grass valley

A **BELDEN** BRAND

MV-821

STANDALONE MULTIVIEWER - SDI HD-BNC OR IP VIDEO

User Manual

www.grassvalley.com

FCC Compliance

In order to comply with FCC/CFR47: Part 15 regulations, it is necessary to use Mini HDMI to HDMI high-quality triple-screened cable assemblies with integrated ferrite suppression at both ends.

Patent Information

This product may be protected by one or more patents.

For further information, please visit: www.grassvalley.com/patents/

Copyright and Trademark Notice

Copyright © 2020, Grass Valley Canada. All rights reserved.

Belden, Belden Sending All The Right Signals, and the Belden logo are trademarks or registered trademarks of Belden Inc. or its affiliated companies in the United States and other jurisdictions. Grass Valley and MV-821 are trademarks or registered trademarks of Grass Valley Canada. Belden Inc., Grass Valley Canada, and other parties may also have trademark rights in other terms used herein.

Terms and Conditions

Please read the following terms and conditions carefully. By using MV-821 documentation, you agree to the following terms and conditions.

Grass Valley hereby grants permission and license to owners of MV-821 to use their product manuals for their own internal business use. Manuals for Grass Valley products may not be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose unless specifically authorized in writing by Grass Valley.

A Grass Valley manual may have been revised to reflect changes made to the product during its manufacturing life. Thus, different versions of a manual may exist for any given product. Care should be taken to ensure that one obtains the proper manual version for a specific product serial number.

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

Warranty information is available from the Legal Terms and Conditions section of Grass Valley's website (www.grassvalley.com).

Title	MV-821 User Manual
Part Number	RMY3 MV821UM
Revision	Issue 1 Revision 2 2020 April 15, 12:14

About this Manual

Thank you for purchasing your new MV-821 Multiviewer.

This user manual describes how to install, configure and operate the multiviewer, and it provides any relevant safety information. It covers both the MV-821-HDBNC and MV-821-IP product versions.

If you have any questions regarding the installation and setup of your product, please contact Grass Valley Customer Support.
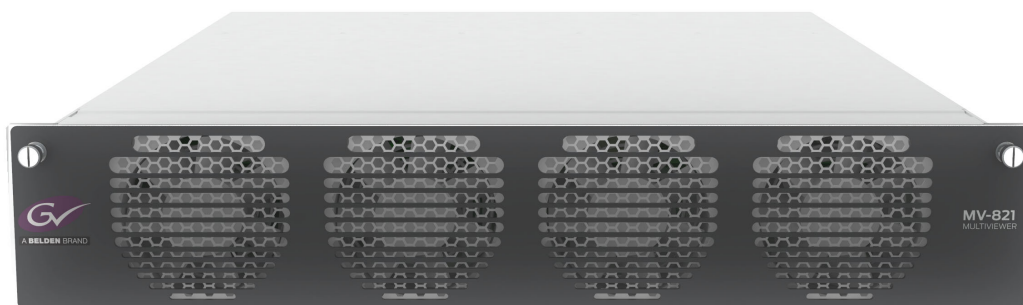
Related Documents

The following Grass Valley manuals are related documents:

Related Document	Description
User Manual: MV-8 Series Multiviewer	User manual for the multiviewer 'engine' within MV-8X1 Multiviewer products.

Important Safety Information

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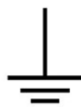
Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

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 Underwriters Laboratory (UL) regulations and recommendations for USA.

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 rated mains voltage.

- This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for the rated mains voltage is used on the phase conductors.

- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.

- Do not operate the equipment in wet or damp conditions.

- This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.

- Route power cords and other cables so they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.

- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.

- High leakage current may be present. Earth connection of product is essential before connecting power.

- Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

- To avoid fire hazard, use only the fuse type and rating specified in the service instructions for this product, or on the equipment.

- To avoid explosion, do not operate this equipment in an explosive atmosphere.

- Use proper lift points. Do not use door latches to lift or move equipment.

- Avoid mechanical hazards. Allow all rotating devices to come to a stop before servicing.

- Have qualified service personnel perform safety checks after any service.

Cautions

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

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

- When installing this equipment, do not attach the power cord to building surfaces.

- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.

- Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.

- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.

- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.
- This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.
- Follow static precautions at all times when handling this equipment. Servicing should be done in a static-free environment.
- To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

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 may include 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* at:

http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf

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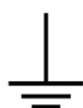
Identifie une borne de mise à la terre externe qui peut être connectée en tant que borne de mise à la terre supplémentaire.

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 UL 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 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.

- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.

- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.

- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.

- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.

- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire. Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.

- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.

- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.

- Pour réduire le risque de choc électrique, branchez chaque cordon d'alimentation dans des circuits de dérivation distincts utilisant des zones de service distinctes.

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.

Manipulation de la pile

Ce produit peut inclure une pile de sauvegarde. Il y a un risque d'explosion si la pile est remplacée de manière incorrecte. Remplacez la pile uniquement par un modèle identique ou équivalent recommandé par le fabricant. Disposez des piles usagées conformément aux instructions du fabricant. Avant de vous séparer de votre équipement Grass Valley, veuillez consulter les *informations de mise au rebut et de recyclage* à:

http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf

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.

Environmental Information

European (CE) WEEE directive.

This symbol on the product(s) means that at the end of life disposal it should not be mixed with general waste.

Visit www.grassvalley.com for recycling information.

Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy since it is based on data received from sources outside our company. All specifications are subject to change without notice.

If you have questions about Grass Valley environmental and social involvement (WEEE, RoHS, REACH, etc.), please contact us at environment@grassvalley.com.

Safety Information Continued

Lithium Batteries

Battery Warning

<div style="background-color: yellow; border: 1px solid black; text-align: center;">

CAUTION
This equipment contains a lithium battery.
There is a danger of explosion if this is replaced incorrectly.
Replace only with the same or equivalent type.
Dispose of used batteries according to the manufacturer's instructions.
Batteries **shall only** be replaced by trained service technicians.

</div>

Your Grass Valley equipment usually comes with at least one button battery located on the main printed circuit board. The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.

Battery Disposal

Before disposing of your Grass Valley equipment, please remove the battery as follows:

1 Make sure the AC adapter / power Cord is unplugged from the power outlet.

2 Remove the protective cover from your equipment.

3 Gently remove the battery from its holder using a blunt instrument for leverage such as a screwdriver if necessary. In some cases the battery will need to be desoldered from the PCB.

4 Dispose of the battery and equipment according to your local environmental laws and guidelines.

> WARNING
> - Be careful not to short-circuit the battery by adhering to the appropriate safe handling practices.
> - Do not dispose of batteries in a fire as they may explode.
> - Batteries may explode if damaged or overheated.
> - Do not dismantle, open or shred batteries.
> - In the event of a battery leak, do not allow battery liquid to come in contact with skin or eyes.
> - Seek medical help immediately in case of ingestion, inhalation, skin or eye contact, or suspected exposure to the contents of an opened battery.

Fiber Output Modules and Laser Safety

The MV-821 unit has 'small form-factor' module cages at its rear for SFP (small form-factor pluggable) and (in the case of MV-821-IP) QSFP (quad small form-factor pluggable) plug-in modules. Various SFP and QSFP optical fiber modules may be fitted into some rear cages.

Laser Safety - Fiber Output SFP and QSFP Modules Warning

LASER SAFETY

**CLASS 1
LASER PRODUCT**

The average optical output power does not exceed 0 dBm (1mW) under normal operating conditions. Unused optical outputs should be covered to prevent direct exposure to the laser beam.

Even though the power of these lasers is low, the beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fiber is connected to the board's fiber outputs before power is applied. If a fiber cable (e.g. patchcord) is already connected to an output, make sure that the cable's other end is connected, too, before powering up the board.

- **Do not** look in the end of a fiber to see if light is coming out. The laser wavelengths being used are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

Ventilation

Although the unit is constructed to meet normal environmental requirements, ensure that there is a free flow of air at the front, rear, and sides of the unit to dissipate the heat produced during operation. Installations should be designed to allow for this.

> CAUTION
>
> Do not obstruct the unit's ventilation holes: Damage to the equipment may result.

Equipment Mains Supply Voltage

Before connecting the equipment, observe the safety warnings section and ensure that the local mains supply is within the rating stated on the rear of the equipment.

Mains supply rating for the equipment.
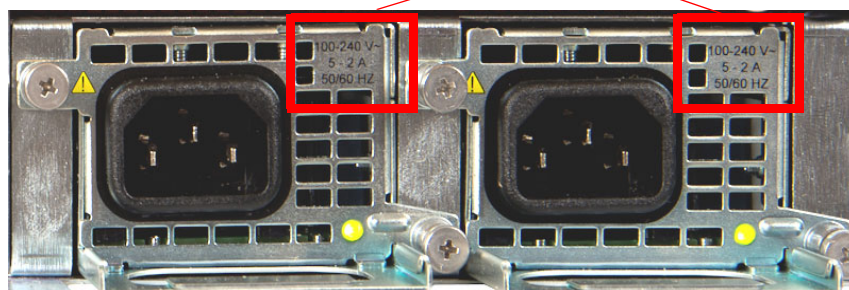
Rear Mains Inlets and Mains Supply Rating

Power Cords Supplied

> **WARNING**
>
> To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

Power Cords Supplied for the USA

Power cords: 2-off   RMW8 18   USA MAINS LEAD IEC TO 3BLADE PLUG 2.4M

GREEN lead connected to   E (Protective Earth Conductor)

WHITE lead connected to   N Neutral Conductor)

BLACK lead connected to   L (Live Conductor)

Power Cords Supplied for Countries other than the USA

Power cords: 2-off   RMW8 16   POWER CORD 10A 2M (IECSKT-IEC PLG

GREEN/YELLOW lead connected to   E (Protective Earth Conductor)

BLUE lead connected to   N (Neutral Conductor)

BROWN lead connected to   L (Live Conductor)

> **WARNING**
>
> • Always ensure that the unit is properly earthed and power connections are correctly made.
> • Isolate the unit from the outputs of other products before servicing.
> • The unit's IEC power inlets are the mains disconnection devices for this unit.

Safety and EMC Standards

This equipment complies with the following standards:

Safety Standards

Information Technology Equipment - Safety Part 1

EN60950-1: 2006

Safety of Information Technology Equipment Including Electrical Business Equipment.

UL1419 (4th Edition)

Standard for Safety – Professional Video and Audio equipment (UL file number E193966)

EMC Standards

This unit conforms to the following standards:

EN55032:2015 (Class A)

Electromagnetic Compatibility of multimedia equipment - Emission requirements

EN61000-3-2:2014 (Class A)

Electromagnetic Compatibility - Limits for harmonic current emissions

EN61000-3-3:2013

Electromagnetic Compatibility - Limits of voltage changes, voltage fluctuations and flicker

EN55103-2:2009 (Environment E2)

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2. Immunity

> WARNING
> This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

FCC / CFR 47:Part 15 (Class A)

Federal Communications Commission Rules Part 15, Subpart B

Caution to the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

> 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.

EMC Performance of Cables and Connectors

Grass Valley products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

SIGNAL/DATA PORTS

For unconnected signal/data ports on the unit, fit shielding covers. For example, fit EMI blanking covers to SFP+ type ports; and fit 75 ohm RF terminators to BNC type ports

COAXIAL CABLES

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M and Belden 1694A (for 3Gbps).

D-TYPE CONNECTORS

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having "dimples" which improve the contact between the plug and socket shells, are recommended.

Table of Contents

Product Overview

1

The MV-821 Multiviewer is a standalone 2RU unit with high i/o density. It has 48 video inputs and up to 12 multiviewer display outputs. Different video input types are supported by different product variants (HD-BNC variant for SDI coax inputs, IP variant for video IP inputs).

Video input SDI standards supported include up to 12Gb/s SDI. Multiviewer display outputs can be HDMI, fiber SDI or HD-BNC. Additionally, they can be video-over-IP on the IP variant.

Fig. 1-1: MV-821 Multiviewer

Product Versions:

- **MV-821-HDBNC** - with 48 BNC SDI video input HD-BNC coax connectors.
- **MV-821-IP** - with integrated IP-to-SDI conversion for 48-off video IP inputs and for multiviewer display IP outputs.

A single MV-821 can directly drive up to 12 multiviewer display monitors, offering multiviewer video wall layouts from multi-channel quad-splits to flexible multi-tile screens, see Figure 1-2. The unit contains a Grass Valley MV-8 Series Multiviewer.

Multiviewer display outputs

Fig. 1-2: MV-821 Multiviewer Video Walls and Screens

Features

Video Inputs:

- 48 multiviewer inputs.
- Input connectors: HD-BNC coax (MV-821-HDBNC); QSFP+ cages (MV-821-IP).
- SDI Video Inputs:
    - Up to 12Gb/s SDI inputs:
        - Up to 3Gb/s SDI inputs, with 4K inputs supported via quad-link SDI. (Unlicensed).
        - Up to 12Gb/s SDI inputs. (Licensed).
    - Reference Timing: Analog reference inputs.
- SDI IP Video Inputs (requires QSFP28 modules):
    - Standards supported:
      SMPTE 2022-6, SDI in IP, and SMPTE 2022-07, network redundancy;
      VSF TR-03 and VSF TR-04 IP stream flows;
      SMPTE 2110; SMPTE 2042; RFC4175.
    - Resolution: 1080p/1080i/720p 50/59.94; UHD via "quad-link".
    - Reference Timing:
      Using IEEE-1588v2 (PTP), compliant with SMPTE 2059-2.
      Analog reference input.

Advanced broadcast media monitoring:

- Media biometric signature generation for all 48 multiviewer inputs.
    - Low-bandwidth video and audio signatures streamed.
    - Applications include: Lip sync, Channel mapping detection, Confidence monitoring, identification and comparison.
- HDR support on inputs.

Up to 12 head display outputs:

- 3G 1080p head display outputs.
- 4K UHD support with four head display outputs used together as a UHD quad-link.
- Four head display outputs on baseline MV-821 model.
  Additional outputs are licensed.
- Uses flexible SFP modules. Outputs can be a mixture of 3G SDI dual-coax SFPs or dual-fiber SFPs, or single-HDMI SFPs.
- Available as uncompressed video IP streams (MV-821-IP only) 2022-6/-7 and 2110.

Screen layout flexibility:

- Display status and alarms from external devices.
- Drag and Drop objects onto the screen layout.
- Adjustable layering, transparencies and fine-positioning.

Flexible alarm capability:

- Monitoring of video, audio and metadata, with alarm notification.
- Intelligent monitoring of external devices, with configurable on-screen alarms.
- Control and acknowledgment of alarms from hardware- and soft-panels.

H.264 Streaming out of MV-821 Input-Copies:

- Extend and expand monitoring with this factory-fitted license option.
- MV-821 Multiviewer inputs may be compressed to create H.264-encoded copies which can then be streamed out over an IP connection.
- Viewable on a desktop PC with appropriate software, for example, GV Orbit Client.

Order Codes

Table 1-1: Order Codes

Order Code	Description
Product versions:	
MV-821-HDBNC	MV-821 2RU standalone multiviewer, 48 video inputs via HD-BNC. Up to 3Gb/s SDI inputs. Includes license for four multiviewer display outputs (1 to 4).
MV-821-IP	MV-821-IP 2RU standalone multiviewer, 48 video inputs via QSFP28 video IP media interface connections. Includes license for four multiviewer head outputs (1 to 4).
	Note: MV-821-IP ships with QSFP blanking plugs fitted. And QSFP28 modules must be ordered separately.
Licenses:	A license comprises a code to enable more functionality.
MV-821-12G	Enables up to 12G inputs, offering support for 6G and 12G SDI video inputs:
	• 3840 x 2160p at 23.98, 24, 25, 29.97, 30, 50, 59.94 and 60Hz frame rate. (4:2:2 YCbCr)
MV-821-H264	Enables H.264 streaming out of scaled, H.264-encoded multiviewer inputs. ('H.264 Stream' license.)
	Factory-installed option. An MV-821 unit must be ordered from the factory with this option installed.
SDI head display outputs:	Enables more multiviewer head display outputs ('output 5' onwards).
	MV-821-OPxx licenses are applied to the multiviewer block within an MV-821. A license enables multiviewer head display outputs:
	• on SDI connectors at the rear of the unit (via SFPs); and
	• as video IP streams through the media network interfaces at the rear of an MV-821-IP unit (via QSFPs).
	Note: SDI SFPs and Ethernet QSFPs must be ordered separately.
MV-821-OP56	Upgrade to enable outputs 5 and 6.
MV-821-OP78	Upgrade to enable outputs 7 and 8.
MV-821-OP910	Upgrade to enable outputs 9 and 10.
MV-821-OP112	Upgrade to enable outputs 11 and 12.
SFP Video Modules (Head Display Output s):	
	One SFP video module offers:2-off SDI outputs (coaxial or fiber), or 1-off HDMI output.
CC-TTH-3G-N	SFP module: HD-BNC coaxial dual output SFP module.
ST31ST31-3	SFP module: Fiber dual output SFP module (1310 nm, single mode LC/PC).
FC1-HDMI1	SFP module: HDMI single output SFP module.
SFPBLANK	SFP blanking cover (dust and EMC cover).
QSFP Module (Ethernet):	(For MV-821-IP)
FCQ-100GE-SR4	QSFP module: 100Gbase short range multi-mode optical fiber QSFP.
QSFPCOVER	QSFP blanking cover (dust and EMC cover).
SFP Module (Ethernet):	
FGAEY 1GBE-SFP	Ethernet 1GbE SFP.

