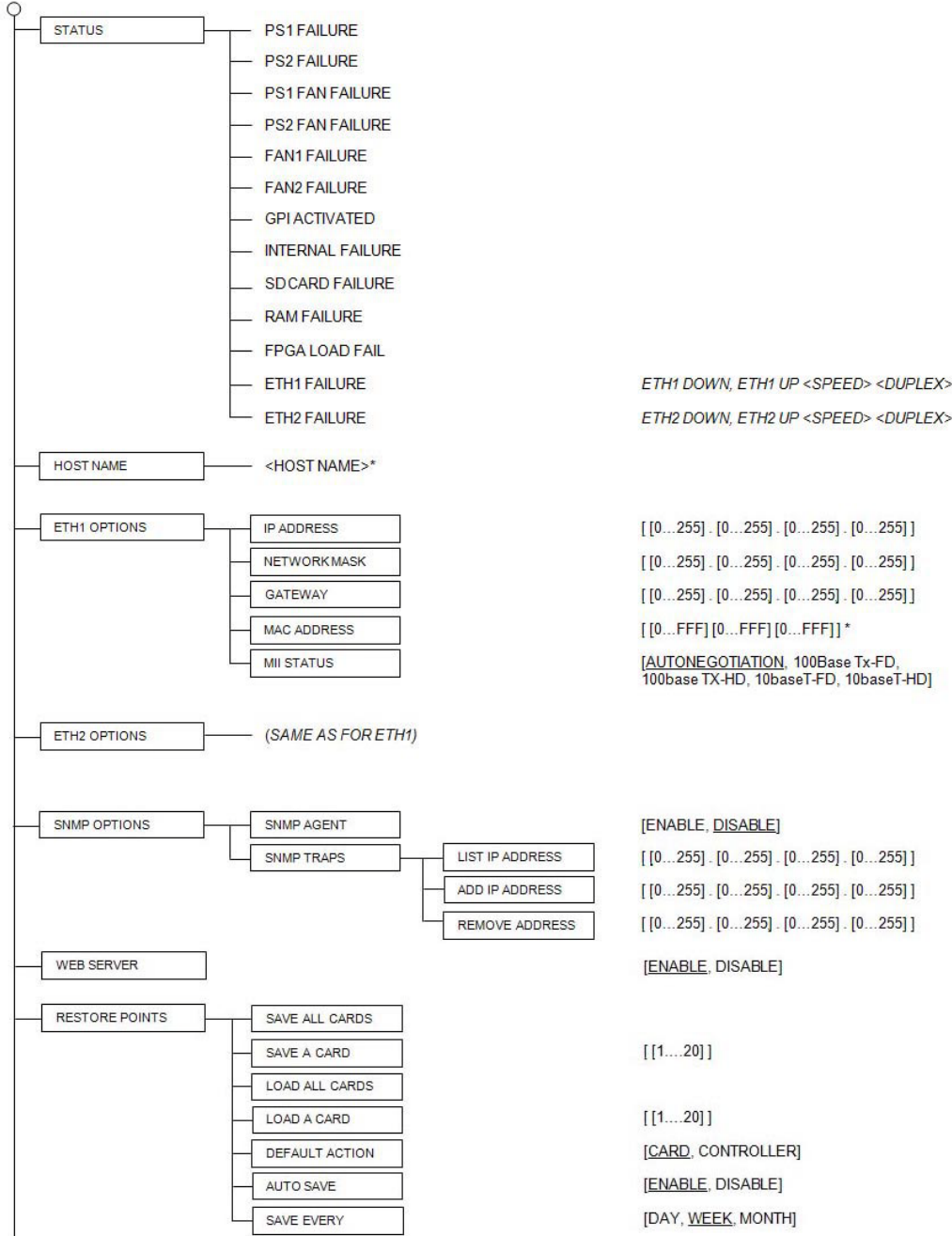
The file is saved in .csv format

OK, Apply, Cancel

- **OK** accepts the settings and closes the window once the controller 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.

