grass valley
A BELDEN BRAND

GV NODE

IP AGGREGATION, PROCESSING AND EDGE ROUTING PLATFORM

User Manual v2.2

M6103-9800-220

2018-08-02

www.grassvalley.com

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Information in this document is subject to change without notice and does not represent a commitment on the part of Grass Valley.

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Title	GV Node User Manual
Part Number	M6103-9800-220
Revision	2018-08-02, 15:00

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.

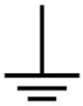
Symbols and Their Meanings

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.
- The power supply cord is used as the main disconnect device. Ensure that the socket-outlet is located/installed near the equipment and 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 has more than one power supply cord. Disconnect both 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.

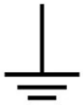
Signification des symboles utilisés

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 nettoyants 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.
- Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité de l'équipement et être facile d'accés.
- 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 comporte plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher les deux cordons d'alimentation avant de faire le dépannage.
- 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

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

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

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 though 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.

- The XIO-4901 user information is integrated into this manual.

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

The IPG-4901 modular card provides 9 IP IN and 9 IP OUT gateways to the GV Node, with SMPTE ST2022-7 support and AES 67 audio embedding and de-embedding, in both aggregation and redundancy modes.

- The IPG-4901 has a separate User Manual. Download it from the Grass Valley website.

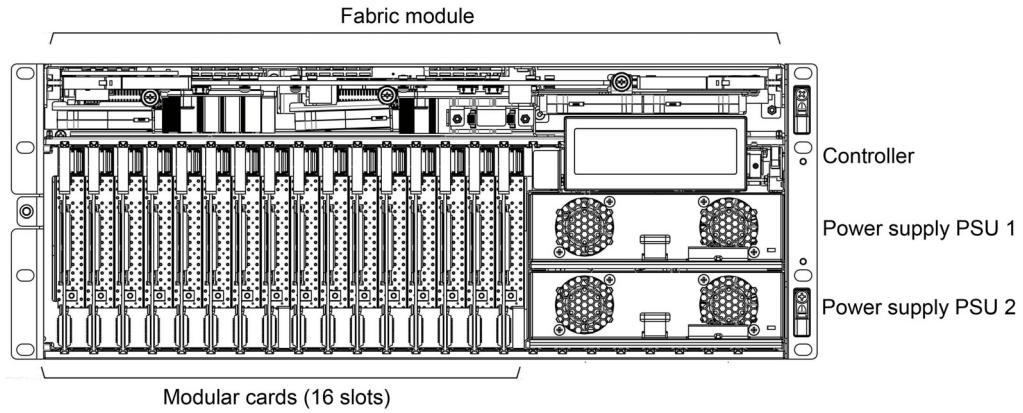
KMX-4911/KMX-4921 Multiviewer Cards

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. It's 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. The KMX-4921 adds the capability to monitor UHD signals.

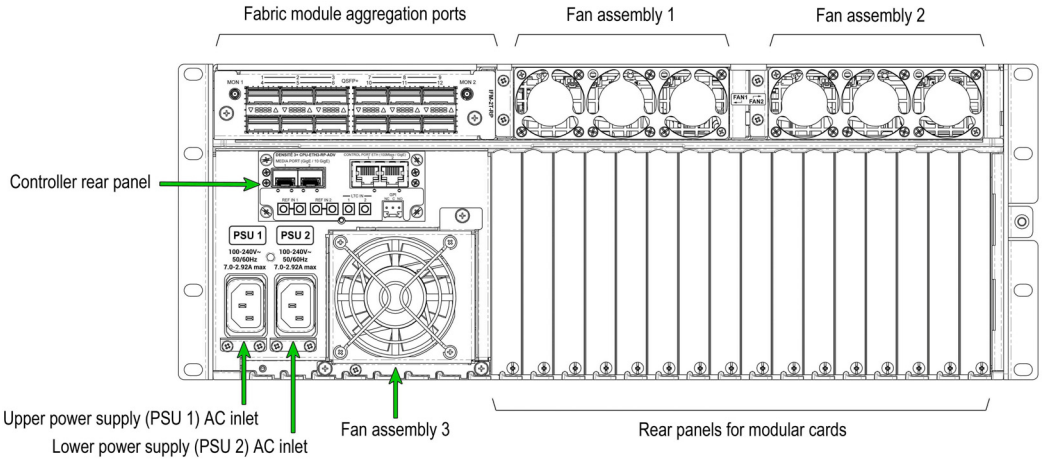
- The KMX-4911 / KMX4921 has a separate user manual. Download it from the Grass Valley website.

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 23, 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 20.
- Install the GV Node in a Rack, on page 20.
- Verify that the Cards and Power Supplies are Properly Seated, on page 22.
- Install the Optional Modular Cards, on page 23.
- Install the Power Cords with their Retaining Clips, on page 23.
- Power Up the GV Node, on page 24.

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.

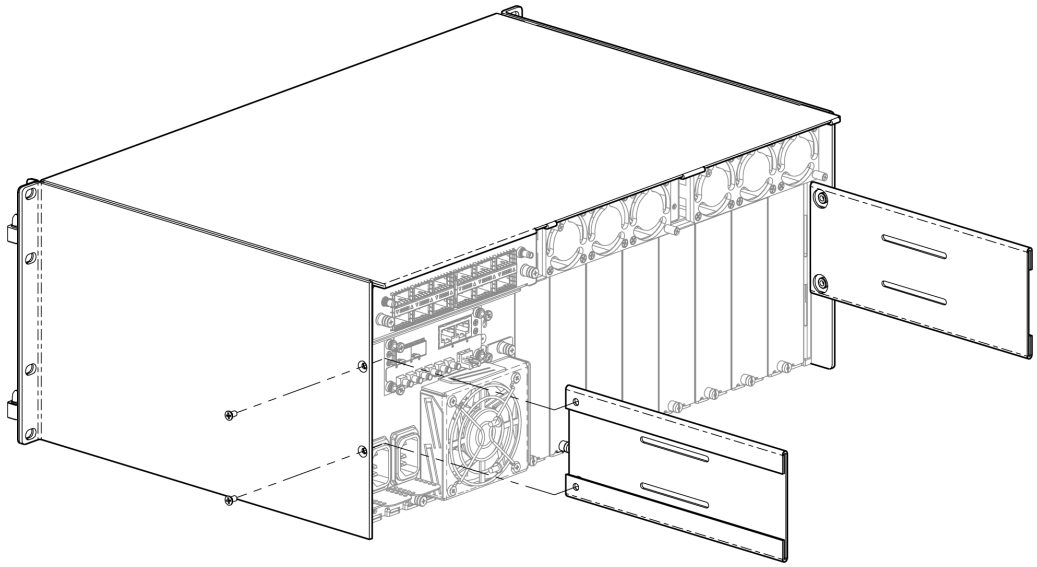
To mount the frame

- 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.

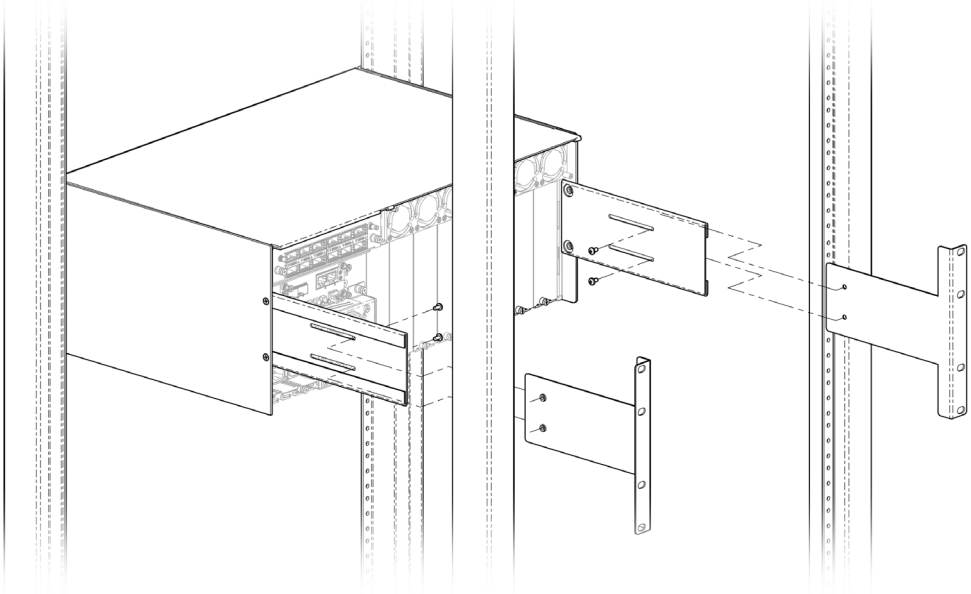
> Note: You will need a T15 (Torx) bit or screwdriver to install the screws supplied with the adapters.



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.

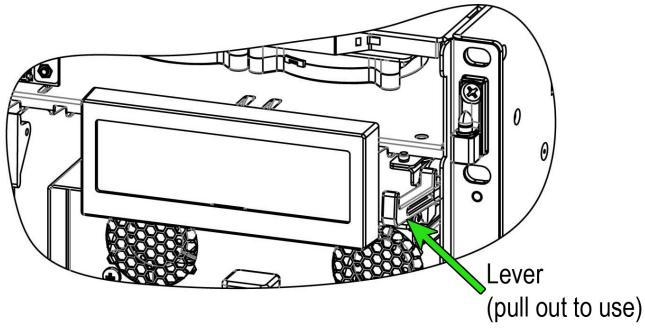


Verify that the Cards and Power Supplies are Properly Seated

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.

Remove and Install the Fabric Module

The fabric module - the GV Node's internal switcher - is a large module extending across the top of the frame. Care must be taken when removing or installing this module to minimize the risk of damage.

To remove the fabric module

1. Grasp the two swivel handles - one at each side of the card - and rotate them together to lever the card out of its socket.
2. Using both handles together, slide the module straight out of the slot.

   Be sure to support the card as it comes out of the slot, as it is quite heavy.

To install the fabric module

1. Position the card directly in front of its slot.
2. Carefully slip it straight into the slot, and slide it gently all the way in.
3. Push gently on the two swivel handles at the sides to seat the card in its socket.

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.

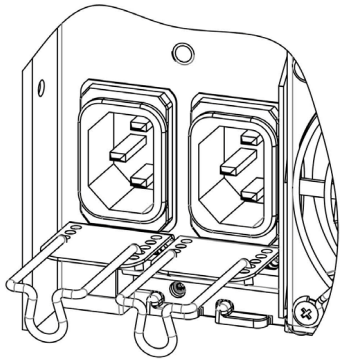
> Note: If the card requires a double-width rear panel or larger, it should be inserted into the rightmost slot (as seen from the front of the frame). Inserting the card into the wrong slot will not damage the card, but will be flagged by the on-card status LED flashing red when power is applied, to 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.

  For safety, ensure that the AC supply sockets are located near the equipment and are easily accessible.\

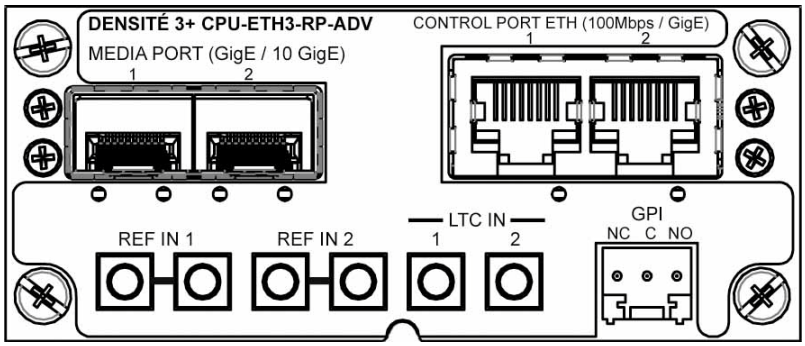
  Be sure to disconnect both supply cords before servicing to avoid electric shock

- 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



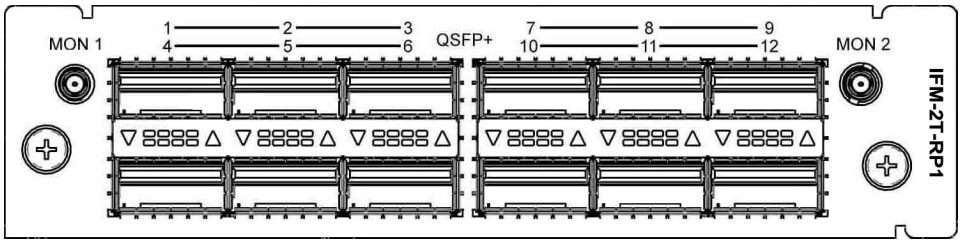
The following signal connections are available on the panel:

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. • 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. *(Future use)*
REF IN 1 (2 connectors)	External reference signal for the frame, with a loop-through, on DIN connectors.
REF IN 2 (2 connectors)	External reference signal for the frame, with a loop-through, on DIN connectors.

Connector Name	Function
LTC IN 1	External time code on DIN connector.
LTC IN 2	External time code on DIN connector.
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.

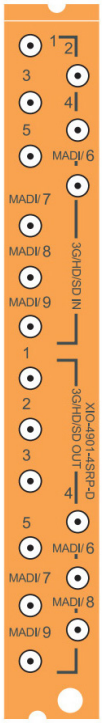
The two DIN monitor ports MON 1 and MON 2 are for future use.

XIO-4901 Rear Panel

One rear panel, using DIN connectors, is currently available for the XIO-4901SDI I/O module.

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

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. I/O 6 and 7 MADI function is not currently available. MADI is only supported on I/O 8 and 9.



XIO-4901-4SRP-D

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:

	ETH1	ETH2
IP address	192.168.3.3	192.168.4.3
Network Mask	255.255.255.0	255.255.255.0
Gateway	0.0.0.0	0.0.0.0

See Setting the GV Node's IP Address, on page 27 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 29.

There are two operational modes for GV Node control throught the ETH ports:

ETH1 only	ETH2 cannot be used to control the GV Node.
Channel Bonding	ETH1 and ETH2 share the control function - only one is functional at a time.

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

Notes

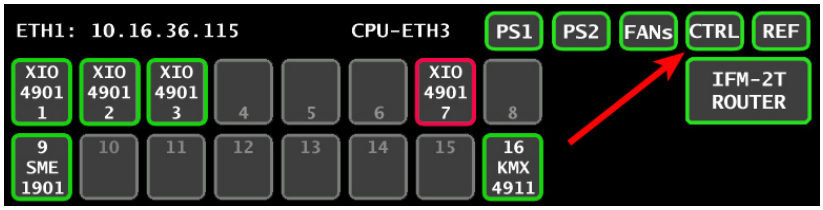
- For detailed information about iControl , refer to the iControl User Guide, available from the Documentation Library section of Grass Valley's website.
- For detailed information about iControl Solo, refer to the iControl Solo User Guide, available from the the Documentation Library section of Grass 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 7.40 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 29, 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 parametyer 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 postion 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.

Notes

- 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 can use either of the two connectors; the second connector is a loop-through. If the second connector is not used, a termination is required.

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 Densite 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 29.

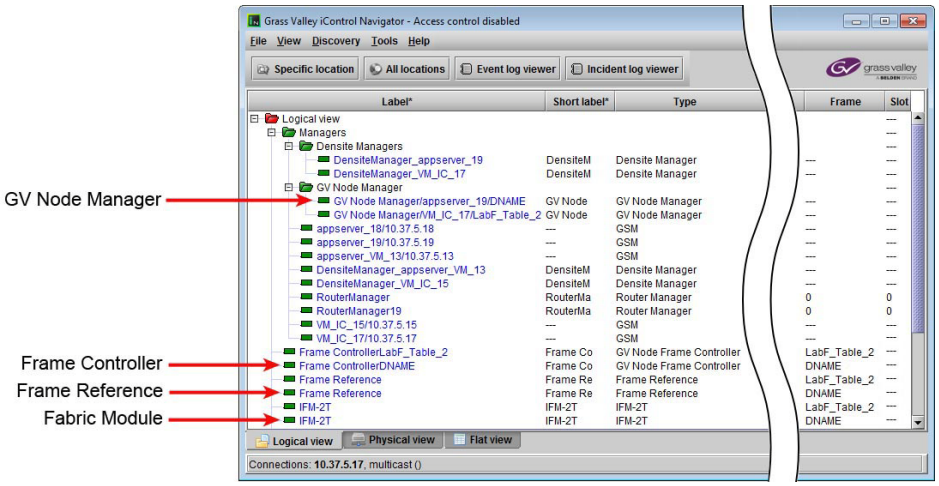
- The GV Node frame reference module, incorporated into the controller, but with its own control panel.

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:

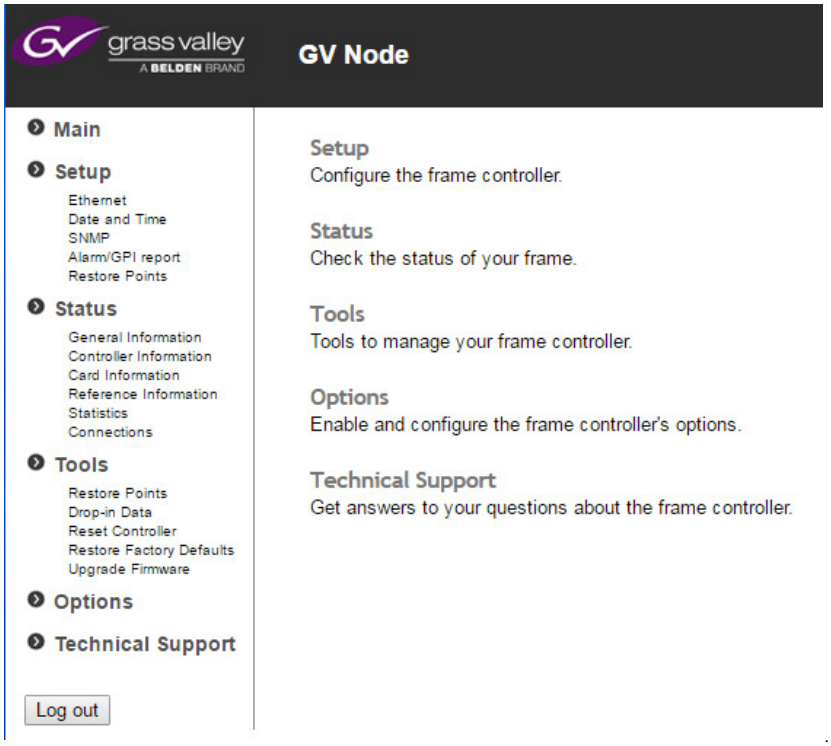
- Configure the Controller, on page 31.
- Configure the Frame Reference, on page 33.
- Configure the Fabric Module, on page 33.

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), on page 32 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.

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 and share a single IP:

- ETH2 settings are disabled, and both ports are configured using the ETH1 settings.
- The controller communicates through one port at a time.
- If the port in use fails, communication is automatically switched over to the backup port, transitioning the IP to the newly-active port.

The feature is OFF by default, and can only be turned ON through the controller's web client. See step 4 on page 31 under Configure the 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 **Timing**.
   b Select either **Module Slots** or **Aggregation Ports** from the **Switching Alignment** pulldown. Each has a different function for clean switch in GV Node as follows.

Select	Description
Module slots	Clean switching on local routes
Aggregation ports	Clean switching on aggregation routes.

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.

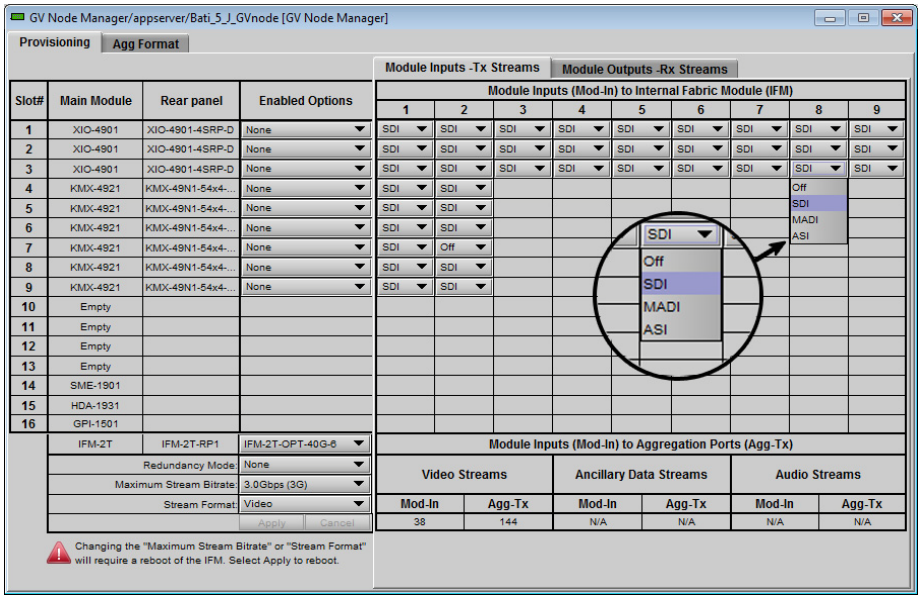
The GV Node's **GV Node Manager** panel opens.

> 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, set the configuration of each one of the 9 inputs to the fabric module and 9 outputs from the fabric module from the pulldown 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 AUTO



Changes are applied immediately.

5 To set the 2022-7 redundancy setting, stream bitrate, and stream format:

a Ensure that the **OPT-40G-6 option** is activated (per step 3 above).

b Use the **Redundancy Mode** pulldown to set redundancy on or off.

c Use the **Maximum Stream Bitrate** pulldown to select 1.5 Gbps (HD) and 3Gbps (3G) maximum bitrates.

d Use the **Stream Format** pulldown to set the aggregation format.

See To configure redundancy, stream bitrate and stream format at the aggregation ports, on page 135 for a more detailed explanation.

2 Configuring Your GV Node

This chapter describes how to configure your GV Node using the available user interfaces.

Summary

User Interfaces

The CPU-ETH3 controller is the control point for the GV Node frame and the modular cards installed in the frame. There are no separate operating controls on the frame or cards.

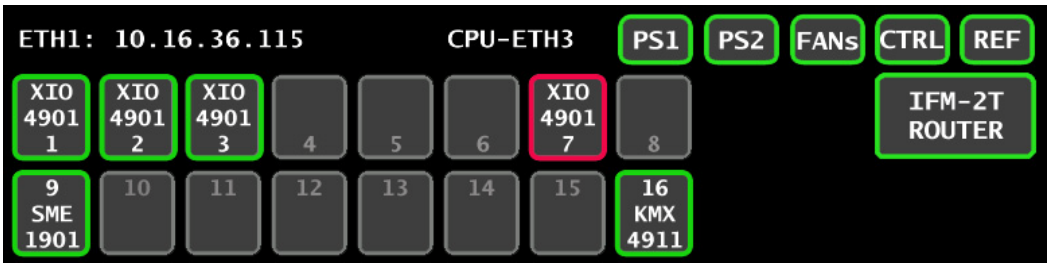
There are three ways to configure the GV Node:

User interface	About...
Local control panel	Step through a menu displayed on the touch screen on the front of the frame. No IP connection required, but not all features available. Both the controller itself, and modular cards installed in the frame, can be configured.
Controller's web page	A web client served by the controller. IP connection required. Complete functionality of the controller is provided, and help is displayed on the browser page. Does not configure or control other elements of the GV Node, i.e. fabric module or modular cards.
iControl	Grass Valley's graphic user interface. IP connection required. All elements of the GV Node can be configured and controlled with iControl.

Local control panel

The local control panel is mounted on the front of the CPU-ETH3 controller card, and when installed is located in the upper-right corner of the frame.

The touch screen interface is accessed through an aperture in the frame door.



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 it's iControl interface. See Alarm Configuration on page 139 for information about status and alarm reporting and configuration.

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

Touching the **CTRL** segment displays the local menu for the CPU-ETH3 controller itself.

The full CPU-ETH3 controller menu is shown beginning on page 69.

The functionality of the four virtual pushbuttons is as follows:

[+] [–] Move up and down the menu when a parameter name is shown

Change to the next or previous value when a variable value is shown and change has been enabled using the [SEL] button

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

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

Pushing [ESC] moves the user back up to the previous menu level.

[HOME] Exits the current menu and returns the user to the HOME screen.

If no controls are operated for 30 seconds, the controller reverts to its normal operating status, and the status display ceases flashing yellow and reverts to its normal operating mode.

Controller Status Indicator

The contoller status is displayed in the upper right side of the control panel, as a colored outilne around the CTRL segment. The table shows how the various error conditions are flagged.

Alarm/Status	Priority	Display
Power supply failure	1	FLASHING RED
Fan failure	1	FLASHING RED
Internal error	2	RED
Normal (no errors)		GREEN

LOCAL CONTROL SELECTED		FLASHING YELLOW

The status display can show only one alarm/status, so it displays only the highest priority. For example if there is an internal error, it should display RED. But if at the same time the chassis fan has failed, then the LED will display FLASHING RED.

Be aware that a high priority alarm can mask a lower priority one.

Controller's web page

The controller serves a web page from it's ETH1 port. The web page provides complete configuration utilities for the controller itself.

To use this resource, you must be able to connect to the controller. The controller is shipped with these default IP addresses on its ports:

	ETH1	ETH2
IP address	192.168.3.3	192.168.4.3
Network Mask	255.255.255.0	255.255.255.0
Gateway	0.0.0.0	0.0.0.0

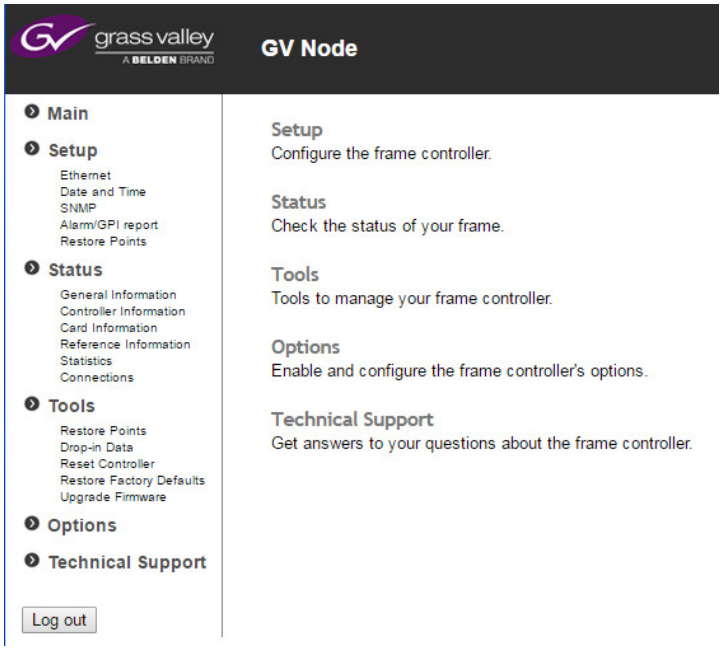
You will need to change these to fit your local network.

- You can change them from this web page, or through the local control panel menu, but not through the iControl interface.
- The procedure to change them using the local control panel interface is described in Setting the GV Node's IP Address, on page 27.

To access the CPU-ETH3 controller web page

1 Open a Web browser window and enter your CPU-ETH3's IP address in the address bar.

The home page of the CPU-ETH3 Web client appears.



Select the topic area of interest from the left-hand navigation pane, and click to open the configuration page.

iControl

The CPU-ETH3 controller supports remote operation through two rear-panel 100Mbps / GigE ethernet ports, using Grass Valley's iControl. The command set available for communicating with a Densité frame permits more complex and comprehensive control, parameter storage, and field upgrading than is supported by the local control panel.

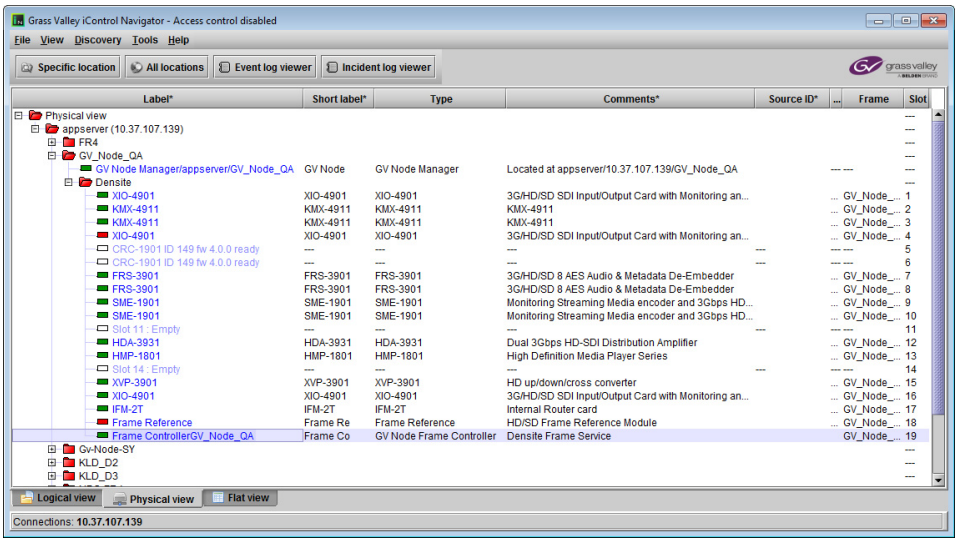
The operation of the CPU-ETH3 card can be controlled using Grass Valley's iControl system. This manual describes the control panels associated with the CPU-ETH3 and their use.