MV-821 Architecture

Figure 1-3 shows an MV-821 block diagram. There are two main blocks:
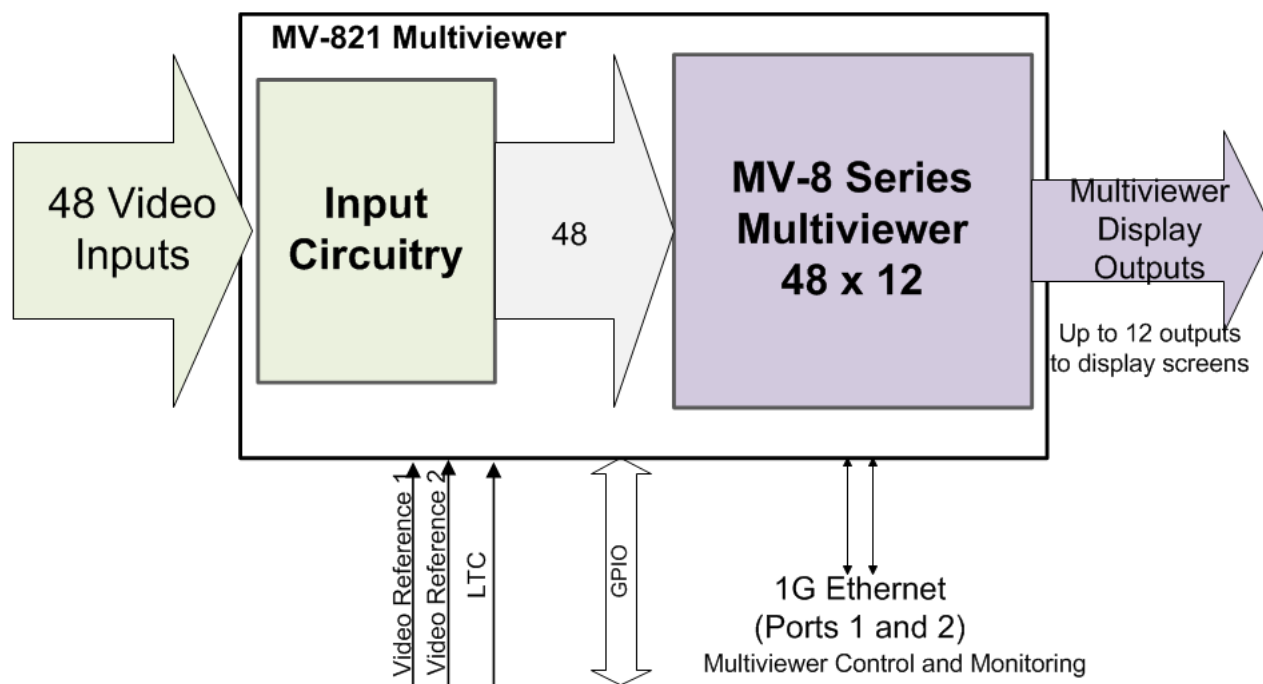
- Input circuitry block.
- MV-8 Series multiviewer block.

Fig. 1-3: MV-821 Block Diagram

The main inputs and outputs comprise:

- 48 video inputs:
    - HD-BNC or IP stream.
    - Up to 12Gb/s SDI.
- Analogue video reference inputs.
  (2-off inputs for MV-821-HDBNC; 1-off input for MV-821-IP.)
- Multiviewer head display outputs:
    - Up to 12 outputs for monitor display screens,
      via up to six 'small format pluggable' modules (SFPs).
    - Output types available: SDI coax, fiber or HDMI.
      Additionally, the MV-821-IP offers video-over-IP display outputs.
    - 4K-capable outputs via quad-link.
- Multiviewer Control and Monitoring Ethernet connections:
    - 2-off 1G - Communications traffic
      (and H.264 streaming out of multiviewer input-copies, a factory-fitted option).
- LTC input and GPIO.

> Note: There is only one HDMI connector per HDMI SFP.
> Thus, there are only up to 6 HDMI head display outputs.

Input Circuitry Variants

The different MV-821 product versions contain the same multiviewer block with specific input circuitry, shown in Figure 1-4:

- **MV-821-HDBNC** - 48-off SDI video input circuits for BNC connectors.
- **MV-821-IP**   - 4-off Video IP circuits for '50G' network connections, providing 48 video input signals in total.
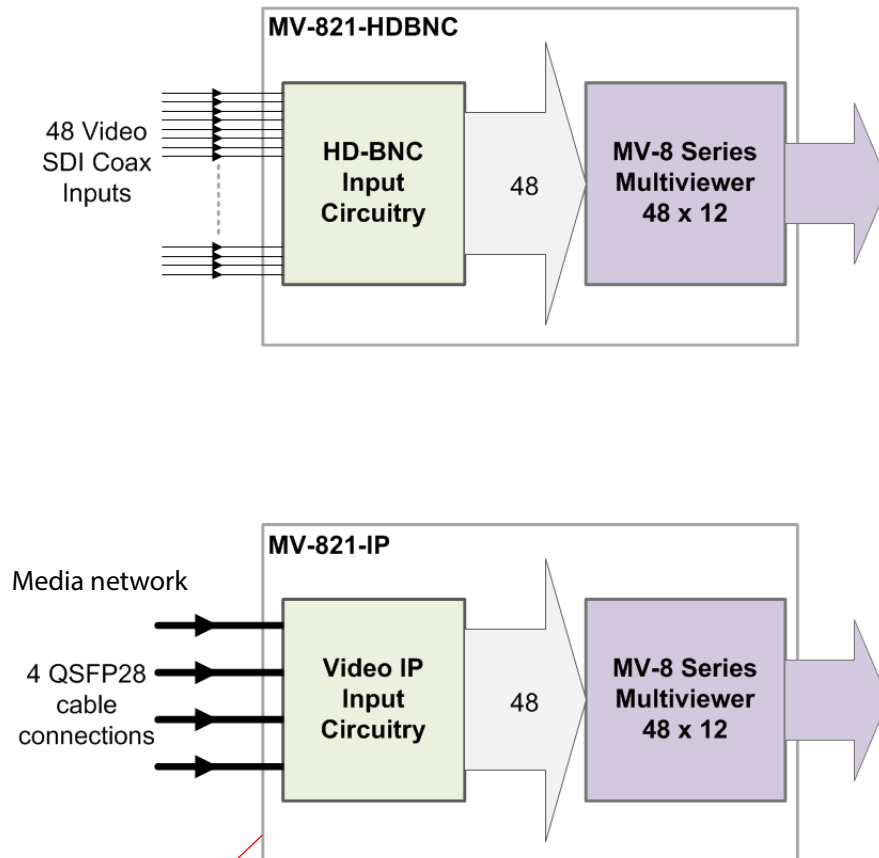
See MV-821-IP: Video IP Circuitry, on page 7.

Fig. 1-4: MV-821 Product Versions and Input Circuitry

From the input circuitry, each of the internal 48 video input signals is directly connected to an input of the internal '48 x 12' multiviewer block. Any video IP input signal can appear on any multiviewer display output.

For more detailed information about the rear, external connections to the MV-821, see Hardware Chassis and Connectors, on page 19.

MV-8 Series 48 x 12 Multiviewer Block

The 48 x 12 multiviewer block is a Grass Valley MV-8 Series Multiviewer and is common to other MV-8xx products.
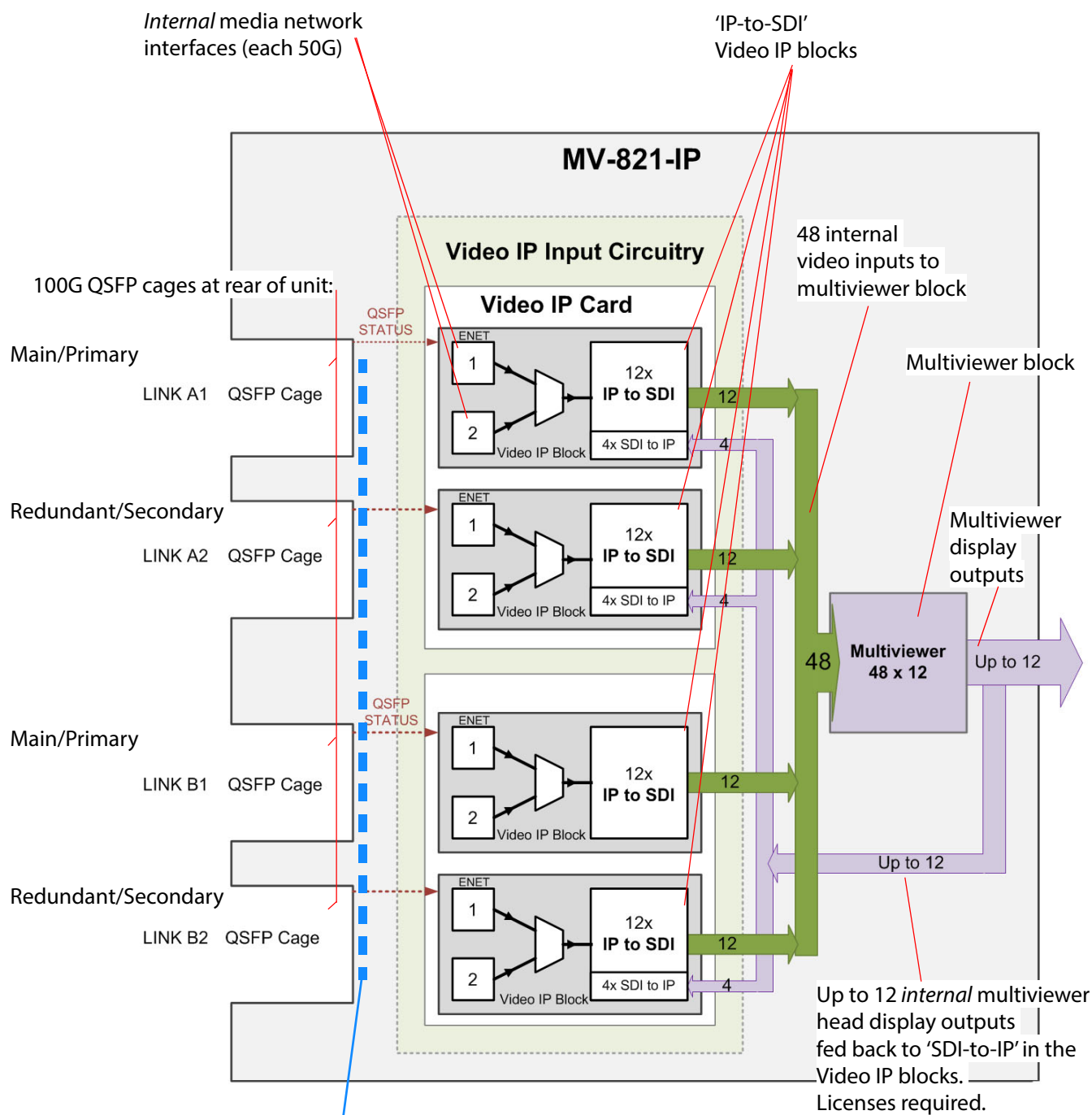
> *Refer To:* 'MV-8 Series Multiviewer' user manual
> for full information about the MV-821's multiviewer block.

MV-821-IP: Video IP Circuitry

A functional overview of the 'Video IP' circuitry inside a MV-821-IP unit and its network connections is covered in this subsection. The IP circuitry comprises two internal video IP cards, each with two Video IP blocks of 'IP-to-SDI' video conversion. The 'IP-to-SDI' blocks have external media network connections via QSFP cages at the rear of the unit. See Figure 1-5.

Internal media network interfaces (each 50G)

'IP-to-SDI' Video IP blocks

100G QSFP cages at rear of unit:

Main/Primary

LINK A1   QSFP Cage

Redundant/Secondary

LINK A2   QSFP Cage

Main/Primary

LINK B1   QSFP Cage

Redundant/Secondary

LINK B2   QSFP Cage

MV-821-IP

Video IP Input Circuitry

Video IP Card

QSFP STATUS

ENET 1
2
Video IP Block

12x **IP to SDI**
4x SDI to IP

ENET 1
2
Video IP Block

12x **IP to SDI**
4x SDI to IP

QSFP STATUS

ENET 1
2
Video IP Block

12x **IP to SDI**

ENET 1
2
Video IP Block

12x **IP to SDI**
4x SDI to IP

48 internal video inputs to multiviewer block

Multiviewer block

Multiviewer display outputs

Multiviewer 48 x 12

48

Up to 12

Up to 12

12
12
12
12
4
4
4

Up to 12 *internal* multiviewer head display outputs fed back to 'SDI-to-IP' in the Video IP blocks. Licenses required.

Fig. 1-5: 'IP-to-SDI' Blocks in an MV-821-IP

Each Video IP block:

- Has two media network interfaces;
  this allows for redundant video IP streams over different media network connections.
- Converts 12 received video IP streams into 12 internal SDI video signals supplied to the internal multiviewer block.
- Can convert 4 internal SDI 'multiviewer head display output' signals into IP streams for *sending* as video IP streams.
- Has a separate control network IP address.
  (**Note:** All Video IP block control IP addresses are accessible via either of the two rear control Ethernet interfaces.)

Each Video IP block circuitry is derived from a Grass Valley IQMIX modular card. Unlike a Grass Valley IQMIX modular card, however, the MV-821-IP unit has a fixed 'Video IP input' and 'IP output' spigot configuration. See Figure 1-6. A Video IP block carries out IP-to-SDI or SDI-to-IP conversion on 16 "spigots":

- Spigots 1 to 4 are configured as sources of video IP streams.
  These are used for multiviewer head display output (uncompressed) video IP streams.
- Spigots 5 to 16 are configured as destinations for video IP streams.
  These are used for multiviewer inputs.

Video IP streams may be sent/received on redundant networks. Note: SDI video connections to a Video IP block (in and out) are internal to the MV-821-IP unit.
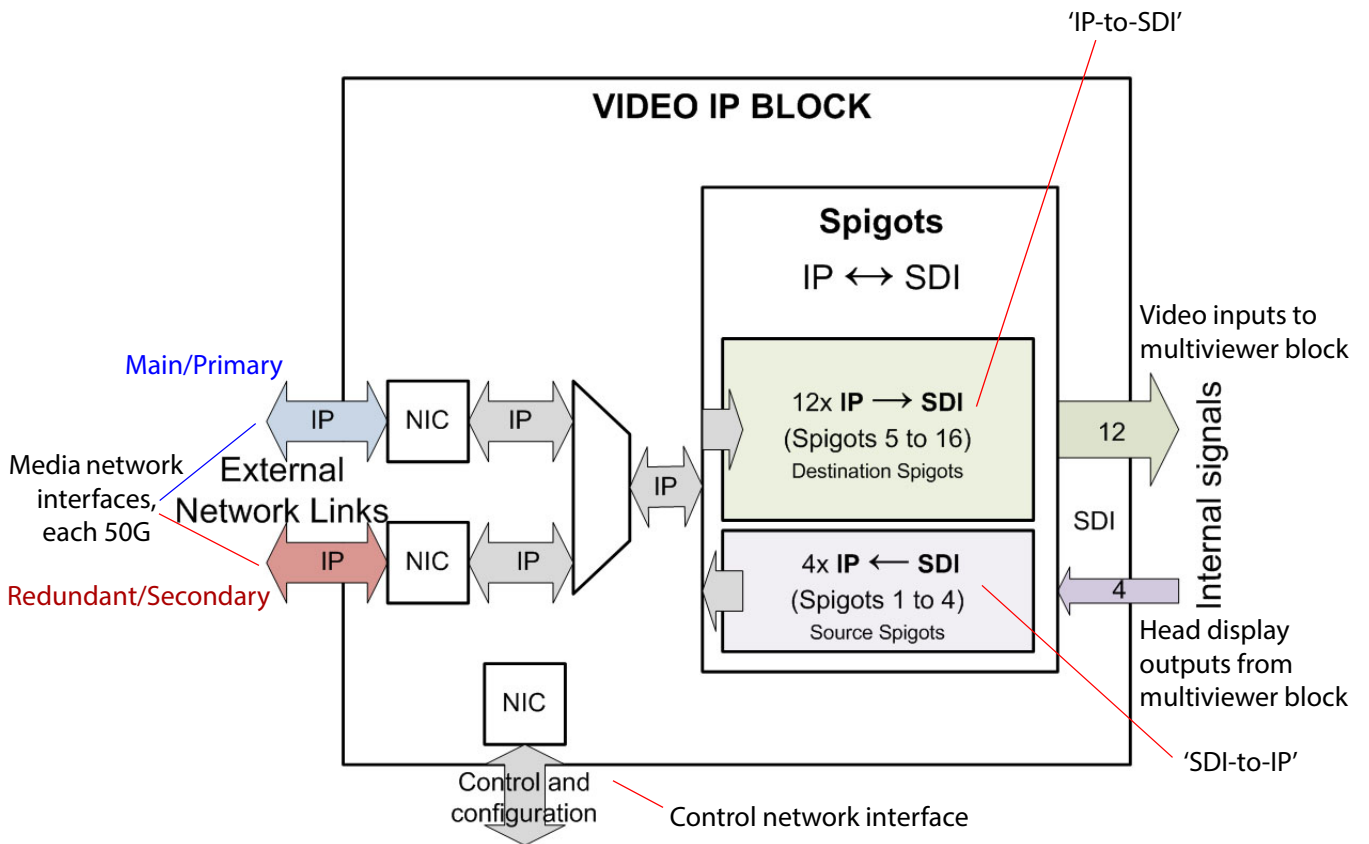