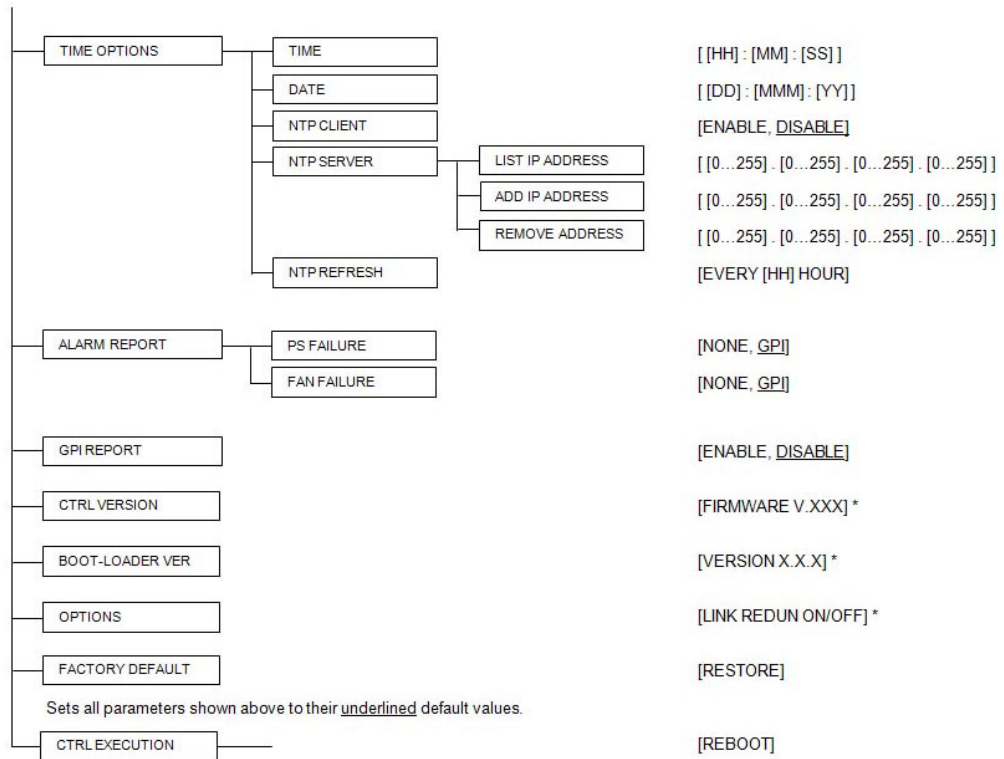
Local Control Menus

CPU-ETH3 Menu



Continued

Configuring Your GV Node CPU-ETH3 Menu



* Values marked with an asterisk are displayed but cannot be modified through this menu.

3 Router Control Configuration

Introduction

Operating the GV Node's internal router, the IFM-2T fabric module, requires an external control solution:

- **NV-9000** - Grass Valley's router controller.
- **GV Convergent**
- **NP0017/0017** for third-party control

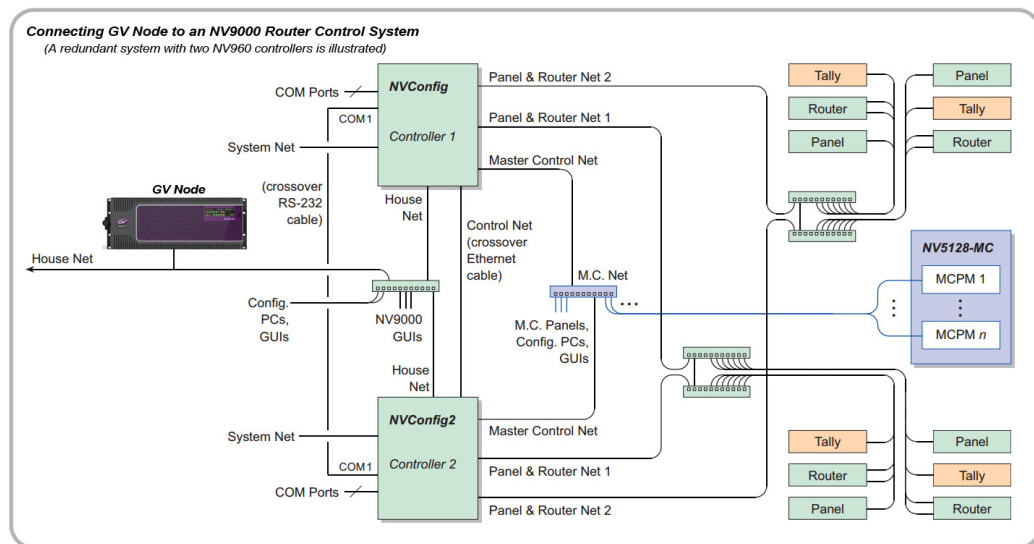
This manual describes an application-specific process for setting up the control interface for GV Node using NV-9000. If you need more detailed information, please consult the user documentation for this product, available on the Grass Valley website, www.grassvalley.com.

Summary

<i>Introduction</i>	89
<i>Overview</i>	89
<i>Step 1: Configure GV Node for your operational setup</i>	90
<i>Step 2: Connect GV Node to the NV9000 network</i>	90
<i>Step 3: Design a configuration using SE Utilities</i>	90

Overview

A typical NV9000 system including a GV Node is shown in the diagram below:



The point to note is that, while NV9000 systems are normally operated as an isolated ecosystem (the entire right-hand side of the figure - controllers, routers, panels, tallys, etc.) to prevent breakdowns caused by extra network traffic, the GV Node can live outside that closed ecosystem, connected through the House Net that links the NV9000 system to the outside world. The user's PC with iControl Solo can also be connected to that network, allowing the GV Node to be configured in situ.

Establishing a router control setup for GV Node and NV9000 involves these steps:

[Step 1: Configure GV Node for your operational setup](#), on page 90

[Step 2: Connect GV Node to the NV9000 network](#), on page 90

[Step 3: Design a configuration using SE Utilities](#), on page 90

Step 1: Configure GV Node for your operational setup

Before connecting GV Node to an external control solution, you must identify the use requirements and configure the system parameters that affect them. These are found in the earlier chapters of this manual.

Step 2: Connect GV Node to the NV9000 network

Because the GV Node is connected to the NV9000 House Net, you will need to set the GV Node IP address to occupy the same subnet as the NV9000 controller.

- NV9000 default address for the House Net: 192.168.20.1

See [Setting the GV Node's IP Address](#), on page 13, for detailed instructions.