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

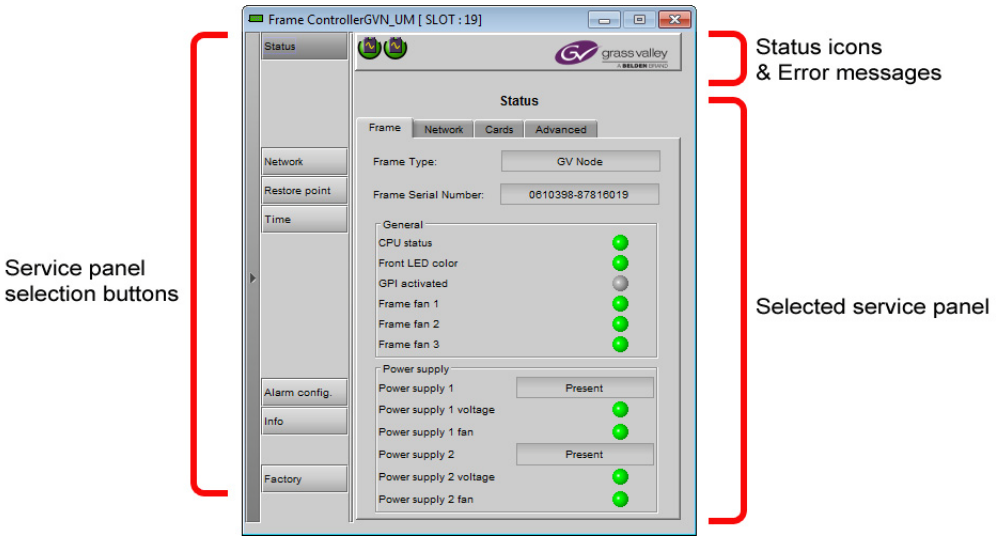
Notes

- 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.
- The CPU-ETH3 controller is compatible with iControl version 7.20 and later, and iControl Solo version 7.20 build 52 and later.

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



The iControl panel for the CPU-ETH3 controller displays a series of buttons down the left-hand side. Clicking a button changes the contents of the main window to display status reports and controls related to the topic named on the button.



Configure the CPU-ETH3 Controller

This section introduces the operating features of the CPU-ETH3 controller, and describes how to access and control them using:

- The iControl interface
- The controller's web page
- The local control panel and menu.

Summary

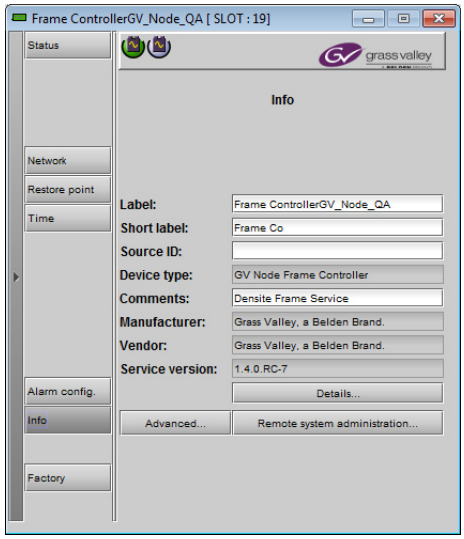
Identification

Configure this feature using...

iControl	Controller's web page	Local control panel
✓		

Identification using iControl

Click the **Info** button in the left-side navigation pane.



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:

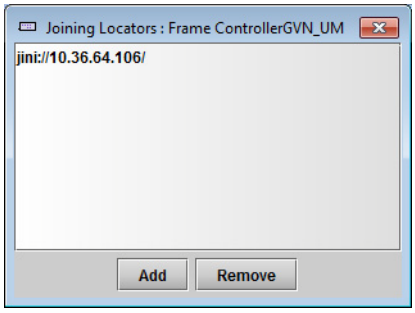
Data Box	Use	Default
Label	Identifies this device in iControl applications; usually device type and identification	FrameControllerDNAME
Short Label	8-character short label used in iControl	Frame Co
Source ID	Any text	[no text]
Comments	Any text	Densite Frame Service

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.

Status Monitoring

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

Monitor status using...

iControl	Controller's web page	Local control panel
✓	✓	✓

Status Monitoring using iControl

The iControl interface always displays two icons in the upper left of the window. These report the status of the two power supplies.

Icon	Messages
	Power supply 1 voltage: OK Power supply 2 voltage: OK

Icon	Messages
	Power supply 1 voltage: Absent Power supply 2 voltage: Absent
	Power supply 1 voltage: Error Power supply 2 voltage: Error

The table 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.

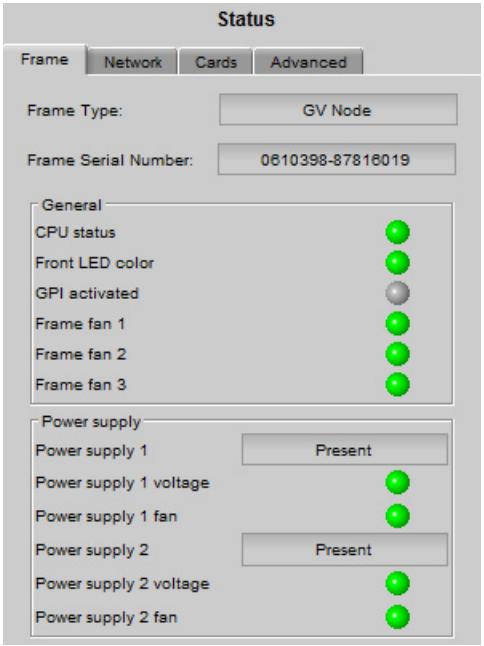
The **Status panel** shows status information in four categories, each accessed by clicking the appropriate tab.

iControl Status Panel

Click the **Status** button in the left-side navigation pane.

Status - Frame

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



These items are displayed:

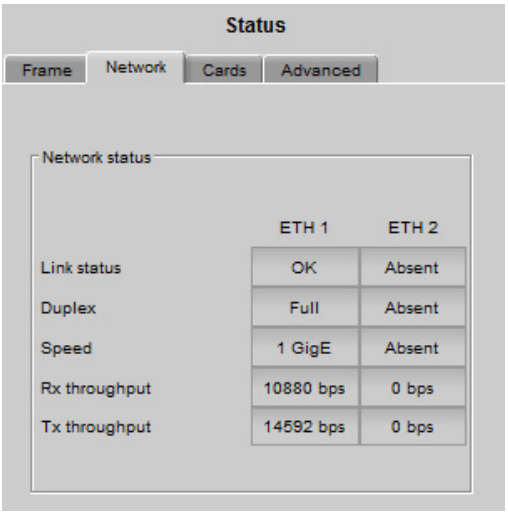
- CPU status (icon)
- Front LED color (icon)
- GPI activated (icon)
- Frame fan 1 (icon)
- Frame fan 2 (icon)
- Power supply 1 (present/absent)
- Power supply 1 voltage (icon)
- Power supply 1 fan (icon)
- Power supply 2 (present/absent)
- Power supply 2 voltage (icon)
- Power supply 2 fan (icon)

Status - Network

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

These items are displayed:

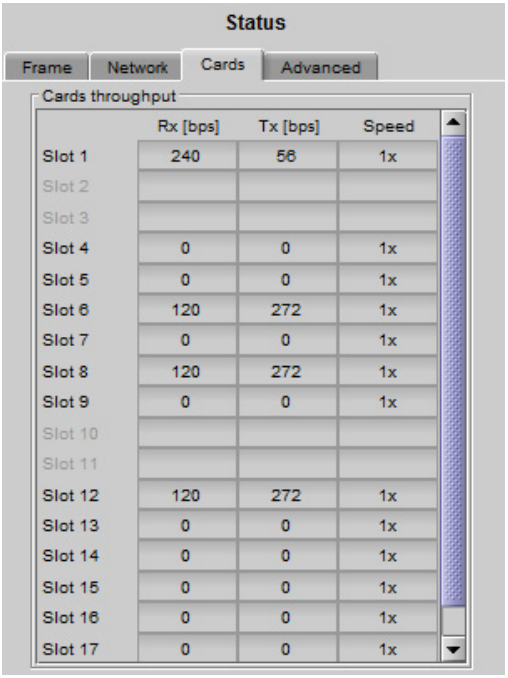
- Link status
- Duplex
- Speed
- Rx throughput
- Tx throughput



Status - Cards

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

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

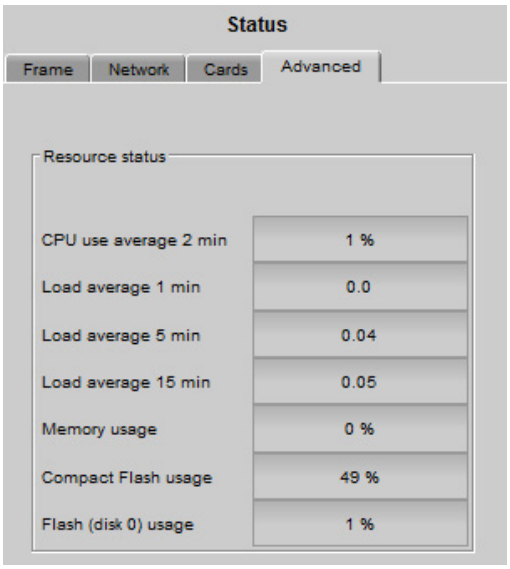


Status - Advanced

Select the *Advanced* tab to view a report on the usage of the controller's resources.

These items are displayed:

- CPU use average 2 min
- Load average 1 min
- Load average 5 min
- Memory usage
- Compact flash usage
- Flash (disk 0) usage

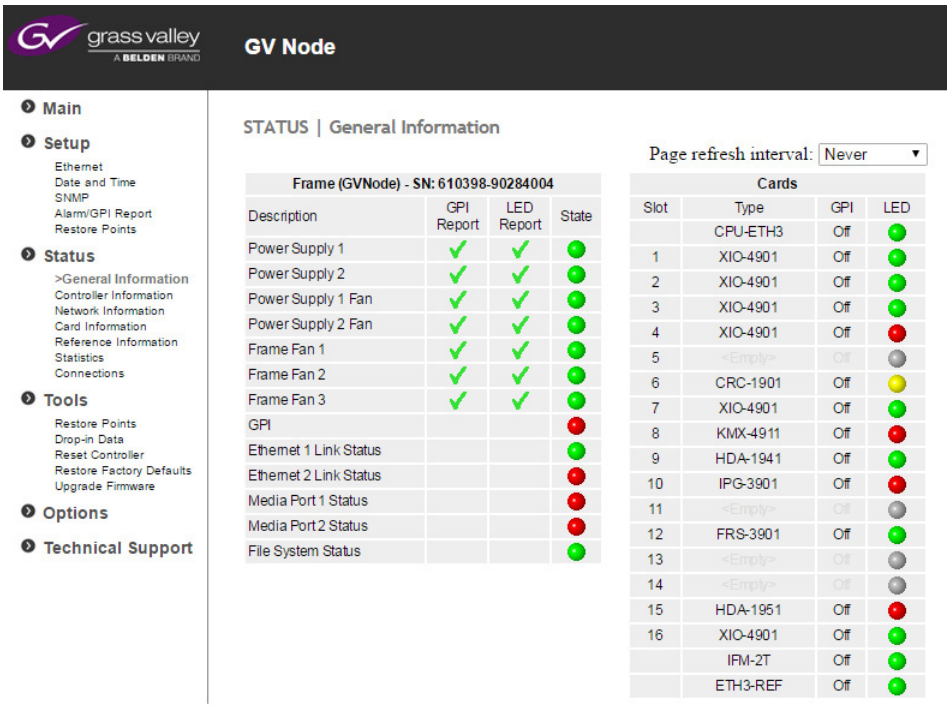


Status monitoring using the Controller's web page

The controller's web page offers a very comprehensive view of the status of the entire frame.

Select a page view from the **Status** section of the left-hand navigation pane.

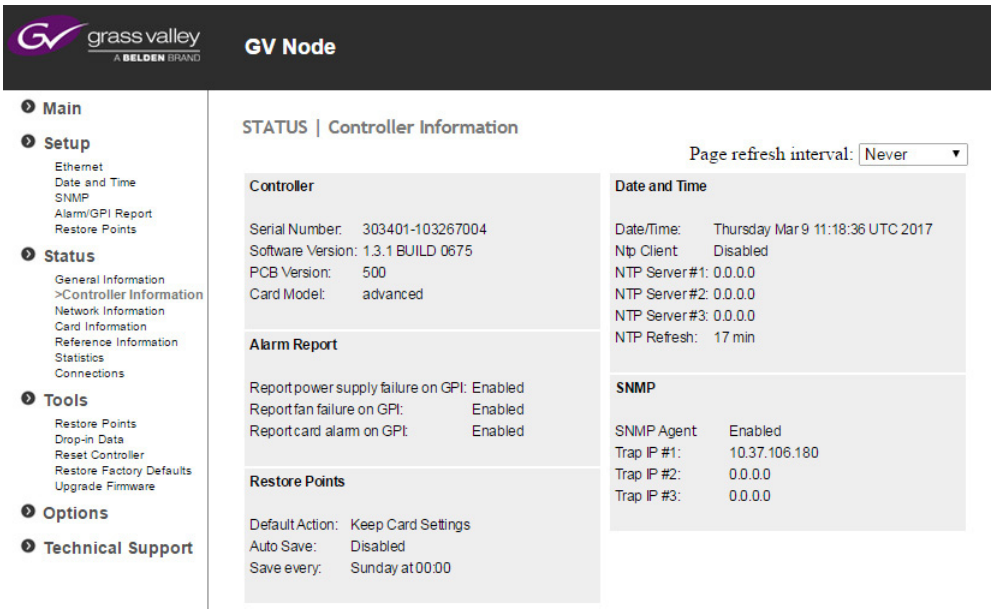
Status | General Information



This page provides status information for the power supplies, the power supply and frame fans, the GPI port, the two ethernet ports, the two media ports, and the controller's file system.

It also shows the cards occupying the frame's slots, and the status of each.

Status | Controller information



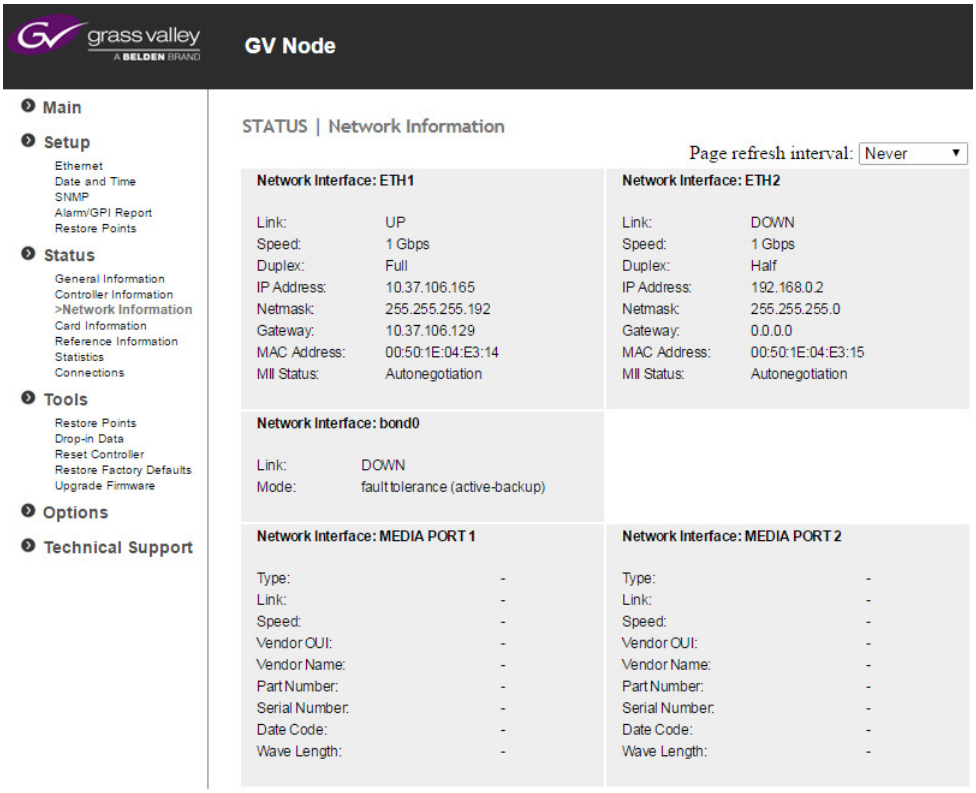
This page provides detailed information about the controller card:

[Serial number, software version, PCB version, Card model]

It also gives the status of these controller functions:

- Alarm report
- Restore points
- Date and Time
- SNMP

Status | Network Information



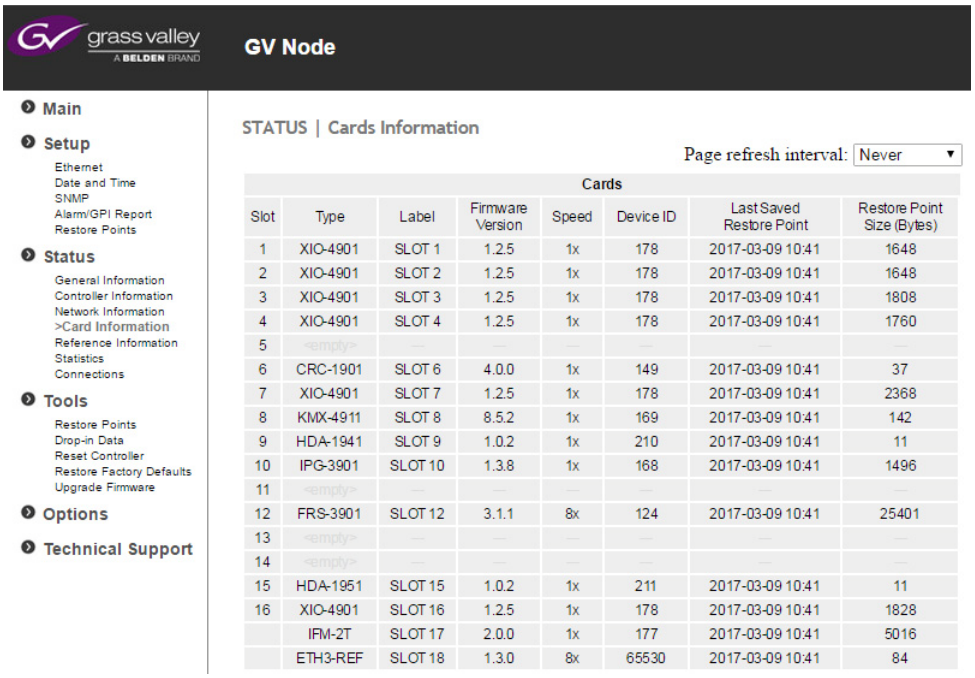
This page shows the current status of the two ethernet network interfaces on the rear panel (ETH1 and ETH2):

- Link status
- Speed
- Duplex
- IP address / Netmask / Gateway
- MAC address
- MII Status

It also shows the status of the two Media Ports on the rear panel (MEDIA PORT 1 and MEDIA PORT 2), including details of the installed SFP module:

- Type
- Link
- Speed
- Vendor details
- Part Number
- Serial Number
- Date code
- Wave length

Status | Card Information

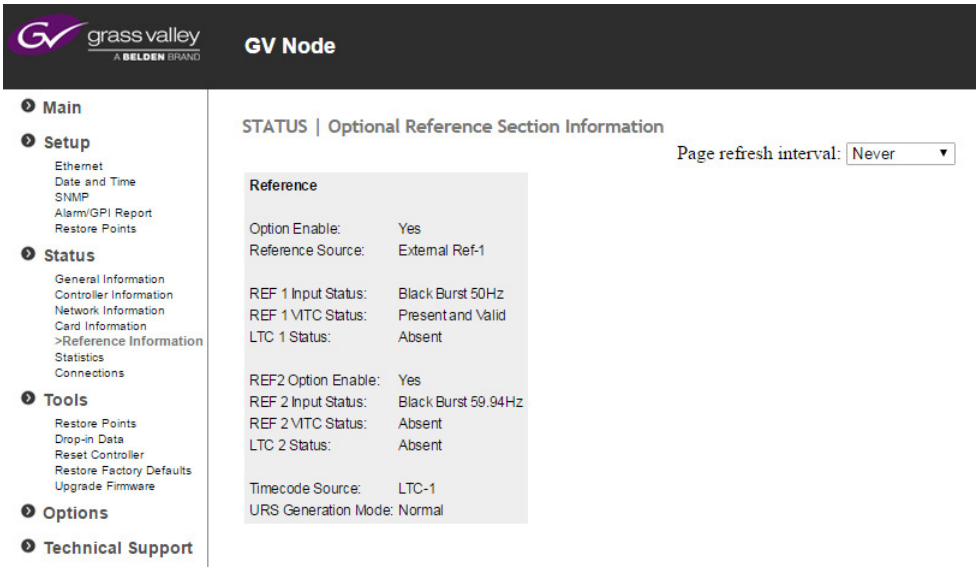


Cards

Slot	Type	Label	Firmware Version	Speed	Device ID	Last Saved Restore Point	Restore Point Size (Bytes)
1	XIO-4901	SLOT 1	1.2.5	1x	178	2017-03-09 10:41	1648
2	XIO-4901	SLOT 2	1.2.5	1x	178	2017-03-09 10:41	1648
3	XIO-4901	SLOT 3	1.2.5	1x	178	2017-03-09 10:41	1808
4	XIO-4901	SLOT 4	1.2.5	1x	178	2017-03-09 10:41	1760
5	<empty>	—	—	—	—	—	—
6	CRC-1901	SLOT 6	4.0.0	1x	149	2017-03-09 10:41	37
7	XIO-4901	SLOT 7	1.2.5	1x	178	2017-03-09 10:41	2368
8	KMX-4911	SLOT 8	8.5.2	1x	169	2017-03-09 10:41	142
9	HDA-1941	SLOT 9	1.0.2	1x	210	2017-03-09 10:41	11
10	IPG-3901	SLOT 10	1.3.8	1x	168	2017-03-09 10:41	1496
11	<empty>	—	—	—	—	—	—
12	FRS-3901	SLOT 12	3.1.1	8x	124	2017-03-09 10:41	25401
13	<empty>	—	—	—	—	—	—
14	<empty>	—	—	—	—	—	—
15	HDA-1951	SLOT 15	1.0.2	1x	211	2017-03-09 10:41	11
16	XIO-4901	SLOT 16	1.2.5	1x	178	2017-03-09 10:41	1828
	IFM-2T	SLOT 17	2.0.0	1x	177	2017-03-09 10:41	5016
	ETH3-REF	SLOT 18	1.3.0	8x	65530	2017-03-09 10:41	84

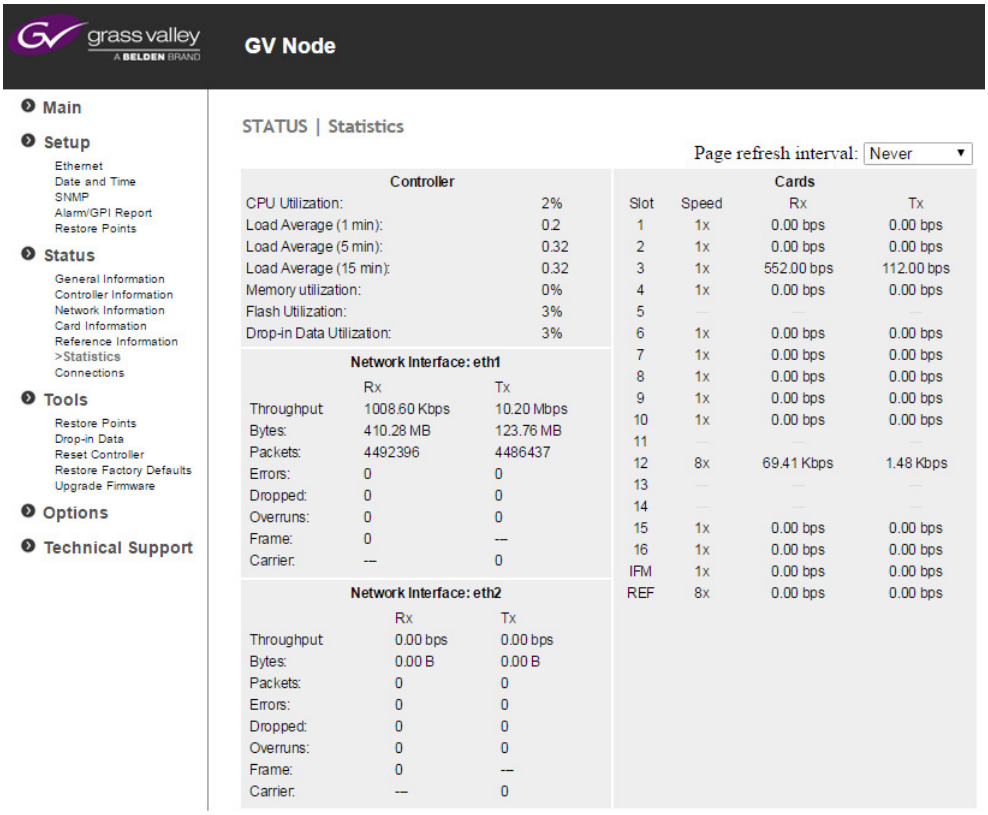
This page shows all the slots in the frame, and identifies cards inserted in them, by type, firmware version, speed, device ID, Last saved restore point, and Restore Point size.

Status | Reference Information



This page shows the status of the reference module that generates the frame's internal URS reference. The status of the two REF inputs and the two LTC inputs is shown, as well as the URS generation mode and the selected timecode source.

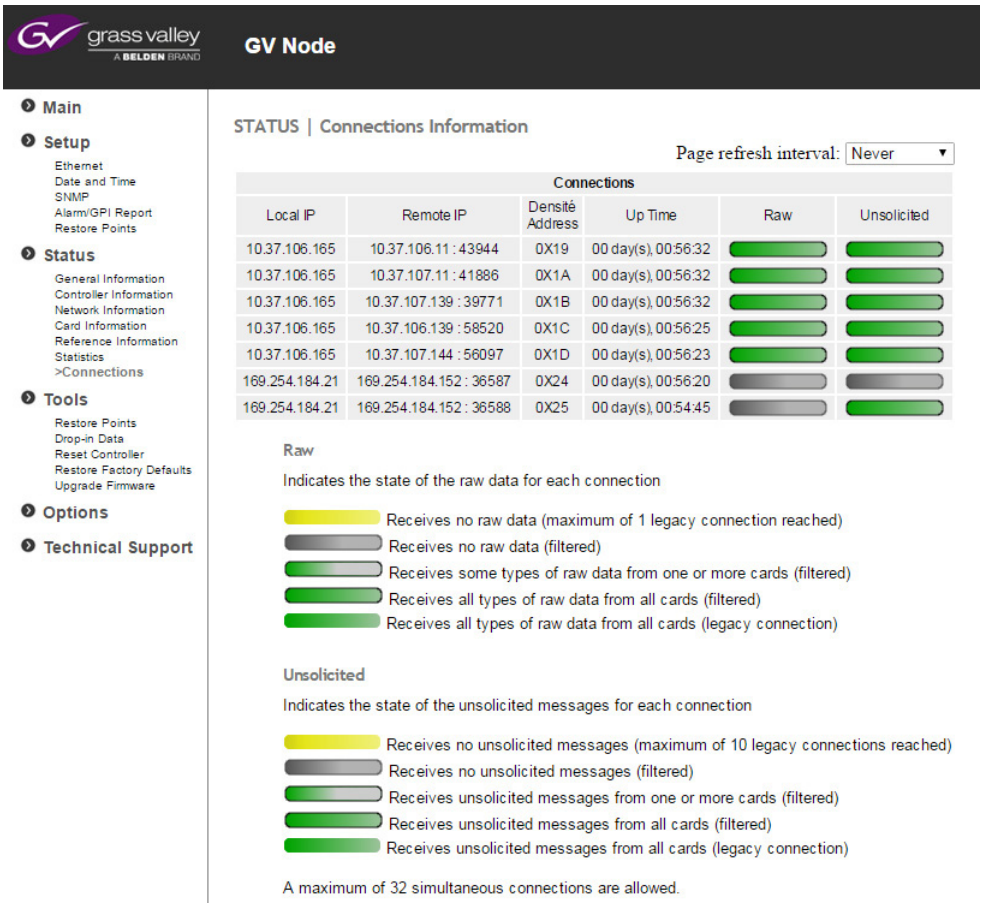
Status | Statistics



This page provides a comprehensive overview of resource utilization in the frame:

- The controller card - CPU utilization, load averages, and memory, flash and drop-in data utilization
- The two network interfaces ETH1 and ETH2 - data transfer
- The cards occupying the 16 slots in the frame - data transfer

Status | Connections Information



This page shows the IP address of all connections to this controller, and graphics representing the state of raw data and unsolicited messages for each connection. The page provides help in interpreting the graphics.

Status monitoring using the local control panel

Select STATUS and then [SEL] to cycle through the list of current faults. The amount of status information available through the local menu is very limited.

Level 1	Level 2	Level 3
STATUS	PS1 FAILURE	
	PS2 FAILURE	
	PS1 FAN FAILURE	
	PS2 FAN FAILURE	
	FAN1 FAILURE	
	FAN2 FAILURE	
	GPI ACTIVATED	
	INTERNAL FAILURE	
	SD CARD FAILURE	
	RAM FAILURE	
	FPGA LOAD FAIL	
	ETH1 FAILURE	ETH1 DOWN, ETH1 UP <SPEED><DUPLEX>
	ETH2 FAILURE	ETH2 DOWN, ETH2 UP <SPEED><DUPLEX>

Network Configuration

The ethernet interface to the CPU-ETH controller can be set up using the local control panel without an existing connection. See Networking and Control Setup on page 26 for instructions on configuring the IP address of the GV Node to enable a connection to your local network, and for instructions on registering your GV Node to iControl.