Fig. 1-6: A Video IP Block (one of four in an MV-821-IP)

MV-821-IP: Media Network Connection

The physical media network link uses QSFP cages on the rear of the unit ('Link A1'...'Link B2') and are 100G Ethernet infrastructure links configured for 2x 50G Ethernet operation. When fitted, QSFP transceivers are internally connected to the Video IP blocks via a hard-wired network 'cross-over' arrangement (which can remove the need for external break-out cables in some cases). See Figure 1-7.
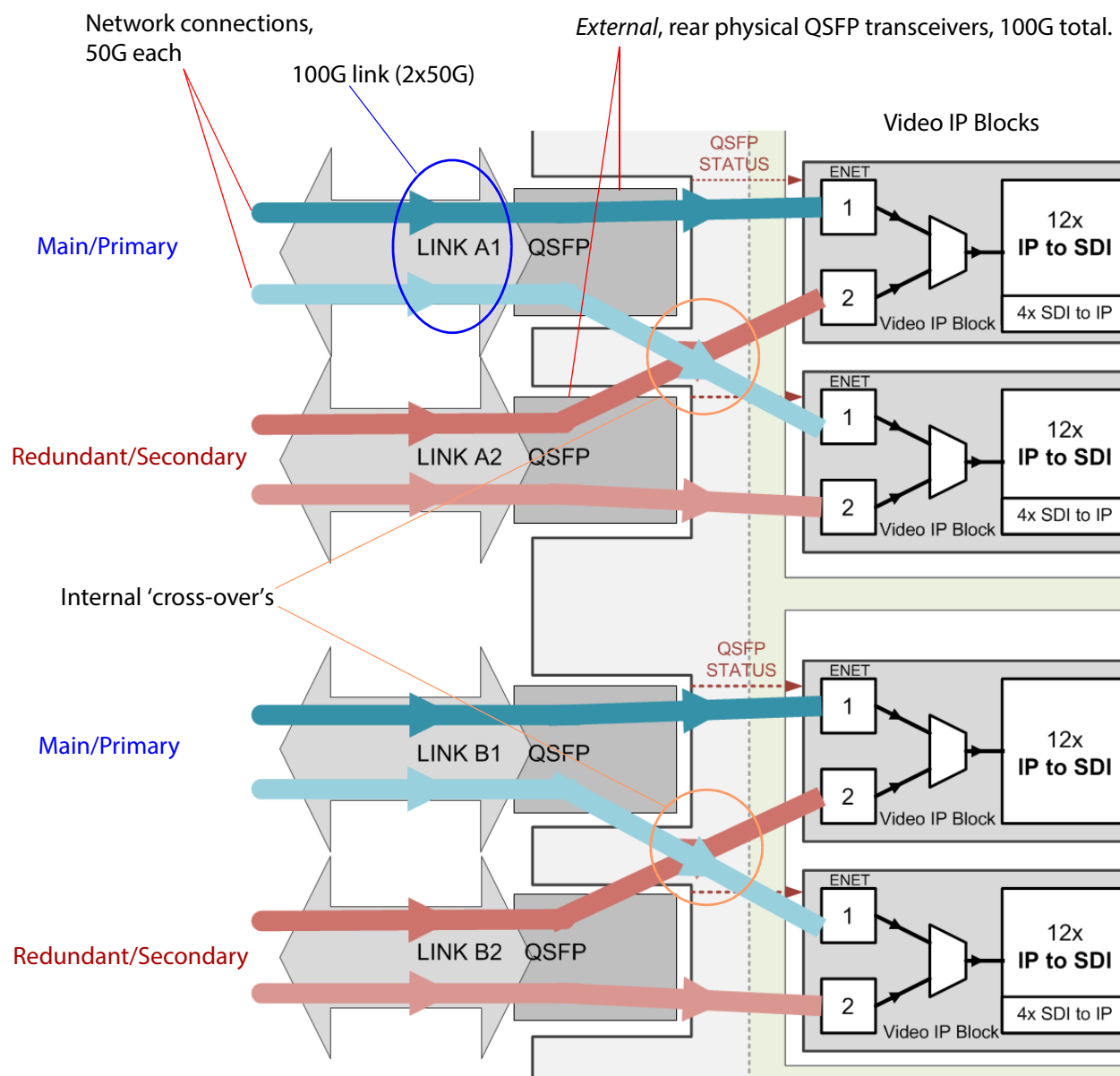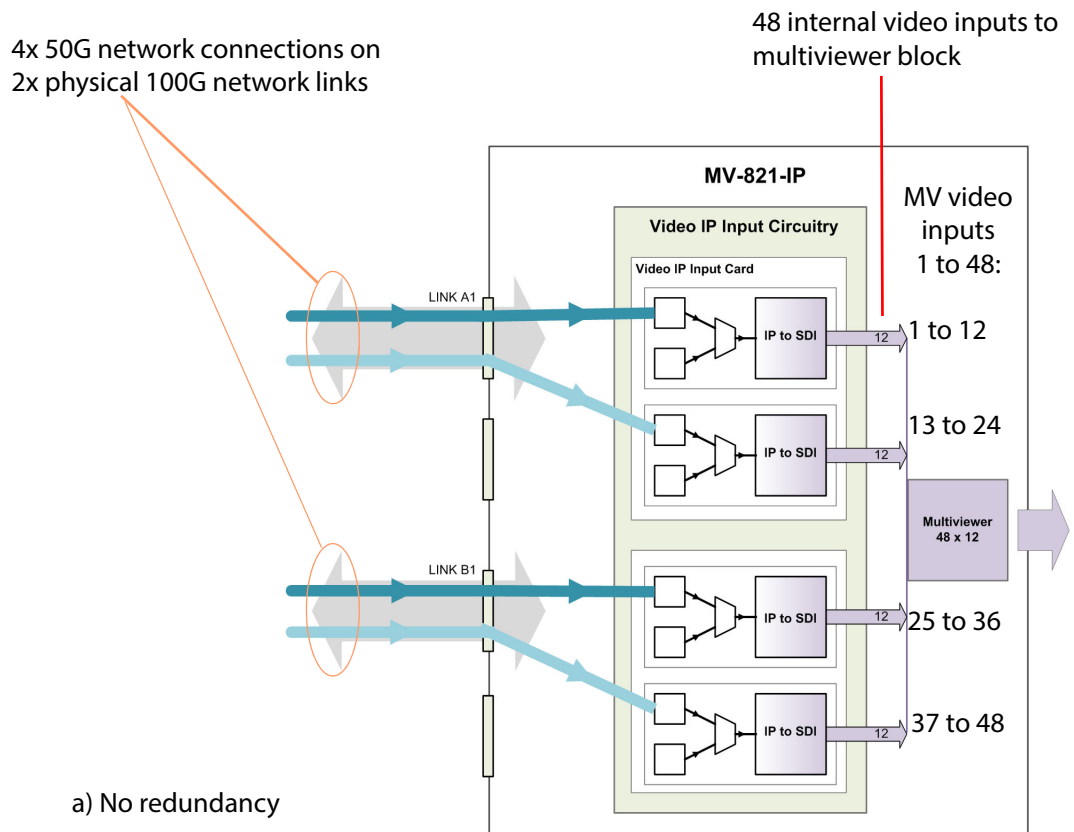

Fig. 1-7: Video IP Block Media Network Link Connections

Thus, one rear physical rear media network 'link' feeds two Video IP blocks.

Video input IP streams for multiviewer inputs 1 to 24 can be carried either in network link 'Link A1', or in 'Link A2', or in both links for redundancy.

The second Video IP card is similarly connected but via 'Link B1' and Link B2', which carry the video IP streams for multiviewer video inputs 25 to 48.

Video IP connection examples are shown in Figure 1-8a, for no link redundancy, and in Figure 1-8b, for link redundancy.

4x 50G network connections on
2x physical 100G network links

48 internal video inputs to
multiviewer block

MV-821-IP

Video IP Input Circuitry

Video IP Input Card

LINK A1

IP to SDI

MV video
inputs
1 to 48:

12 1 to 12

IP to SDI

12 13 to 24

**Multiviewer
48 x 12**

LINK B1

IP to SDI

12 25 to 36

IP to SDI

12 37 to 48

a) No redundancy

b) With redundancy

Network redundancy with
8x 50G network connections
on 4x physical 100G network links.

Main/Primary

Redundant/Secondary

Note:
Extra network connection bandwidth
here provides:

- Resilience (against IP switch or link
  redundancy).
- Bandwidth overhead (for make-
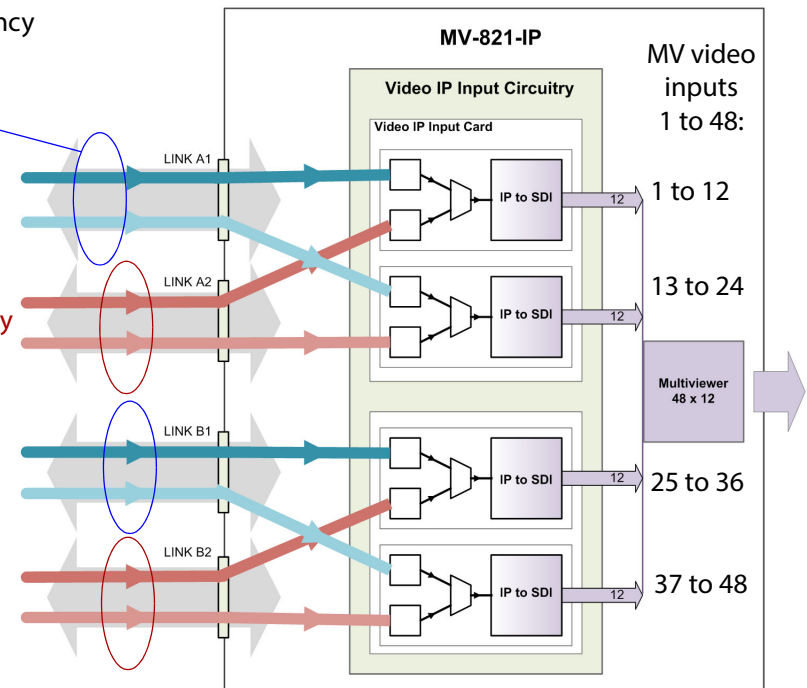 before-make switching, hitless
  switching).

MV-821-IP

Video IP Input Circuitry

Video IP Input Card

LINK A1

MV video
inputs
1 to 48:

IP to SDI

12 1 to 12

LINK A2

IP to SDI

12 13 to 24

**Multiviewer
48 x 12**

LINK B1

IP to SDI

12 25 to 36

LINK B2

IP to SDI

12 37 to 48

Fig. 1-8: Network Connections and Video Inputs:
a) No redundancy.
b) With redundancy.

Control Network Interface

The control network interfaces are used for control purposes and for software upgrades etc.

MV-821-HDBNC

The MV-821-HDBNC units can each be considered to be a single unit from a control perspective. Control and configuration of the units is done through either of two '**MV Control**' Ethernet ports on the rear of the unit. See Figure 1-9.
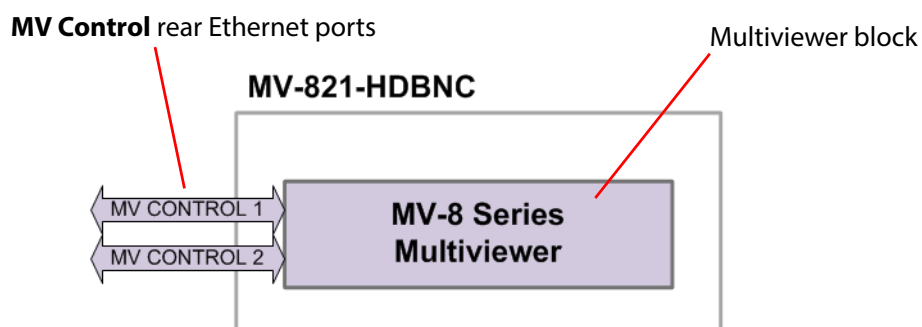
MV Control rear Ethernet ports

Multiviewer block

Fig. 1-9: Controllable Unit - MV-821-HDBNC

MV-821-IP

A MV-821-IP unit contains a multiviewer block and also has four integrated video IP blocks, which convert video IP streams to internal SDI video streams. Each video IP block forms a separate block from a control perspective. See Figure 1-10.

Control and configuration of these different blocks uses different rear Ethernet connectors:

- **Multiviewer** - use either of the two rear '**MV Control**' Ethernet ports.
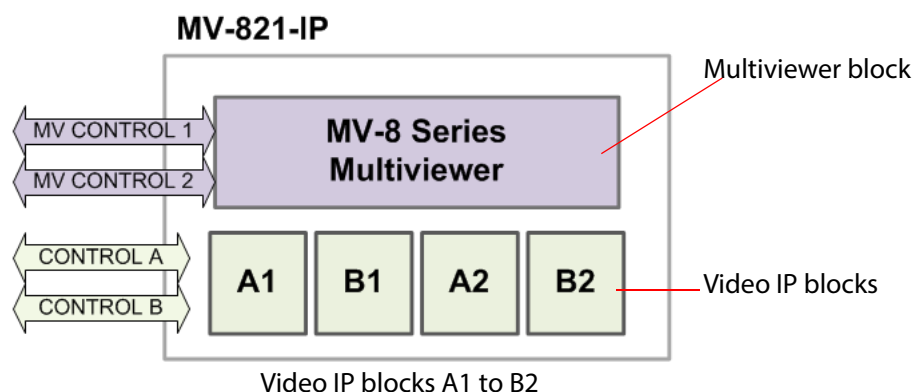- **Video IP** - use either of the two rear '**Control A**' and '**Control B**' Ethernet ports.

Multiviewer block

Video IP blocks

Video IP blocks A1 to B2

Fig. 1-10: MV-821-IP Controllable Blocks - Multiviewer and Video IP

Each Video IP block has an internal control Ethernet connection. Each control connection and the two rear Ethernet ports ('Control A' and 'Control B') connect to an internal Ethernet switch, which allows any one of the control connections to be accessed via either of the rear 'Control A' or 'Control B' connectors. See Figure 1-11.
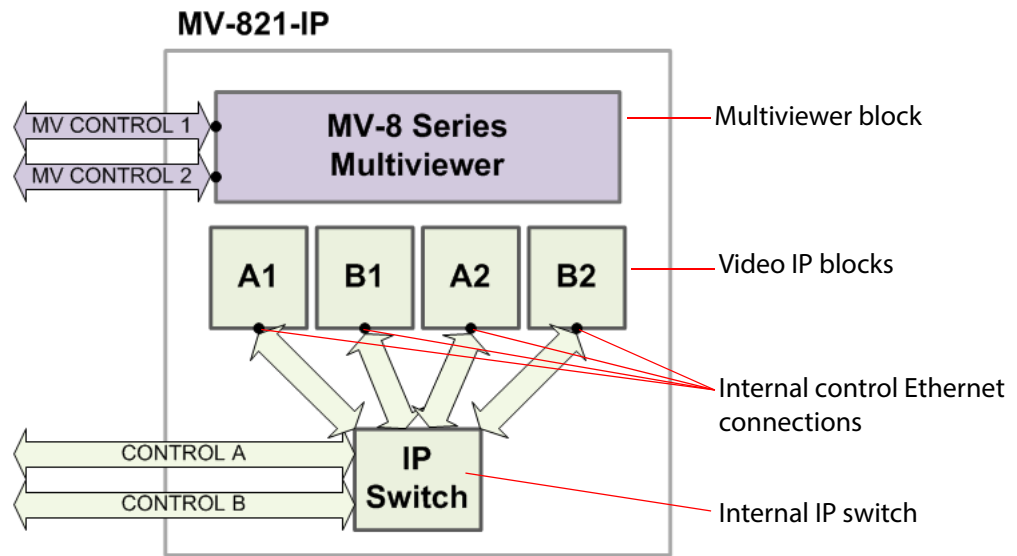
Fig. 1-11: Control of Video IP Blocks via Internal IP Switch

Additionally, a Video IP block's control interface may be accessed via either of its media network connections.

MV-821: Input-Copy H264 Streaming Out (License MV-821-H264)

An MV-821 unit (MV-821-HDBNC or MV-821-IP) can be ordered with an 'H.264 stream' license option (MV-821-H264). This is a factory-installed option which enables streaming out of H.264-encoded, scaled input-copies of multiviewer *input* video signals.

Streaming out is via the '1G1' or '1G2' MV control Ethernet interfaces.

The H.264 streams may be viewed on a PC, for example via the GV Orbit Client tool.