Step 3: Design a configuration using SE Utilities

This process is beyond the scope of this manual.

Please consult the **User Manual for NV9000 SE Utilities** configuration software for detailed instructions.

Helpful Information when designing a configuration:

Protocol	NV Ethernet - Compact router
Router Size	288 x 288
Router IP Address	As configured in Step 2

The tables below list the port identifications for the various I/O to the fabric card.

Card Slot I/O Numbering

Video Matrix

Slot No.	First I/O	Last I/O
1	1	9
2	10	18
3	19	27
4	28	36
5	37	45
6	46	54
7	55	63
8	64	72
9	73	81
10	82	90
11	91	99
12	100	108
13	109	117
14	118	126
15	127	135
16	136	144

Audio Matrix (embedded audio)

Slot No.	I/O 1	I/O 2	I/O 3	I/O 4	I/O 5	I/O 6	I/O 7	I/O 8	I/O 9
1	1	17	33	49	65	81	97	113	129
2	145	161	177	193	209	225	241	257	273
3	289	305	321	337	353	369	385	401	417
4	433	449	465	481	497	513	529	545	561
5	577	593	609	625	641	657	673	689	705
6	721	737	753	769	785	801	817	833	849
7	865	881	897	913	929	945	961	977	993
8	1009	1025	1041	1057	1073	1089	1105	1121	1137
9	1153	1169	1185	1201	1217	1233	1249	1265	1281
10	1297	1313	1329	1345	1361	1377	1393	1409	1425
11	1441	1457	1473	1489	1505	1521	1537	1553	1569
12	1585	1601	1617	1633	1649	1665	1681	1697	1713
13	1729	1745	1761	1777	1793	1809	1825	1841	1857

Audio Matrix (embedded audio)

Slot No.	I/O 1	I/O 2	I/O 3	I/O 4	I/O 5	I/O 6	I/O 7	I/O 8	I/O 9
14	1873	1889	1905	1921	1937	1953	1969	1986	2001
15	2017	2033	2049	2065	2081	2097	2113	2129	2145
16	2161	2177	2193	2209	2225	2241	2257	2273	2289

Audio Matrix (MADI audio)

MADI	Groups 1-4	Groups 5-8	Groups 9-12	Groups 13-16
I/O 8	1-16	17-32	33-48	49-64
I/O 9	65-80	81-96	97-112	113-128

Aggregation Port I/O Numbering

The tables for the aggregation ports depend on whether 222-7 Redundancy and/or 6HD low bit rate modes are activated. See [To configure redundancy and stream bitrate at the aggregation ports](#), on page 82, for details on activating these modes.

- 222-7 Redundancy halves the number of channels sent and received from 144 to 72, but sends/receives each channel twice (e.g. CH145a and Ch145b) on different ports.
- 6HD Low bitrate reduces each channel from 3Gbps to 1.5Gbps, allowing all 144 channels to be sent on aggregation ports 1-6, and leaving aggregation ports 7-12 unused.

Channels on the aggregation ports are numbered from 145 to 288.

The four tables that follow describe the channel mapping to the aggregation ports for the four possible configurations.

222-7 Redundancy	6HD Low bitrate	Table
OFF	OFF	1. Aggregation Port I/O (222-7 Redundancy OFF, 3G signals)
ON	OFF	2. Aggregation Port I/O (222-7 Redundancy ON, 3G signals)
OFF	ON	3. Aggregation Port I/O (222-7 Redundancy OFF, 1.5G signals)
ON	ON	4. Aggregation Port I/O (222-7 Redundancy ON, 1.5G signals)

1. Aggregation Port I/O (222-7 Redundancy OFF, 3G signals)

Agg. Port	Lane 1			Lane 2			Lane 3			Lane 4		
	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3
1	145	146	147	148	149	150	151	152	153	154	155	156
2	157	158	159	160	161	162	163	164	165	166	167	168
3	169	170	171	172	173	174	175	176	177	178	179	180

Agg. Port	Lane 1			Lane 2			Lane 3			Lane 4		
	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3
4	181	182	183	184	185	186	187	188	189	190	191	192
5	193	194	195	196	197	198	199	200	201	202	203	204
6	205	206	207	208	209	210	211	212	213	214	215	216
7	217	218	219	220	221	222	223	224	225	226	227	228
8	229	230	231	232	233	234	235	236	237	238	239	240
9	541	242	243	244	245	246	247	248	249	250	251	252
10	253	254	255	256	257	258	259	260	261	262	263	264
11	265	266	267	268	269	270	271	272	273	274	275	276
12	277	278	279	280	281	282	283	284	285	286	287	288