Once an ethernet connection is established, the current values can be modified using the web page or the local controller. Only the hostname can be changed through the iControl interface.

Configure the network interface using...

iControl	Controller's web page	Local control panel
✓	✓	✓

Network Configuration using iControl

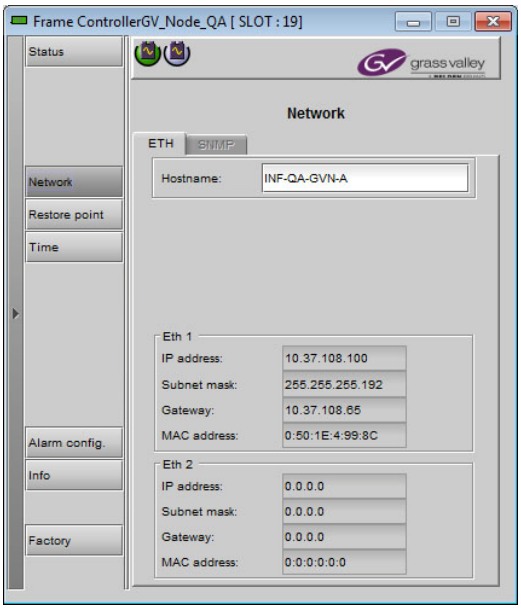
To set the Hostname for this controller

1 Click the *Network* button and select the ETH tab

2 Enter the HOSTNAME in the box at the top.

The hostname is the unique name by which this 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.

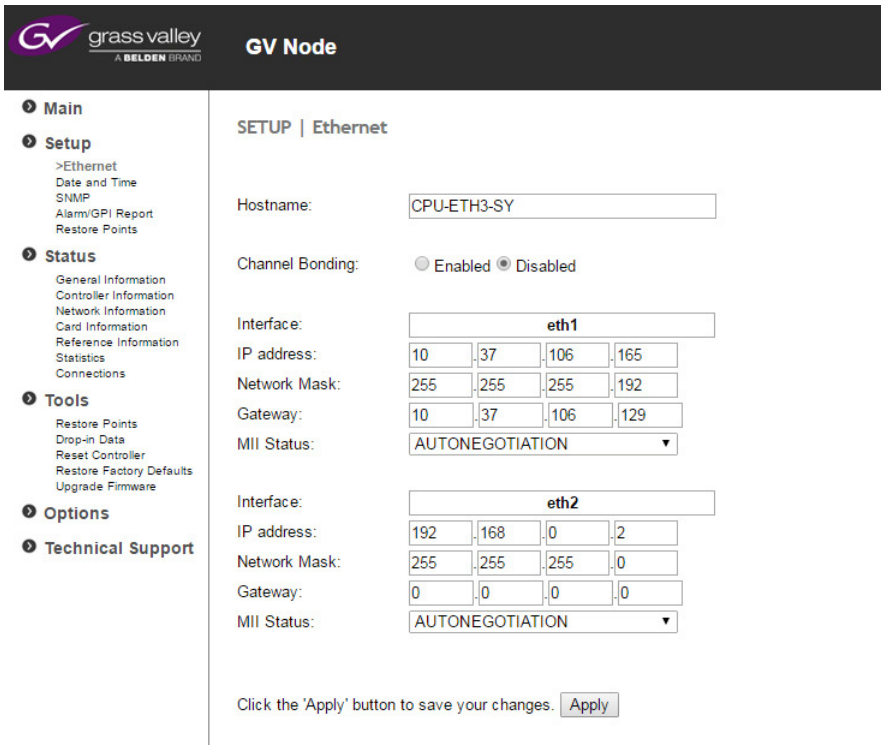
You can see the IP address of the two ethernet ports, but they can only be configured via the menu or the web page.



Network Configuration using the web page

To configure the two Ethernet ports

1 Select **Setup-Ethernet** from the left-side navigation pane.



2 Enter a **Hostname** in the databox.

3 If you have activated the **Ethernet Link Redundancy Option**, you can Enable or Disable it here.

See Link Redundancy on page 55 for detailed information about this option.

4 Enter the **IP address**, **Network Mask** and **Gateway** for the two ethernet ports.

Note - In the current version of the CPU-ETH3, the second IP does not provide control of the GV Node matrix.

5 Select **AUTONEGOTIATION** in the MII Status pulldown for each port.

6 Click **Apply** to save your changes.

If you have changed the IP address, your browser will no longer have access to the web page, so you will need to reconnect using the new IP address.

Network Configuration using the Menu

To change the IP address

1 Scroll down to ETH1 OPTIONS

2 Change the IP ADDRESS, NETWORK MASK and GATEWAY addresses as required.

3 See Setting the GV Node's IP Address on page 27 for more detailed instructions.

Level 1	Level 2	Level 3
ETH1 OPTIONS	IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
	NETWORK MASK	[[0...255].[0...255].[0...255].[0...255]]
	GATEWAY	[[0...255].[0...255].[0...255].[0...255]]
	MAC ADDRESS	[[0...FFF].[0...FFF].[0...FFF]]
	MII STATUS	[AUTONEGOTIATION, 100baseTx-FD, 10baseT-FD, 10baseT-HD]
ETH2 OPTIONS	*(SAME AS FOR ETH1)*	

Link Redundancy

DENSITE 3+ CPU-ETH3-OPT-LINK is a software option that enables the Ethernet link redundancy function on the GV Node's CPU-ETH3.

- Ethernet Link Redundancy is achieved by using channel bonding.
- Channel bonding is an arrangement in which the CPU-ETH3's two network interfaces are combined for redundancy.

The GV Node's CPU-ETH3 works in the Active-Backup bonding mode. Active-Backup bonding provides fault tolerance.

- Only one slave in the bond is active.
- The slave **eth1** is the primary device. The primary device will always be the active slave while it's available. Only when the primary is off-line will the alternate device **eth2** be used.

- The **Link Redundancy Option** can only be activated via the web page.

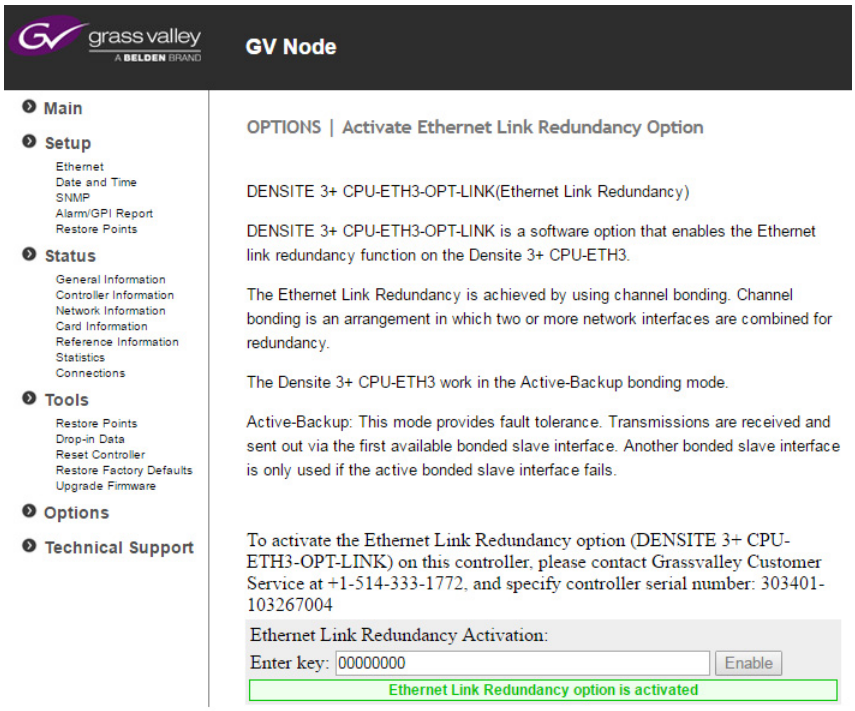
Activate Link Redundancy using...

iControl	Controller's web page	Local control panel
	✓	

To activate the Link Redundancy option

1 Purchase the option from Grass Valley - you will be given an activation key.

2 Click the **Options** heading in the left-side navigation pane.



3 Enter the **activation key** into the web page data box.

4 Click **Enable**.

SNMP Functionality

The CPU-ETH3 card can function as an SNMP agent, sending SNMP traps to designated targets. SNMP functionality can only be enabled via the web page or the local control panel, but once enabled, the iControl panel can be accessed.

Manage SNMP functionality using...

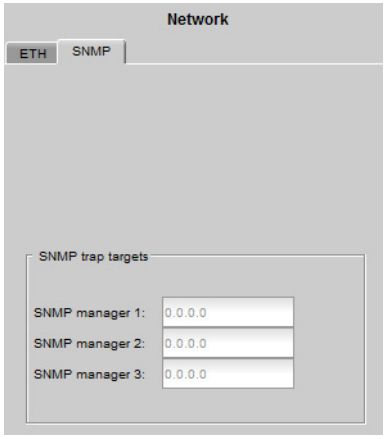
iControl	Controller's web page	Local control panel
✓	✓	✓

SNMP functionality using iControl

The iControl panel is only available when SNMP is enabled, either from the web page or from the local control panel.

To specify trap managers once SNMP is enabled

1 Click the **Network** button in the left-side navigation pane, and select the **SNMP** tab.



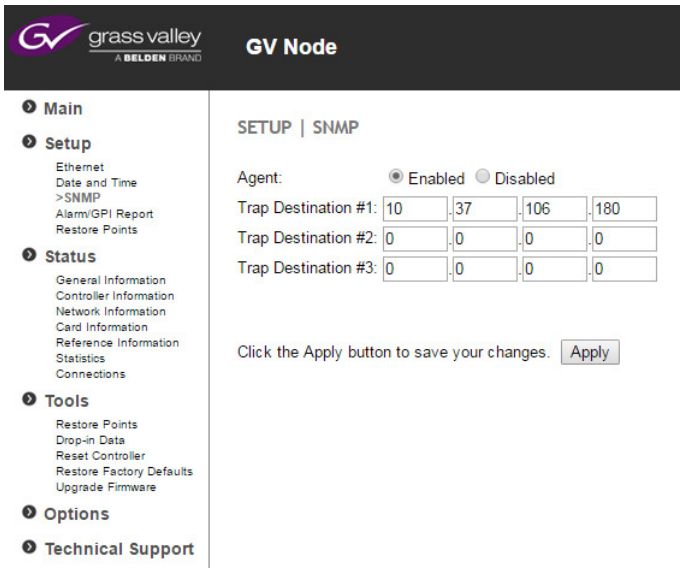
2 Enter the IP addresses of up to three trap managers.

The trap targets are active as soon as the addresses are entered.

SNMP functionality using the web page

To enable and configure SNMP traps

1 Select **Setup-SNMP** from the left-side navigation pane.



2 Select the **Enabled** radio button.

3 Enter the IP addresses of up to three trap managers.

4 Click **Apply** to save your changes.

SNMP functionality using the local control panel

Level 1	Level 2	Level 3	
SNMP OPTIONS	SNMP AGENT	[ENABLE, DISABLE]	
	SNMP TRAPS	LIST IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		ADD IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		REMOVE ADDRESS	[[0...255].[0...255].[0...255].[0...255]]

Data Restoration

Many of the Densité-series 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.

Manage data restoration using...

iControl	Controller's web page	Local control panel
✓	✓	✓

Data Restoration configuration using iControl

To manually save and apply restore point data

1 Click ***Restore Point*** and view the **Cards** tab.

The tab show a list of the modular card slots available in the GV Node frame, with a check box, name, and status box for each. Slots with a card installed are enabled.

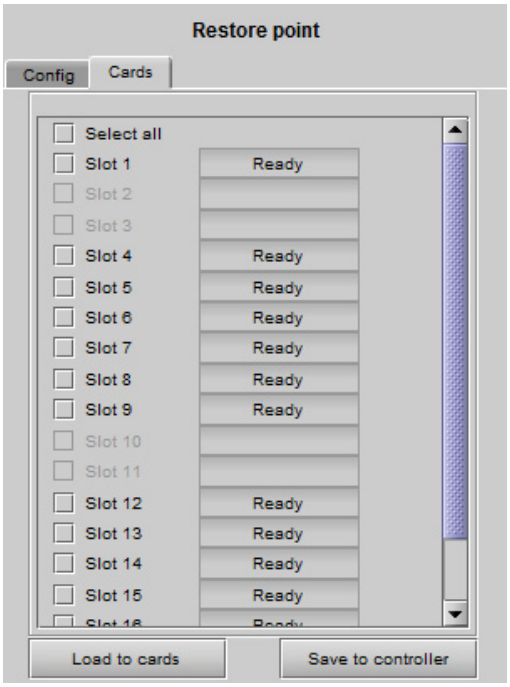
2 Click the check box to activate the Data Restore feature for the card in that slot,

-or-

Click the **Select All** box at the top to activate the feature for all slots in the frame.

3 Click **Save to controller** at the bottom 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 that 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.

To configure automatic data restoration functions

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

2 Select the **Default Action** box to enable the auto restore function for all the modular cards in the GV Node frame.

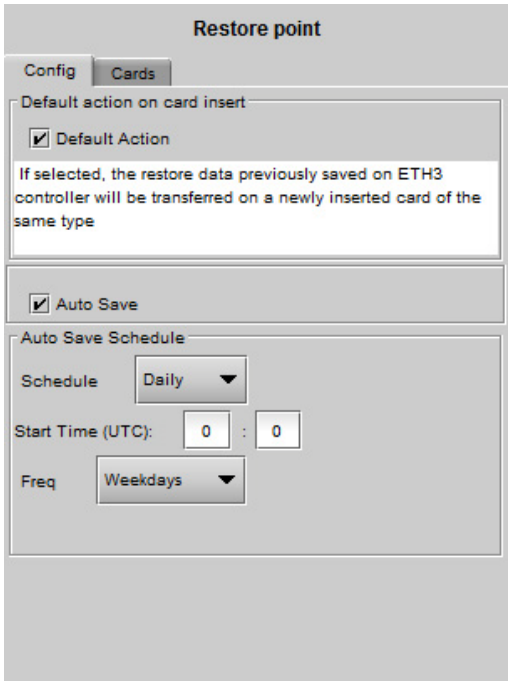
Default Action automatically updates a card when it is inserted in a slot previously occupied by a card of the same type whose data was saved. Thus, a new card can be configured automatically to replace the card that was removed, saving a lot of time when cards are swapped.

3 Click the **Auto Save** box to enable the automatic save function.

When **Auto Save** is enabled, **t**he CPU-ETH3 card will automatically back up the data on the cards in its slots according to a set schedule.

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



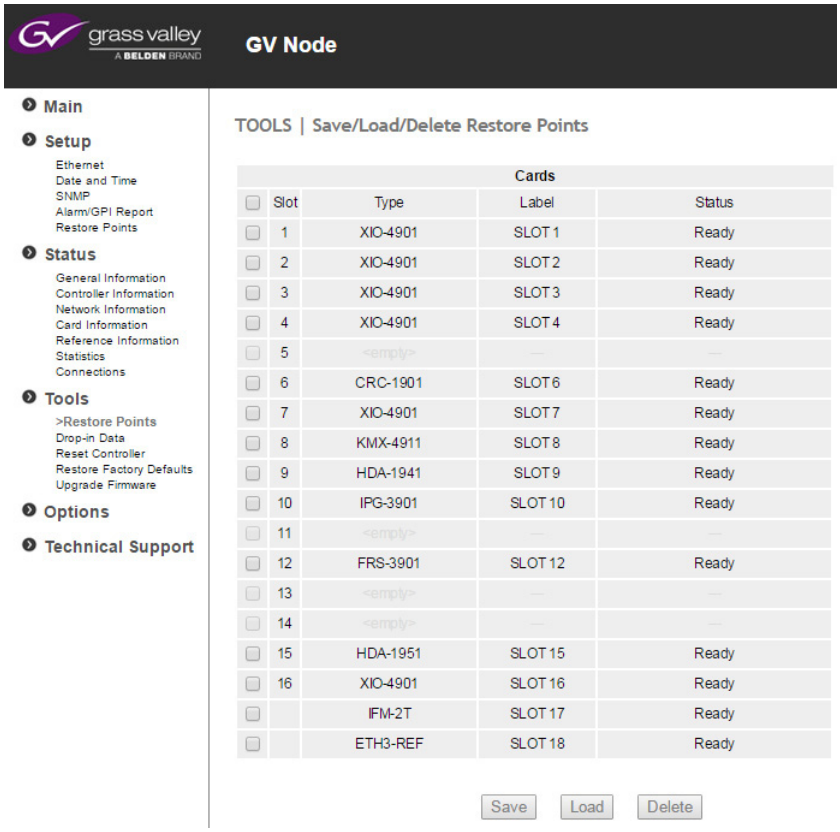
The label and function of the pulldown at the bottom changes to follow the Schedule selection:

Schedule	Label	Pulldown Options
Daily	Freq	Every day, Weekdays
Weekly	Day	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday
Monthly	Week	Week1, Week2, Week3, Week4, Last Week
	Day	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

Data Restoration using the Web Page

To manually save and apply restore point data

1 Select **Tools - Restore Points** from the left-side navigation pane.



The page shows the card type, label and staus for all cards currently installed in the frame.

2 Select the **checkboxes** for all the cards for which you want to manually save or restore data.

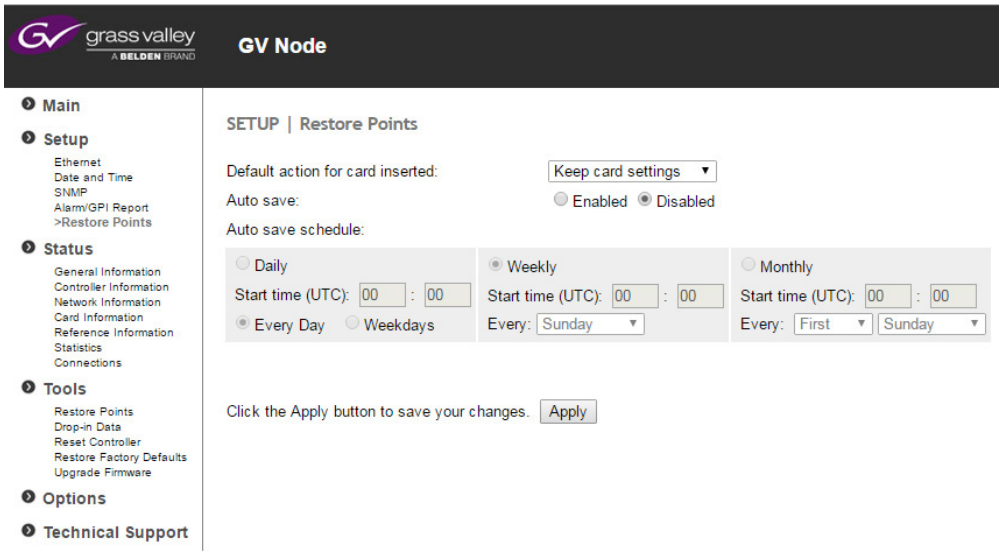
3 Click **Save** at the bottom to copy all restorable data from the cards in the selected slots into the memory on board the CPU-ETH3 controller.

4 Click **Load** to load the cards in the selected slots with data from the controller's memory.

5 Click **Delete** to delete the restore points of the cards in the selected slots.

To configure automatic data restoration functions

1 Select **Setup - Restore Points** from the left-side navigation pane.



2 Select the **Default action for card inserted** using the pulldown:

- **Keep card settings** - leave current card settings unchanged when it is inserted into the frame.
- **Update card settings** - replace the current card settings with the restore point data stored in the controller when the card is inserted into the frame.

3 Select whether **Auto save** is enabled or disabled, using the radio buttons.

4 When Auto Save is enabled, you must set up a schedule to save the restore point data.

Use the radio buttons to select a daily, weekly or monthly schedule.

5 For the selected schedule, set a start time for the auto save action, and select the day and week as needed.

6 Click **Apply** to save your changes.

Data Restoration using the local control panel

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

Level 1	Level 2	Level 3
RESTORE POINTS	SAVE ALL CARDS	
	SAVE A CARD	[1...16] *(slot number)*
	LOAD ALL CARDS	
	LOAD A CARD	[1...16] *(slot number)*
	DEFAULT ACTION	[CARD, CONTROLLER]
	AUTO SAVE	[ENABLE, DISABLE]
	SAVE EVERY	[DAY, WEEK, MONTH]

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.

Reset the card to factory settings using...

iControl	Controller's web page	Local control panel
✓	✓	✓

Recall Factory Settings in iControl

To reset the controller to the factory default settings

1 Click **Factory**

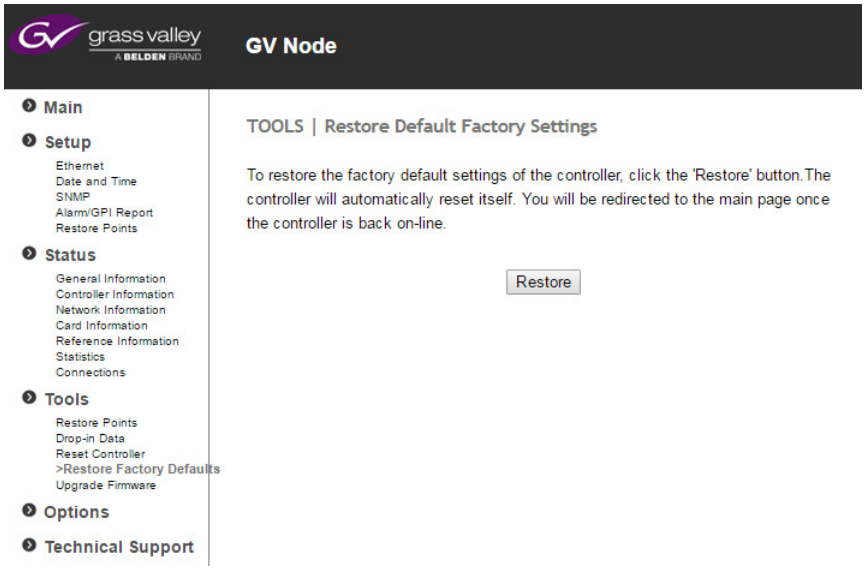
2 Click **Load Factory** to restore the card to the Factory default alignment.

The controller will automatically **reset** to complete the process.

Recall factory settings using the web page

To reset the controller to the factory default settings

1 Select **Tools - Restore Factory Defaults** from the left-side navigation pane.



2 Click **Restore**.

The controller will automatically **reset**, and you will be returned to the Main page once it is back online.

Recall factory settings using the menu

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

Level 1	Level 2	Level 3	
FACTORY DEFAULT	[RESTORE] *(Sets all parameters shown above to their underlined default values)*		

The default values are shown underlined in the menu listing beginning on page 69.

Time Management.

The CPU-ETH3 controller is time-aware, and its internal clock can be updated manually or via an NTP (Network Time Protocol) server.

The controller runs on UTC (i.e. universal coordinated time). Note that this does not recognize daylight savings time as implemented in many jurisdictions.

Manage time and date settings using...

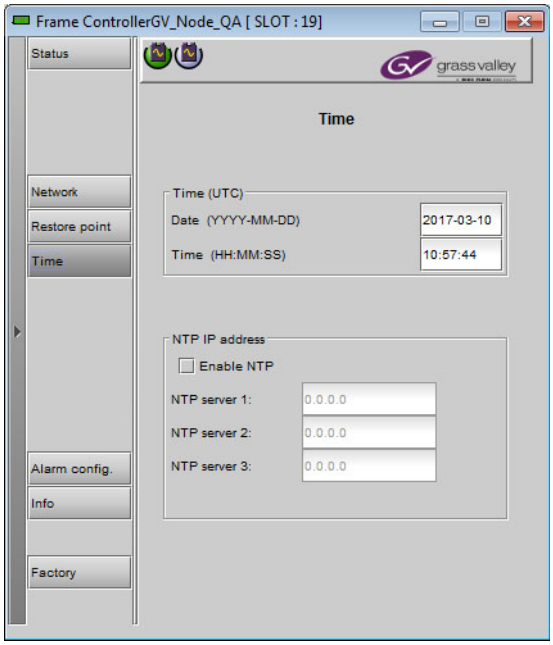
iControl	Controller's web page	Local control panel
✓	✓	✓

Time management using iControl

To manage the controller's internal time settings

1 Click **Time**.

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



2 If the **Enable NTP** checkbox is **not** selected, you can manually enter new date and time values into the data boxes.

3 Select the **Enable NTP** checkbox if you want to use an NTP server as a source of time and date information.

4 Enter up to three **IP addresses of NTP servers** in the data boxes.

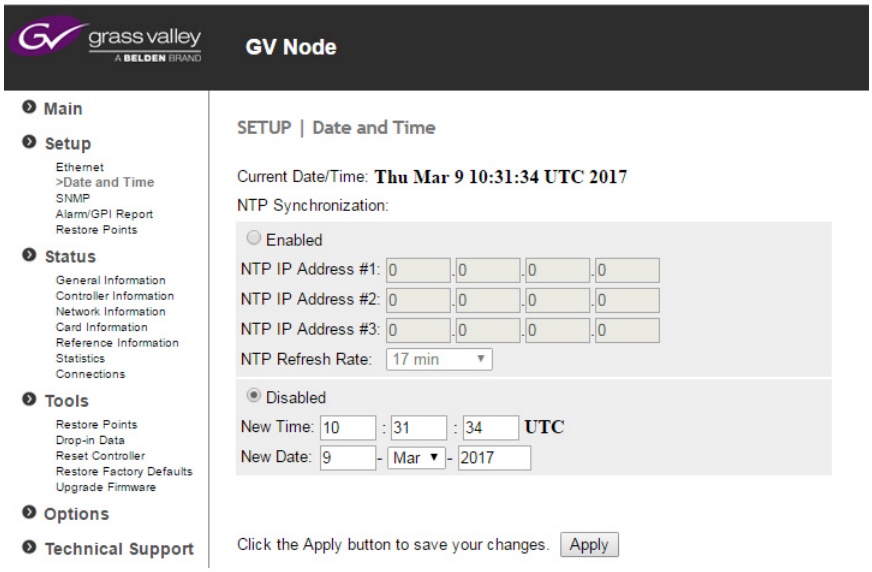
The CPU-ETH3 card will use the first source of valid time it finds in this list.

Note: You can set a refresh interval for the NTP data using the web page or the menu, but not from this iControl panel.

Time management using the web page

To manage the controller's internal time settings

1 Select **Setup - Date and Time** from the left-side navigation pane.



The **Current Date/Time** shown at the top is the value at the time this page was opened, and is not dynamically updated.

2 Select **Enabled** to activate NTP time synchronization in the controller.

3 Enter the IP address of at least one, and up to three running **NTP servers** in the data boxes.

The CPU-ETH3 card will use the first source of valid time it finds in this list.

4 From the **NTP refresh rate** pulldown, choose how often the controller will update its internal time from the NTP server.

5 Select **Disabled** if you want to enter the time and date manually.

6 Enter **New Time** and **New Date** information in the data boxes.

7 Click **Apply** to activate your changes.

Time management using the menu

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

Level 1	Level 2	Level 3	
TIME OPTIONS	TIME	[[HH]:[MM]:[SS]]	
	DATE	[DD]:[MMM]:[YY]]	
	NTP CLIENT	[ENABLE, DISABLE]	
	NTP SERVER	LIST IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		ADD IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		REMOVE ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
	NTP REFRESH	[EVERY [HH] HOUR]	

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

Alarms

The CPU-ETH3 controller generates alarms for the GV Node when error conditions are detected. These alarms are used to set the card status on the local control panel 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 GV Node's GPI port.

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

Detailed alarm settings are available though the iControl panel. The web page and local control panel are limited to turning GPI reporting ON or OFF.

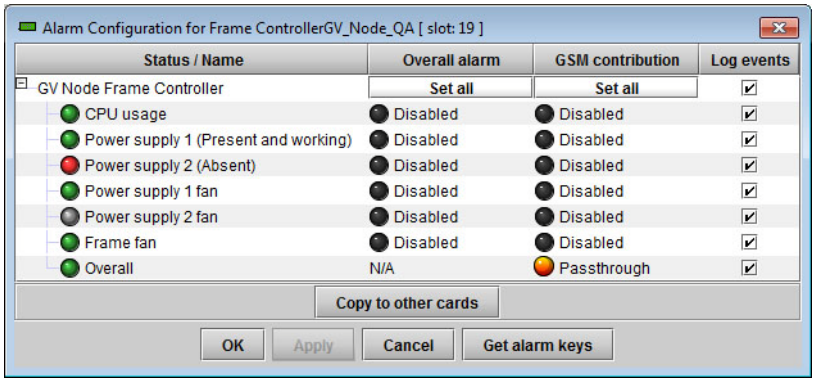
Configure alarm generation and reporting on the CPU-ETH3 using...

iControl	Controller's web page	Local control panel
✓	✓	✓

Alarm Configuration using iControl

To Configure the alarms

1 Click **Alarm Config**.

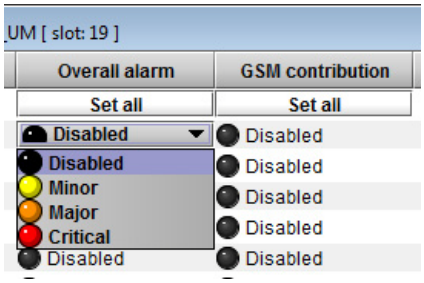


The iControl Alarm Configuration panel opens in a new window. It can be resized if needed.