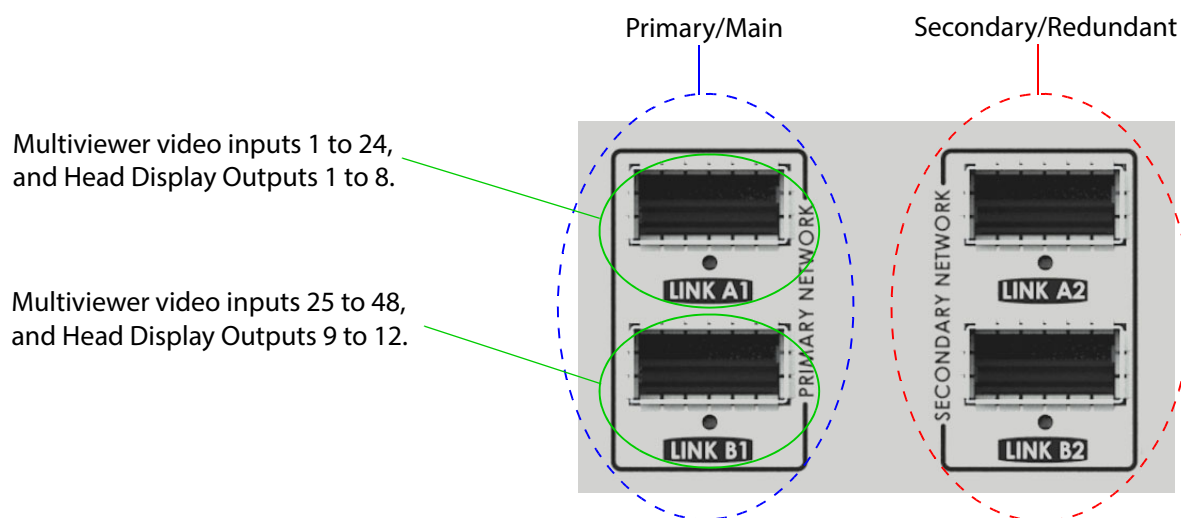# MV-821-IP: Input Video IP Streams and Head Output IP Streams

Fig. 1-12: Four Rear Panel QSFP Cages

IP Input and Output Streaming

The MV-821-IP Video IP circuitry has bi-directional media network connections and the MV-821-IP unit can receive up to 48 video IP stream inputs (multiviewer inputs, uncompressed) for display on the MV-821-IP unit's multiviewer display outputs (i.e. on a video wall).

Additionally, the Video IP circuitry can source uncompressed, full-resolution, video-IP-stream versions of each multiviewer head display output (head display outputs 1 to 12) as video IP streams on media network connections.

Four streamed head display outputs are sourced from each of three of the four Video IP blocks, making a total of up to (4x3=) 12 streamed multiviewer head display outputs. Four such head display IP outputs are available as standard; further head display IP outputs are enabled when more multiviewer head display (rear) outputs are licensed.

Table 1-2 lists the video IP streams passing through each rear media connector.

Figure 1-13 shows a diagram of the media network connections, video input IP streams and multiviewer display output IP streams for a case with no redundancy and using 'Link A1' and 'Link B1'.
If 'Link A2' and 'Link B2' are used in addition (i.e. for redundancy), then the multiviewer display output IP streams appear on those network connections in a similar way.

Table 1-2: Video Inputs/Head Display Outputs on the Four Rear QSFP Cages on MV-821-IP Unit

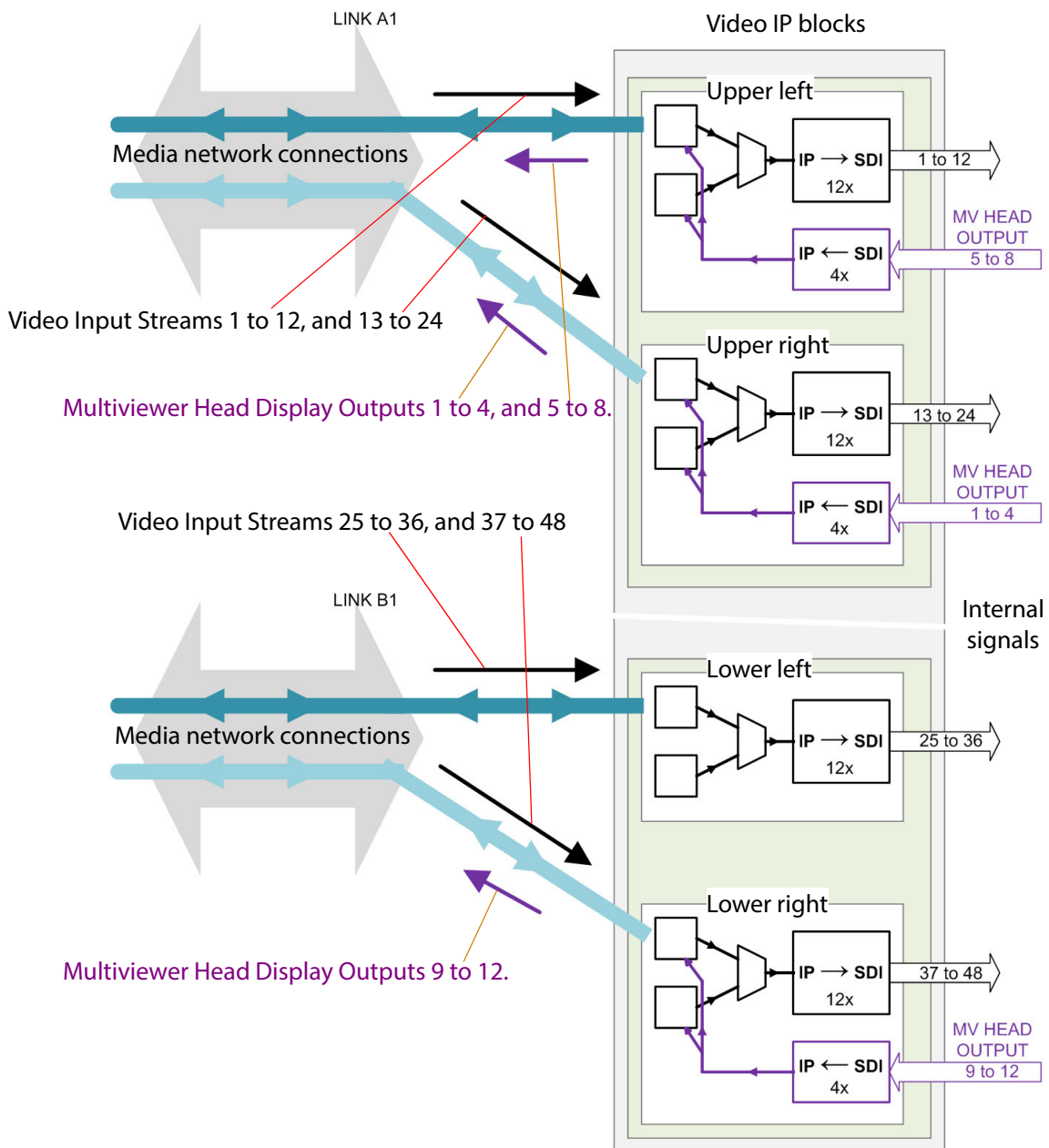|	Upper Left	Upper Right
Label	LINK A1	LINK A2
Video Inputs	1 to 12, and 13 to 24	1 to 12, and 13 to 24
Head Display Outputs	5 to 8, and 1 to 4	5 to 8, and 1 to 4
	Lower Left	Lower Right
Label	LINK B1	LINK B2
Video Inputs	25 to 36, and 37 to 48	25 to 36, and 37 to 48
Head Display Outputs	9 to 12	9 to 12

Fig. 1-13: Video IP Blocks Sourcing Full-Resolution Multiviewer Head Display Outputs

IP Routing Control

The Video IP block can be configured for 'in-band' or 'out-of-band' control. Use rear connectors 'Control A' and 'Control B' for out-of-band control.

IP System Applications

The MV-821-IP unit can be used in the following IP system applications:

- Simple manual control of the video input routing and with static IP addresses.
- Grass Valley IP routing system with an IP Routing System Controller (IP-RSC) Unit.
- Third-party system using a Grass Valley IQTIC card and the Grass Valley open-API 'SDC-01' protocol.

Reference Timing

The analog reference inputs can be used to lock the multiviewer's display outputs and used as the reference for the video inputs.

For the MV-821-IP model, there is only one analog reference input and PTP can also be used as the reference for the Video IP blocks.

Terminology

Multiviewer Terminology

Refer To: 'MV-8 Series Multiviewer' user manual for a glossary of multiviewer terminology.

IP Routing Terminology

See IP Routing Terminology, on page 151 for some IP routing terminology.

MV-821 Set up

Configuration and set up of the MV-821 multiviewer is done via its control screens. These are accessible via the GV Orbit Client application or with Grass Valley's RollCall Control Panel application.

Hardware Installation

Hardware installation is described in Hardware Installation, on page 39.

Multiviewer:

Initial configuration and set up of the multiviewer is done via its control screen (see *MV-8 Series Multiviewer User Manual*). See Getting Started, on page 111.

Video wall design and management is done via GV Orbit Client software using a GV Orbit multiviewer project.

Video IP:

Initial Video IP circuitry setting up is done via the control screens.

For a description of the control screens, see Control Screens for Video IP Blocks, on page 47.
For instruction on getting started, see Getting Started, on page 111.

Multiviewer Block Configuration

Each MV-821 unit's multiviewer block is configured separately: The MV-8 Series multiviewer functionality is a separate, independent sub-system within the unit.

Typically, a new MV-821 multiviewer will be using a default IP address (10.54.31.221) on Ethernet port 1 ("1G1") for its MV-8 Series multiviewer.
See Appendix A Ethernet Rear Panel Connectors, on page 145:

- See MV-821-HDBNC Ethernet Connectors, on page 145, for default IP addresses on "1G1" Ethernet ports for the MV-821-HDBNC product version.
- See MV-821-IP Ethernet Connector Interfaces, on page 146, for default IP addresses on "1G1" Ethernet ports for MV-821-IP products.

Initial configuration and set up of the MV-821 multiviewer is done via its control screens.

> *Refer To:* 'MV-8 Series Multiviewer' user manual
> for information about MV-821 multiviewer block control screens
> and getting started with the multiviewer block.

Following the initial configuration of the MV-821 multiviewer block, the block's control screens may then be used to access and control various other MV-821 multiviewer items, including:

- selection of video wall layouts;
- monitoring alarm status;
- acknowledging alarms; and
- control of timer widgets on the video wall.

Refer to the 'MV-8 Series Multiviewer' user manual for full details of the MV-821 module's multiviewer block control screens and configuration information.

MV-821-IP Video IP Block Control Screens (RollCall Templates)

Initial setting up of each of an MV-821-IP unit's Video IP blocks is done via a block's control screens.

- For a description of the RollCall Video IP block control screens,
  see Control Screens for Video IP Blocks, on page 47.

- For instruction on getting started, see Getting Started, on page 111.

Multiviewer Video Wall Design

The layout and style of the MV-821 video walls are designed with the GV Orbit Client software application. Wall designs are stored as individual projects (GV Orbit projects), which are then pushed to an MV-821 unit multiviewer for deployment.

Multiple wall layout designs may be generated and stored on a PC. Different wall designs can then be pushed to the multiviewer for various MV-821 multiviewer user-case applications.

> *Refer To:* 'MV-8 Series Multiviewer' user manual
> for information about the design and management of MV-821
> multiviewer video wall layouts with GV Orbit.

Maintenance

Multiviewer Licensing

> *Refer To:* 'MV-8 Series Multiviewer' user manual
> for information about licensing the MV-821 multiviewer.

Multiviewer Software Upgrade

> *Refer To:* 'MV-8 Series Multiviewer' user manual
> for information about software upgrading the MV-821
> multiviewer.

The MV-821-IP product comprises one MV-8 multiviewer block and four Video IP blocks which must be controlled/ configured and upgraded separately. See Table 1-3.

Table 1-3: Network Connections to use for Control/ Configuration/ Upgrade

Product	Rear Network Connection...	for Control/ Configuration/ Upgrade of:
MV-821-HDBNC		
	MV CONTROL 1, MV CONTROL 2	Multiviewer block
MV-821-IP		
	MV CONTROL 1, MV CONTROL 2	Multiviewer block
	CONTROL A, CONTROL B	Video IP blocks, see **Note 1**.
Note 1:	Video IP block control/configuration may also use the media network connections.	

> Note:
>
> Information about:
>
> - The MV-821 Multiviewer block (software version, serial number etc) is displayed on the multiviewer block's **System - Setup** control screen.
>
> - All Video IP blocks (MV-821-IP only) is displayed on the respective Video IP block **Set Up** control screen.

Hardware Chassis and Connectors

2

This section describes the MV-821 Multiviewer from the outside and contains information on:

Unpacking

The MV-821 Multiviewer is supplied in dedicated packaging provided by the manufacturer and should not be accepted if delivered in inferior or unauthorized materials.

1 Carefully unpack the system components and check them against the packing list.
   An MV-821 Quick Setup Guide is shipped with the unit.
   If there is anything incorrect, then notify your Grass Valley Partner, or Grass Valley, at once.

2 Check that the equipment has not been damaged in transit. If any damage has occurred notify your Grass Valley Partner (or Grass Valley directly) and the carrier immediately.

3 Always retain the original packing materials if possible, they could prove useful should it ever be necessary to transport or ship the equipment.

4 Always read the installation guide and the user instructions (separate manual) carefully, it will provide you with helpful hints and tips about care and maintenance and help you get the most out of your MV-821 Multiviewer.

In the unlikely event of an equipment failure, contact your Grass Valley Partner, or Grass Valley, at once, contact details are at the start of this manual, see Grass Valley Technical Support, on

Chassis Overview

The MV-821 Multiviewer is a 2RU 19" rack-mount chassis with connectors at the rear, see Figure 2-1and Figure 2-2 showing the different product versions which cover different video input types.

> Note: Product Versions **MV-821-HDBNC** and **MV-821-IP**:
>
> - The products contain the same 48-input multiviewer core function.
> - The products have different rear panels, with some different rear panel video input connectors.
> - Each product contains dedicated video input circuitry.
> - The products are not modular and cannot be converted from one version to another.

The MV-821 has a door at the front. The door has a grille and integral cooling fans for the MV-821 unit. The chassis is air-cooled and the airflow is front-to-back.

On the rear, there are two power inlets and an array of video, control and data signal connectors.

Some rear connections use quad small form-factor pluggable (QSFP28) plug-in transceiver modules for video input IP streams.
Some rear connections use small form-factor pluggable (SFP) plug-in modules (for the multiviewer control).

> **Optical Output Warnings:**
>
> WARNING   With some SFP or QSFP28 modules fitted, the MV-821 may be equipped with optical input/outputs which contain low-power laser beams.
>
> WARNING   Do not look into an optical output. Laser radiation can cause irreversible and permanent damage of eyesight.
>
> WARNING   Do not look at the end of a fiber to see if light is coming out. Use optical instrumentation.
>
> WARNING   Unused optical outputs should be covered, to prevent direct exposure to the laser beam.

There are two dual-redundant power supply units (PSUs) in the chassis. These are removable from the rear of the chassis.

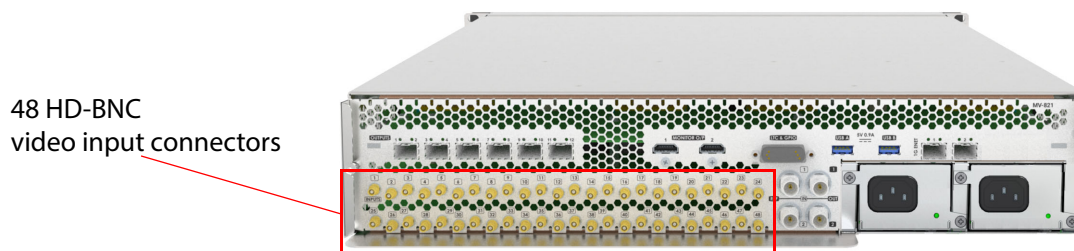For chassis dimensions, see MV-821 Dimensions, on page 149.

MV-821-HDBNC

48 HD-BNC
video input connectors

Fig. 2-1: MV-821 Multiviewer views - MV-821-HDBNC

MV-821-IP

4-off QSFP+ cages for
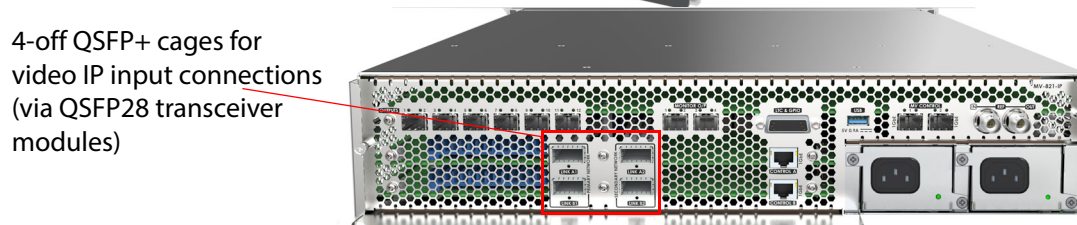video IP input connections
(via QSFP28 transceiver
modules)

Fig. 2-2: MV-821 Multiviewer views - MV-821-IP

Chassis Front

The front door has two knurled fastening screws and a grille, behind which are fitted four fans which draw air in at the front, see Figure 2-3.
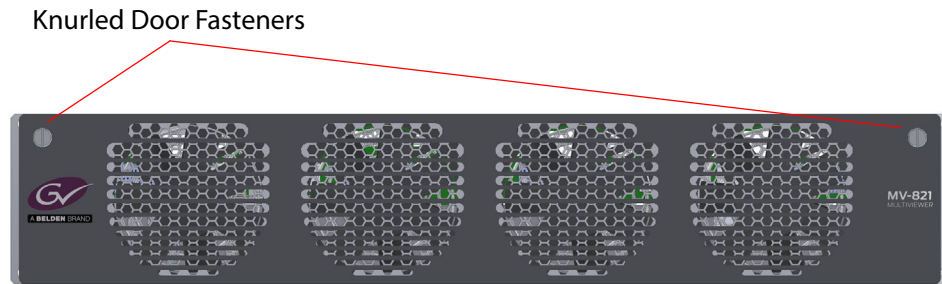
Knurled Door Fasteners

Fig. 2-3: MV-821 Multiviewer Front View, Door Closed (MV-821-HDBNC shown)

To Open the Front Door

1 Unscrew the two captive knurled door fasteners, see Figure 2-3.

2 Pull the door outwards about 2 cm and then down.
   The door hinges along its bottom edge. See Figure 2-4.
   When the door is open, the door fans and the fan supply wires are visible.