2. Aggregation Port I/O (2022-7 Redundancy ON, 3G signals)

Agg. Port	Lane 1			Lane 2			Lane 3			Lane 4		
	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3	Port 1	Port 2	Port 3
1	145a	146a	147a	148a	149a	150a	151a	152a	153a	154a	155a	156a
2	157a	158a	159a	160a	161a	162a	163a	164a	165a	166a	167a	168a
3	169a	170a	171a	172a	173a	174a	175a	176a	177a	178a	179a	180a
4	145b	146b	147b	148b	149b	150b	151b	152b	153b	154b	155b	156b
5	157b	158b	159b	160b	161b	162b	163b	164b	165b	166b	167b	168b
6	169b	170b	171b	172b	173b	174b	175b	176b	177b	178b	179b	180b
7	181a	182a	183a	184a	185a	186a	187a	188a	189a	190a	191a	192a
8	193a	194a	195a	196a	197a	198a	199a	200a	201a	202a	203a	204a
9	205a	206a	207a	208a	209a	210a	211a	212a	213a	214a	215a	216a
10	181b	182b	183b	184b	185b	186b	187b	188b	189b	190b	191b	192b
11	193b	194b	195b	196b	197b	198b	199b	200b	201b	202b	203b	204b
12	205b	206b	207b	208b	209b	210b	211b	212b	213b	214b	215b	216b

3. Aggregation Port I/O (2022-7 Redundancy OFF, 1.5G signals)

Agg. Port	Lane 1	Lane 2	Lane 3	Lane 4
	Ports 1-6	Ports 1-6	Ports 1-6	Ports 1-6
1	145 to 150	151 to 156	157 to 162	163 to 168
2	169 to 174	175 to 180	181 to 186	187 to 192
3	193 to 198	199 to 204	205 to 210	211 to 216
4	217 to 222	223 to 228	229 to 234	235 to 240
5	241 to 246	247 to 252	253 to 258	259 to 264

Router Control Configuration
 Aggregation Port I/O Numbering

Agg. Port	Lane 1	Lane 2	Lane 3	Lane 4
	Ports 1-6	Ports 1-6	Ports 1-6	Ports 1-6
6	265 to 270	271 to 276	277 to 282	283 to 288
7-12	Not Used			

4. Aggregation Port I/O (2022-7 Redundancy ON, 1.5G signals)

Agg. Port	Lane 1	Lane 2	Lane 3	Lane 4
	Ports 1-6	Ports 1-6	Ports 1-6	Ports 1-6
1	145a to 150a	151a to 156a	157a to 162a	163a to 168a
2	169a to 174a	175a to 180a	181a to 186a	187a to 192a
3	193a to 198a	199a to 204a	205a to 210a	211a to 216a
4	145b to 150b	151b to 156b	157b to 162b	163b to 168b
5	169b to 174b	175b to 180b	181b to 186b	187b to 192b
6	193b to 198b	199b to 204b	205b to 210b	211b to 216b
7-12	Not Used			

4 GV Node Audio

GV Node provides audio routing resources in parallel with its video routing resources. This chapter describes the GV Node's audio functions.

Summary

<i>Overview of GV Node Audio</i>	95
<i>MADI</i>	96
<i>SDI Embedded Audio</i>	98

Overview of GV Node Audio

GV Node supports audio by incorporating an audio router in the IFM-2T fabric module, and by incorporating embedding and de-embedding of audio from SDI streams passing through the XIO-4901 modular card. The XIO-4901 also provides access to the audio router for MADI audio streams. There are no other discreet audio inputs or outputs to the GV Node.

Audio functionality is affected by:

- The MDX option (see [Options](#), on page 77) - enables embedding and de-embedding on the XIO-4901.
- The [GV Node Manager](#) - the control point for selecting the status of audio on the XIO-4901 inputs and outputs.

The audio functionality available at each of the XIO-4901 rear panel inputs (9) and outputs (9) is summarized in the table:

XIO-4901 Card	GV Node Manager		
MDX Option	Options	I/O CH 1-7	I/O CH 8 & 9*
Not activated	(blank)	OFF SDI ASI	OFF SDI MADI ASI
Activated	None	OFF SDI ASI	OFF SDI MADI ASI
Activated	MDX	OFF SDI MDX	OFF SDI MDX

The following summarizes what you can do with audio in the GV Node:

- If MDX is OFF (option not activated, or option active but not selected in GV Node manager), embedding and de-embedding are not active on the entire XIO-4901 card.
- If MDX is OFF, MADI may be enabled on the last two I/O of an XIO-4901. The MADI audio is directed to the audio matrix. Embedded audio can enter and leave the XIO-4901 through the remaining 7 SDI I/O ports, but remains embedded in the video stream and does not go to the audio matrix. At the outputs, it is passed through and not overwritten.
- If the MDX option is active, and turned ON in GV Node manager, the use of MADI is disabled.
- If the MDX option is active, the user may select, through the GV Node manager, whether embedding and de-embedding is active on the entire XIO-4901 card using the Options pulldown. If it is active, embedding and de-embedding can be enabled/disabled on individual inputs and outputs. If MDX is active on an output, embedded audio arriving from the video matrix will ALWAYS be overwritten by discrete audio from the audio matrix, or blanked if no audio input is selected by the control system.
- AGGREGATION port inputs (SMPTE 2066-6) do not pass through a de-embedder, so the audio from these inputs is not available on the audio matrix. In order to preserve this audio at an XIO-4901 output, that output must have MDX turned OFF (i.e. MDX option not active, or MDX disabled for that output using GV Node manager) so that the embedded audio is not overwritten.
- AGGREGATION port outputs do not incorporate an embedder, so they can only carry embedded audio that was present when the signal entered the IFM-2T video matrix.

Control of the router for audio and video is handled by the NV9000 control system. See [Router Control Configuration](#) on page 89.