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.

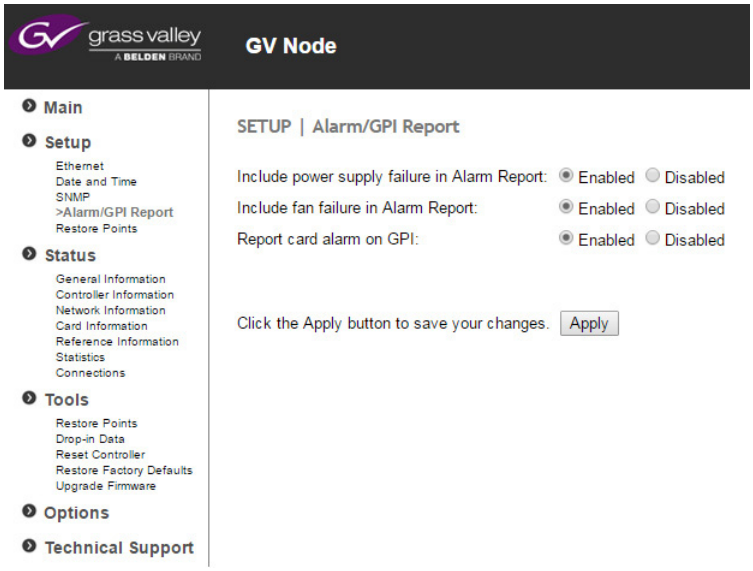
3 Click **OK** to accept the settings, or **Cancel** to discard the changes.

See Alarm Configuration, on page 139, for a more detailed description of the contents of this panel.

Alarm Reporting using the Web Page

To configure alarm reporting on the web page

1 Select **Setup-Alarm/GPI Report** from the left-side navigation pane.



2 Choose whether to enable or disable the inclusion of **Power Supply Failure** in the alarm report, using the radio buttons.

3 Choose whether to enable or disable the inclusion of **Fan Failure** in the alarm report, using the radio buttons.

4 Choose whether the card alarms will be reported on the rear-panel **GPI interface**, using the radio buttons.

5 Click **Apply** to save your changes.

Alarm reporting 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.

Level 1	Level 2	Level 3
ALARM REPORT	PS FAILURE	[NONE, GPI]
	FAN FAILURE	[NONE, GPI]
GPI REPORT	[ENABLE, DISABLE]	

Local Control Panel Menu - CPU-ETH3

Here is the complete on-board menu for the GV Node's CPU-ETH3 controller, accessed through its local control panel.

Level 1	Level 2	Level 3	
STATUS	PS1 FAILURE		
	PS2 FAILURE		
	PS1 FAN FAILURE		
	PS2 FAN FAILURE		
	FAN1 FAILURE		
	FAN2 FAILURE		
	GPI ACTIVATED		
	INTERNAL FAILURE		
	SD CARD FAILURE		
	RAM FAILURE		
	FPGA LOAD FAIL		
	ETH1 FAILURE	ETH1 DOWN, ETH1 UP <SPEED><DUPLEX>	
	ETH2 FAILURE	ETH2 DOWN, ETH2 UP <SPEED><DUPLEX>	
HOST NAME	<HOST NAME>		
ETH1 OPTIONS	IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]	
	NETWORK MASK	[[0...255].[0...255].[0...255].[0...255]]	
	GATEWAY	[[0...255].[0...255].[0...255].[0...255]]	
	MAC ADDRESS	[[0...FFF].[0...FFF].[0...FFF]]	
	MII STATUS	[AUTONEGOTIATION, 100baseTx-FD, 10baseT-FD, 10baseT-HD]	
ETH2 OPTIONS	*(SAME AS FOR ETH1)*		
SNMP OPTIONS	SNMP AGENT	[ENABLE, DISABLE]	
	SNMP TRAPS	LIST IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		ADD IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		REMOVE ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
WEB SERVER	[ENABLE, DISABLE]		
RESTORE POINTS	SAVE ALL CARDS		
	SAVE A CARD	[1...N] *(N DEPENDS ON FRAME CAPACITY)*	
	LOAD ALL CARDS		
	LOAD A CARD	[1...N] *(N DEPENDS ON FRAME CAPACITY)*	
	DEFAULT ACTION	[CARD, CONTROLLER]	
	AUTO SAVE	[ENABLE, DISABLE]	
	SAVE EVERY	[DAY, WEEK, MONTH]	

Level 1	Level 2	Level 3	
TIME OPTIONS	TIME	[[HH]:[MM]:[SS]]	
	DATE	[DD]:[MMM]:[YY]]	
	NTP CLIENT	[ENABLE, DISABLE]	
	NTP SERVER	LIST IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		ADD IP ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
		REMOVE ADDRESS	[[0...255].[0...255].[0...255].[0...255]]
	NTP REFRESH	[EVERY [HH] HOUR]	
ALARM REPORT	PS FAILURE	[NONE, GPI]	
	FAN FAILURE	[NONE, GPI]	
GPI REPORT	[ENABLE, DISABLE]		
CTRL VERSION	[FIRMWARE V.XXX]		
BOOT-LOADER VER	[VERSION X.X.X]		
OPTIONS	[LINK REDUN ON/OFF]		
FACTORY DEFAULT	[RESTORE] *(Sets all parameters shown above to their underlined default values)*		
CTRL EXECUTION	[REBOOT]		

	Reported value; cannot be changed.		List of values that can be selected. Default value is underlined.

Upgrading the CPU-ETH3 Controller

Upgrading the CPU-ETH3 firmware must be accomplished via a web page served by the controller, and accessed through its ethernet port using a browser.

To upgrade the CPU-ETH3 controller

1. Obtain an upgrade file from Grass Valley.

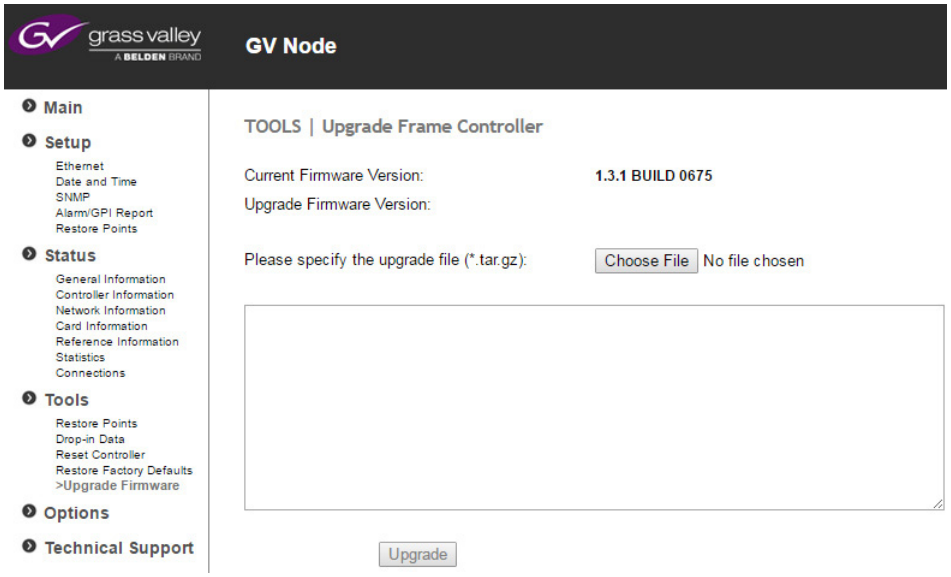
   The file will be named **3034-01P80-###_CPU-ETH3-BASIC-Firmware_v#.#.#.zip**, where ### is the firmware release version number.
2. Unzip the file, and save the expanded file, which will be named **cpueth3-upgrade-#.#.#.bbb.tar.gz**

   This file is the file you will need to upgrade the CPU-ETH3 card in step 7 below.
3. Using a browser on your network, browse to the IP address of the CPU-ETH3 card.

   If you are using iControl, double-click the controller in the iNavigator page, and select **NETWORK | ETH** to see the IP address.
4. You will be asked for a username and password - the default values are:
   - "Username = admin
   - "Password = (leave blank)

   The CPU-ETH3 web page will open in your browser.

5 In the left-side menu, select **Tools | Upgrade Firmware**.



The current firmware version is shown at the top of the window

6 Click **Choose File**.

7 In the **Open** window, browse to the upgrade file you obtained in Step 1, **select** it and click **Open**.

In the Tools | Upgrade Frame Controller window, the upgrade firmware version will be shown at the top of the page, and the Upgrade button will be enabled.

8 Click **Upgrade**.

The window will show the status of the upgrade process.

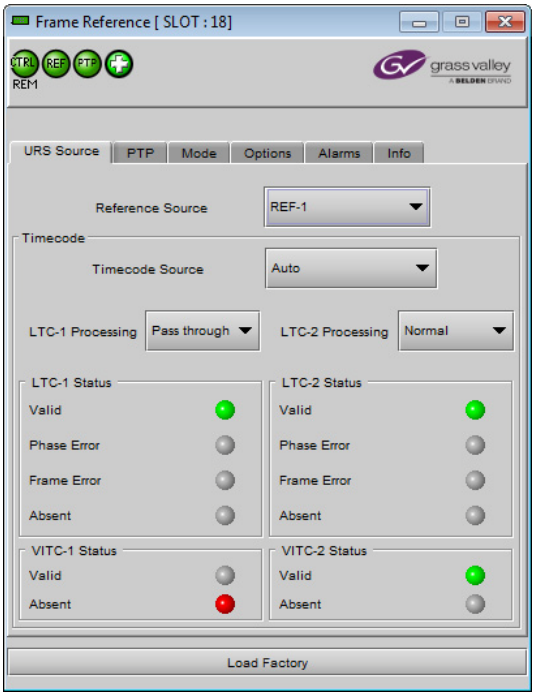
The CPU-ETH3 card will reboot once the upgrade is complete.

Configure the Frame Reference

Summary

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.



Frame Reference iControl Panel

Reference Source

To select the reference source

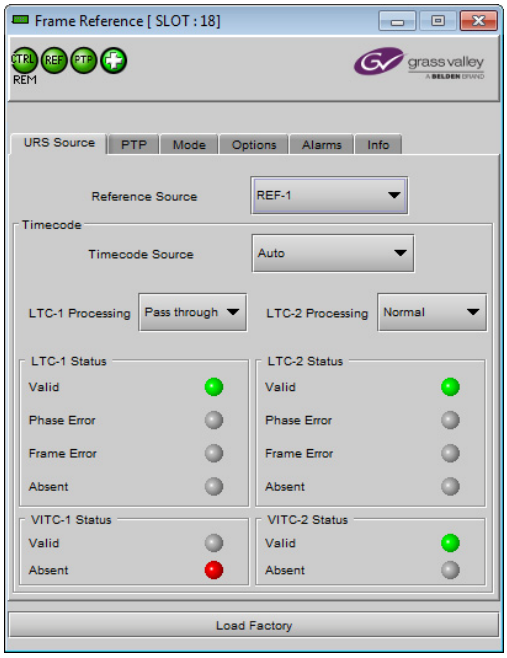
1. Select the **URS Source** tab.
2. Click the **Reference Source** pulldown.
3. Click to select the reference source:

Selection	Detail
Auto	Select the first valid source from this list, in order: REF-1, REF-2, PTP (unsupported), Internal
REF-1	Use the reference connected to the REF-1 input on the rear panel.
REF-2	Use the reference connected to the REF-2 input on the rear panel.
REF-1 & REF-2	Useful if REF-1 and REF-2 are different frequencies (i.e. 50 Hz and 59.94 Hz). The URS will carry both timing references, allowing the use of cards operating in both standards within the same frame.
PTP	Unsupported.
Internal	Use the signal from the internal free-running generator.

Timecode

To select the source of timecode for the URS

1 Select the **URS Source** tab.



2 Click the **Timecode Source** pulldown

3 Click to select the source of timecode:

Source	Function
Auto	Select the firstvalid source from the list below, in the order listed.
LTC-1	Use the timecode connected to the LTC-1 input on the rear panel.
VITC-1	Extract timecode from the REF 1 input.
LTC-2	Use the timecode connected to the LTC-2 input on the rear panel.
VITC-2	Extract timecode from the REF 2 input.
OFF	Do not insert timecode into the URS signal.

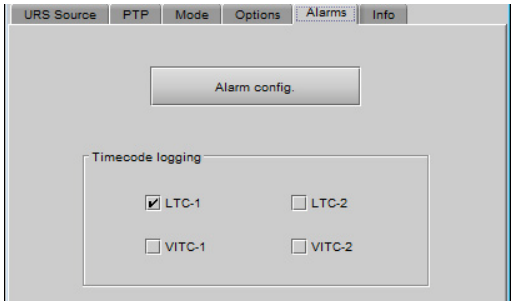
The current status of timecode available to the reference module is shown in the LTC Status and VITC Status areas:

Status	Icon	Details
Valid	Green	Valid timecode detected at the input.
Phase Error (LTC 1 & 2)	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 (LTC 1 & 2)	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



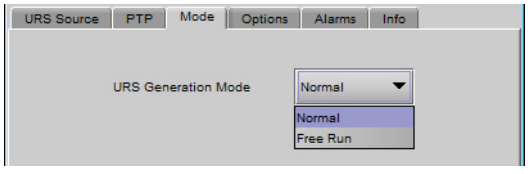
2 Select the checkboxes to send the indicated time codes (LTC-1, LTC-2, VITC-1, VITC-2) to the iControl GSM, where they can be used by other network devices.

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.

URS Generation

To select the URS generation mode

1 Select the **Mode** tab.



2 Click the **URS Generation Mode** pulldown.

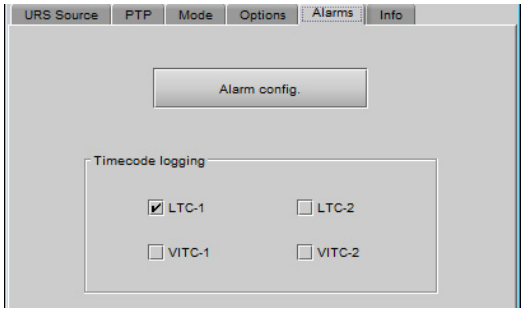
3 Click to select the URS Generation mode:

Mode	Means
Normal	The URS frame rate matches the selected reference input, i.e. only 29.97 or 25 Hz.
Free Run	Not supported in GV Node

Alarms

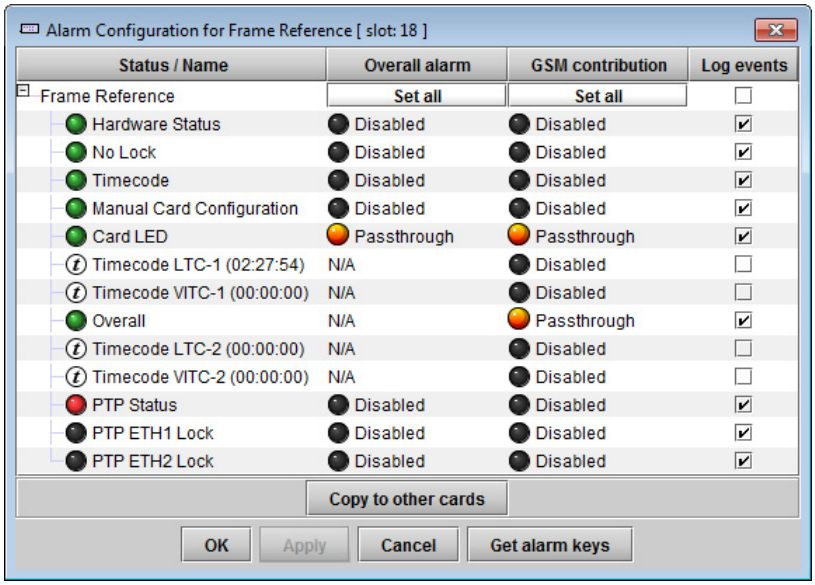
To configure alarms

1 Select the **Alarms** tab



2 Click **Alarm Config**

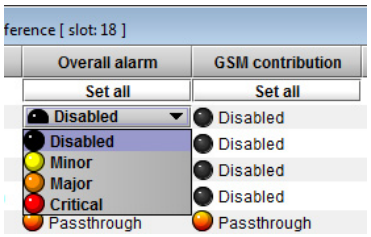
The **Alarm Configuration for Frame Reference** window opens.



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.

Options

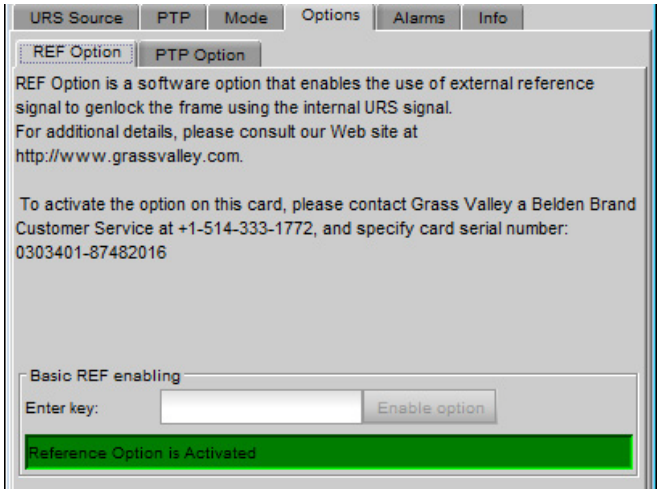
Two options are available for the frame reference:

- **REF option** - this software option enables the use of external reference signals to genlock the frame using the internal URS signal.
- **PTP option** - this option is unsupported.

Before activating an option, you must purchase the appropriate **key** from Grass Valley. See the option tab for instructions.

To activate the REF option

1 Select the **Options - REF Option** tab.



2 Type the key into the **Enter key** data box.

3 Click **Enable Option**.

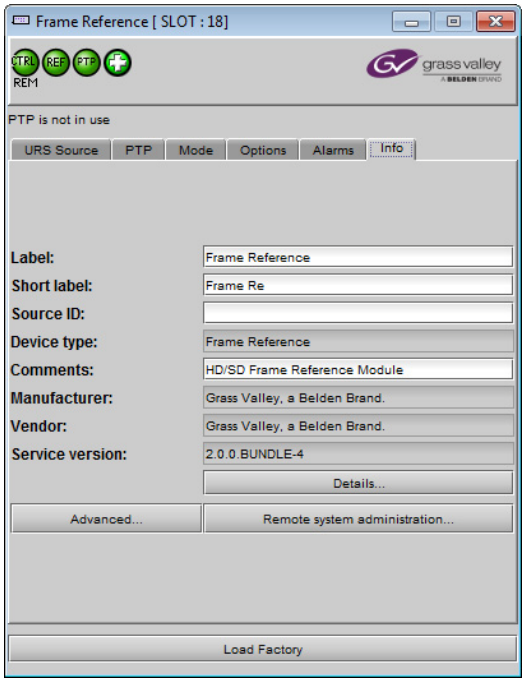
The activation will be confirmed in the display - text and green background,

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 - Basic and Advanced versions

1 Select the **Info** tab.



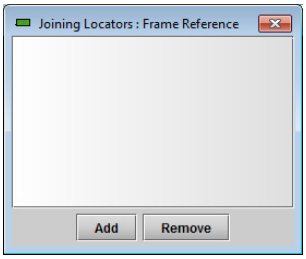
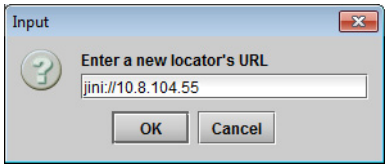
2 Enter appropriate text in the white data boxes (the image shows the default values):

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.

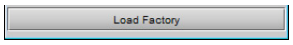
Button	
Advanced...	Shows the LongID for this device. The LongID is the address of this frame reference in the iControl network.
Remote System Administration	Opens the Joining Locators window, which lists remote lookup services to which this frame reference is registered.  **To add additional services** 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.

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.

Upgrading the Frame Reference

The Frame Reference is upgraded using the Densité Upgrade Manager. See your iControl documentation for detailed instructions.

Menu for Local Control

The menu accessed from the touch screen on the frame's front panel is shown below.

Level 1	Level 2	Level 3	
STATUS	GENERAL STATUS	REF NOT ENABLED	
		HARDWARE FAIL NO	
		INTERNAL REF	
		EXT REF 525-S, etc	
		DUAL REF ERR	
		EXT REF 1 PRESENT / NO EXT REF 1	
		EXT REF 2 PRESENT / NO EXT REF 2	
		LTC-1 DETECTED / NO LTC-1	
		LTC-1 PHASE ERR	
		LTC-2 DETECTED / NO LTC-2	
		LTC-2 PHASE ERR	
		VITC-1 DETECTED / NO VITC-1	
		VITC-2 DETECTED / NO VITC-2	
		LTC-1 FRAME ERR	
		LTC-2 FRAME ERR	
		VITC-1 FRAME ERR	
		VITC-2 FRAME ERR	
	PTP STATUS (unsupported)	G-MASTER IP ADDR	
		G-MASTER UID MSB	
		G-MASTER UID LSB	
		ETH-1 IP ADDRESS	
		ETH-1 IP STATUS	
		ETH-2 IP ADDRESS	
		ETH-2 IP STATUS	
REFERENCE	SOURCE	[**AUTO**, REFERENCE-1, REFERENCE-2, PTP (unsupported), INTERNAL, DUAL_REF]	
	URS GEN MODE	[**NORMAL**]	
TIME CODE	SOURCE	[**AUTO**, LTC-1, LTC-2, VITC-1, VITC-2, OFF]	
	PROCESSING MODE	LTC-1	[**NORMAL**, PASS-THROUGH]
		LTC-2	[**NORMAL**, PASS-THROUGH]
	USER BITS	[**OFF**, ON]	

Level 1	Level 2	Level 3	
PTP CONFIG (unsupported)	ETH1 OPTIONS	IP ADDRESS	[**0.0.0.0**, …, 255.255.255.255]
		NETWORK MASK	[**0.0.0.0**, …, 255.255.255.255]
		GATEWAY	[**0.0.0.0**, …, 255.255.255.255]
	ETH2 OPTIONS	IP ADDRESS	[**0.0.0.0**, …, 255.255.255.255]
		NETWORK MASK	[**0.0.0.0**, …, 255.255.255.255]
		GATEWAY	[**0.0.0.0**, …, 255.255.255.255]
	SOURCE	[ETH1, ETH2, BMCA, **AUTOMATIC**]	
	DOMAIN NUMBER	[0, 1, 2, ..., **127**, ..., 254, 255]	
	ANNOUNCE INTERVAL	[0.125sec-8Hz, 0.250sec-4Hz, 0.5sec-2Hz, 1sec-1Hz, **2sec-0.5Hz**]	
	ANNOUNCE TIMEOUT	[2, **3**, 4, 5, 6, 7, 8, 9, 10]	
	OWD OFFSET	[**00.000**, 00.001, …, 99.998, 99.999]	
CONFIG ALARMS	NO INPUT SIGNAL	ALARM LEVEL	[GREEN, YELLOW, **RED**, FLASH RED]
		ALARM REPORT	[**NONE**, GPI]
	NO TIME CODE	ALARM LEVEL	[GREEN, YELLOW, **RED**, FLASH RED]
		ALARM REPORT	[**NONE**, GPI]
VERSION	X.X.X.X, FPGA : X.X.X.X, BOOT : X.X.X		
OPTIONS	REF2X ON/OFF		
FACTORY DEFAULT	[RESTORE]		

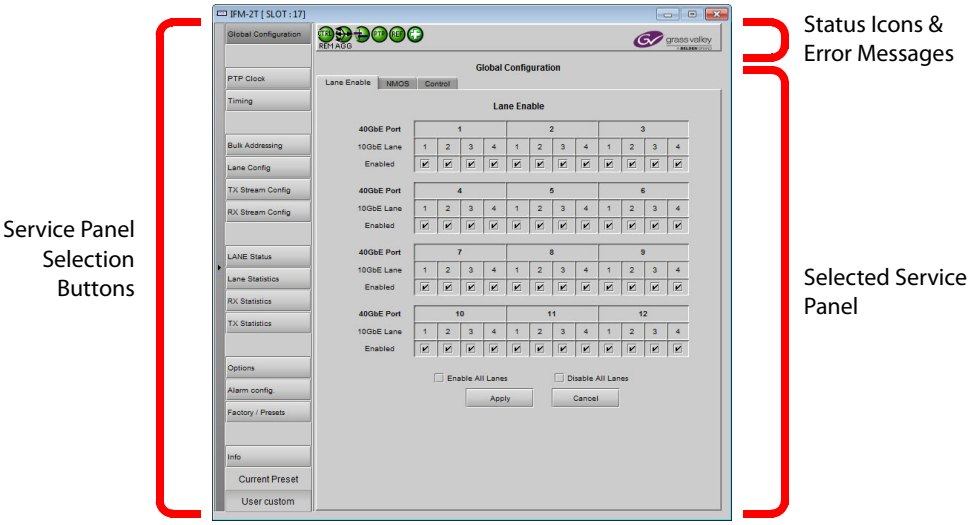
	Reported value; cannot be changed.		List of values that can be selected. Default value is **bold underlined**.

Configure the IFM-2T Fabric Module

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

Summary

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

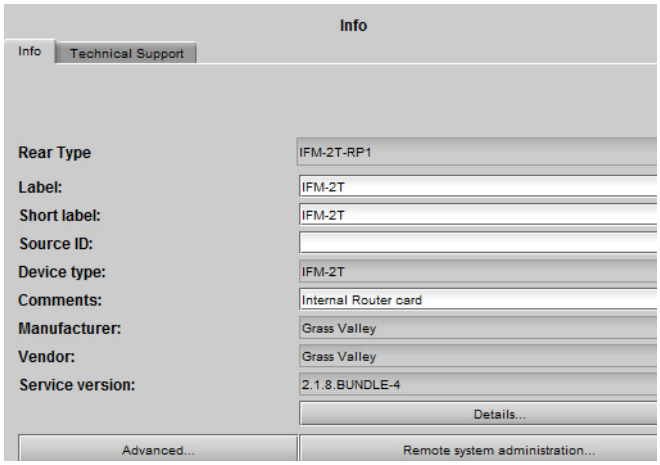


Identification

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.

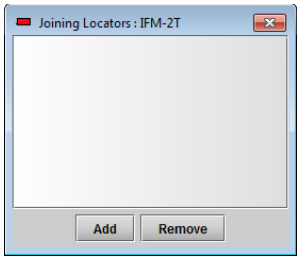
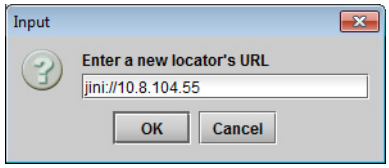


2 Enter appropriate text in the white data boxes (the image shows the default values):

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.
Advanced...	Shows the LongID for this device. The LongID is the address of this IFM-2T in the iControl network.
Remote System Administration	Opens the Joining Locators window, which lists remote lookup services to which this IFM-2T 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 IFM-2T displays six icons in the top left. These icons report the status of card functions.

1 2 3 4 5 6

Icon #	Significance
1	Card control status for this IFM-2T • 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: • Green: All ports OK. • Red: At least one port is down.
3	Timing status: • Green: Timing is OK. • Red: Timing error.
4	• PTP Status (unsupported)
5	Reference Status • Green: Locked • Red: Not locked
6	Card health: • 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.

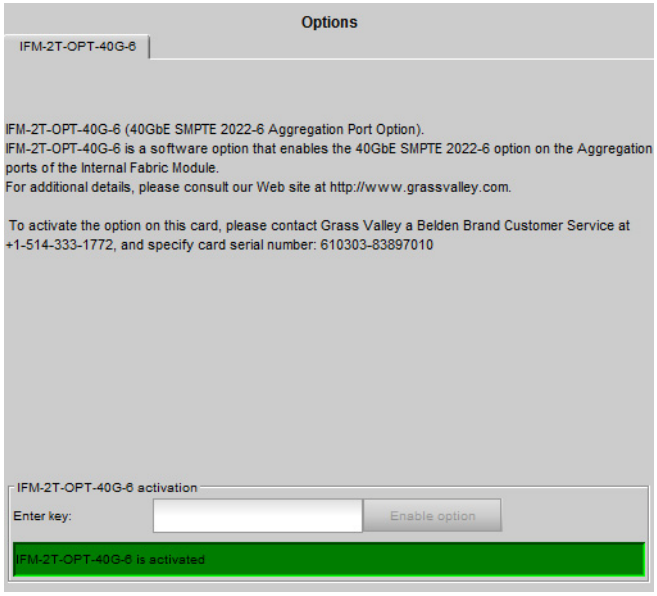
IFM-2T-OPT-40G-6 is a software option that enables 40GbE SMPTE ST 2022-6 on the aggregation ports. If this option is not enabled, the aggregation ports are non-functional, and the GV Node is limited to intra-frame operation.

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.

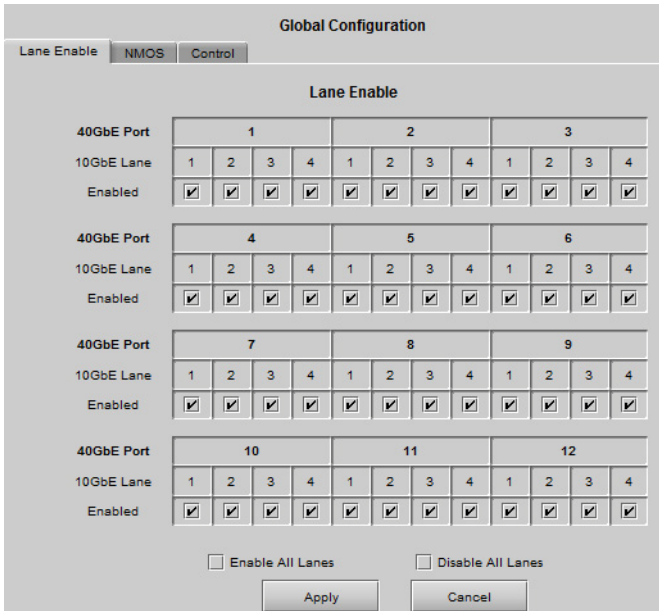
Port and Lane Configuration

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.