Out and Down

Door Fans
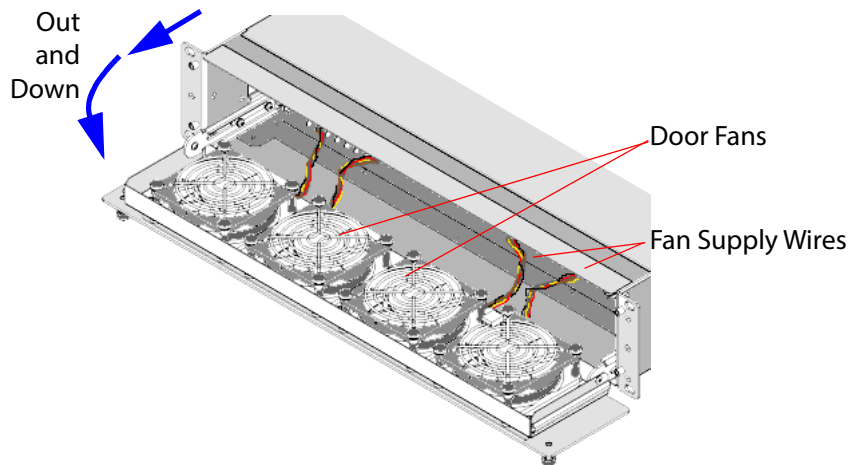
Fan Supply Wires

Fig. 2-4: MV-821 Multiviewer - Front Door Open, Hinged Down

To Close the Front Door

Before closing the door:

1 Check that the fan supply wires are all connected to the front edge of the MV-821 Main Module. See Figure 2-5.
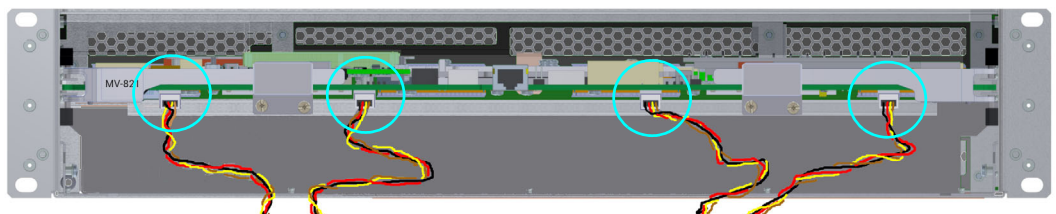
Fig. 2-5: Fan Supply Wires Connected to front of the Main Module

Closing the door:

2 Pull the door upwards into a vertical position (the door hinges along its bottom edge) and then push it fully into the front of the chassis.

3 Secure the door by tightening the two captive knurled door fasteners.

Keep the front door closed when the equipment is powered, to maintain cooling airflow.

CAUTION
- Close the Door:
- Always keep the MV-821 front door closed. This ensures correct ventilation and operation of the equipment.
- The integral door fans ensure cooling airflow through the MV-821 chassis when the door is properly closed.
- When the front door is open, there is no cooling airflow through the frame. Do not leave the door open for longer than 45 seconds.

Front Controls and Indicators

With the front door open and dropped down, a front main card can be seen in the top half of the chassis frame. This is the MV-821 Main Module, see Figure 2-6.
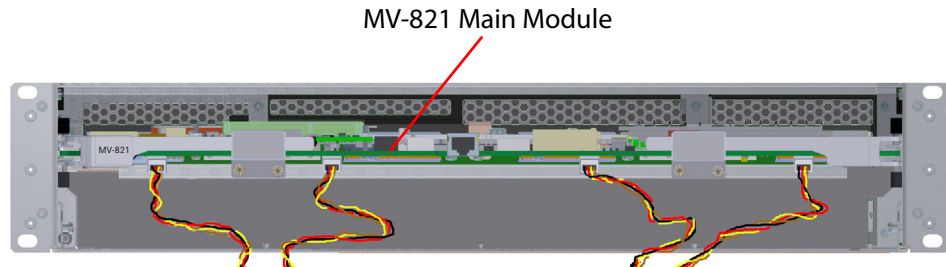
MV-821 Main Module

Fig. 2-6: MV-821 Multiviewer Front View with Front Door Open

Note:	The front door should not need to be opened in normal operation. And the MV-821 Main Module is *not* a serviceable item.
	Close the front door when the equipment is powered, to maintain cooling airflow.

LED status indicators are on the front edge of the main card within the MV-821 chassis and are viewed by opening the front door. Figure 2-7 on page 25 shows the front edge of the module and Table 2-1 on page 25 lists the LED color codes for the MV-821 Main Module.

Along the underside of the card are four header connectors. These supply power for the front door fans. See Figure 2-7 on page 25.

Other DIP switches and connectors along the front edge are for engineering use only. The four DIP switches are not used. Check that all four switches are in the "up" position.

There are two other connectors on the front edge of the module, see Figure 2-7 on page 25. These are for Engineering use only and should not be used.

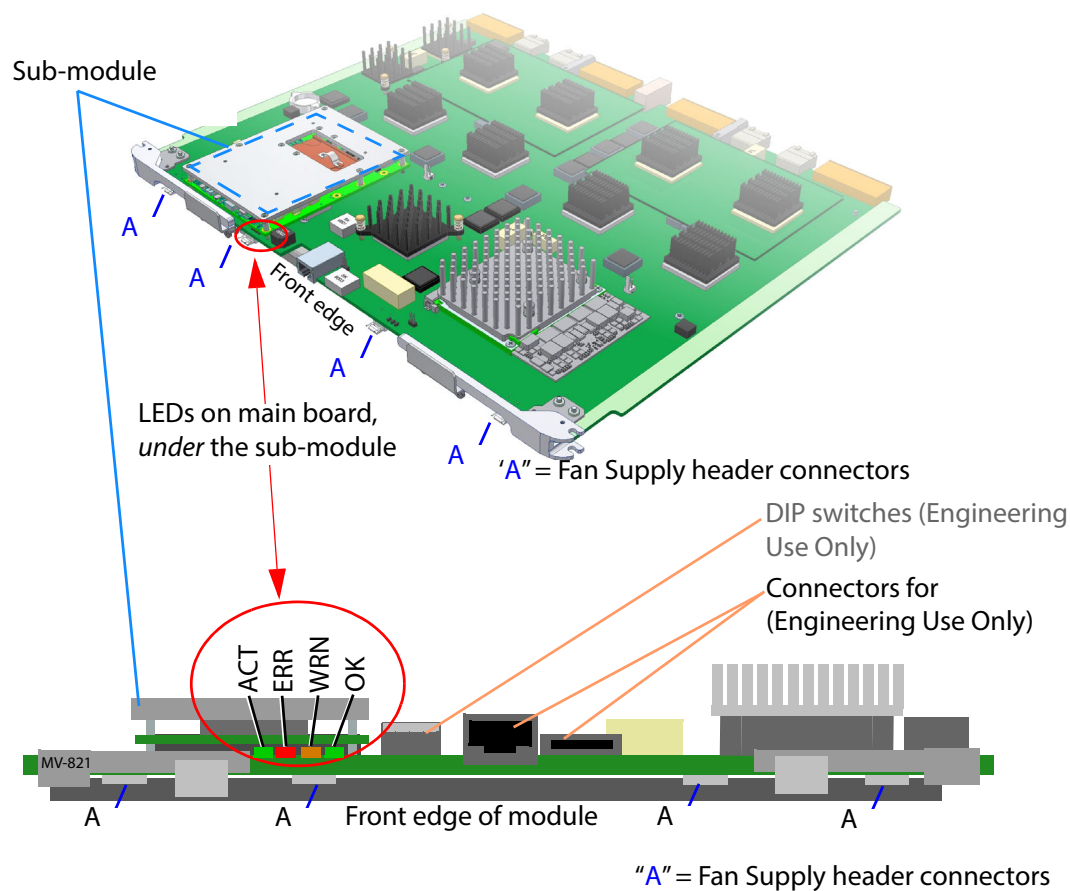|	
Note:	The front door fan supply wires connect to the four small headers on the underside of the front of the card.

Fig. 2-7: MV-821 Main Module - Status Indicating LEDs and Fan Supply Headers

Table 2-1: MV-821 Multiviewer Main Module Status LED Information

Label	LED Color	Detail	Status
ACT	**Green**	"CPU Activity"	**Flashing** (approximately 2Hz): CPU heartbeat, working correctly. **Solid On** or **Off:** Software fault detected. Contact Grass Valley Customer Support, see Grass Valley Technical Support, on page 156.
ERR	**Red**	Error	**Off:** Working correctly. **On:** Hardware fault detected. Contact Grass Valley Customer Support, see Grass Valley Technical Support, on page 156.

Table 2-1: MV-821 Multiviewer Main Module Status LED Information (continued)

Label	LED Color	Detail	Status
WRN	Amber	Over Temperature Warning	**Off:** Working correctly. **On:** MV-821 module overheating. Ensure the chassis front door is closed and the fans are all operating correctly.
OK	Green	Hardware Communications Status	**Solid On:** Working correctly. **Flashing (2Hz):** Hardware communications fault detected. Contact Grass Valley Customer Support, see Grass Valley Technical Support, on page 156.

	CAUTION	**Electrostatic Damage**
		Static precautions must be observed when touching or handling modules.

Rear Panel - MV-821-HDBNC

The MV-821-HDBNC Rear Panel is shown in Figure 2-8. The rear panel houses various video, data and control connectors and two power supply modules (PSUs). Each PSU module is fitted into the unit from the rear and houses an IEC mains inlet.
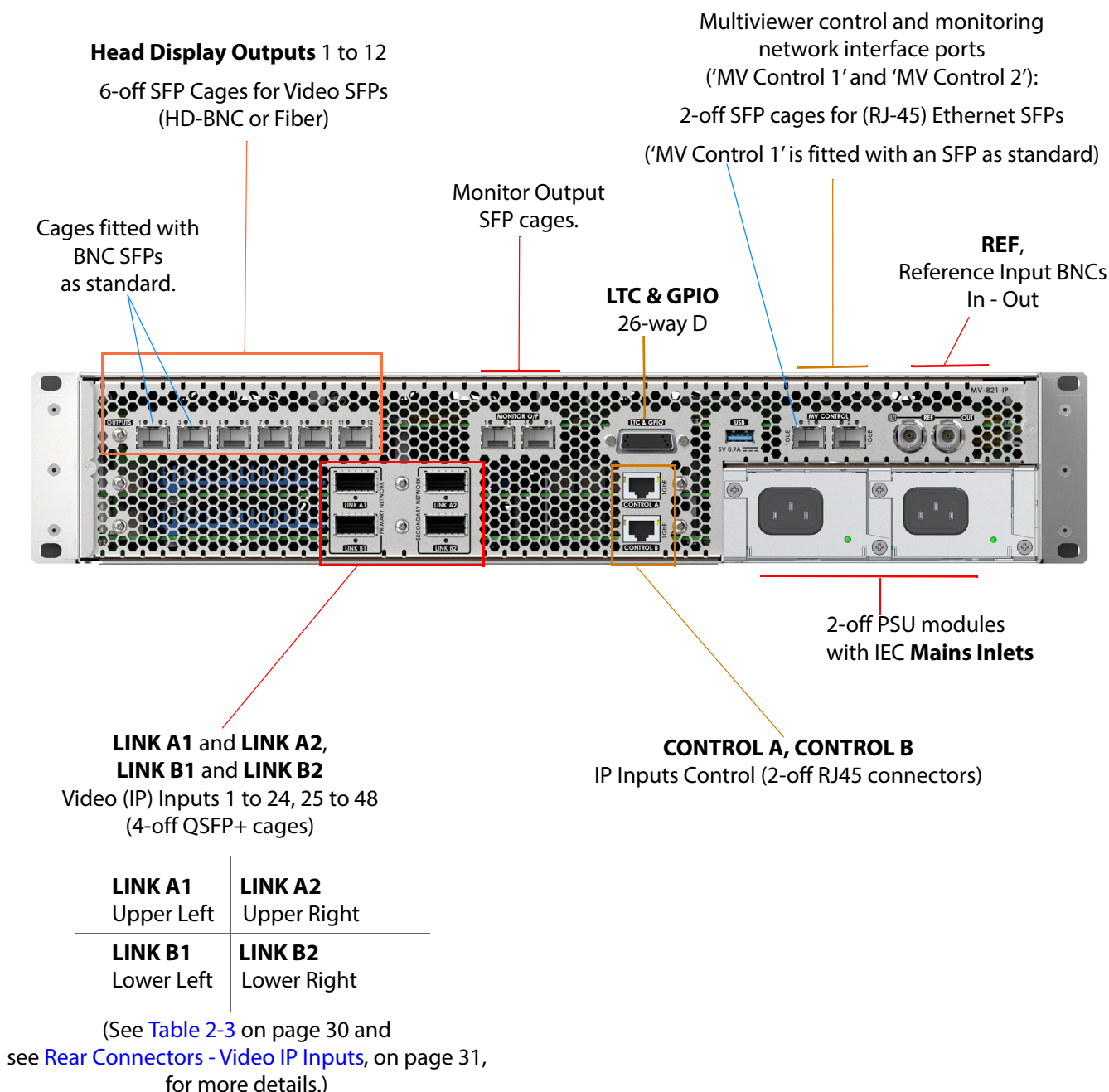
Multiviewer control and monitoring network interface ports ('1G ENET 1' and '1G ENET 2'):

2-off SFP cages for (RJ-45) Ethernet SFPs

('1G ENET 1' fitted with an SFP as standard)

Head Display Outputs 1 to 12

6-off SFP Cages for Video SFPs (HD-BNC or Fiber)

Cages fitted with BNC SFPs as standard.

LTC & GPIO
26-way D

Monitor Outputs (Not currently used)

USB A and **B** (For engineering use)

Video Inputs 1 to **48** (2x 24-off HD-BNC connectors)

REF, Reference Input BNCs

2-off PSU modules with IEC Mains Inlets
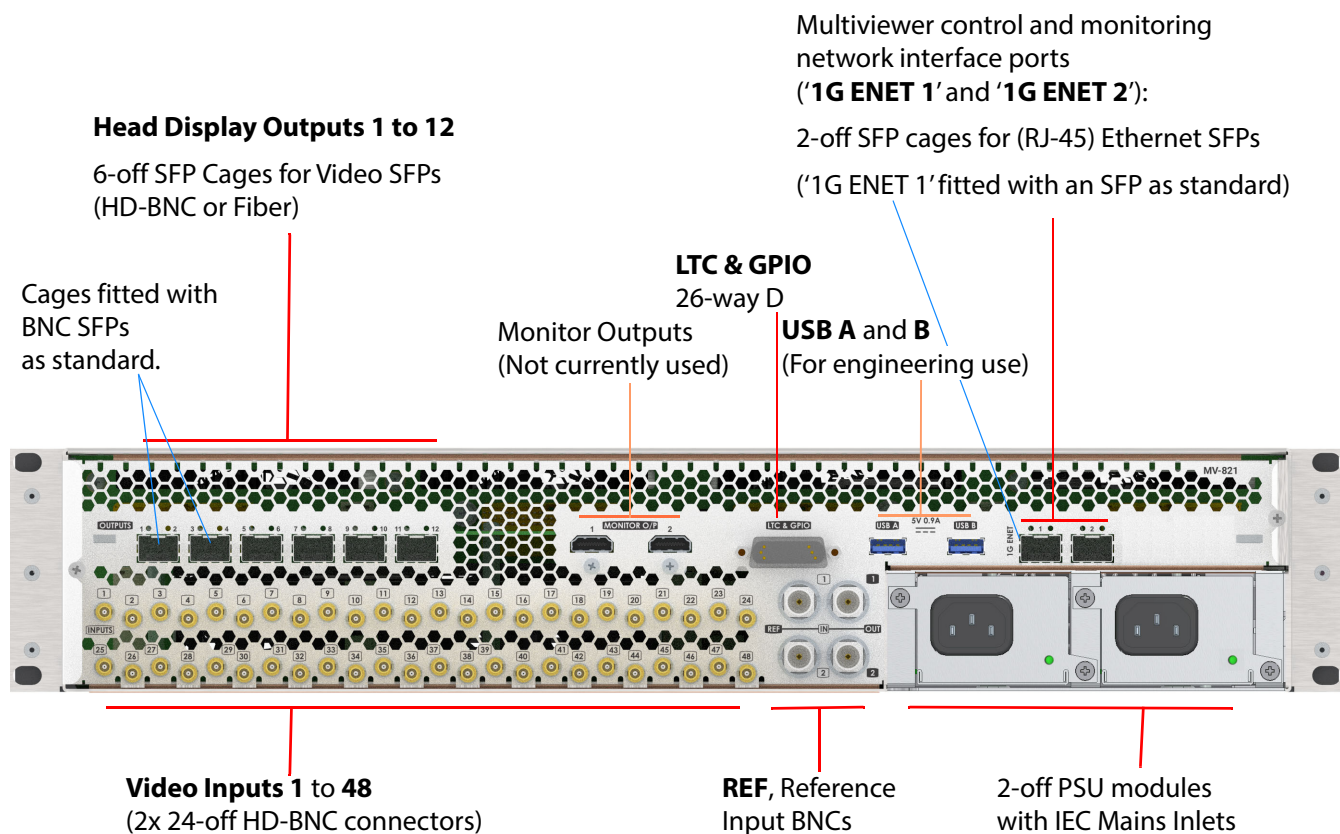
Fig. 2-8: MV-821-HDBNC Rear Panel

Table 2-2: MV-821 Rear Connectors

MV-821-HDBNC Connection	Description
Video Inputs 1 to **48**	48-off HD-BNC video inputs. Two rows: Upper 1 to 24, Lower 25 to 48.
	(See Rear Connectors - HD BNC Video Inputs, on page 31.)
Reference 1 and **2**	4-off BNC's. Two Analog Reference inputs, numbered 1 and 2. Ref Input BNC and Ref "Loop-through" Output BNC per Reference.
	(See Rear Connectors - BNC Reference Inputs, on page 34.)
Mains Inlets	2-off IEC mains inlets. One per PSU module.
Head Display Outputs 1 to **12**	Multiviewer video wall head display outputs. 6-off SFP cages for outputs 1 to 12.
	Two dual-BNC SFPs are fitted as standard, providing display outputs 1 & 2, and display outputs 3 & 4.
	(See Rear Connectors - Display Outputs, on page 35.)