MADI

The XIO-4901 supports MADI audio on the last two numbered inputs and outputs. The actual designated inputs and outputs depend on the installed rear panel, because the panel with DIN connectors supports 9 IN and 9 OUT, while the panel with BNC connectors supports 8 IN and 8 OUT.

Rear Panel	Connectors	MADI I/O Channels
XIO-4901-4DRP	BNC	7 & 8
XIO-4901-4SRP-D	DIN	8 & 9

The XIO-4901 supports MADI at 48 KHz sampling, and the MADI stream can carry 64 channels of audio, in 16 groups of 4 channels each.

Note: When the MDX Option is installed and ON, support for MADI is no longer available.

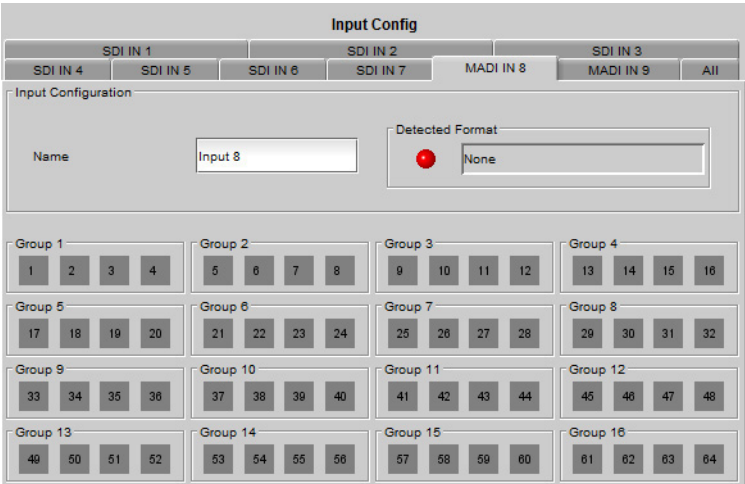
To configure SDI inputs and outputs to carry MADI audio

- 1 Open the **GV Node Manager** by double-clicking in the iControl Navigator window.
- 2 In the row for the XIO-4901 you are configuring:

- a Under **Options**, select **None** from the pulldown if the MDX option is available.
Note that this will disable embedding and de-embedding of audio on all 9 inputs and outputs of the XIO-4901.
- b In the section **Inputs to Internal Fabric Module**, select **MADI** from the pulldown for any of the last two inputs (see the table above) if you want to activate MADI for that SDI input.
- c In the section **Outputs from Internal Fabric Module**, select **MADI** from the pulldown for any of the last two outputs (see the table above) if you want to activate MADI on that SDI output.

To configure MADI on an XIO-4901 input

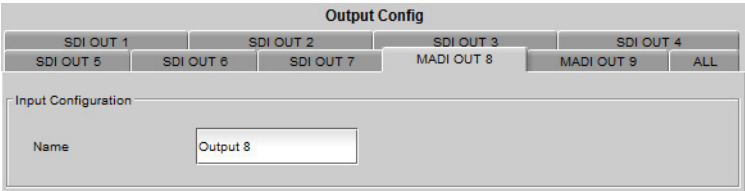
- 1 Click **Input Config** in the XIO-4901 iControl service panel, and select a **MADI IN** tab. Only the last two numbered inputs may be designated as MADI inputs.



The 64 icons in 16 Groups at the center of the panel indicate the status of incoming audio channels in the MADI stream. These audio channels are mapped to the IFM-2T audio matrix as shown in the table [Audio Matrix \(MADI audio\)](#), on page 92.

To configure MADI on an XIO-4901 output

- 1 Click **Output Config** in the XIO-4901 iControl service panel, and select a **MADI OUT** tab. Only the last two numbered inputs may be designated as MADI outputs.



The 64 audio channels in the output MADI stream are mapped from the IFM-2T audio matrix as shown in the table [Audio Matrix \(MADI audio\)](#), on page 92.

SDI Embedded Audio

SDI inputs and outputs on the XIO-4901 can carry up to 32 channels of embedded audio. With the MDX option enabled on the XIO-4901, embedding and de-embedding of 4 groups (16 channels) of audio is activated.

Each XIO-4901 supports 9 inputs and 9 outputs, totaling $(9 \times 16) = 144$ audio IN and 144 audio OUT. Since there are 16 modular card slots, the IFM-2T fabric module provides routing resources for $(16 \times 144) = 2304$ audio IN and 2304 audio OUT at the modular card interface. These audio channels must also be routed to the aggregation ports, so the total requirement is for $(2 \times 2304) = 4608$ audio routing paths.

These audio channels are mapped to the IFM-2T audio matrix as shown in the table [Audio Matrix \(embedded audio\)](#), on page 91.

To enable audio embedding and de-embedding on the XIO-4901

- 1 Activate the **MDX option** on the XIO-4901.
See [Options](#) on page 77.
- 2 Open the **GV Node Manager** by double-clicking in the iControl Navigator window.
- 3 In the row for the XIO-4901 you are configuring:
 - a Under **Options**, select MDX from the pull-down.
 - b In the section **Inputs to Internal Fabric Module**, select MDX from the pull-down for each of the 9 inputs if you want to activate de-embedding for that SDI input.
 - c In the section **Outputs from Internal Fabric Module**, select MDX from the pull-down for each of the 9 outputs if you want to activate embedding on that SDI output.