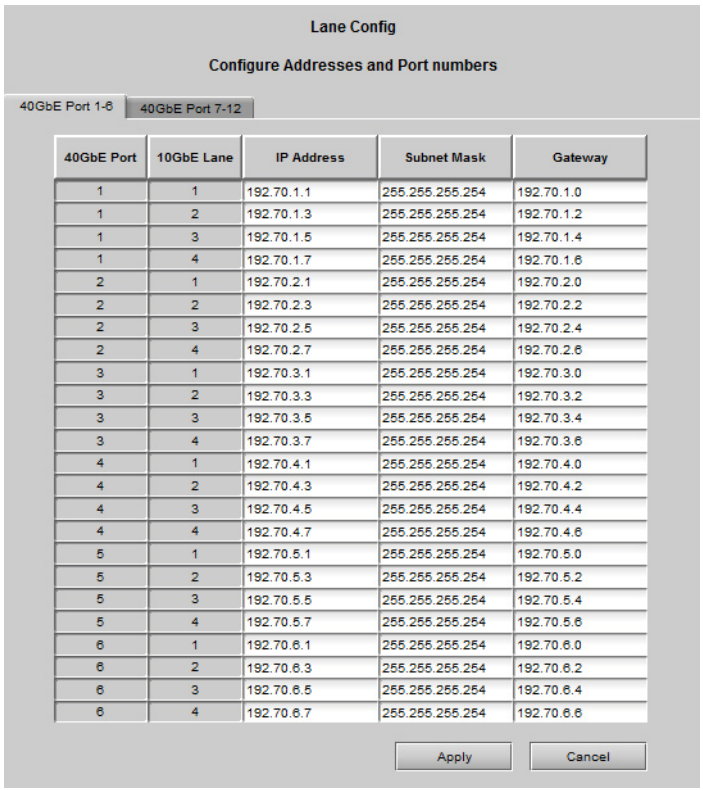
2 Select the **Enabled** checkbox for every lane that you want to enable.

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 **Lane Config and select** the **40GbE Port x-y** tab corresponding to the group of six 40GbE ports you want to configure.



40GbE Port	10GbE Lane	IP Address	Subnet Mask	Gateway
1	1	192.70.1.1	255.255.255.254	192.70.1.0
1	2	192.70.1.3	255.255.255.254	192.70.1.2
1	3	192.70.1.5	255.255.255.254	192.70.1.4
1	4	192.70.1.7	255.255.255.254	192.70.1.6
2	1	192.70.2.1	255.255.255.254	192.70.2.0
2	2	192.70.2.3	255.255.255.254	192.70.2.2
2	3	192.70.2.5	255.255.255.254	192.70.2.4
2	4	192.70.2.7	255.255.255.254	192.70.2.6
3	1	192.70.3.1	255.255.255.254	192.70.3.0
3	2	192.70.3.3	255.255.255.254	192.70.3.2
3	3	192.70.3.5	255.255.255.254	192.70.3.4
3	4	192.70.3.7	255.255.255.254	192.70.3.6
4	1	192.70.4.1	255.255.255.254	192.70.4.0
4	2	192.70.4.3	255.255.255.254	192.70.4.2
4	3	192.70.4.5	255.255.255.254	192.70.4.4
4	4	192.70.4.7	255.255.255.254	192.70.4.6
5	1	192.70.5.1	255.255.255.254	192.70.5.0
5	2	192.70.5.3	255.255.255.254	192.70.5.2
5	3	192.70.5.5	255.255.255.254	192.70.5.4
5	4	192.70.5.7	255.255.255.254	192.70.5.6
6	1	192.70.6.1	255.255.255.254	192.70.6.0
6	2	192.70.6.3	255.255.255.254	192.70.6.2
6	3	192.70.6.5	255.255.255.254	192.70.6.4
6	4	192.70.6.7	255.255.255.254	192.70.6.6

Note: If you have selected the **1.5Gbps maximum stream bitrate** option using GV Node Manager (See To configure redundancy, stream bitrate and stream format at the aggregation ports on page 135), only 6 ports are needed to carry all 144 streams, and only the first three ports in each tab (i.e. 1-3 and 7-9) will be available to configure.

2 For each 10GbE Lane, enter the Source Address (IP Address, Subnet Mask and Gateway) into the three data boxes.

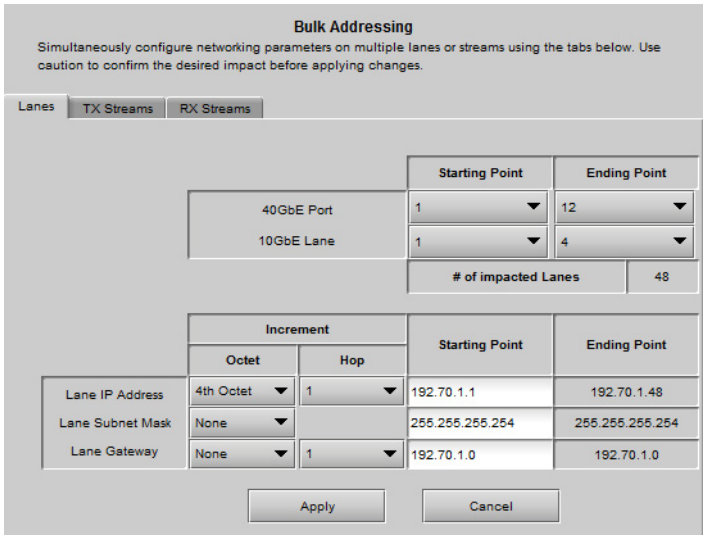
- The IP address must be a valid IPv4 address
- Duplicate addresses are not allowed

3 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 **Bulk Addressing** and select the **Lanes** tab



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 HOP function can be used to skip IPs. This is useful when configuring systems where Lanes and Gateways will increment subnets.

6 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].

7 Click **Apply** to modify the lane addresses, or **Cancel** to leave the lane addresses unchanged.

8 You can see the results of your changes by looking at the **Lane Config** panel.

Stream Redundancy

When the **IFM-2T-OPT-40G-6 option** is active (See Options on page 85), you can choose to enable **2022-7 Low Latency redundancy** on the aggregation ports, using the GV Node manager. See To configure redundancy, stream bitrate and stream format at the aggregation ports on page 135.

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 85), you can choose the **stream bitrate** to be 1.5Gbps (HD) or 3Gbps (3G), using the **GV Node Manager**. See To configure redundancy, stream bitrate and stream format at the aggregation ports on page 135.

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

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

Therefore, when 1.5 (HD) is selected, only 6 ports are needed to carry all 144 video streams. See Aggregation Port I/O Numbering, on page 148, for details.

Stream Addressing

All streams arriving at the GV Node (RX streams) or leaving the GV Node (TX Streams) via the aggregation ports require addresses - stream address, stream port, and IGMPv2 address for RX streams.

Three different modes are activated through the **Stream Format** selection in the GV Node Manager - See To configure redundancy, stream bitrate and stream format at the aggregation ports on page 135.

Mode	Stream formats
ST 2022-6	Video
TR-04	Video+Audio
ST 2110	Video+Audio+Metadata

In each of the three modes, the available stream types will need multicast addresses entered, in order to access the desired multicast signals:

The procedures for setting TX and RX Video stream addresses, for both redundancy (ST 2022-7) ON and OFF, and using both the individual Stream Config panels and the Bulk Addressing facility, are described in detail below.

- Transmit Stream Addressing - Redundancy OFF, on page 92
- Receive Stream Addressing - Redundancy OFF, on page 93
- Transmit Stream Addressing - Redundancy ON, on page 96
- Receive Stream Addressing - Redundancy ON, on page 98

You can follow the same steps to set up the addresses for **Audio** and **Metadata** streams.

- Using the config panels, select the appropriate tab - Video, Audio, Metadata - at the top of the panel.
- Bulk Addressing panel - in the TX or RX streams tab, use the **Impacted Streams** selector to choose the streams you will configure.

Port Count and Numbering for Modes of Operation

		Redundancy ON		Redundancy OFF	
Mode	Stream	Port Count	Port Numbers	Port Count	Port Numbers
ST 2022-6	Video	72	145A/B-216A/B	144	145-288
TR-04	Video	72	145A/B-216A/B	144	145-288
	Audio	1152	2305A/B-3456A/B	2304	2305-4608
ST 2110	Video	72	145A/B-216A/B	N/A	N/A
	Audio	1152	2305A/B-3456A/B	N/A	N/A
	Metadata	72	145A/B-216A/B	N/A	N/A

For a detailed breakdown of port configuration and allocation for the operating modes, see Aggregation Port I/O Numbering, on page 148.

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 89
TX streams - Redundancy OFF:	See To address many transmit streams at once using the Bulk Addressing Utility on page 93
RX streams - Redundancy OFF:	See To address many receive streams at once using the Bulk Addressing Utility on page 95

TX streams - Redundancy ON: See To address many transmit streams at once using the Bulk Addressing Utility on page 97.

RX streams - Redundancy ON: See To address many receive streams at once using the Bulk Addressing Utility on page 100

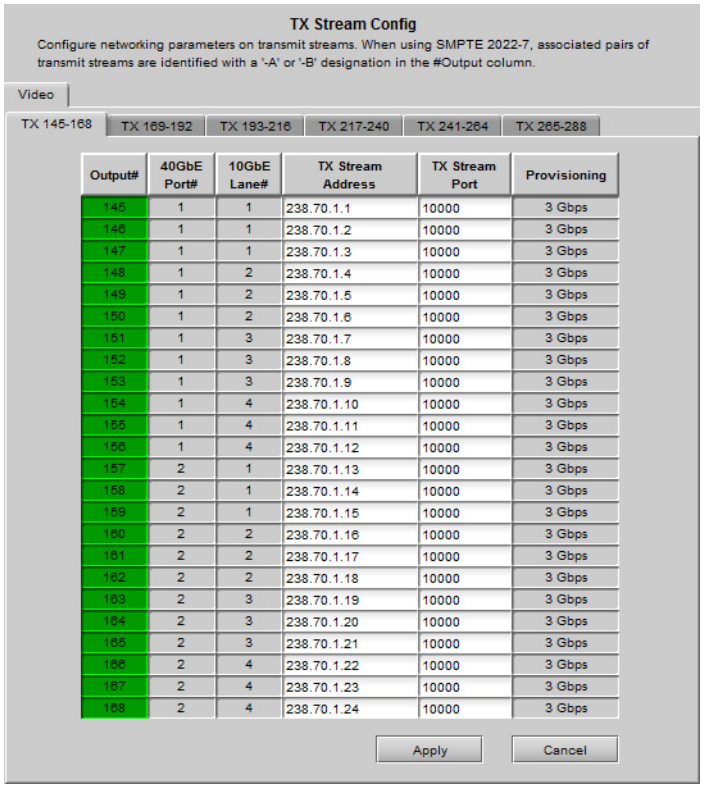
Transmit Stream Addressing - Redundancy OFF

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

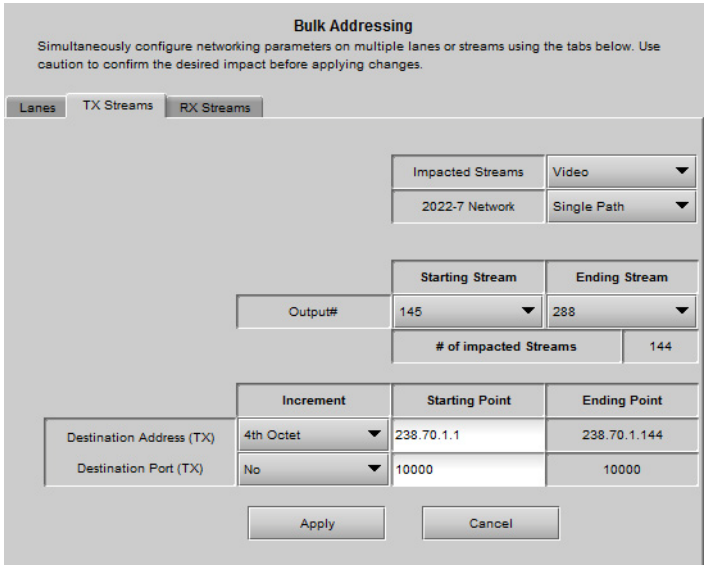
1. Click **TX Stream Config**.
2. Click the **Video** tab to set up video stream addresses.
3. Click on the tab that refers to the output that you want to configure.
   - The assignment of fabric module outputs to aggregation ports and lanes is determined by the stream format, redundancy mode and stream bitrate selected in the GV Node Manager.
   - For a comprehensive listing of all channel-to-port assignments, see Aggregation Port I/O Numbering, on page 148



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

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

1 Click **Bulk Addressing** and select the **TX Streams** tab



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

2 Select **Video** in the impacted Streams pulldown.
3 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 288].
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 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,

- an IGMPv2 or IGMPv3 source address. Source Specific Multicasting (SSM) is not supported.

Set:

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

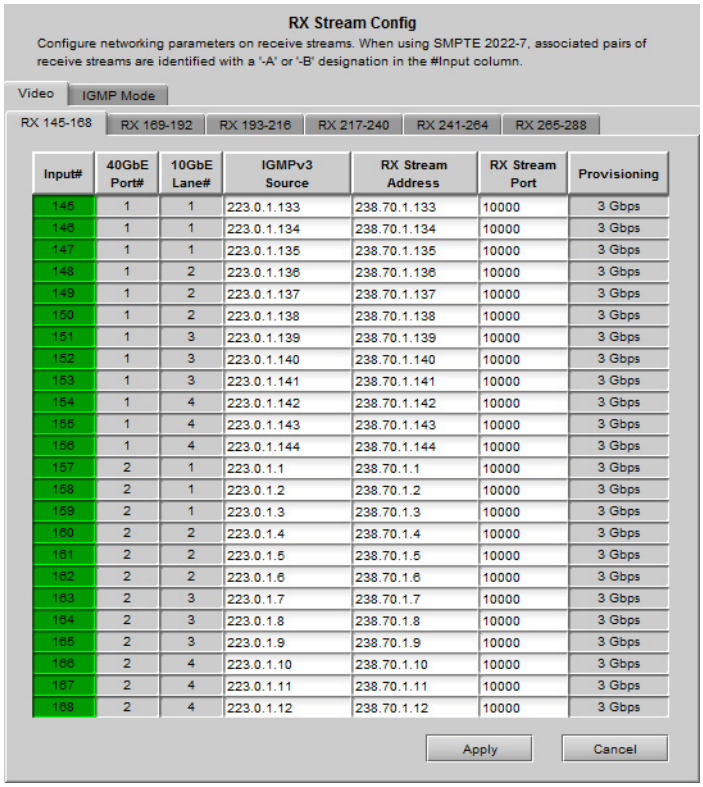
To set the Receive Stream source address and port

1 Click **RX Stream Config**.

2 Click the **Video** tab to set up video stream addresses.

3 Click on the tab that refers to the input that you want to configure.

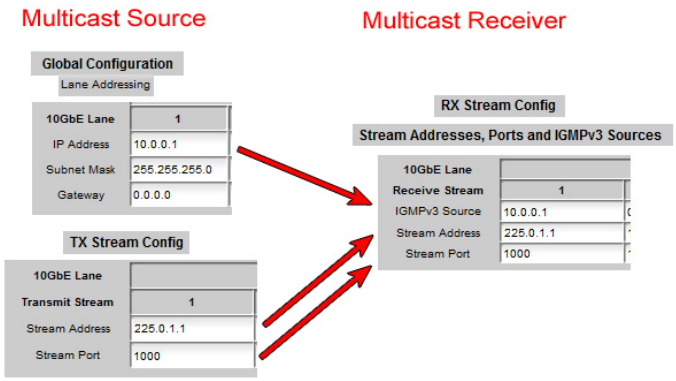
- The assignment of fabric module outputs to aggregation ports and lanes is determined by the stream format, redundancy mode and stream bitrate selected in the GV Node Manager.
- For a comprehensive listing of all channel-to-port assignments, see Aggregation Port I/O Numbering, on page 148



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

a To receive ASM/IGMPv2 streams, enter a stream address and stream port, and leave the IGMPv3 Source address as 0.0.0.0.

b To receive SSM/IGMPv3 streams, fill in the data boxes as indicated in the diagram:



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

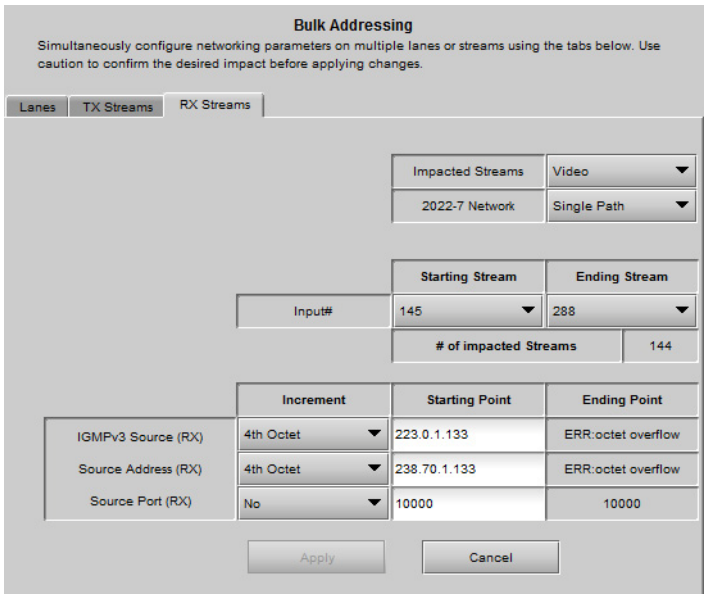
You can choose the IGMP mode - see IGMP Mode Selection, on page 101

5 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 112 , for more information.

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

1 Click **Bulk Addressing**and select the **RX Streams** tab



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

2 Select **Video** in the impacted Streams pulldown.

3 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 288].

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 indexed:

[No, Yes]

8 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.

9 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.

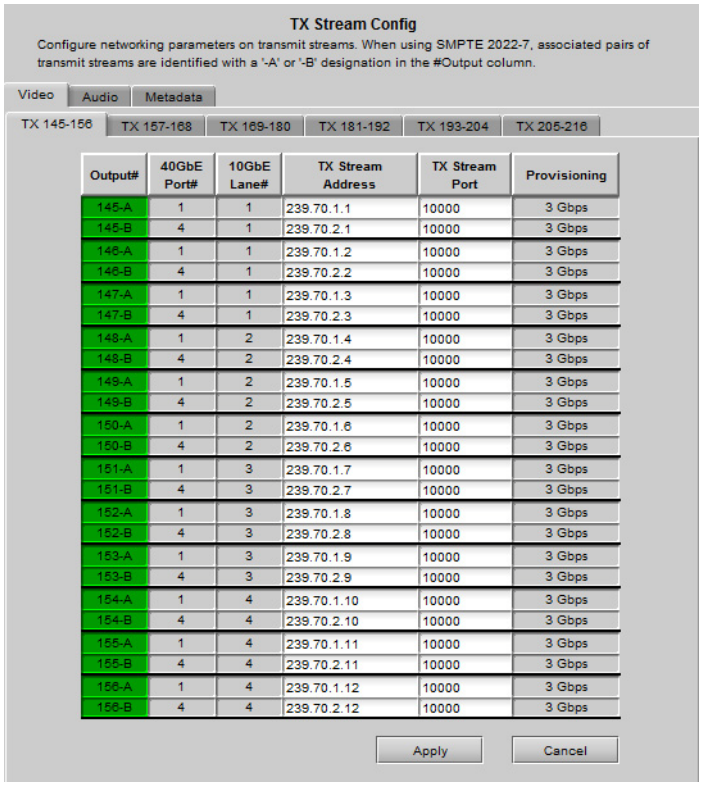
To set the Transmit Stream destination address and port

1 Click **TX Stream Config** and select the **Video** tab

2 Click on the tab that refers to the outputs that you want to configure.

- The assignment of fabric module outputs to aggregation ports and lanes is determined by the stream format, redundancy mode and stream bitrate selected in the GV Node Manager.

- For a comprehensive listing of all channel-to-port assignments, see Aggregation Port I/O Numbering, on page 148



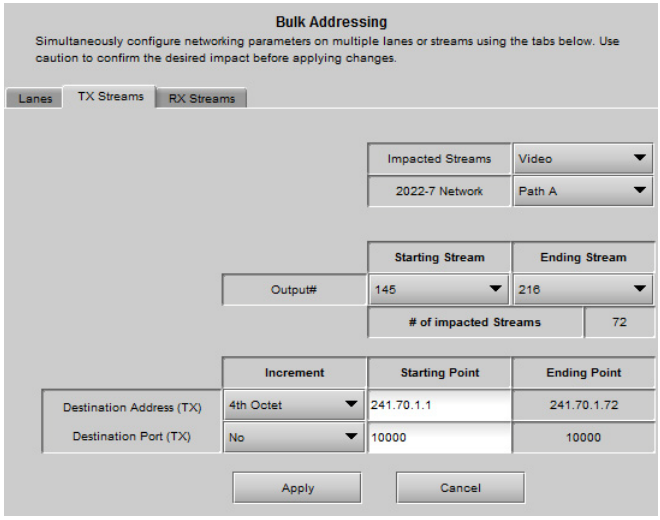
3 Enter a Stream Address and Stream Port for each output that you want to configure. You may use Multicast in some cases, so select your Address and Port accordingly.

- 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 **Bulk Addressing** and select the **TX Streams** tab



2 Use the **Impacted Streams** pulldown to select **Video.**
3 Use the **2022-7 Network** pulldown to select **Path A**
4 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 216].
5 Enter a Starting Point value for **Destination Address (TX)** and **Destination Port (TX)** in the Starting Point data boxes.
6 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]
7 Use the **Auto Increment** pulldown in the **Destination Port (TX)** line to select whether the port address will be indexed:

   [No, Yes]
8 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.
9 Repeat step 3 to step 8, but select **Redundant Path B** in step 3.
10 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,
- an IGMPv2 or IGMPv3 source address. Source Specific Multicasting (SSM) is not supported.

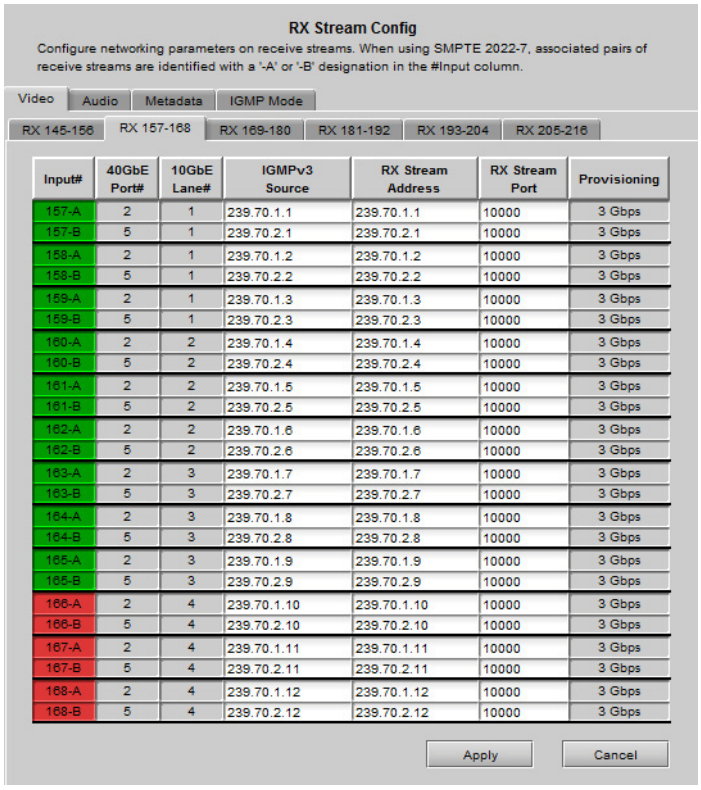
Set:

- individual receive stream addresses using the procedure below.
- 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.
   - The assignment of fabric module inputs to aggregation ports and lanes is determined by the stream format, redundancy mode and stream bitrate selected in the GV Node Manager.

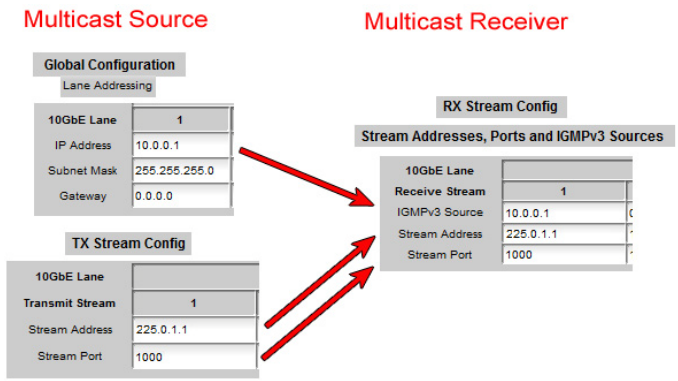
- For a comprehensive listing of all channel-to-port assignments, see Aggregation Port I/O Numbering, on page 148



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

a To receive IGMPv2 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.

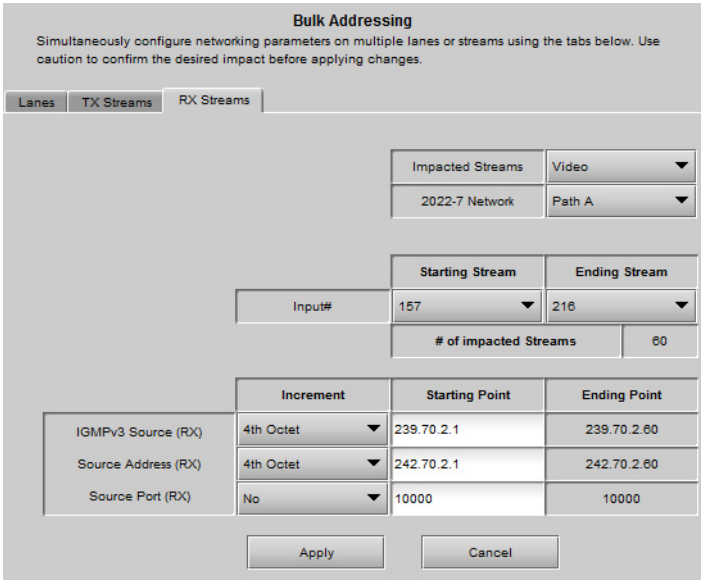
You can choose the IGMP mode - see IGMP Mode Selection, on page 101

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 112 , for more information.

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

1 Click **Bulk Addressing** and select the **RX Streams** tab



2 Use the **Impacted Streams** pulldown to select **Video.**

3 Use the **Network** pulldown to select **Redundant Path A**

4 Use the **Starting Stream** and **Ending Stream** pulldowns to choose the range of streams that you will address [available range 145 to 216].

5 Enter a Starting Point value for **IGMPv3 Source (RX)**, **Source Address (RX)** and **Source Port (RX)** in the Starting Point data boxes.

6 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]

7 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]

8 Use the **Auto Increment** pulldown in the **Source Port (RX)** line to select whether the port address will be incremented:

[No, Yes]

9 Click **Apply** to modify the stream addresses, or **Cancel** to leave the stream addresses unchanged.

10 Repeat step 3 to step 9, but select **Redundant Path B** in the network pulldown.

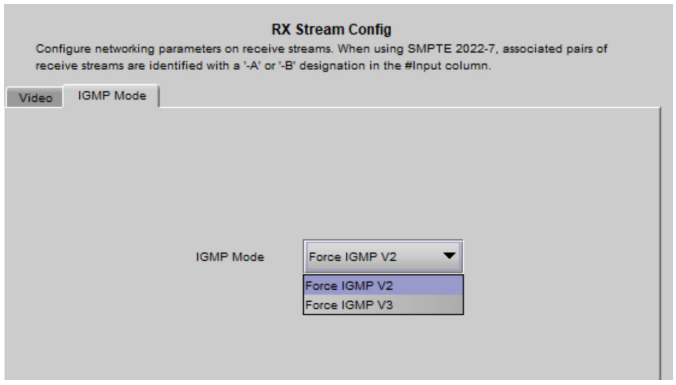
11 You can see the results of your changes by looking at the **RX Stream Config** panel.

IGMP Mode Selection

You can choose whether you will operate in IGMPv2 or IGMPv3 for RX streams.