Table 2-2: MV-821 Rear Connectors (continued)

MV-821-HDBNC Connection	Description
Monitor Outputs 1 and **2**	2-off connectors. Not currently used
USB A and **B**	2-off USB connectors. For engineering use.
'**1G ENET 1**' and '**1G ENET 2**'	2-off SFP+ Ethernet cages for multiviewer control and monitoring: 1 Gbps, RJ45. ("1G1", "1G2") '1G ENET 1' is fitted with an SFP as standard. (See Rear Connectors - Network Interface Ports (Control and Monitoring), on page 36.)
LTC & GPIO	26 Way High Density "D" Type female connector. (See Rear Connectors - LTC and GPI, on page 37 for more details, including pinout details.)

Rear Panel - MV-821-IP

The MV-821-IP Rear Panel is shown in Figure 2-9. The rear panel houses various video, data and control connectors and two power supply modules (PSUs). Each PSU module is fitted into the unit from the rear and houses an IEC mains inlet.

Head Display Outputs 1 to 12

6-off SFP Cages for Video SFPs (HD-BNC or Fiber)

Multiviewer control and monitoring network interface ports ('MV Control 1' and 'MV Control 2'):

2-off SFP cages for (RJ-45) Ethernet SFPs

('MV Control 1' is fitted with an SFP as standard)

Cages fitted with BNC SFPs as standard.

Monitor Output SFP cages.

REF, Reference Input BNCs In - Out

LTC & GPIO 26-way D

2-off PSU modules with IEC **Mains Inlets**

LINK A1 and **LINK A2**, **LINK B1** and **LINK B2** Video (IP) Inputs 1 to 24, 25 to 48 (4-off QSFP+ cages)

CONTROL A, CONTROL B IP Inputs Control (2-off RJ45 connectors)

LINK A1 Upper Left	**LINK A2** Upper Right
LINK B1 Lower Left	**LINK B2** Lower Right

(See Table 2-3 on page 30 and see Rear Connectors - Video IP Inputs, on page 31, for more details.)

Fig. 2-9: MV-821-IP Rear Panel

Table 2-3: MV-821-IP Rear Connectors

MV-821-**IP Connection**	Description
LINK A1, LINK A2, LINK B1, LINK B2	Video (IP) Inputs 1 to 48
	4-off QSFP+ cages for QSFP28 transceiver modules.
	These IP network connections are the carriers for 48-off video input IP streams.
	Inputs 1 to 24: Link A1 (and Link A2 for secondary network). Inputs 25 to 48: Link B1 (and Link B2 for secondary network).
	Note: The QSFP28 transceiver modules are not fitted as standard and must be ordered separately.
	(See Rear Connectors - Video IP Inputs, on page 31, for more details.)
CONTROL A, CONTROL B	IP Inputs control. 2-off RJ45 connectors for IP routing control network connections and service updates to the IP input circuitry.
	(See Rear Connectors - Video IP Inputs, on page 31.)
REF	Single analogue reference input and loop-thru output. See **Note 1**.
	(See Rear Connectors - BNC Reference Inputs, on page 34.)
Mains Inlets	See **Note 1**.
Head Display Outputs 1 to **12**	See **Note 1**. (See Rear Connectors - Display Outputs, on page 35.)
Monitor Outputs 1 to **2**	SFP cages for Monitor outputs, unused (for future use).
MV Control 1, **MV Control 2**	2-off SFP+ Ethernet cages for multiviewer control and monitoring: 1 Gbps. ("1G1", "1G2" on control screen/RollCall template.)
	'MV Control 1' is fitted with a 1G RJ45 SFP as standard.
	See **Note 1**. (See Rear Connectors - Network Interface Ports (Control and Monitoring), on page 36.)
LTC & GPIO	See **Note 1**.
	(See Rear Connectors - LTC and GPI, on page 37 for more details, including pinout details.)
Note 1: Connector(s) are common to MV-821-IP and MV-821-HDBNC, see Table 2-2 on page 27.	

Rear Panel Connectors

Rear Connectors - HD BNC Video Inputs

There are two rows of HD BNCs for up to 12G SDI video inputs.
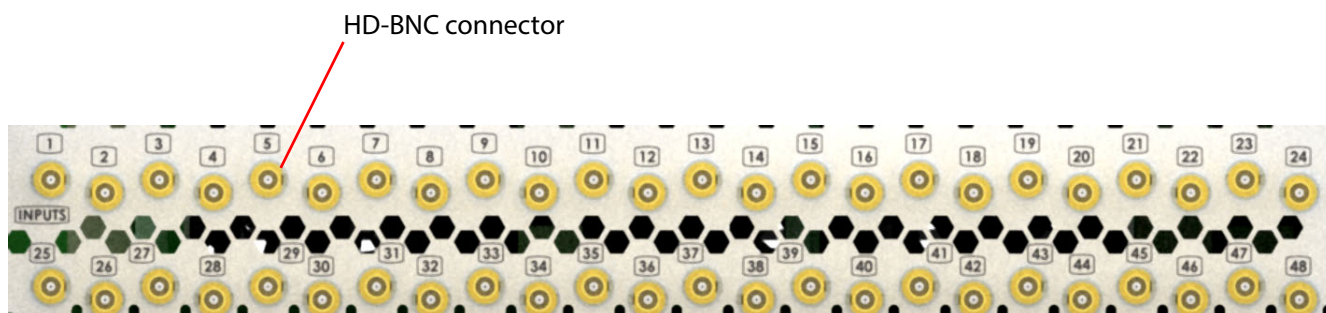
Fig. 2-10: MV-821-HDBNC Video Input Connectors - 1 to 24, and 25 to 48

Rear Connectors - Video IP Inputs

The multiviewer video inputs are video signals comprising multicast IP streams and are routed by a video IP routing system. Video IP streams enter the MV-821-IP unit via QSFP28 transceiver modules at the QSFP+ cages on the rear ('Link A1' etc.).

IP routing control messages for the multiviewer video inputs are carried by a control IP network and have separate rear connections ('Control A' and 'Control B') for out-of-band control. Control connection may also be in-band, via each media IP interface.

For IP routing redundancy, two IP networks (fabrics) are used, "Fabric A" and "Fabric B" (also referred to as 'primary' and 'secondary' on control screens/RollCall templates).
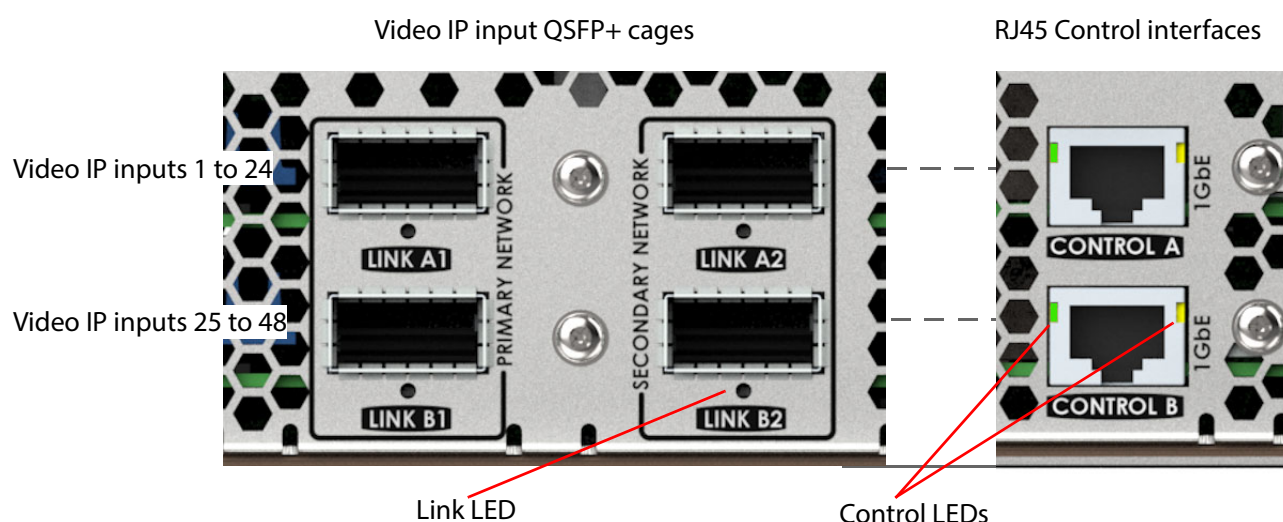
Fig. 2-11: MV-821-IP Video Input Connectors - QSFP+ cages and RJ45 connectors

Connectors and LEDs

Table 2-4: Video IP Connectors

Physical Connector	Connector Type	Supported Network Connections	Comment
Link A1	QSFP+ cage	2-off 50G	Network connections for media IP streams - Video IP inputs 1 to 24.
Link A2	QSFP+ cage	2-off 50G	Use two physical connections for redundancy. **Note:** QSFP28 transceivers are required to fit the rear QSFP+ cages.
Control A	RJ45 Ethernet	1G	Control network connector for out-of-band control and upgrades to IP Input blocks. See Note 1.
Link B1	QSFP+ cage	2-off 50G	Similar to 'Link A1' and 'Link A2' but for video IP inputs 25 to 48.
Link B2	QSFP+ cage	2-off 50G	**Note:** QSFP28 transceivers are required to fit the rear QSFP+ cages.
Control B	RJ45 Ethernet	1G	Similar to 'Control A'. See Note 1.
Note 1: Control network connectors 'Control A' and 'Control B' are connected to a small, *internal* IP switch within the MV-821-IP unit. Either control network connector can provide a connection to the four Video IP Input blocks' control network interfaces.			

Table 2-5: Video IP LEDs

LED	Color	Description
Link A1, Link A2, Link B1, Link B2		Single LED per QSFP+ cage.
	Off	No QSFP28 module fitted.
	Flashing Blue	Flashing blue. QSFP28 module fitted, but network link is down.
	Blue	Solid blue. QSFP28 module fitted and link is up.
Control A and B		Pair of LEDs.
Left LED.	**Green**	Flashes to show 1Gbit link activity.
Right LED.	**Yellow**	On when link is present.

Physical Link Connection and Media Network Interface Connections

Each physical "Link" media network interface uses a QSFP28 transceiver module This is overall a 100G link configured for 2x 50G network connection operation. Each 50G connection has sufficient bandwidth for 12-off 3G video IP streams.

- **Link A1** and **Link A2** can provide 24-off multiviewer inputs (1 to 24) to the multiviewer, with network redundancy and 'make-before-break' switching capability.
  (**Link A1** primary/main media network connection;
  Link A2 secondary/redundant connection.)
- **Link B1** and **Link B2** similarly provide 24-off multiviewer inputs (25 to 48).
  (**Link B1** primary/main media network connection;
  Link B2 secondary/redundant connection.)

Each QSFP28 status is reported by one of the internal Video IP blocks via RollCall.

LINK A1	**LINK A2**
Upper Left	Upper Right
LINK B1	**LINK B2**
Lower Left	Lower Right

Fig. 2-12: Media Network Interface Connections - Relative Rear Panel Location
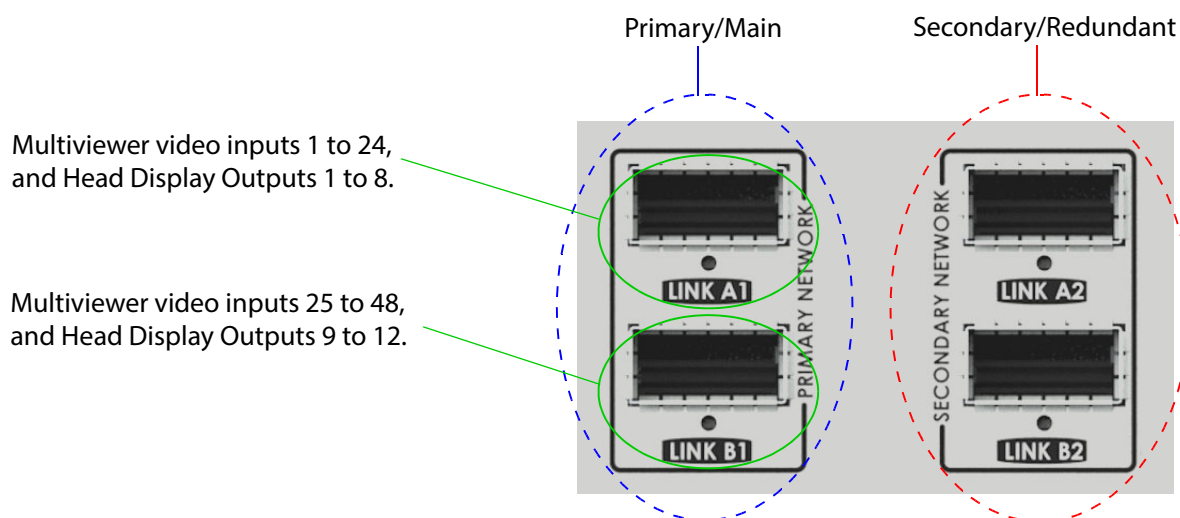
Fig. 2-13: Media Network Connection

For a functional description on these network interfaces,
see MV-821-IP: Video IP Circuitry, on page 7
and MV-821-IP: Media Network Connection, on page 9.

Rear Connectors - BNC Reference Inputs

The Reference Inputs are unterminated. Termination should be done at the Reference Out connector with a 75 ohm termination, or the reference signal may be "looped through", via the Reference Out connector, and taken to another piece of equipment (where the signal must be terminated).
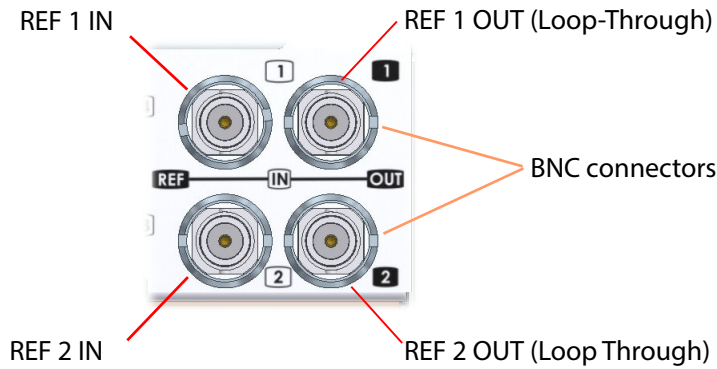
Fig. 2-14: MV-821 Multiviewer Video Reference Connectors (MV-821-HDBNC shown)

The reference input is used for SDI video input timing and display output timing.

MV-821-HDBNC:

There are two analog Reference inputs and two loop outputs on the MV-821-HDBNC version.

MV-821-IP:

There is one analog Reference Input and loop output on MV-821-IP.
This can be used to lock the multiviewer display outputs.
It can also be selected as the reference for the video IP inputs.
(The video IP inputs can also use PTP as their reference timing.)