Note: MDX is the default selection for the Options, Inputs and Outputs columns in GV Node Manager when the MDX Option is first enabled. Steps 2 and 3 allow you to verify the default configuration, and let you disable MDX, if you don't need it on a particular input or output, by selecting OFF or SDI in the pull-down.

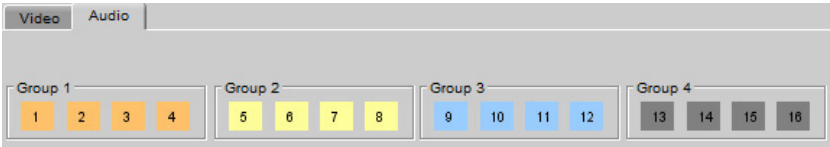
To configure Audio De-embedding on an SDI Input

- 1 Click **Input Config** in the XIO-4901 iControl service panel, and select an **SDI IN** tab.
- 2 Select the **Audio** tab.

The tab will only be shown if the **MDX option** is:

- Installed on this XIO-4901.
- Selected under **Options** in the GV Node Manager for this card.
- Selected under **Inputs to Internal Fabric Module** for this input on this card.

The 16 icons in four Groups at the top of the tab indicate the status of incoming audio to the de-embedder:



Icon color		Audio Type
Yellow		Non-PCM
Orange		PCM
Blue		Dolby E
Light purple		Dolby Digital
Dark purple		Dolby Digital Plus
Gray		No Audio

You can mouse-over a colored icon to see the format.

To configure Audio Embedding on an SDI Output

- 1 Click **Output Config** in the XIO-4901 iControl service panel, and select an **SDI OUT** tab.
- 2 Select the **Audio** tab.

The tab will only be shown if the **MDX option** is:

- Installed on this XIO-4901.
- Selected under **Options** in the GV Node Manager for this card.
- Selected under **Outputs from Internal Fabric Module** for this output on this card.

No information is displayed in this tab in the current release.

5 Use Cases

This chapter documents some typical use cases for GV Node.

Summary

<i>Two GV Nodes via a COTS switch</i>	101
<i>Two GV Nodes via a COTS switch, 2022-7 Low Latency streams</i>	102
<i>Two GV Nodes via a COTS switch, 6HD mode</i>	104
<i>Two GV Nodes via a COTS switch, 2022-7 and 6HD mode</i>	106

Use Cases for v1.2

These use cases illustrate how to configure two GV Nodes to communicate through a COTS switch, using four different setups:

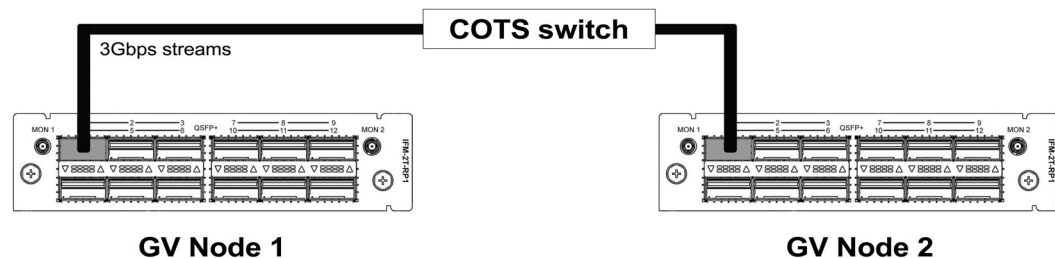
- No redundancy; high bit-rate streams
- 2022-7 Low Latency redundant, high-bit-rate streams
- No redundancy; 6HD low bit-rate streams
- 2022-7 Low Latency redundant streams, using 6HD low bit-rate mode

Step-by-step procedures are given for each case.

Two GV Nodes via a COTS switch

Connections

- 1 Plug QSFP port 1 of GV Node 1 into the COTS switch using an active optical cable QSFP
- 2 Plug QSFP port 1 of GV Node 2 into the COTS switch using an active optical cable QSFP



Configuring GV Node 1's lanes using the bulk addressing tool

- 1 Open the IFM-2T control panel in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab

- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.2"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click apply

Configuring GV Node 2's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.3"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click **Apply**

Configuring the transmit stream for a basic SMPTE 2022-6 stream on GV Node 1

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **TX Stream Config** button in the left navigation pane
- 3 Click the **TX Out 145-156** tab
- 4 Click the **TX Stream Address** field for Output #145
- 5 Enter "10.0.0.3" in the field
- 6 Click the **TX Stream Port** field for Output #145
- 7 Enter "1001" in the field
- 8 Click **Apply**

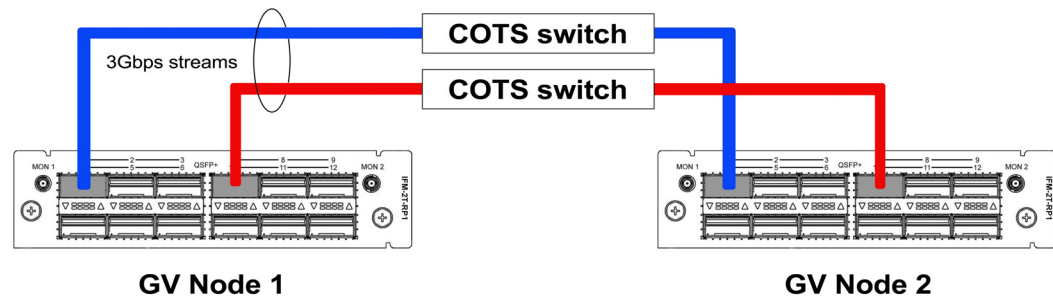
Configuring the receive stream for a basic SMPTE 2022-6 stream on GV Node 2