To select the IGMP mode

1 Click RX Stream Config, and select the IGMP Mode tab.



2 Select the IGMP mode from the pulldown.

- Force IGMP V2
- Force IGMP V3

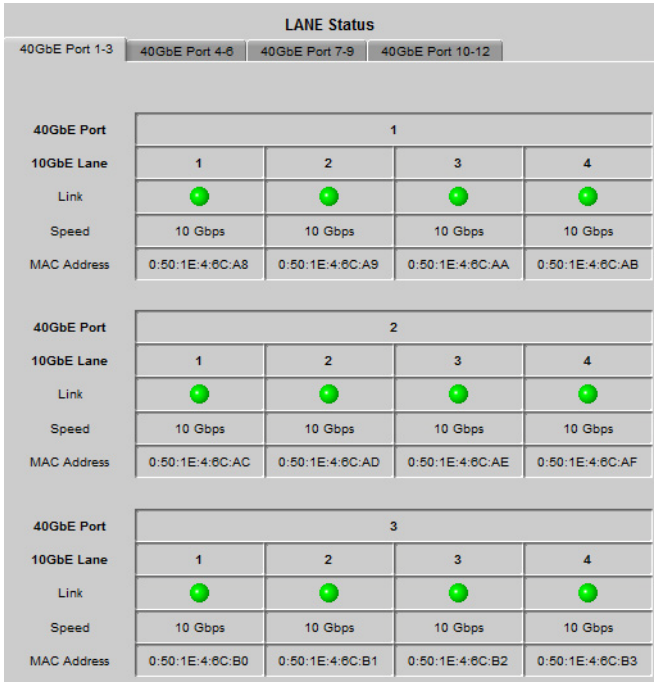
Lane Status Monitoring

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**.

2 Select the tab for the 40GbE port containing the Lane to be examined.



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

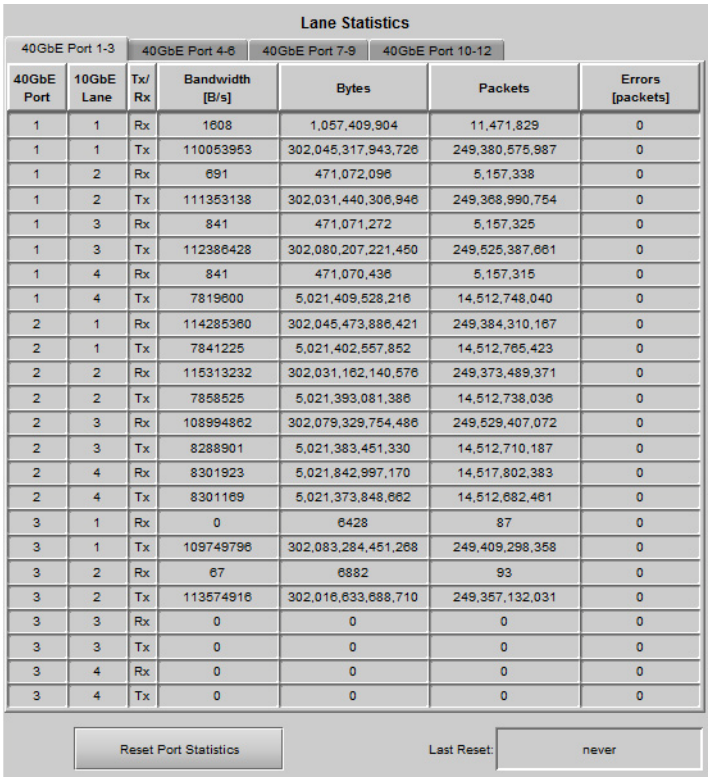
Lane Statistics Reporting

Statistics on lane usage are compiled and can be viewed on the Lane Staistics 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 4-8 | 40GbE Port 7-9 | 40GbE Port 10-12

40GbE Port	10GbE Lane	Tx/ Rx	Bandwidth [B/s]	Bytes	Packets	Errors [packets]
1	1	Rx	1608	1,057,409,904	11,471,829	0
1	1	Tx	110053953	302,045,317,943,726	249,380,575,987	0
1	2	Rx	691	471,072,096	5,157,338	0
1	2	Tx	111353138	302,031,440,306,946	249,368,990,754	0
1	3	Rx	841	471,071,272	5,157,325	0
1	3	Tx	112386428	302,080,207,221,450	249,525,387,661	0
1	4	Rx	841	471,070,436	5,157,315	0
1	4	Tx	7819600	5,021,409,528,216	14,512,748,040	0
2	1	Rx	114285360	302,045,473,886,421	249,384,310,167	0
2	1	Tx	7841225	5,021,402,557,852	14,512,765,423	0
2	2	Rx	115313232	302,031,162,140,576	249,373,489,371	0
2	2	Tx	7858525	5,021,393,081,386	14,512,738,036	0
2	3	Rx	108994862	302,079,329,754,486	249,529,407,072	0
2	3	Tx	8288901	5,021,383,451,330	14,512,710,187	0
2	4	Rx	8301923	5,021,842,997,170	14,517,802,383	0
2	4	Tx	8301169	5,021,373,848,662	14,512,682,461	0
3	1	Rx	0	6428	87	0
3	1	Tx	109749796	302,083,284,451,268	249,409,298,358	0
3	2	Rx	67	6882	93	0
3	2	Tx	113574916	302,016,633,688,710	249,357,132,031	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: never

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.

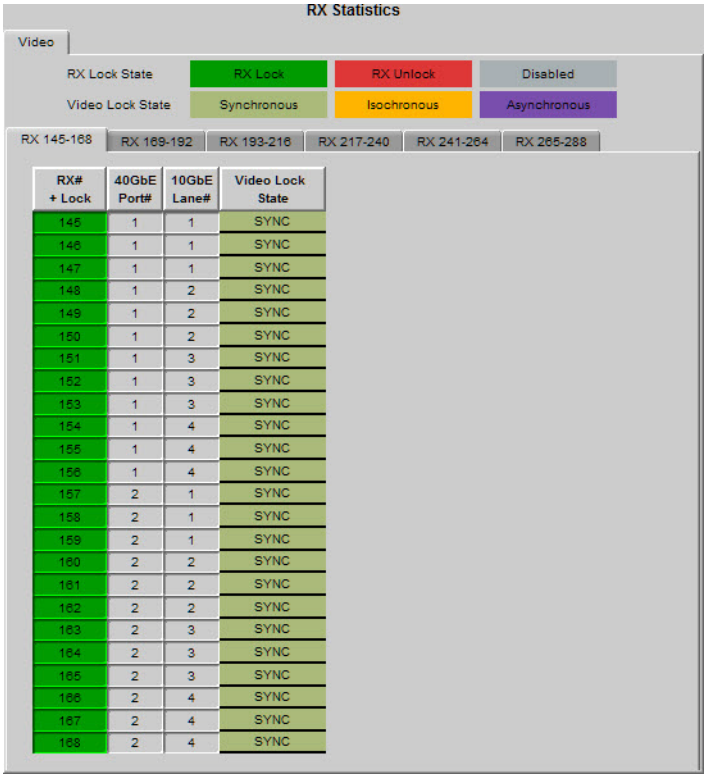
- The counters are reset by default each time the card is started,
- Click **Reset Port Statistics** to immediately reset the statistics.
- The date and time of the last reset is displayed beside the Reset button.

RX Statistics

The RX Statistics panel reports the health of the input data streams on each port and is broken down into the following two parameters:

- The receive lock state: this shows the operational status of the selected receiver; it indicates whether it is receiving a valid multicast stream or not.
- The video lock state: this shows the operational status of the video stream lock state, in relation to GV Node's external reference signal.

Tabs allow you to look at Video streams, and subtabs let you look at each individual stream.



The receive lock state health is reported by the color of the **RX# + Lock** column.

Color	Description	Significance
Dark Green	RX Lock	This indicates that the receiver was able to lock on to the video stream.
Red	RX Unlock	This indicates that the receiver was unable to lock on to the video stream.
Gray	Disabled	This indicates that there is no multicast video stream selected for this receiver.

The video lock state health is reported by the color of the **Video Lock State** column.

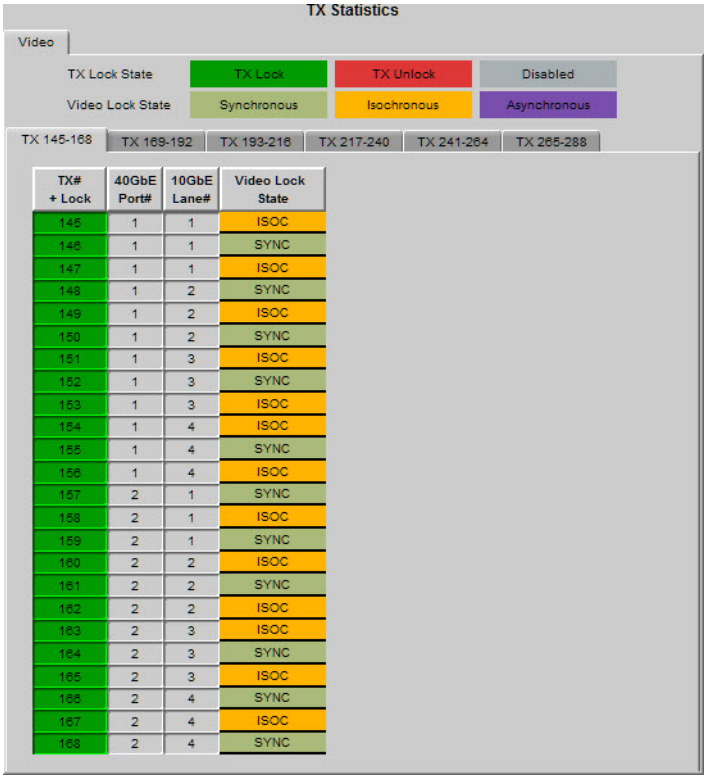
Color	Description	Significance
Light Green	Synchronous	This indicates that the received stream is locked and aligned within the clean switching window.
Yellow	Isochronous	This indicates that the received stream is locked but it is not sufficiently aligned to be within the clean switching window.
Purple	Asynchronous	This indicates that the received stream is not locked relation to GV Node's external reference signal and therefore, clean switching is unavailable.

TX Statistics

The TX Statistics panel reports the health of the output data streams on each port and is broken down into the following two parameters:

- The transmit lock state: this shows the operational status of the selected transmitter; it indicates whether it is transmitting a valid multicast stream or not.
- The video lock state: this shows the operational status of the video stream lock state, in relation to GV Node's external reference signal.

Tabs allow you to look at Video streams, and subtabs let you look at each individual stream.



The transmit lock state health is reported by the color of the **TX# + Lock** column.

Color	Description	Significance
Dark Green	TX Lock	This indicates that the transmitter is locked on to the video stream.
Red	TX Unlock	This indicates that the transmitter is not locked on to the video stream.
Gray	Disabled	This indicates that there is no multicast video stream selected for this transmitter.

The video lock state health is reported by the color of the **Video Lock State** column.

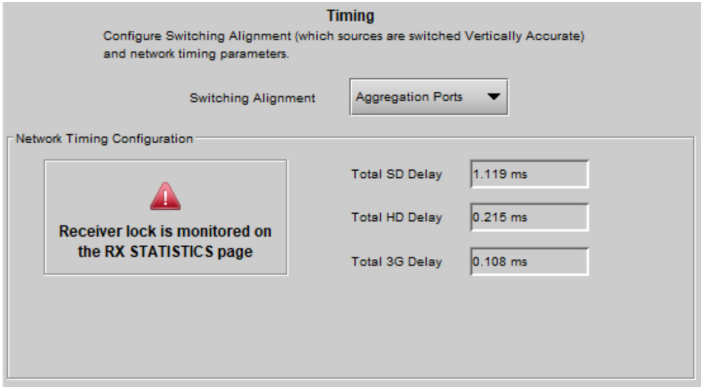
Color	Description	Significance
Light Green	Synchronous	This indicates that the transmitted stream is locked and aligned within the vertical alignment point.
Yellow	Isochronous	This indicates that the transmitted stream is locked but it is not sufficiently aligned to be within the vertical alignment point.
Purple	Asynchronous	This indicates that the transmitted stream is not locked in relation to GV Node's external reference signal.

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 and 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 **Timing**.



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.

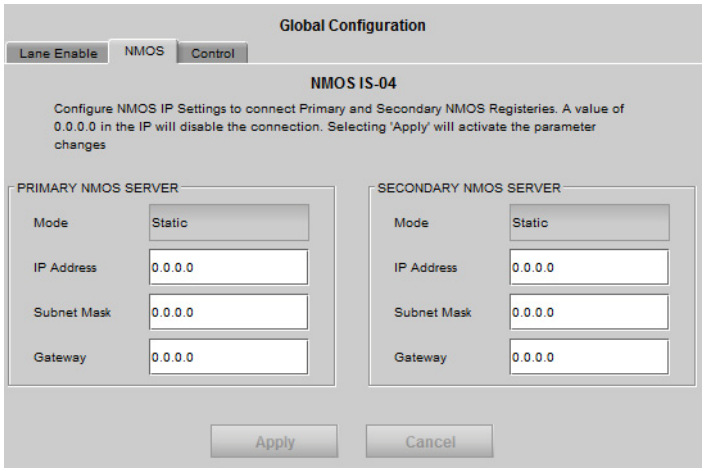
When you have selected the **Aggregation Ports**, you will be dealing with IP signals, and will need to configure the network timing.

NMOS IS-04

The IFM-2T supports discovery and registration per IS-04.

To connect to primary and secondary NMOS registries

1 Click **Global Configuration** and select the **NMOS** tab.



2 Enter the IP Address, Subnet Mask and Gateway for the primary NMOS server.

3 Enter the IP Address, Subnet Mask and Gateway for the secondary NMOS server.

4 A value of 0.0.0.0 in the IP address will disable the connection.

5 Click Apply to activate the parameter changes.

6 Reboot IFM-2T to register the changes:

- Use the iControl IFM-2T panel to reboot the card by using the *Info*, *Technical Support*, then *Reboot* option.
- Use the reboot option in the local control panel. See Local Control Panel Menu - CPU-ETH3, on page 69.

Alarms

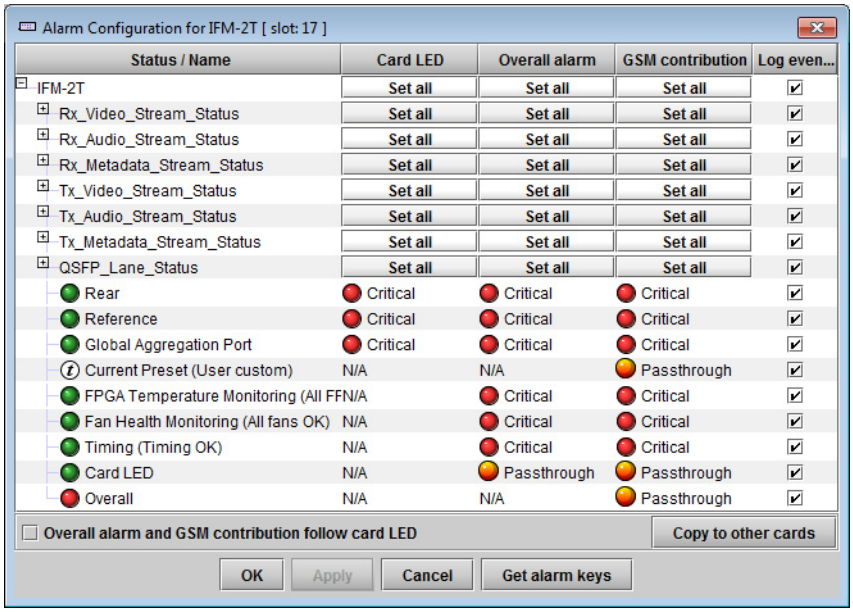
The fabric module generates alarms that are sent to the GV Node controller card when error conditions are detected. These alarms are used to set the control panel status display, and the status icon in the top left of the iControl window.

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

To configure the alarms

1 Click **Alarm Config**.

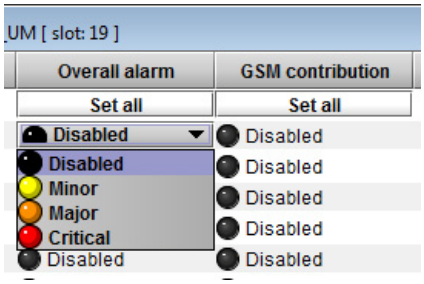
The Alarm Configuration panel opens in a new window, and can be resized if needed. It allows the alarm reporting of the module to be configured. The panel is organized in columns.



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.

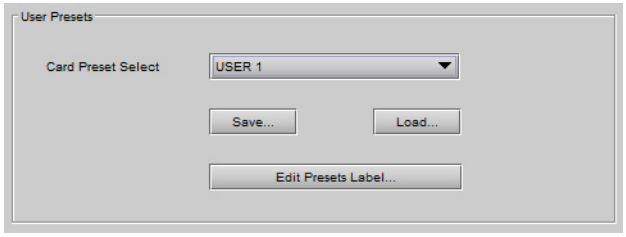
See Alarm Configuration on page 139 for a more detailed description of the contents of this panel.

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.

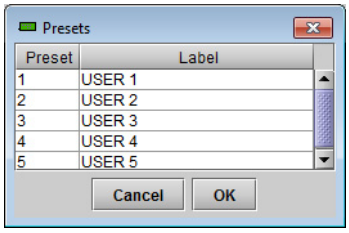
A pop-up will allow you to proceed or cancel the action.

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.**

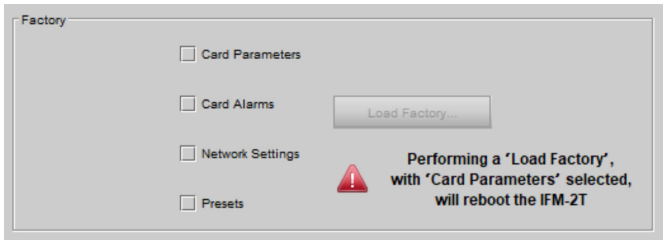
The text you have entered (up to 16 characters) will be appended to the label name in the selection pulldown.

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.**



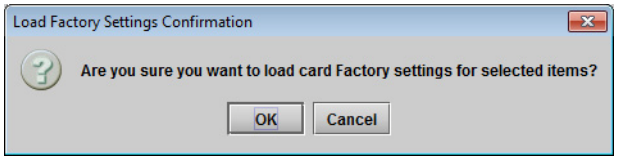
2 Click the checkboxes corresponding to the parameters that you want to restore to factory default values:

Checkbox	Restores (i.e. overwrites current values with factory defaults)
Card Parameters	All operating parameters you have configured via the user interface. When in TR04 or ST2022 modes, this will also cause the IFM-2T to reboot.
Card Alarms	The alarm settings you have made on the **Alarms** panel.
Network Settings	TX and RX addresses. However, the Lane IP address is not set to default.
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

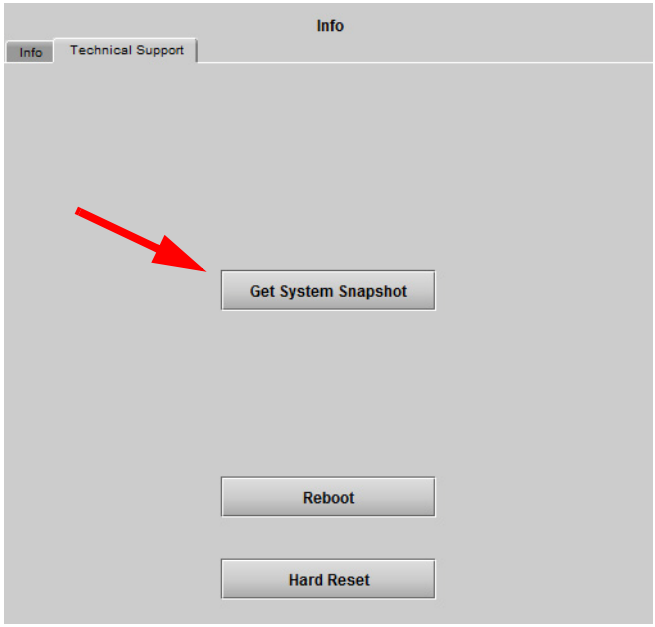
If you need to swap the IFM card for any reason, and want to keep any programmed routes, you should leave the **GV Node ON** (specifically, the CPU-ETH3 on and plugged in) while you remove the old IFM-2T and insert a new one.

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.

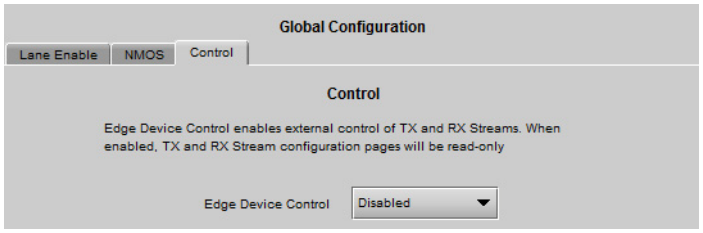
Edge Device Control

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:

Status Options
Disabled
Enabled

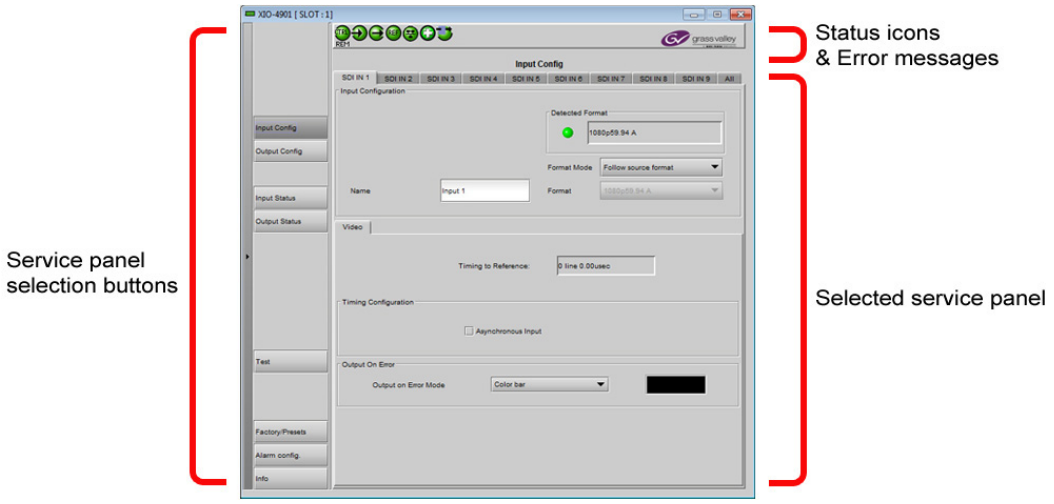
Configure the XIO-4901 SDI I/O Card

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

Summary

The iControl Service Panel

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

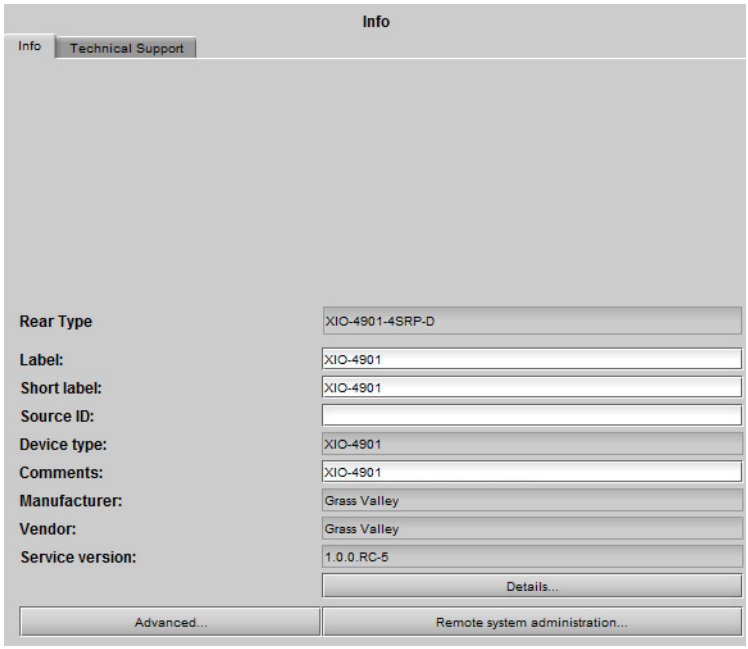


Identification

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.



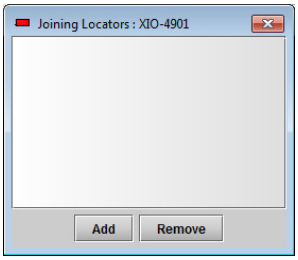
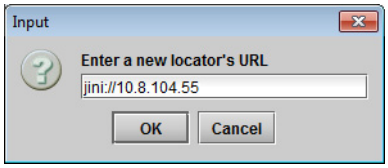
2 Enter appropriate text in the white data boxes (the image shows the default values):

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).
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.

Button	
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.

1 2 3 4 5 6 7

Icon #	Significance
1	Card control status for this XIO-4901: • 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: • Green: Inputs OK. • Red: At least one input is in error.
3	Status of the SDI Outputs: • 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: • Green: URS OK. • Red: URS fault.
5	Status of the Ethernet connection (via the controller rear panel) • Green: Ehernet OK • Red: Ethernet fault.
6	Card health: • Green: Card OK. • Red: Card failure.
7	Processing Mode: • 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).

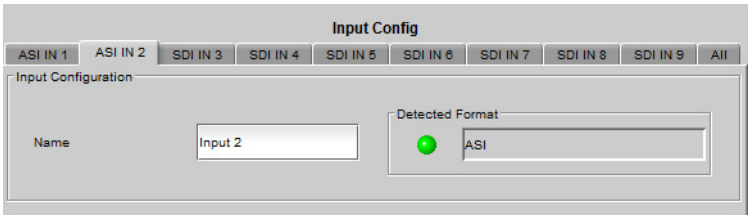
> Note: ASI input is **not supported** if the **MDX option is enabled** for the XIO-4901 card.

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

1 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

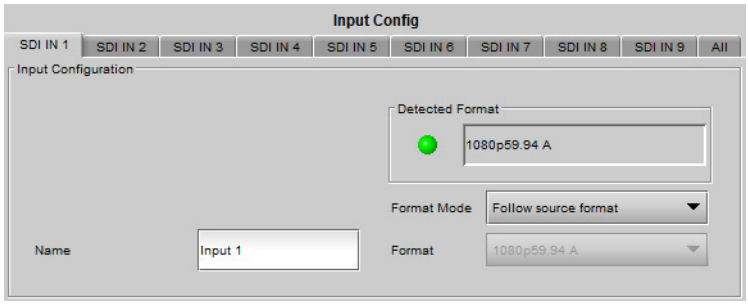
Input Configuration - SDI

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

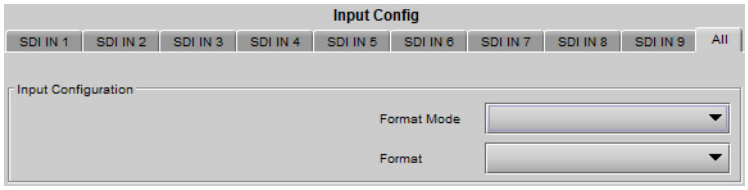
1 Click the **Format Mode** pulldown

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.

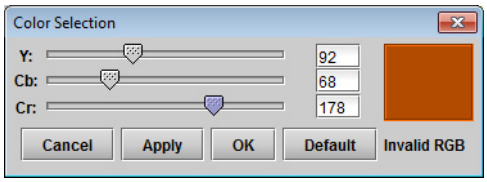
2 In the **Video** tab, click the **Output on Error Mode** pulldown.

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 118. 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

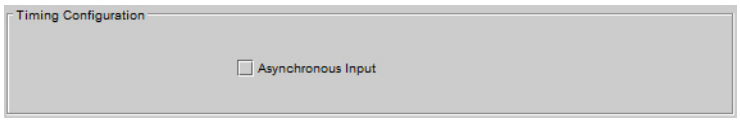
signal drift away from the reference, unlocking the input circuits. The lock/unlock cycle will raise error messages, and interfere with system operation.

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. See Asynchronous Video on page 141 for an overview of how GV Node handles asynchronous video.

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.

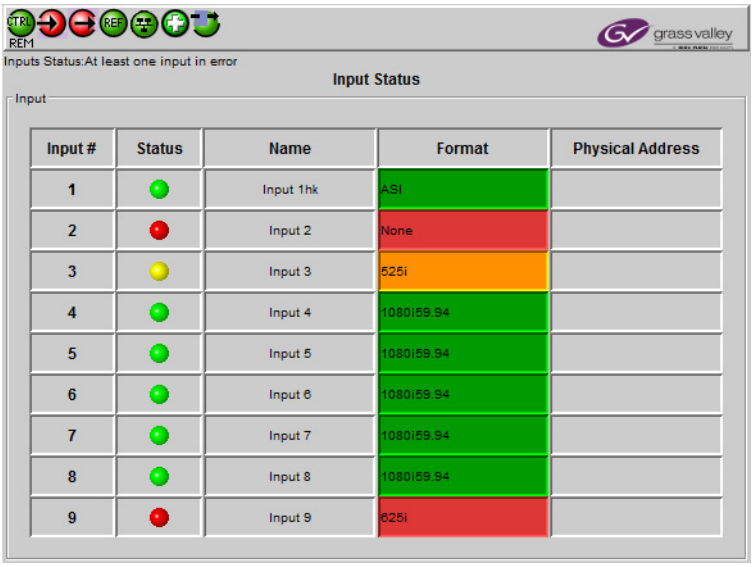


3 Click the **Asynchronous Input** box to select it.

This input will now be considered asynchronous by the system, and processed accordingly. XIO outputs will **not** clean switch to or from this source.

Input Status

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



Input #	Status	Name	Format	Physical Address
1		Input 1hk	ASI	
2		Input 2	None	
3		Input 3	525i	
4		Input 4	1080i59.94	
5		Input 5	1080i59.94	
6		Input 6	1080i59.94	
7		Input 7	1080i59.94	
8		Input 8	1080i59.94	
9		Input 9	625i	

CRC Errors

GV Node manages CRC errors as follows:

Inputs	GV Node performs CRC comparisons on the inputs. Detected errors are flagged in the status icons, and identified more specifically on this status page.
Outputs	GV Node re-calculates the CRC and inserts it into the outgoing stream. Therefore, there will be no CRC errors on the outputs.