Rear Connectors - Mains Inlets

The IEC power inlets are the mains disconnection devices for this unit. Each power supply unit (PSU) has a status LED. See Table 2-6:
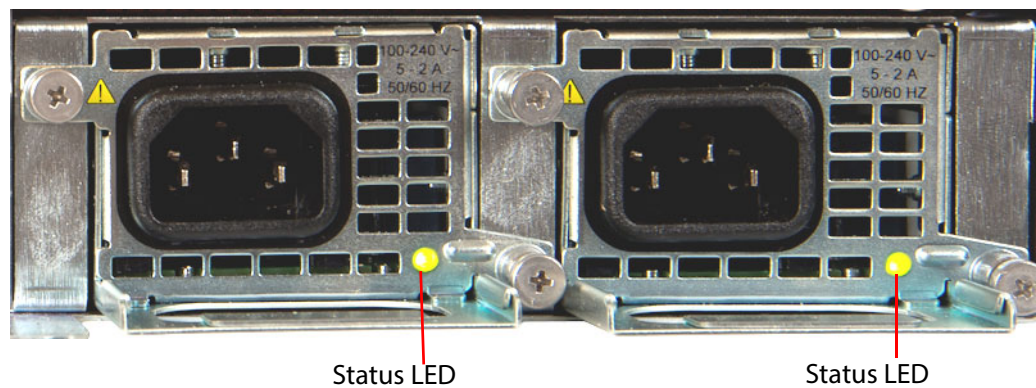
Fig. 2-15: MV-821 Multiviewer IEC Mains Connectors

Table 2-6: PSU Status LED

Status	LED Color	Main Output	Standby Output	Other
Normal Operation	**Green**	ON	ON	-
Stand by	**Flashing Green**	Off	ON	AC Mains Present
Warning	**Flashing Yellow**	Over-current, Under-voltage, or Over-voltage warning		-
Fault	**Yellow**	Over-current, Under-voltage, or Over-voltage fault		Fan Fault or Over-temperature fault

Rear Connectors - Display Outputs

Display outputs 1 to 12 come from Video SFPs fitted into the 6-off SFP cage positions. The SFPs fitted depend on which display output options have been purchased.

Different types of video SFP modules provide:

- 2-off SDI Coax outputs per SFP,

- or 2-off SDI Fiber outputs per SFP,

- or 1-off HDMI output per SFP.

SFP blanking plugs must be fitted if no SFP is present.
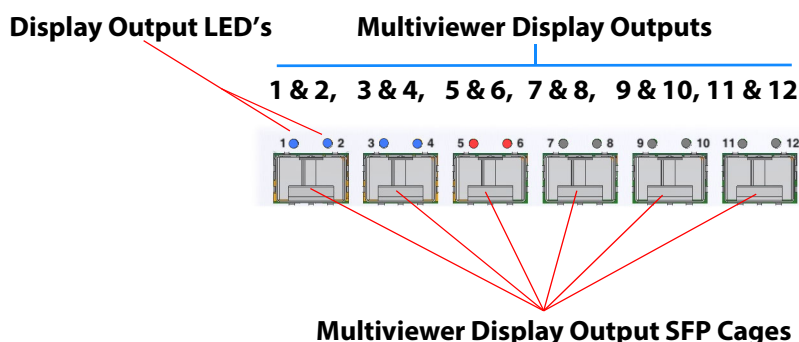
Fig. 2-16: MV-821 Multiviewer Display Output SFP Cages

Each display output has an associated LED which indicates the output status. Table 2-7: describes the LED function.

Table 2-7: Video Display Output Status LED

LED Color	Status
Blue	Licensed Output; SFP Fitted. 1080p video output signal.
Green	Licensed Output; SFP Fitted. 720p video output signal.
Red	Licensed Output; No SFP Fitted.
Off	Unlicensed output.
Red Green Flashing	Flashes Red/Green at 1Hz *during* an internal FPGA upgrade (part of a unit software upgrade).
Red Flashing	Flashes Red/Off at 1Hz *after* a unit software upgrade if: • internal FPGA upgrading was unsuccessful; or • internal FPGAs fail to load during unit boot. **Note:** A unit upgrade to the same version may be carried out to recover a unit if FPGA upgrading was unsuccessful. Otherwise, contact Grass Valley support.

Rear Connectors - Network Interface Ports (Control and Monitoring)

Ports "1G1" and "1G2" may currently both be used.
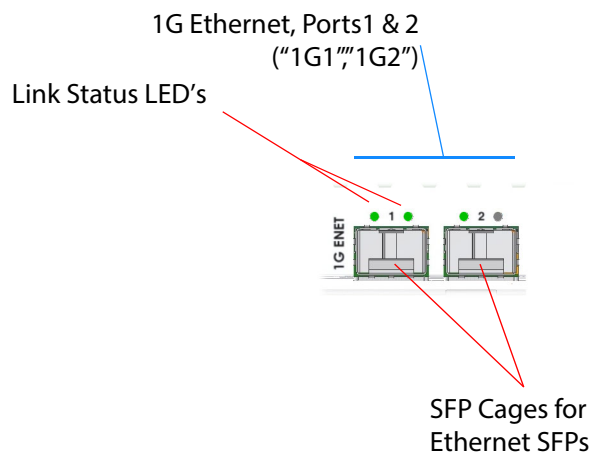
Fig. 2-17: MV-821 Multiviewer Control and Monitoring Ethernet Port Connectors

There are 2 link status LED's associated with each Ethernet SFP module connector. Table 2-8: describes the LED function.

Table 2-8:   Control and Monitoring Ethernet Port Status LEDs

Color	LEDs		Status
	¢	¢	
Green / Off	[green]	OFF	Ethernet link established
Green Solid / Flashing	[green]	* * *	Activity on Ethernet link
Off / Off	OFF	OFF	Establishing link, or unconnected.

Rear Connectors - LTC and GPI

LTC and GPIO Connector Pin-outs

Female high density 26 way 'D' type connector assignments
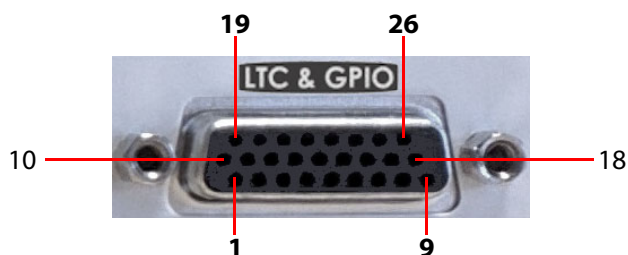
Fig. 2-18: Female High Density 26 Way 'D' Type LTC and GPIO Connector

The following table gives the pin assignments for the LTC and GPIO connector:

Table 2-9:   Female High Density 26 Way 'D' Type LTC and GPIO Connector

Pin Number	Signal	Pin Number	Signal
1	+5 Vdc Out	14	GND
2	+5 Vdc Out	15	GND
3	Do Not Connect	16	GND
4	nc	17	GND
5	nc	18	GND
6	Do Not Connect	19	nc
7	Do Not Connect	20	Do Not Connect
8	nc	21	nc
9	LTC+	22	GPI 1
10	nc	23	GPI 2
11	nc	24	GPI 3
12	nc	25	GPI 4
13	GND	26	LTC-
Note: 'nc' denotes a "not connected" connector pin.			

Note: **MV-821 GPI outputs** - Open collector outputs. Require external pull-up resistors of value between 10 kΩ and 100 kΩ. Each output can sink up to 100 mA.

- "+5 Vdc Out" pins are provided on the connector for this purpose.
- Maximum voltage, +5 V.
- See Example: Driving LEDs from the GPI Outputs, on page 38 for an example of how GPI outputs can be used to drive LEDs.

Note: **MV-821 GPI inputs** - Inputs have weak internal pull-down resistors.

Can be driven by input voltages of up to +5 V. A logic "low" input is represented by an input voltage below +0.8 V.

Example: Driving LEDs from the GPI Outputs

MV-821 GPI outputs have open collector drivers. There is a +5 V DC pin on the GPIO connector to provide the power needed to drive LEDs or relays.

The following schematic is an example of the circuit needed to drive an LED by each GPI output. MV-821 GPIO connector pin names and numbers are shown on the left.
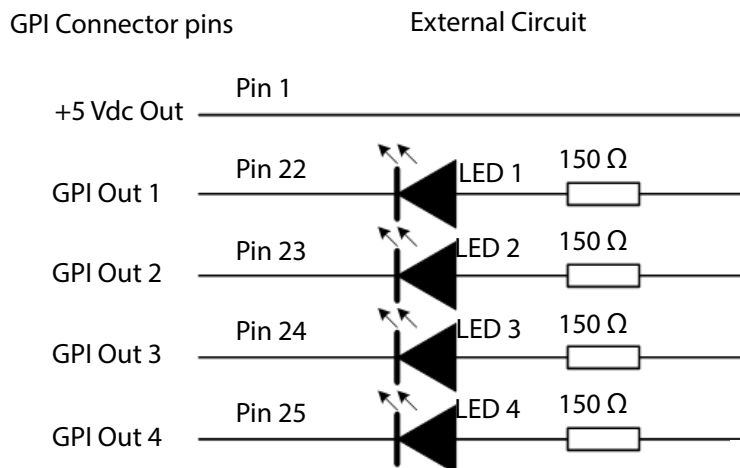
Fig. 2-19: Connecting LEDs to GPI Outputs

3 Hardware Installation

Hardware Installation

Environmental Considerations

The ambient temperature for all the supplied equipment should not exceed the limits specified in Operating Environment, on page 140.

Installing the equipment in a clean environment with moderate temperature and humidity will promote a long and trouble-free equipment life.

Chassis Dimensions

See:

- Overall Dimensions, on page 140.
- MV-821 Dimensions, on page 149 for a chassis dimension drawing.

Chassis Ventilation

The MV-821 Multiviewer is a 2RU 19" rack-mount chassis with front-to-back air cooling. Cooling fans are mounted in the chassis front door. Additionally, each PSU module has an internal variable-speed cooling fan.

Figure 3-1 shows the external chassis air flow and air intake and exhaust holes.
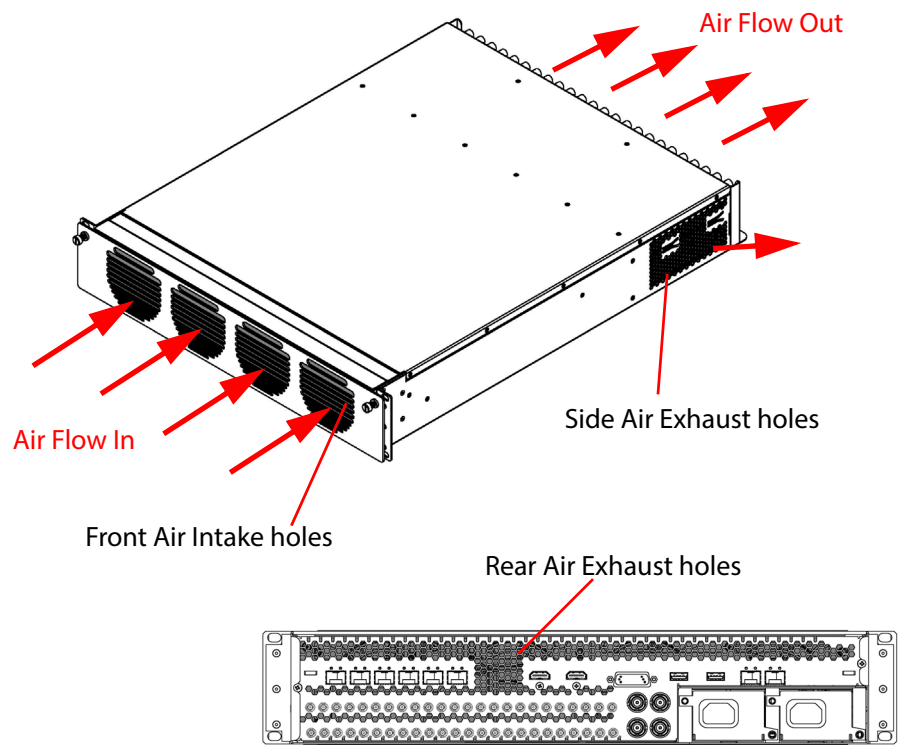
Fig. 3-1: MV-821 Multiviewer Chassis Air Flow and Air Intake/Exhaust Holes

IMPORTANT
Do not block MV-821 chassis air intake and exhaust holes. This allows for correct unit operation,

Figure 3-2 shows the internal chassis air flow.

a) Air flow MV-821 Chassis, Plan View with No Lid

Fans in Front Door

b) Air Flow MV-821 Chassis, Side View with No Side
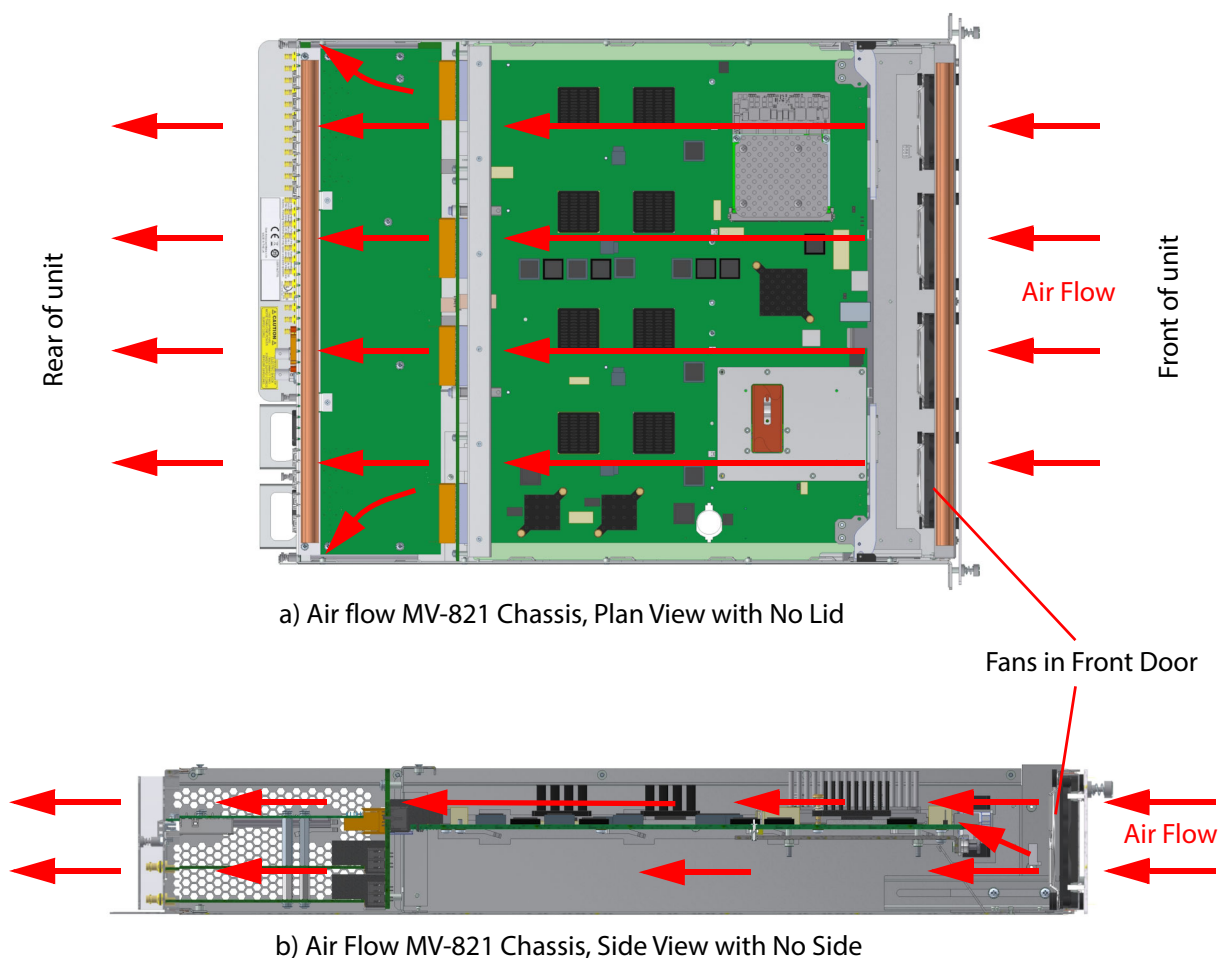
Fig. 3-2: MV-821 Multiviewer Air Flow (MV-821-HDBNC shown)
a) Chassis Plan View with No Lid.
b) Chassis Side View with No Side.

Cooling Fan Failure

CAUTION If the cooling fans on the MV-821 Multiviewer should stop for any reason, then the unit should be switched off immediately. Otherwise permanent damage may result.

Depending on the length of time the MV-821 Multiviewer has been run with no fan the unit may need to be returned for checking and repair. Contact Grass Valley or your Grass Valley dealer to discuss the situation.

Note: MV-821 Multiviewer status, including unit temperature and fan status, may be monitored via GV Orbit.

Rack Mounting

Location in Rack

The MV-821 Multiviewer is designed to be installed in a standard 483mm (19 inch) equipment rack for use. The unit requires a 2RU high space within a rack.

The following precautions should be observed:

1 Do not obstruct the front air intake holes. These are to allow the inlet of cooling air.and the air exhaust holes at the sides and rear of the unit.

CAUTION	Do not obstruct the front air inlet holes.

2 Do not obstruct the air exhaust holes at the sides and rear of the unit.

CAUTION	Do not obstruct the side and rear air exhaust holes.

3 Ensure that there is a minimum clearance at the rear of the mainframe of 200mm (8 inches). This is **ESSENTIAL**.

CAUTION	Ensure a minimum clearance at the rear of the chassis frame of 200mm (8 inches).

Mounting the MV-821 Multiviewer into a Rack

CAUTION	The MV-821 Multiviewer is heavy (14kg – 30.3lb) and will require two people to lift into position, using correct lifting procedures. If you are unsure of the lifting procedures, ask a Health and Safety adviser for information.