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **RX Stream Config** button in the left navigation pane
- 3 Click the **RX In 145-156** tab
- 4 Click the **RX Stream Address** field for Input #145
- 5 Enter "10.0.0.3" in the field
- 6 Click the **RX Stream Port** field for Input #145
- 7 Enter "1001" in the field
- 8 Click **Apply**

Two GV Nodes via a COTS switch, 2022-7 Low Latency streams

Connections

- 1 Plug QSFP port 1 of GV Node 1 into the COTS switch using an active optical cable QSFP
- 2 Plug QSFP port 7 of GV Node 1 into the COTS switch using an active optical cable QSFP
- 3 Plug QSFP port 1 of GV Node 2 into the COTS switch using an active optical cable QSFP
- 4 Plug QSFP port 7 of GV Node 2 into the COTS switch using an active optical cable QSFP



Configuring GV Node 1 for Redundancy

- 1 Open the **GV Node Manager** for GV Node 1 in iControl
- 2 Click the **IFM-2T Redundancy Mode** dropdown
- 3 Select "2022-7 Low Latency"
- 4 Close the GV Node Manager

Configuring GV Node 1's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.2"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click apply

Configuring GV Node 2 for Redundancy

- 1 Open the **GV Node Manager** for GV Node 2 in iControl
- 2 Click the **IFM-2T Redundancy Mode** dropdown
- 3 Select "2022-7 Low Latency"
- 4 Close the GV Node Manager

Configuring GV Node 2's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.3"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click **Apply**

Configuring the transmit stream for a basic SMPTE 2022-6 stream on GV Node 1

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **TX Stream Config** button in the left navigation pane

- 3 Click the **TX Out 145-156** tab
- 4 Click the **TX Stream Address** field for Output #145A
- 5 Enter "10.0.0.3" in the field
- 6 Click the **TX Stream Port** field for Output #145A
- 7 Enter "1001" in the field
- 8 Click the **TX Stream Address** field for Output #145B
- 9 Enter "10.0.6.3" in the field
- 10 Click the **TX Stream Port** field for Output #145B
- 11 Enter "1001" in the field
- 12 Click **Apply**

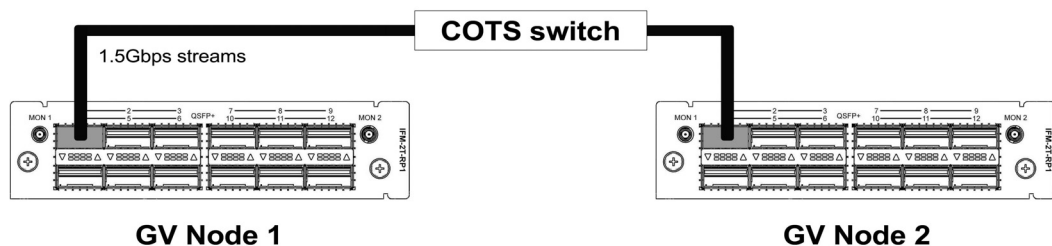
Configuring the receive stream for a basic SMPTE 2022-6 stream on GV Node 2

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **RX Stream Config** button in the left navigation pane
- 3 Click the **RX In 145-156** tab
- 4 Click the **RX Stream Address** field for Input #145A
- 5 Enter "10.0.0.3" in the field
- 6 Click the **RX Stream Port** field for Input #145A
- 7 Enter "1001" in the field
- 8 Click the **RX Stream Address** field for Input #145B
- 9 Enter "10.0.6.3" in the field
- 10 Click the **RX Stream Port** field for Input #145B
- 11 Enter "1001" in the field
- 12 Click **Apply**

Two GV Nodes via a COTS switch, 6HD mode

Connections

- 1 Plug QSFP port 1 of GV Node 1 into the COTS switch using an active optical cable QSFP
- 2 Plug QSFP port 1 of GV Node 2 into the COTS switch using an active optical cable QSFP



Configuring GV Node 1 for Low Bitrate 6HD mode

- 1 Open the **GV Node Manager** for GV Node 1 in iControl
- 2 Click the **IFM-2T Maximum Stream Bitrate** dropdown

- 3 Select "1.5Gbps (HD)"
- 4 Close the GV Node Manager

Configuring GV Node 1's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.2"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click **Apply**

Configuring GV Node 2 for Low Bitrate 6HD mode

- 1 Open the **GV Node Manager** for GV Node 2 in iControl
- 2 Click the **IFM-2T Maximum Stream Bitrate** dropdown
- 3 Select "1.5Gbps (HD)"
- 4 Close the GV Node Manager

Configuring GV Node 2's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.3"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click **Apply**