Input Audio

For a complete discussion of audio (including MADI) in the XIO-4901and GV Node, see GV Node Audio, on page 153.

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.

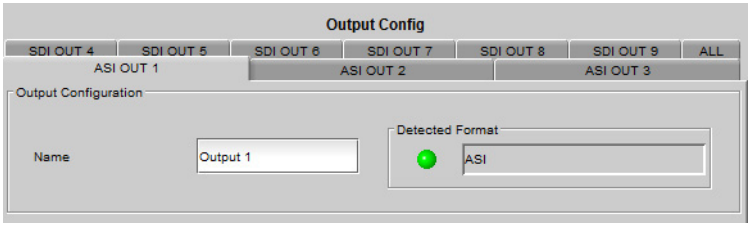
If an output has been configured for ASI output using the GV Node Manager, the tab for that output in the Output Config panel will be labeled ASI OUT n (n = 1 through 9).

> 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

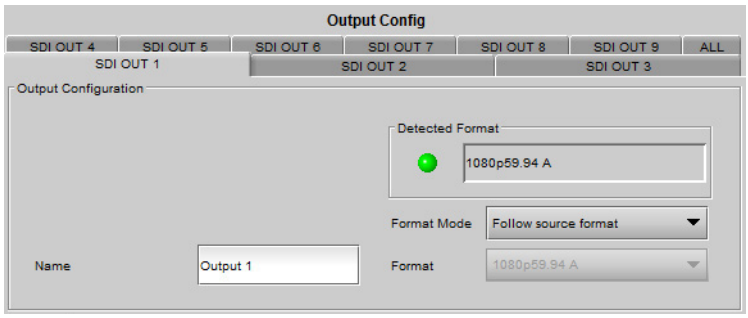
Output Configuration - SDI

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-4901is determined

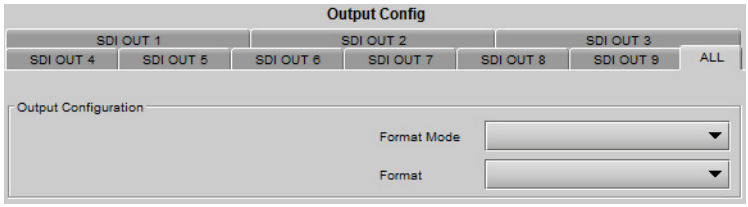
1 Click the **Format Mode** pulldown

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.

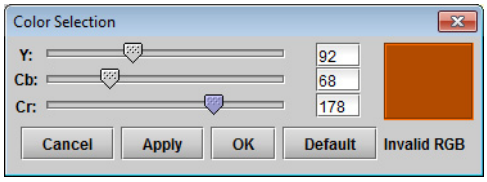
3 Click to select the desired output.

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)

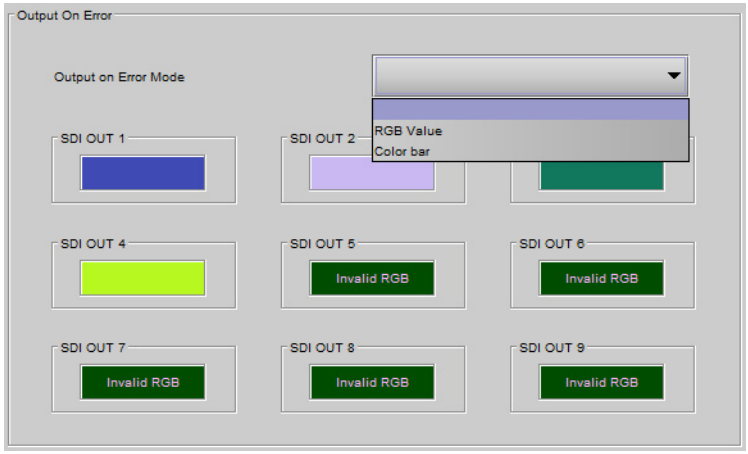
3 Move the sliders, or type into the data boxes, to adjust the color.

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.

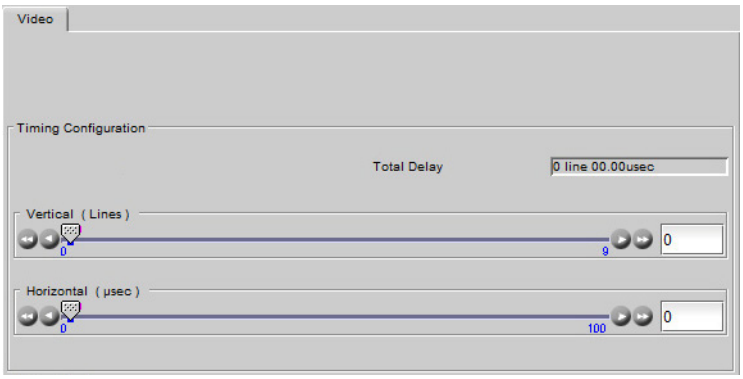
4 You must select the color patch individually for each of the nine outputs, as per To choose the color for the RGB value, on page 118. You can use the color patches here instead of returning to the individual tabs - they are interconnected.

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.

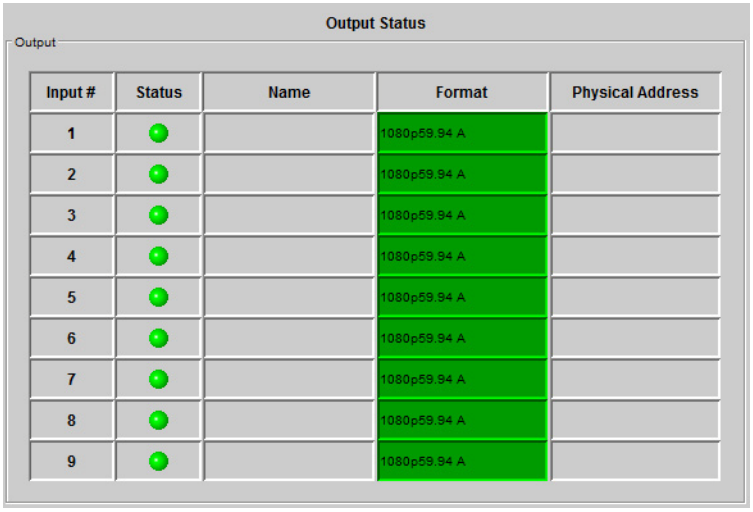


Delay (Vertical and Horizontal)

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**:



CRC Errors

GV Node manages CRC errors as follows:

Inputs	GV Node performs CRC comparisons on the inputs. Detected errors are flagged in the status icons, and identified more specifically on the **Input Status** page.
Outputs	GV Node re-calculates the CRC and inserts it into the outgoing stream. Therefore, there will be no CRC errors on the outputs.

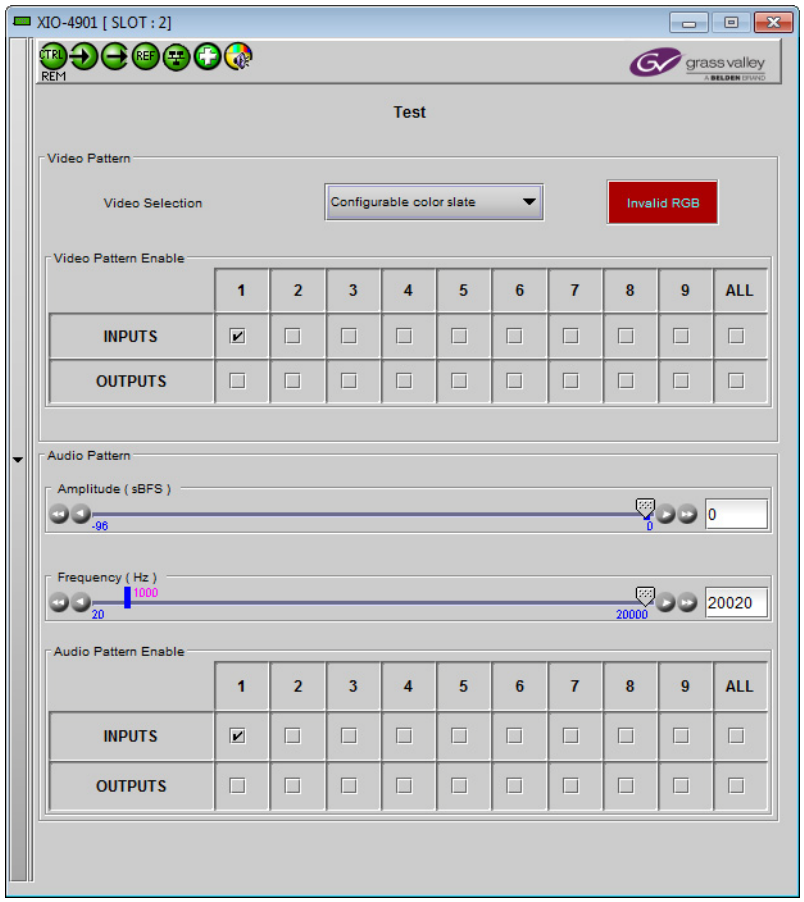
Output Audio

For a complete discussion of audio (including MADI) in the XIO-4901and GV Node, see GV Node Audio, on page 153.

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.

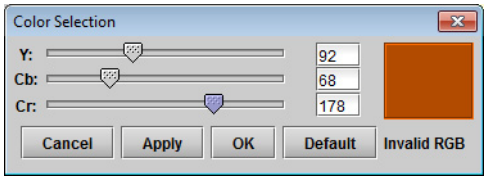
2 Click to select the desired test signal.

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.

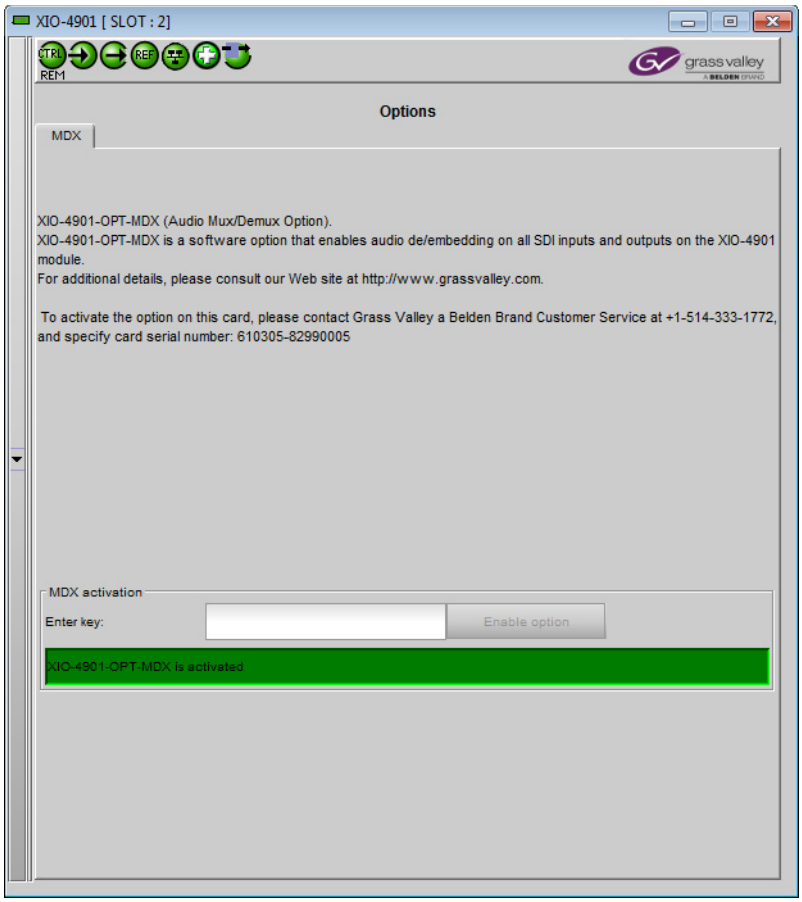
XIO-4901-OPT-MDX is a software option that enables audio embedding / de-embedding on all SDI inputs and outputs on the XIO-4901 module.

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**.

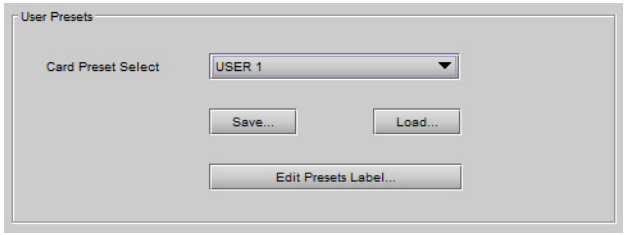
The status window beneath the data box will show that the option is active.

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**.



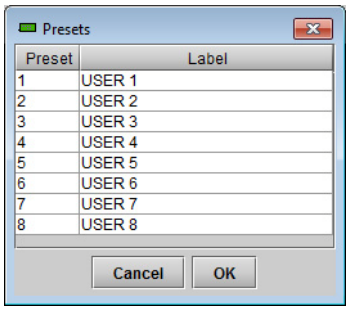
2 Select a register using the **Card Preset Select** pulldown.

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.**

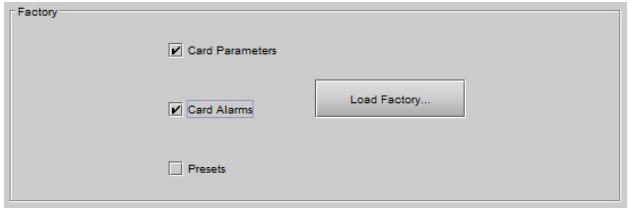
The text you have entered (up to 16 characters) will be appended to the label name in the selection pulldown.

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:

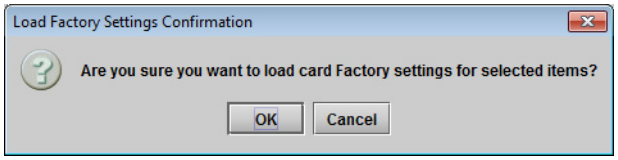
Checkbox	Restores (i.e. overwrites current values with factory defaults)
Card Parameters	All operating parameters you have configured via the user interface.

Checkbox	Restores (i.e. overwrites current values with factory defaults)
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.

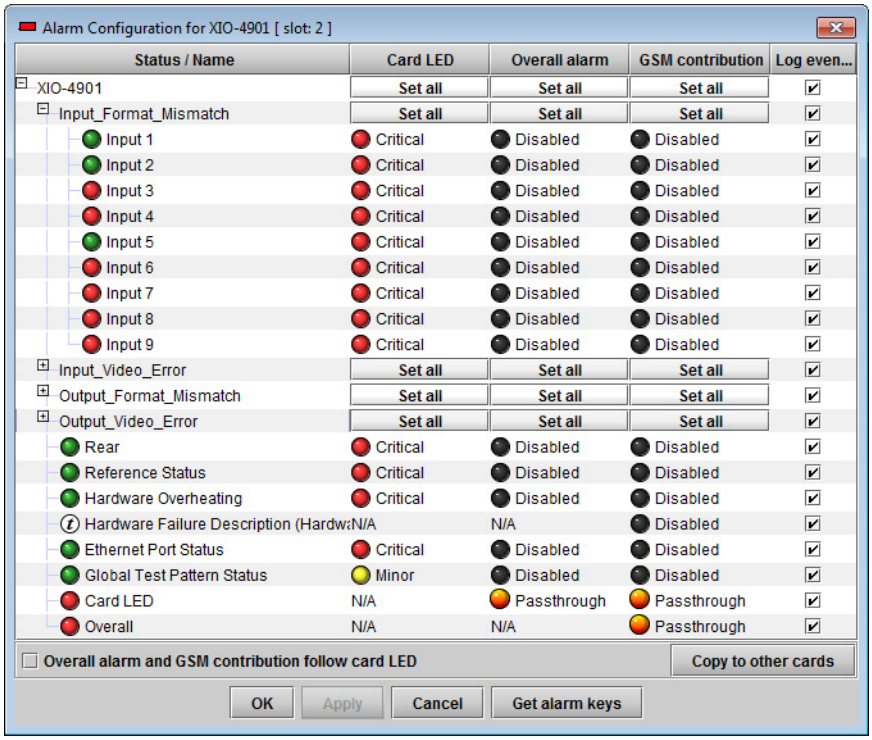
The alarms are reported to the iControl network, and can be reported locally on the frame's GPI port.

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**.

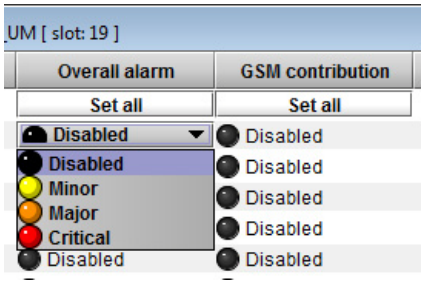
The Alarm Configuration panel opens in a new window, and can be resized if needed. It allows the alarm reporting of the module to be configured. The panel is organized in columns.



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.

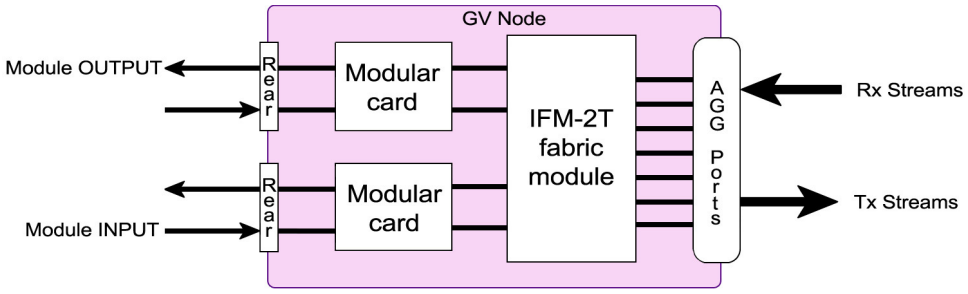
See Alarm Configuration on page 139 for a more detailed description of the contents of this panel.

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 and format at the aggregation port IP interface.

Terminology

The following terms are used in the GV Node Manager interface to describe the input and output signal flows in the GV Node:



Term	Meaning
Module Inputs	SDI inputs to the modular cards in the GV Node frame, via their rear panels.
Module outputs	SDI outputs from the modular cards in the GV Node frame, via their rear panels.
Tx Streams	Outgoing streams from the GV Node aggregation ports.
Rx Streams	Incoming streams to the GV Node aggregation ports.

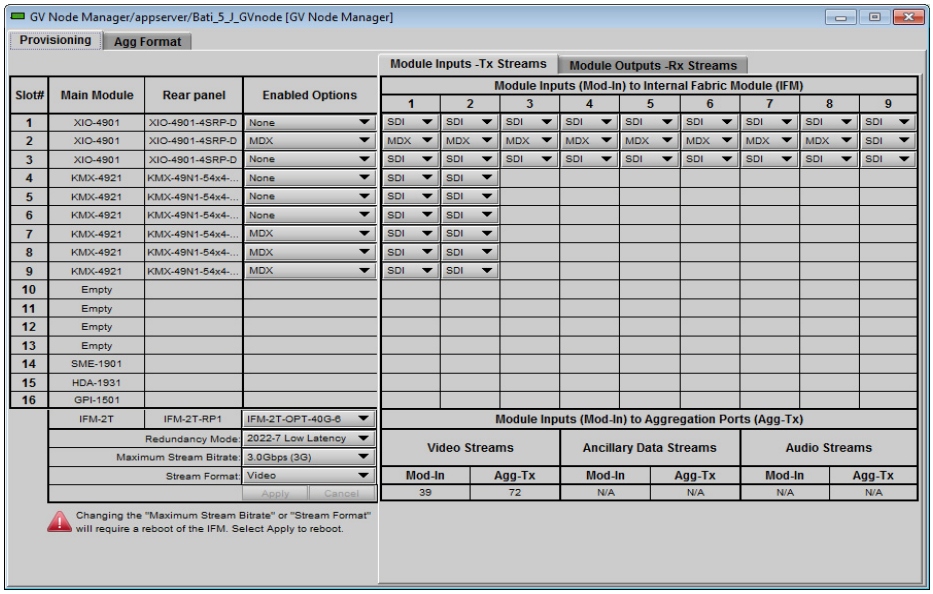
Input and Output Provisioning

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.

> 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 29 under Registering your GV Node to iControl.

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



2 Select the **Provisioning** tab, and the **Module Inputs - Tx Streams** tab

3 In the row beside each GV Node modular card, select the status of each of the 9 module inputs to the internal fabric module.

XIO-4901: The available choices depend on whether the MDX option is activated on the XIO-4901 card (See Options on page 127), and whether it is selected under the Enabled Options column in the GV Node Manager window.

XIO-4901 Card	GV Node Manager		
MDX Option	Options	IN 1 - IN 7	IN 8 & IN 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

KMX-49N1: The available choices depend on whether the MDX option is activated on the KMX-49N1 card (see its User Manual), and whether it is selected under the Enabled Options column in the GV Node Manager window.

KMX-49N1 uses only IN 1 and IN 2.

KMX-49N1 Card	GV Node Manager		
MDX Option	Options	IN 1 - IN 2	IN 3 - IN 9
Not activated	(blank)	OFF SDI	(blank)
Activated	None	OFF SDI	(blank)
Activated	MDX	OFF SDI MDX	(blank)

4 Select the **Provisioning** tab and the **Module Outputs - Rx Streams** tab

5 In the row beside each GV Node modular card, select the status of each of the 9 module outputs from the internal fabric module.

XIO-4901: The available choices depend on whether the MDX option is activated on the XIO-4901 card (See Options on page 127), and whether it is selected under the Enabled Options column in the GV Node Manager window.

XIO-4901 Card	GV Node Manager		
MDX Option	Options	OUT 1 - OUT 7	OUT 8 - OUT 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 AUTO[a]

a. Available when MX license has been activated. The AUTO mode allows the 'pass-thru' routing to determine if the embedder is on or off.

KMX-49N1: The available choices depend on whether the MDX option is activated on the KMX-49N1 card (see its User Manual), and whether it is selected under the Enabled Options column in the GV Node Manager window.

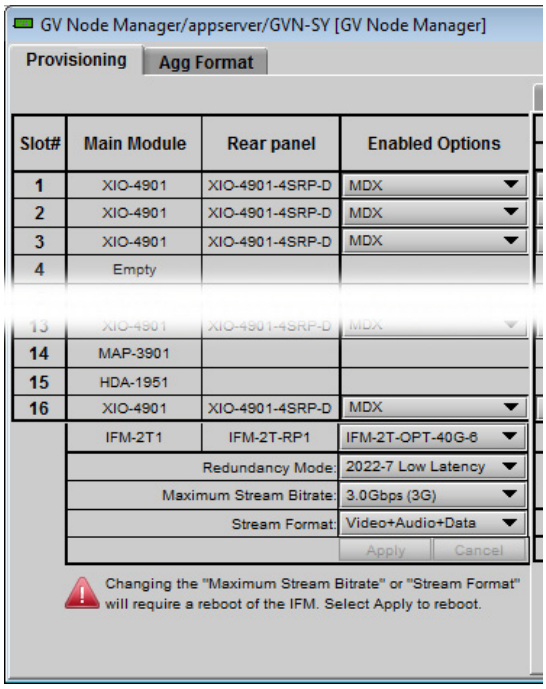
KMX-49N1 Card	GV Node Manager	
MDX Option	Options	OUT 1 - OUT 9
Not activated	(blank)	OFF SDI
Activated	None	OFF SDI
Activated	MDX	OFF SDI MDX

To configure redundancy, stream bitrate and stream format at the aggregation ports

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

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.



2 Select the **Provisioning** tab, and view the lower left portion of the window.

3 In the row labeled "IFM-2T1", ensure that **IFM-2T-OPT-40G-6** is selected under **Enabled Options.**

This selection will only be available if the option has been installed on the IFM-2T. See Options, on page 85, for installation instructions.

4 Use the **Redundancy Mode** pulldown to enable or disable 2022-7 Low-Latency redundancy.

5 Use the **Maximum Stream Bitrate** pulldown to select between 1.5 Gbps (HD) and 3Gbps (3G) maximum bitrates.

6 Use the **Stream Format** pulldown to select the streams that will be processed, per ST 2110 (Audio and Data options are only available when 2022-7 is selected in the Redundancy Mode pulldown):

- Video
- Video+Audio
- Video+Audio+Data

The streams must be configured individually in the IFM-2T control panels. The table summarizes the available configurations.

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

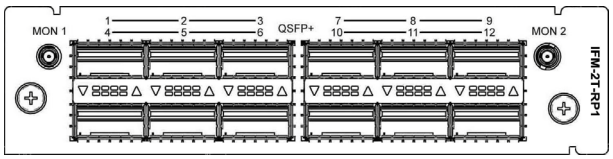
7 Click **Apply** to reboot the IFM-2T if you have changed **Maximum Stream Bitrate** or **Stream Format**.

The IFM-2T service will restart in the selected operating mode.

NOTE: All of the outputs will be interrupted during the reboot process.

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**	Port locations
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.

Aggregation Port Formats

Tx Formats: The signal formats appearing at the aggregation port outputs are determined by the input selected for each output by the internal IFM router.

You can see the format for each for each output by selecting the **Agg Format** tab in the GV Node Manager and then the **Tx Format** tab.

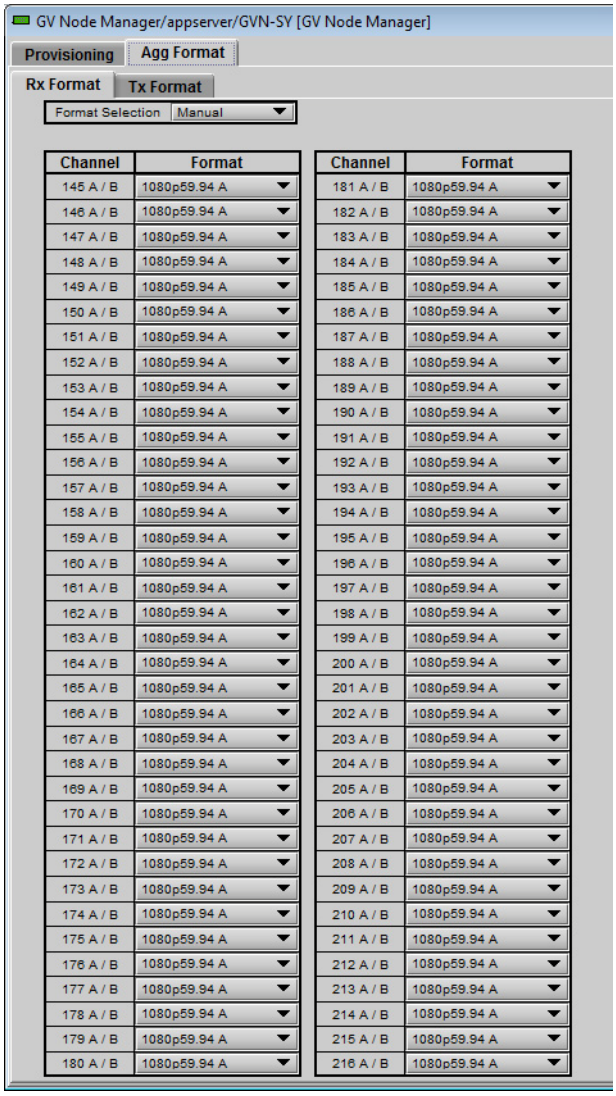
The display shows either 144 individual channels (redundancy OFF) or 216 A-B paired channels (redundancy ON).

Rx Formats: In most cases, the signal formats arriving at the aggregation port inputs are specified by the incoming data stream. However, some controls are available to the user in certain circumstances.

The signal formats arriving at the aggregation port inputs can be specified when the user selects **Video+Audio+Metadata** in the **Stream Format** pulldown.

- When this selection is made the **Redundancy Mode** selection defaults to **2022-7 Low Latency.**

Select the **Agg Format** tab in the GV Node Manager and then the **Rx Format** tab.



The display shows either 144 individual channels (redundancy OFF) or 216 A-B paired channels (redundancy ON).

The **Format Selection** pulldown in the top left of the screen offers two options:

Selection	Meaning
Manual	Used for provisioning in the absence of an IS-04 registry or router control system.
External	Enables external control of the formats via: • SDP: used when the control system is IS-04 compliant and the NP0016-IP protocol is not supported. • NP0016-IP: used to improve performance, requires control system to understand the expanded NP protocols. This mode is supported by GV Convergent. The control system may or may not be IS-04 compliant.

If the Format Selection is **Manual**, and the selected stream format is **Video+Audio+Data**, each stream will display an active format pulldown, allowing the user to select the stream video format. The available choices vary with the **Maximum Stream Bitrate** selection.

Max. Stream Bitrate	Available formats
3G	525i, 625i, 1080p59.94A, 1080p50A, 1080i59.94, 1080i50, 720p50, 720p59.94.
1.5G	525i, 625i, 1080i59.94, 1080i50, 720p50, 720p59.94.

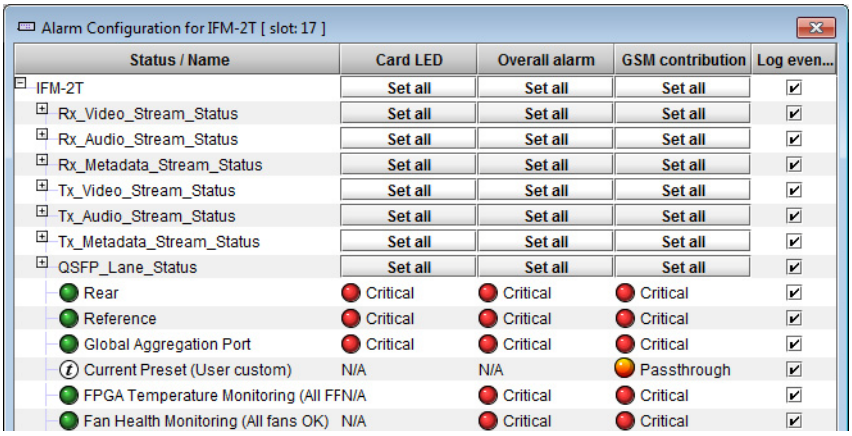
In all other cases, the video format of the stream is displayed, but it cannot be configured. In the case of redundant streams, only the A leg is polled.