Configuring the transmit stream for a basic SMPTE 2022-6 stream on GV Node 1

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **TX Stream Config** button in the left navigation pane
- 3 Click the **TX Out 145-156** tab
- 4 Click the **TX Stream Address** field for Output #145
- 5 Enter "10.0.0.3" in the field
- 6 Click the **TX Stream Port** field for Output #145
- 7 Enter "1001" in the field
- 8 Click **Apply**

Configuring the receive stream for a basic SMPTE 2022-6 stream on GV Node 2

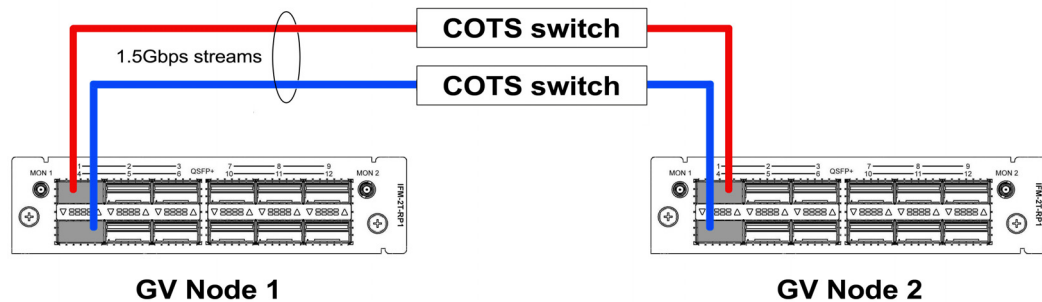
- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **RX Stream Config** button in the left navigation pane
- 3 Click the **RX In 145-156** tab
- 4 Click the **RX Stream Address** field for Input #145

- 5 Enter "10.0.0.3" in the field
- 6 Click the **RX Stream Port** field for Input #145
- 7 Enter "1001" in the field
- 8 Click **Apply**

Two GV Nodes via a COTS switch, 2022-7 and 6HD mode

Connections

- 1 Plug QSFP port 1 of GV Node 1 into the COTS switch using an active optical cable QSFP
- 2 Plug QSFP port 4 of GV Node 1 into the COTS switch using an active optical cable QSFP
- 3 Plug QSFP port 1 of GV Node 2 into the COTS switch using an active optical cable QSFP
- 4 Plug QSFP port 4 of GV Node 2 into the COTS switch using an active optical cable QSFP



Configuring GV Node 1 for Redundancy and Low Bitrate 6HD mode

- 1 Open the **GV Node Manager** for GV Node 1 in iControl
- 2 Click the **IFM-2T Redundancy Mode** dropdown
- 3 Select "2022-7 Low Latency"
- 4 Click the **IFM-2T Maximum Stream Bitrate** dropdown
- 5 Select "1.5Gbps (HD)"
- 6 Close the GV Node Manager

Configuring GV Node 1's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address** -> **Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.2"
- 6 Click the **Lane Gateway** -> **Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click **Apply**

Configuring GV Node 2 for Redundancy and Low Bitrate 6HD mode

- 1 Open the **GV Node Manager** for GV Node 2 in iControl
- 2 Click the **IFM-2T Redundancy Mode** dropdown
- 3 Select "2022-7 Low Latency"

- 4 Click the **IFM-2T Maximum Stream Bitrate** dropdown
- 5 Select "1.5Gbps (HD)"
- 6 Close the GV Node Manager

Configuring GV Node 2's lanes using the bulk addressing tool

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **Global Config** button in the left navigation pane
- 3 Click the **Bulk Addressing** tab
- 4 Click the **Lane IP Address -> Auto Increment** dropdown and select 3rd octet.
- 5 Change the starting point to "10.0.0.3"
- 6 Click the **Lane Gateway -> Auto Increment** dropdown and select 3rd octet.
- 7 Change the starting point to "10.0.0.1"
- 8 Click **Apply**

Configuring the transmit stream for a basic SMPTE 2022-6 stream on GV Node 1

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **TX Stream Config** button in the left navigation pane
- 3 Click the **TX Out 145-156** tab
- 4 Click the **TX Stream Address** field for Output #145A
- 5 Enter "10.0.0.3" in the field
- 6 Click the **TX Stream Port** field for Output #145A
- 7 Enter "1001" in the field
- 8 Click the **TX Stream Address** field for Output #145B
- 9 Enter "10.0.6.3" in the field
- 10 Click the **TX Stream Port** field for Output #145B
- 11 Enter "1001" in the field
- 12 Click **Apply**

Configuring the receive stream for a basic SMPTE 2022-6 stream on GV Node 2

- 1 Open the **IFM-2T control panel** in iControl
- 2 Click the **RX Stream Config** button in the left navigation pane
- 3 Click the **RX In 145-156** tab
- 4 Click the **RX Stream Address** field for Input #145A
- 5 Enter "10.0.0.3" in the field
- 6 Click the **RX Stream Port** field for Input #145A
- 7 Enter "1001" in the field
- 8 Click the **RX Stream Address** field for Input #145B
- 9 Enter "10.0.6.3" in the field
- 10 Click the **RX Stream Port** field for Input #145B
- 11 Enter "1001" in the field
- 12 Click **Apply**

Use Cases

Two GV Nodes via a COTS switch, 2022-7 and 6HD mode



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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