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.

Asynchronous Video

Sometimes video arriving at the GV Node, either through the XIO-4901 inputs or at the aggregation ports, will not be synchronous with the local reference source. Dealing with asynchronous video in a switching/routing environment requires special consideration.

GV Node input behavior for asynchronous video

- **SDI inputs:** The user must manually identify asynchronous SDI inputs to the XIO-4901 as asynchronous in the **XIO-4901 Input Config** panel.

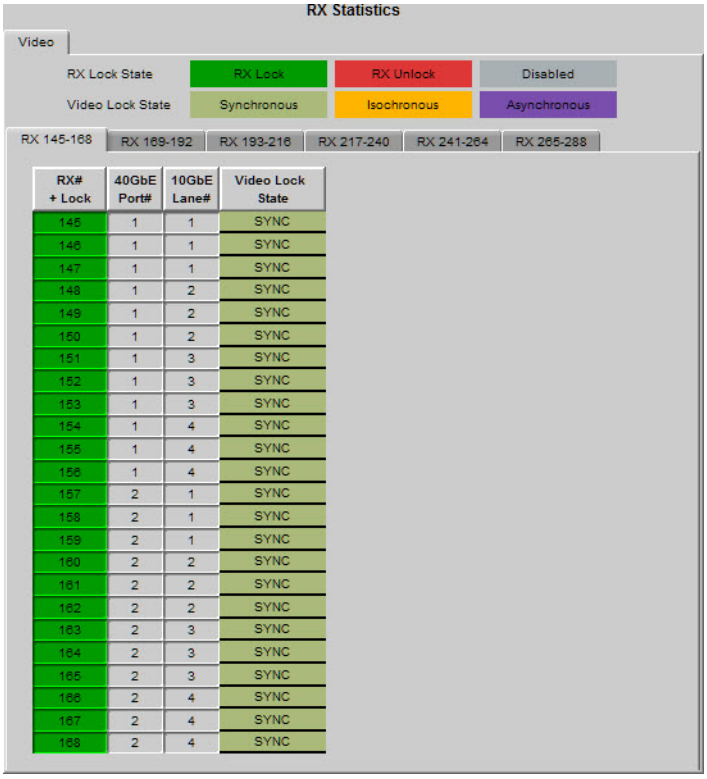
  See Asynchronous Input Signals on page 119 for a fuller description and procedure.

Asynchronous IN checkbox	Behavior
Checked	The signal is considered ASYNC. The incoming SDI can be at a different frame rate than reference, or can be a wild feed.
Unchecked	The signal is considered SYNC. The incoming SDI must be genlocked and timed within Network Tolerance Window (NTW).

- **IP inputs:** GV Node checks the **sync status bit** (R-Bit) of signals arriving at the aggregation ports to determine whether the video is synchronous or asynchronous.

R-Bit state	Behavior (not user configurable)
ON	Signal is considered SYNC: Uses clock derived from reference to process the signal
OFF	Signal is considered ASYNC: Uses clock recovered from the incoming signal.

To help the user be aware of the SYNC/ASYNC status of the aggregation port inputs, the detected status of all aggregation port inputs is displayed on the **RX Statistics** iControl panel.



GV Node output behavior for asynchronous video

- **SDI Outputs:** Clean switching at the XIO-4901 output depends on the status of the signals arriving from the fabric module.

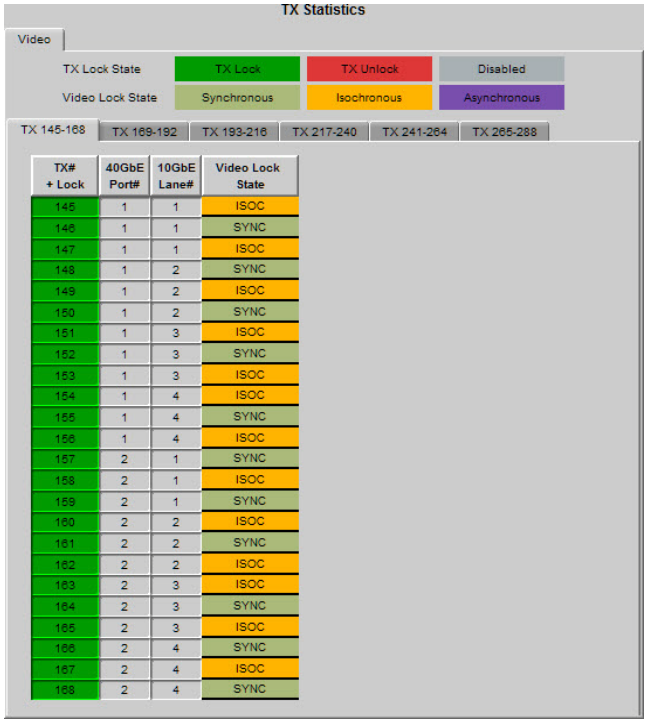
Signal status	Behavior
SYNC	The deglitcher in the XIO output is active. Switches between synchronous sources will be clean.
ASYNC	The deglitcher in the XIO output is disabled. Switches will not be clean.

- **IP outputs:** Switches at the aggregation port outputs are never clean, as there is no deglitcher in the signal path. Aggregation port outputs will pass the sync status bit.

Sync status bit	Signal status
ON	Signal is SYNC
OFF	Signal is ASYNC

The sync bit status, and hence the SYNC/ASYNC designation, is shown for all outputs in

the **TX Statistics** iControl panel.



3 Router Control Configuration

Introduction

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

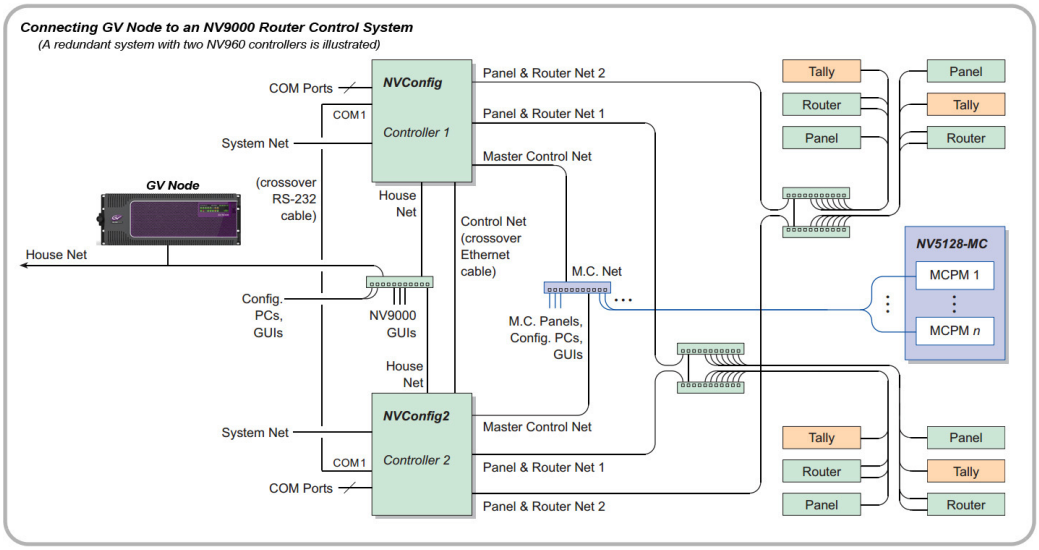
- **NV-9000** - Grass Valley's router controller.
- **GV Convergent**
- **NP0016** for third-party control

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

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 146

Step 2: Connect GV Node to the NV9000 network, on page 146

Step 3: Design a configuration using SE Utilities, on page 146

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 27, 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
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/O7	I/O 8	I/O 9
1	1-16	17-32	33-48	49-64	65-80	81-96	97-112	113-128	129-144
2	145-160	161-176	177-192	193-208	209-224	225-240	241-256	257-272	273-288
3	289-304	305-320	321-336	337-352	353-368	369-384	385-400	401-416	417-432
4	433-448	449-464	465-480	481-496	497-512	513-528	529-544	545-560	561-576
5	577-592	593-608	609-624	625-640	641-656	657-672	673-688	689-704	705-720
6	721-736	737-752	753-768	769-784	785-800	801-816	817-832	833-848	849-864
7	865-880	881-896	897-912	913-928	929-944	945-960	961-976	977-992	993-1008

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/O7	I/O 8	I/O 9
8	1009-1024	1025-1040	1041-1056	1057-1073	1073-1088	1089-1104	1105-1120	1121-1136	1137-1152
9	1153-1168	1169-1184	1185-1200	1201-1216	1217-1232	1233-1248	1249-1264	1265-1280	1281-1296
10	1297-1312	1313-1328	1329-1344	1345-1360	1361-1376	1377-1392	1393-1408	1409-1424	1425-1440
11	1441-1456	1457-1472	1473-1480	1489-1504	1505-1520	1521-1536	1537-1552	1553-1568	1569-1584
12	1585-1600	1601-1616	1617-1632	1633-1648	1649-1664	1665-1680	1681-1696	1697-1712	1713-1728
13	1729-1744	1745-1760	1761-1776	1777-1792	1793-1808	1809-1824	1825-1840	1841-1856	1857-1872
14	1873-1888	1889-1904	1905-1920	1921-1936	1937-1952	1953-1968	1969-1984	1985-2000	2001-2016
15	2017-2032	2033-2048	2049-2064	2065-2080	2081-2096	2097-2112	2113-2128	2129-2144	2145-2160
16	2161-2176	2177-2192	2193-2208	2209-2224	2225-2240	2241-2256	2257-2272	2273-2288	2289-2304

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 assignment of channels to the aggregation ports depends on the operational modes that have been activated,. See To configure redundancy, stream bitrate and stream format at the aggregation ports, on page 135, for details on activating these modes.

- 2022-7 Redundancy halves the number of channels sent and received, 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 channels to be sent on aggregation ports 1-3 and 6-9, while leaving aggregation ports 4-6 and 10-12 unused.

Video channels available at the aggregation ports are numbered from 145 to 288.

Audio channels available at the aggregation ports are numbered from 2305 to 4608.

Metadata channels available at the aggregation ports are numbered from 145 to 288

The three tables that follow show the aggregation port (QSFP) channel assignments for the three stream format modes that can be selected in the GV Node manager.

Within each table, results are shown for Redundancy Mode (None = Standard; 2022-7 Low Latency = Redundant) and for Maximum Stream Bitrate (3GB, 1.5GB)

Stream Format: Video

ST 2022-6						
	Standard ST 2022-6/3GB - 3 streams per 10GB lane / 12 per QSFP					
	QSFP1 VID 145-156	QSFP2 VID 157-168	QSFP3 VID 169-180	QSFP7 VID 181-192	QSFP 8 VID 193-204	QSFP9 VID 205-216
	QSFP4 VID 217-228	QSFP5 VID 229-240	QSFP6 VID 241-252	QSFP10 VID 253-264	QSFP11 VID 265-278	QSFP12 VID 277-288
3GB	**Redundant ST 2022-6 / 2022-7 - 3 streams per 10GB lane / 12 per QSFP**					
	QSFP1 VID 145-156 A	QSFP2 VID 157-168 A	QSFP3 VID 169-180 A	QSFP7 VID 181-192 A	QSFP 8 VID 193-204 A	QSFP9 VID 205-216 A
	QSFP4 VID 145-156 B	QSFP5 VID 157-168 B	QSFP6 VID 169-180 B	QSFP10 VID 181-192 B	QSFP 11 VID 193-204 B	QSFP12 VID 205-216 B
	Standard ST 2022-6/6HD - 6 streams per 10GB lane / 24 per QSFP					
	QSFP1 VID 145-168	QSFP2 VID 169-192	QSFP3 VID 193-216	QSFP7 VID 217-240	QSFP 8 VID 241-264	QSFP9 VID 265-288
	QSFP4	QSFP5	QSFP6	QSFP10	QSFP11	QSFP12
1.5GB	**Redundant ST 2022-6 / 2022-7 - 6 streams per 10GB lane / 24 per QSFP**					
	QSFP1 VID 145-168 A	QSFP2 VID 169-192 A	QSFP3 VID 193-216 A	QSFP7	QSFP8	QSFP9
	QSFP4 VID 145-168 B	QSFP2 VID 169-192 B	QSFP3 VID 193-216 B	QSFP10	QSFP11	QSFP12

QSFP marked in RED are not used

Stream Format: Video+Audio

TR04 (ST 2022-6+AES-67)						
	Standard ST 2022-6+AES-67/3GB - 3 streams per 10GB lane / 12 per QSFP					
	QSFP1 VID 145-156 AUD 2305-2496	QSFP2 VID 157-168 AUD 2497-2688	QSFP3 VID 169-180 AUD 2689-2880	QSFP7 VID 181-192 AUD 2881-3072	QSFP 8 VID 193-204 AUD 3073-3364	QSFP9 VID 205-216 AUD 3265-3456
	QSFP4 VID 217-228 AUD 3457-3648	QSFP5 VID 229-240 AUD-3649-3840	QSFP6 VID 241-252 AUD 3841-4032	QSFP10 VID 253-264 AUD 4033-4224	QSFP11 VID 265-278 AUD 4225-4414	QSFP12 VID 277-288 AUD 4417-4608
3GB	**Redundant 2022-7 / ST 2022-6+AES-67 - 9 streams per 10GB lane / 36 per QSFP**					
	QSFP1 VID 145-156 A AUD 2305-2496 A	QSFP2 VID 157-168 A AUD 2497-2688 A	QSFP3 VID 169-180 A AUD 2689-2880 A	QSFP7 VID 181-192 A AUD 2881-3072 A	QSFP 8 VID 193-204 A AUD 3073-3364 A	QSFP9 VID 205-216 A AUD 3265-3456 A
	QSFP4 VID 145-156 B AUD 2305-2496 B	QSFP5 VID 157-168 B AUD 2497-2688 B	QSFP6 VID 169-180 B AUD 2689-2880 B	QSFP10 VID 181-192 B AUD 2881-3072 B	QSFP 11 VID 193-204 B AUD 3073-3364 B	QSFP12 VID 205-216 B AUD 3265-3456 B
	Standard ST 2022-6+AES-67/6HD - 6 streams per 10GB lane / 24 per QSFP					
	QSFP1 VID 145-168 AUD 2305-2496	QSFP2 VID 169-192 AUD 2497-2688	QSFP3 VID 193-216 AUD 2689-2880	QSFP7 VID 217-240 AUD 3457-3648	QSFP 8 VID 241-264 AUD 3649-3840	QSFP9 VID 265-288 AUD 3841-4032
	QSFP4	QSFP5	QSFP6	QSFP10	QSFP11	QSFP12
1.5GB	**Redundant ST 2022-6 / 2022-7 - 6 streams per 10GB lane / 24 per QSFP**					
	QSFP1 VID 145-168 A AUD 2305-2496 A	QSFP2 VID 169-192 A AUD 2497-2688 A	QSFP3 VID 193-216 A AUD 2689-2880 A	QSFP7	QSFP8	QSFP9
	QSFP4 VID 145-168 B AUD 2305-2496 B	QSFP2 VID 169-192 B AUD 2497-2688 B	QSFP3 VID 193-216 B AUD 2689-2880 B	QSFP10	QSFP11	QSFP12

QSFP marked in RED are not used

Stream Format: Video+Audio+Data

ST 2110-20/30/40						
	Redundant 2022-7 / ST 2022-6+AES-67 - 9 streams per 10GB lane / 36 per QSFP					
3GB	QSFP1 VID 145-156 A AUD 2305-2496 A ANC 145-156 A	QSFP2 VID 157-168 A AUD 2497-2688 A ANC 157-168 A	QSFP3 VID 169-180 A AUD 2689-2880 A ANC 169-180 A	QSFP7 VID 181-192 A AUD 2881-3072 A ANC 181-192 A	QSFP 8 VID 193-204 A AUD 3073-3364 A ANC 193-204 A	QSFP9 VID 205-216 A AUD 3265-3456 A
	QSFP4 VID 145-156 B AUD 2305-2496 B ANC 145-156 B	QSFP5 VID 157-168 B AUD 2497-2688 B ANC 157-168 B	QSFP6 VID 169-180 B AUD 2689-2880 B ANC 169-180 B	QSFP10 VID 181-192 B AUD 2881-3072 B ANC 181-192 B	QSFP 11 VID 193-204 B AUD 3073-3364 B ANC 193-204 B	QSFP12 VID 205-216 B AUD 3265-3456 B ANC 205-216 A
	Redundant ST 2022-6 / 2022-7 - 6 streams per 10GB lane / 24 per QSFP					
1.5GB	QSFP1 VID 145-168 A AUD 2305-2688 A ANC 145-168 A	QSFP2 VID 169-192 A AUD 2689-3072 A ANC 169-192 A	QSFP3 VID 193-216 A AUD 3073-3456 A ANC 193-216 A	QSFP7	QSFP8	QSFP9
	QSFP4 VID 145-168 B AUD 2305-2688 B ANC 145-168 B	QSFP2 VID 169-192 B AUD 2689-3072 B ANC 169-192 B	QSFP3 VID 193-216 B AUD 3073-3456 B ANC 193-216 B	QSFP10	QSFP11	QSFP12

QSFP marked in RED are 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

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 127) - 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-4901card.
- 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 145.

MADI

The XIO-4901supports MADI audio on the last two numbered inputs and outputs.

Rear Panel	Connectors	MADI I/O Channels
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.

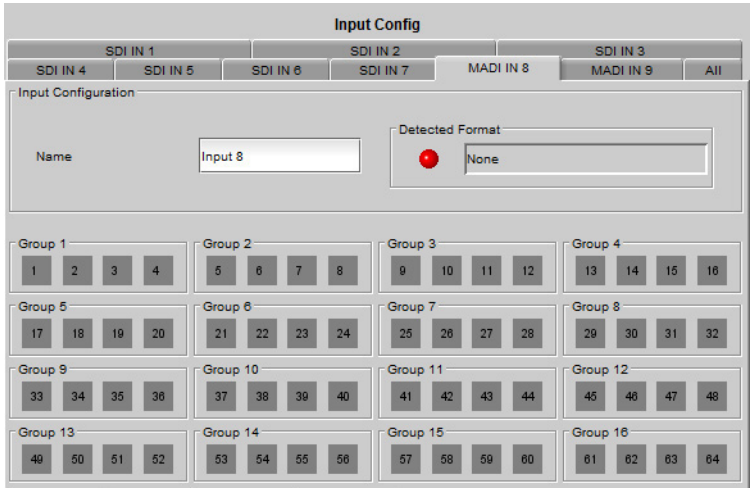
b In the section **Inputs to Internal Fabric Module**, select MADI from the pulldown for any of the last two inputs (see the table above) if you want to activate MADI for that SDI input.

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 view the MADI signal status 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.

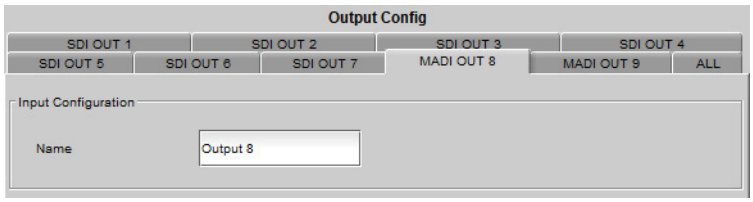


The 64 icons in 16 Groups at the center of the panel indicate the status of incoming audio channels in the MADI stream. These audio channels are mapped to the IFM-2T audio matrix as shown in the table Audio Matrix (MADI audio), on page 148.

To view the MADI configuration 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 148.

SDI Embedded Audio

SDI inputs and outputs on the XIO-4901 can carry up to 16 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 (9x 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 x 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 x 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 147.

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

1. Activate the **MDX option** on the XIO-4901.

   See Options on page 127.
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 pulldown.
   b. In the section **Inputs to Internal Fabric Module**, select MDX from the pulldown 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 pulldown for each of the 9 outputs if you want to activate embedding on that SDI output.

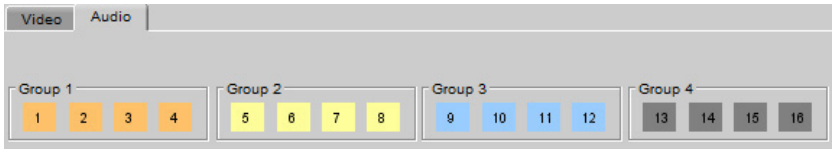
> Note: MDX is the default selection for the Options, Inputs and Outputs columns in GV Node Manager when the MDX Option is first enabled. Steps 2 and 3 allow you to verify the default configuration, and let you disable MDX, if you don't need it on a particular input or output, by selecting OFF or SDI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

To view the Audio De-embedding status 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

Icon color		Audio Type
Dark purple		Dolby Digital Plus
Gray		No Audio

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

To view the Audio Embedding configuration 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.

Audio under ST 2110

Please see the discussion under Stream Addressing, on page 90.

Note: ST 2110-30 audio will support 16 channel 125 μsec, and all incoming audio flows must be compliant with this.

5 Use Cases

This chapter documents some typical use cases for GV Node.

Summary

Use Cases for v1.2 and later

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

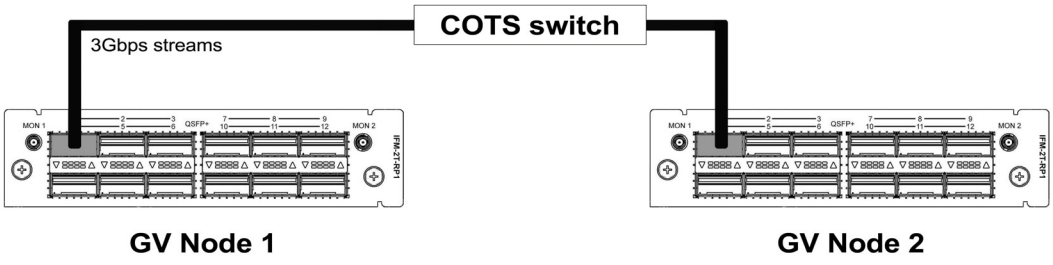
- No redundancy; high bit-rate streams
- 2022-7 Low Latency redundant, high-bit-rate streams
- No redundancy; 6HD low bit-rate streams
- 2022-7 Low Latency redundant streams, using 6HD low bit-rate mode

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 **Bulk Addressing** button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.

4 Change the starting point to "10.0.0.2"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 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 **Bulk Addressing** button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.3"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 Click **Apply**

Configuring the transmit stream for a basic SMPTE ST 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 **TX145-156** tab
4 Click the **TX Stream Address** field for Output #145
5 Enter "238.1.1.1" in the field (a multicast IP address only)
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 ST 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 **RX145-156** tab
4 Click the **RX Stream Address** field for Input #145
5 Enter "238.1.1.1" in the field (a multicast IP address only)
6 Click the **RX Stream Port** field for Input #145
7 Enter "1001" in the field
8 Click **Apply**

Setting a video route to get video content to the transmitter.

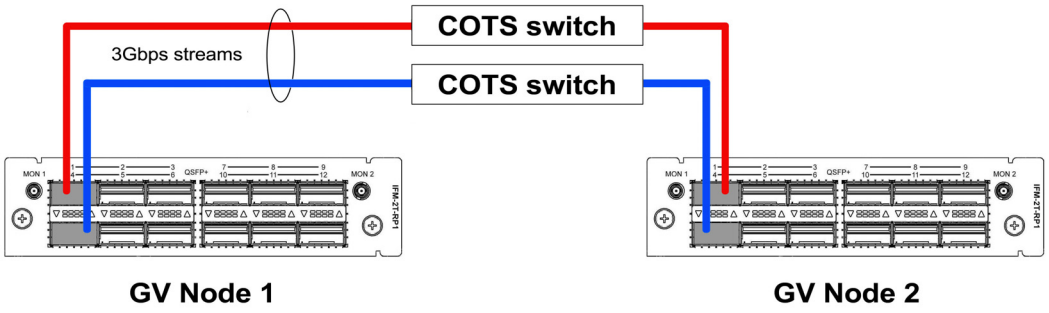
1 On GV Node 1, set TX side route Source 1 to Destination 145 (Video source from XIO-4901 input 1 sent out to the transmitter)
2 On GV Node 2, set RX side, we can route Source 145 to Destination 1. Where a KMX is present in Slot 1 of receiving GV Node.

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 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

1 Open the **GV Node Manager** for GV Node 1 in iControl
2 Click the **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 **Bulk Addressing**button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.2"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 Click apply

Configuring GV Node 2 for Redundancy

1 Open the **GV Node Manager** for GV Node 2 in iControl
2 Click the **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 **Bulk Addressing**button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.3"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 Click **Apply**

Configuring the transmit stream for a basic SMPTE ST 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 "238.1.1.1" in the field (a multicast IP address only)
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 "238.1.6.1" in the field (a multicast IP address only)
10 Click the **TX Stream Port** field for Output #145B
11 Enter "1001" in the field
12 Click **Apply**

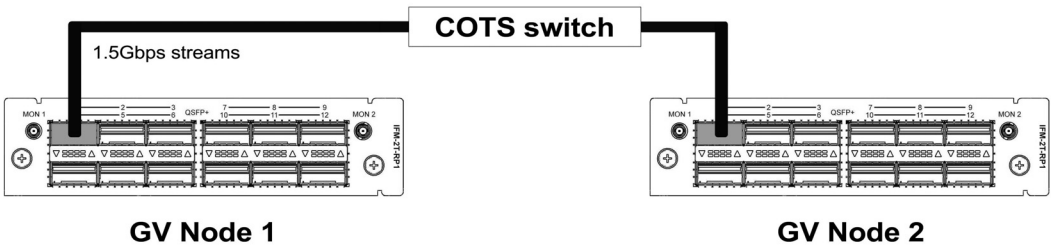
Configuring the receive stream for a basic SMPTE ST 2022-6 stream on GV Node 2

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 145-156** tab
4 Click the **RX Stream Address** field for Input #145A
5 Enter "238.1.1.1" in the field (a multicast IP address only)
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 "238.1.6.1" in the field (a multicast IP address only)
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 **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 **Bulk Addressing** button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.2"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 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 **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 **Bulk Addressing** button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.3"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 Click **Apply**

Configuring the transmit stream for a basic SMPTE ST 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 **TX145-156** tab
4 Click the **TX Stream Address** field for Output #145
5 Enter "238.1.1.1" in the field (a multicast IP address only)
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 ST 2022-6 stream on GV Node 2

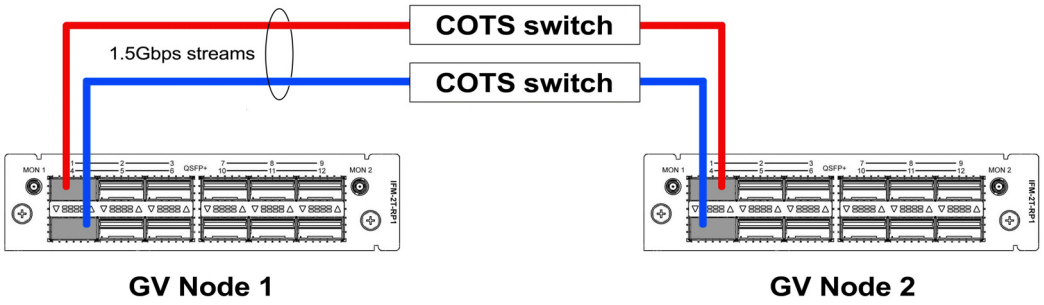
1 Open the **IFM-2T control panel** in iControl
2 Click the **RX Stream Config** button in the left navigation pane
3 Click the **RX 145-156** tab
4 Click the **RX Stream Address** field for Input #145
5 Enter "238.1.1.1" in the field (a multicast IP address only)

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 **Redundancy Mode** dropdown
3 Select "2022-7 Low Latency"
4 Click the **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 **Bulk Addressing** button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.2"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 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 **Redundancy Mode** dropdown
3 Select "2022-7 Low Latency"
4 Click the **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 **Bulk Addressing** button in the left navigation pane
3 Click the **Lane IP Address -> Octet** dropdown and select 3rd octet.
4 Change the starting point to "10.0.0.3"
5 Click the **Lane Gateway -> Octet** dropdown and select 3rd octet.
6 Change the starting point to "10.0.0.1"
7 Click **Apply**

Configuring the transmit stream for a basic SMPTE ST 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 **TX145-156** tab
4 Click the **TX Stream Address** field for Output #145A
5 Enter "238.1.1.1" in the field (a multicast IP address only)
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 "238.1.6.1" in the field (a multicast IP address only)
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 ST 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 145-156** tab
4 Click the **RX Stream Address** field for Input #145A
5 Enter "238.1.1.1" in the field (a multicast IP address only)
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 "238.1.6.1" in the field (a multicast IP address only)
10 Click the **RX Stream Port** field for Input #145B
11 Enter "1001" in the field
12 Click **Apply**

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.

Corporate Head Office

Grass Valley
3499 Douglas-B.-Floreani
St-Laurent, Quebec H4S 2C6
Canada
Telephone: +1 514 333 1772
Fax: +1 514 333 9828
www.grassvalley.com