Preliminaries:

1 Check that the rack is rigid enough for the MV-821 Multiviewer chassis.

2 Use a suitable rack tray in the rack to take the weight of the MV-821 Multiviewer. The chassis rear will become heavier when cables are connected.

Note:	If the rack tray has sides, make sure that they do not block the ventilation holes on the sides of the MV-821 Multiviewer.

Fitting the Multiviewer:

3 Position the MV-821 Multiviewer in the rack on the shelf.
Use the correct lifting procedures.

4 Open the MV-821 front door (see To Open the Front Door, on page 22).
Four chassis rack mounting holes are revealed, two on each side. See Figure 3-3.
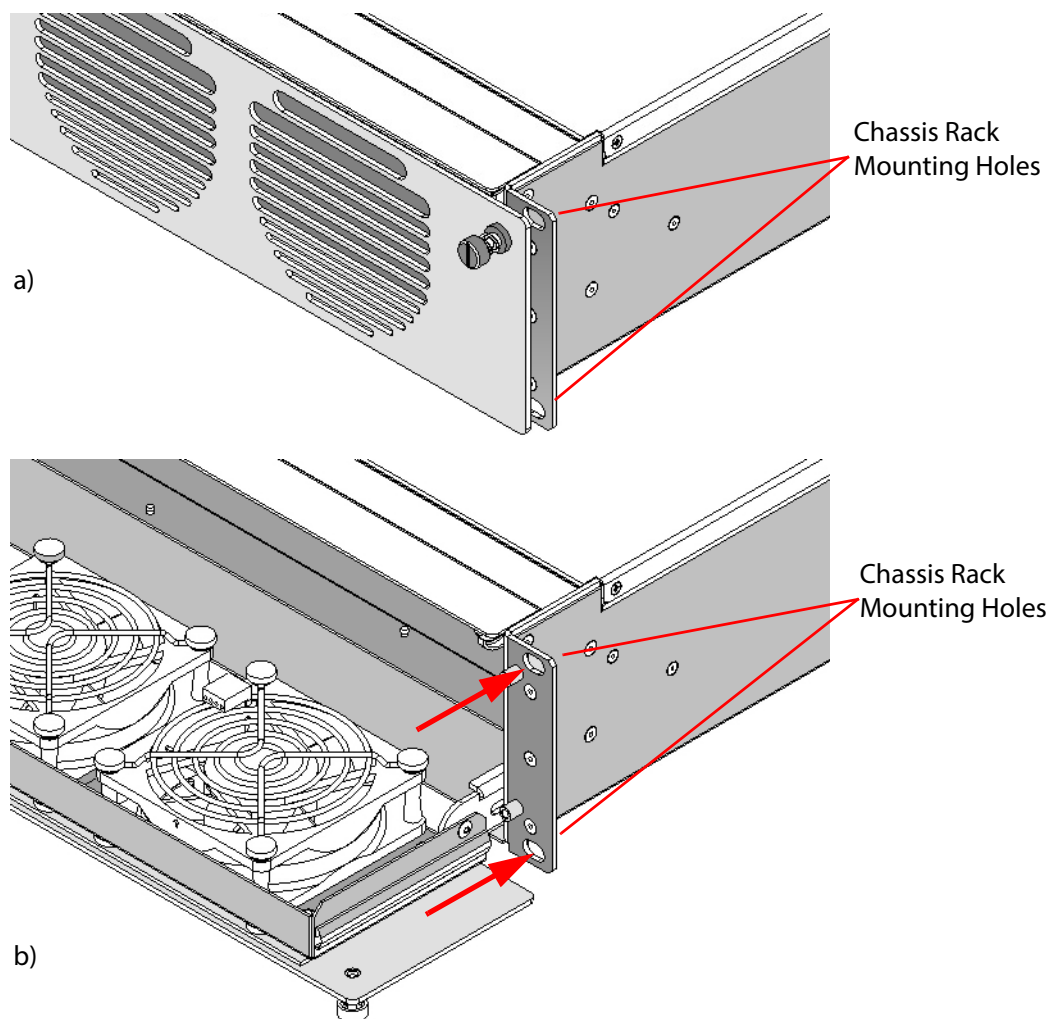
Fig. 3-3: MV-821 Multiviewer Chassis Rack Mounting Holes
a) Front Door Closed.
b) Front Door Open, Allowing Access to Mounting Holes.

5 Secure the MV-821 Multiviewer chassis in the rack at each mounting hole using 4-off M6 (1/4 inch) screws. See Figure 3-4. (Screws are available from rack suppliers.)

MV-821 Chassis

(Front panel open)

Rack
Shelf

4-off M6
(1/4 inch) Screws
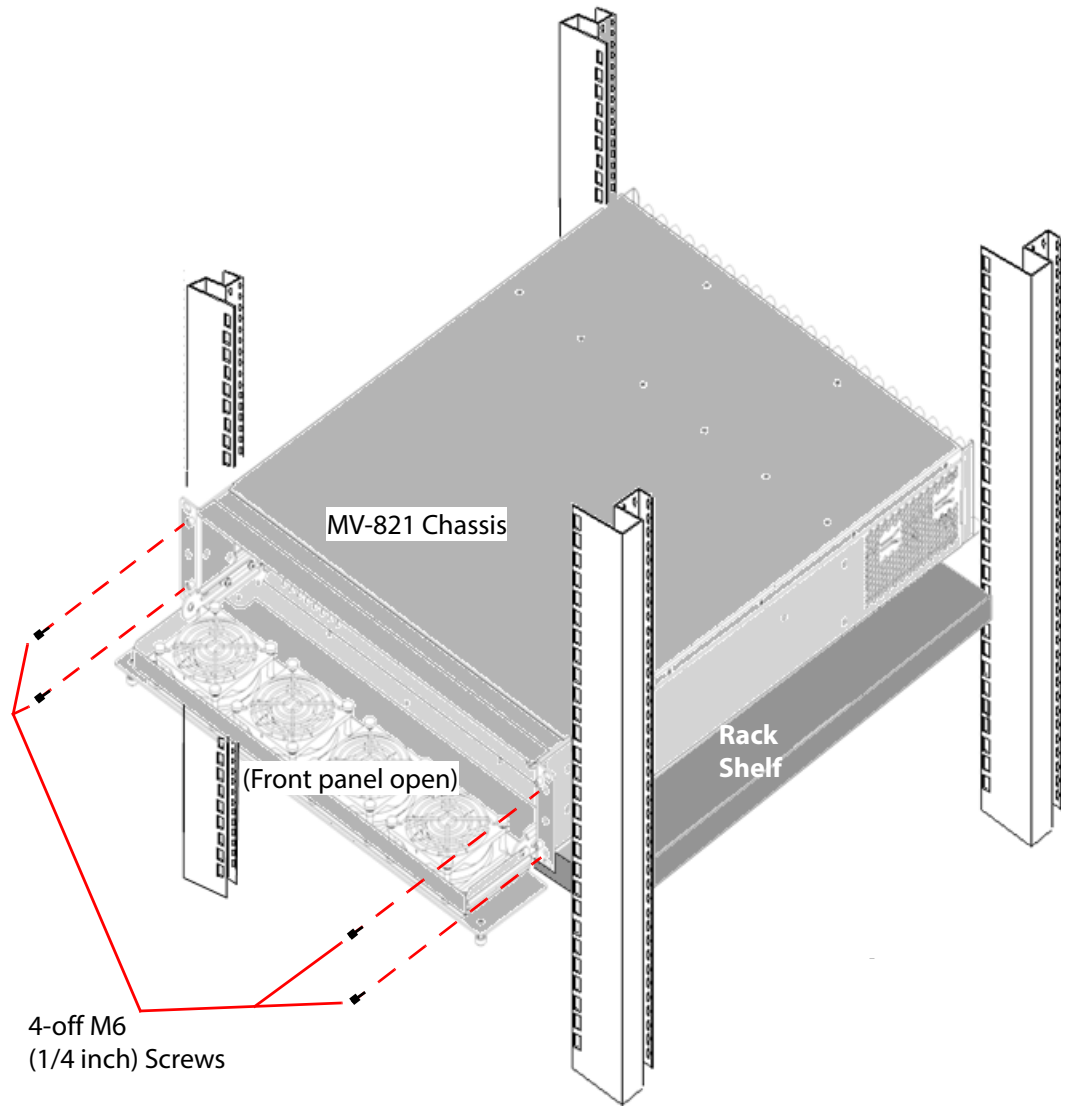
Fig. 3-4: Rack Mounting MV-821 Multiviewer.

6 Close and secure the front door (see To Close the Front Door, on page 22).

Cabling Up in a Rack

When connecting cables to the MV-821 Multiviewer, it is recommended that cable supports are used (clamps and bars) to relieve the strain on rear connectors.

For connector information, see Rear Panel Connectors, on page 31

MV-821-HDBNC Example

Multiviewer Head Display Outputs
4 to 12 outputs, depending on licensing

Multiviewer Control
Network Connection

Up to 48 Video Inputs
(SDI HD-BNC)

Analog
Reference
+ 75R termination

Mains Power
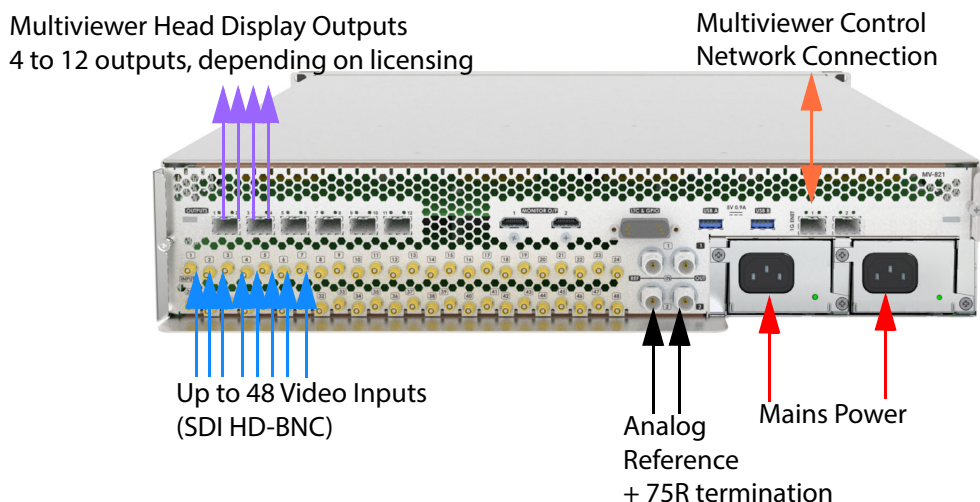
Fig. 3-5: MV-821-HDBNC Cable Connection Example

MV-821-IP Example

Analog
Reference
+
75R termination

Multiviewer Head Display Outputs
4 to 12 outputs, depending on licensing

Multiviewer Control
Network Connection

Typically, for multiviewer video IP inputs over 'QSFP28' media network connections:

- Use **Link A1** for inputs 1 to 24 and **Link B1** for inputs 25 to 48.

- Additionally, use **Link A2** and **Link B2**, respectively, for secondary link redundancy.

Up to four QSFP+ cages for
'QSFP28 module' video IP input
connections
via media network(s)

Mains Power

(Network Connection for Out-of-Band
video IP block control)

Fig. 3-6: MV-821-IP Cable Connection Example

Powering

Note:	To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

Power consumption is listed in Power, on page 140.

MV-821 Booting

Refer To:	'MV-8 Series Multiviewer' user manual for information about MV-821 booting and start-up splash screen.

Note:	Use the '1G1' network interface when performing the initial unit configuration with Grass Valley RollCall control panel.

Note:	The 'Eng' interface is a reserved internal IP network interface, do not use this interface.

Control Screens for Video IP Blocks 4

This section lists and describes the control screens (RollCall templates) for any one of the four *Video IP blocks* in an MV-821-IP unit.

> Note: Control screens for the *Multiviewer block* of a MV-821 are described in the 'MV-8 Series Multiviewer' user manual.

Control Screens for Video IP Blocks

Control Screens

Video IP Control Screen	Used For	See
Configuration	Basic parameters	page 56
Time Sync Configuration	Time synchronization source selection	page 58
TPG	Video test patterns on IP outputs	page 61
Counters	Clearing internal counters	page 63
FEC	Forward Error Correction control	page 64
Ethernet 1, **Ethernet 2**	Media network interface IP settings	page 65
Ethernet 1 RTP Sender, **Ethernet 2 RTP Sender**	RTP sender stats	page 69
Ethernet 1 RTP Receiver, **Ethernet 2 RTP Receiver**	RTP receiver stats	page 70
Ethernet RTP Receiver Video Stats	Received video flow stats	page 71
Ethernet RTP Receiver Audio Stats	Received audio flow stats	page 72
Ethernet RTP Receiver Metadata Stats	Received metadata flow stats	page 73
Link Control	4K quad-link control	page 74
Destination Timing	Received IP flow video input timing	page 75
Spigot 1, **Spigot 2,** **…** **Spigot 16**	Spigot IP settings (source and destination spigots)	page 77
Logging Configuration	Configuring logging	page 89
Logging SDI Info	SDI status logging settings	page 90
Logging System	System status logging	page 91
Logging Network	Network status logging	page 94
Logging SFP	Designated QSFP28 module status logging	page 96
Logging FPGA	FPGA status information logging	page 99
Logging Spigot 1, **Logging Spigot 2,** **…** **Logging Spigot 16**	Spigot name and spigot information logging. (Set multiviewer video input names.)	page 100
Logging Card Diagnostics	Video IP block diagnostics	page 103
Loopback Router	Loopback IP routing	page 104
Setup	Display of basic information, plus 'restart' and 'default settings' buttons.	page 105
Ethernet Rear	Control interface IP settings	page 106
Interop	IP interoperability settings	page 107
SFP Configuration	Configuration of designated QSFP28 module.	page 109

Introduction

This chapter describes the control screens (RollCall templates) of a Video IP block of an MV-821-IP unit.

Each MV-821-IP unit contains four separate Video IP blocks, each identified out of the box in RollCall Control Panel as 'MV-821-IP-Rear'.

The key distinguishing item for each Video IP block is its **Slot** location, which is shown on each **Configuration** control screen (template). See Figure 4-1.

Each of the four Video IP block is independently configured via its own control screens.
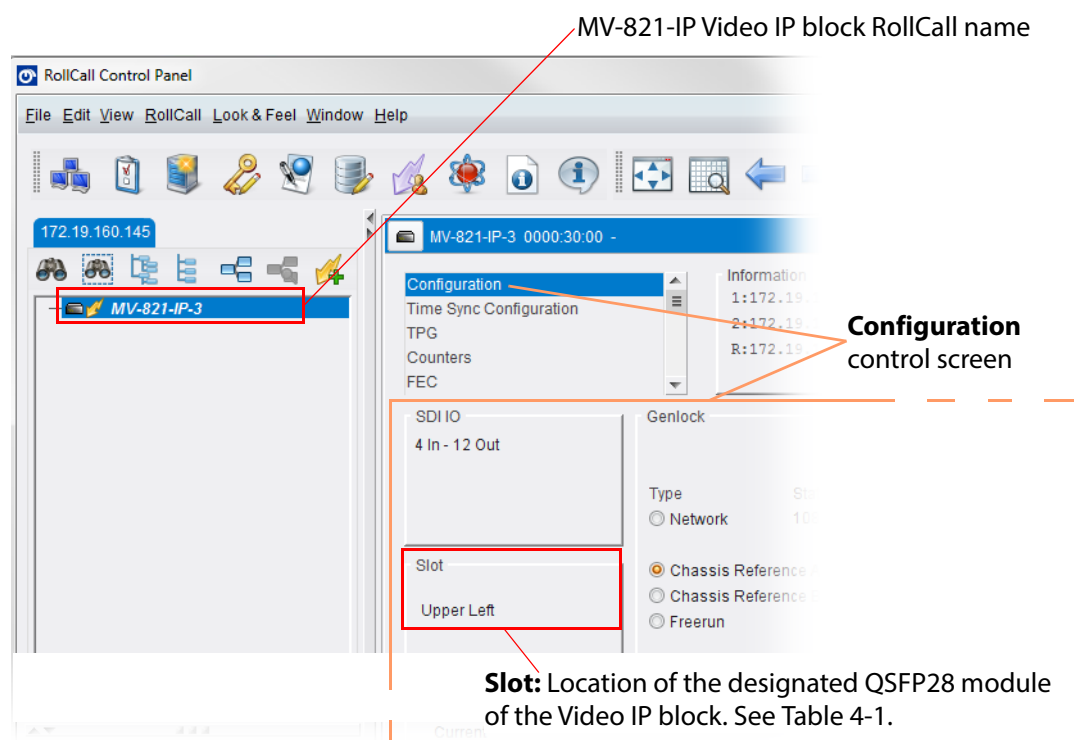
Fig. 4-1: Initial Control Screen (Shown in RollCall Control Panel)

Note: **MV-821-IP Video IP Blocks and Designated QSFP28 modules:**

There are four Video IP blocks. Each reports on the status of one rear designated QSFP cage/link in the MV-821-IP unit.

Table 4-1: Designated QSFPs

Slot (location of designated QSFP)	Rear QSFP cage label (see Figure 4-2)
'Upper Left'	"LINK A1"
'Upper Right'	"LINK A2"
'Lower Left'	"LINK B1"
'Lower Right'	"LINK B2"
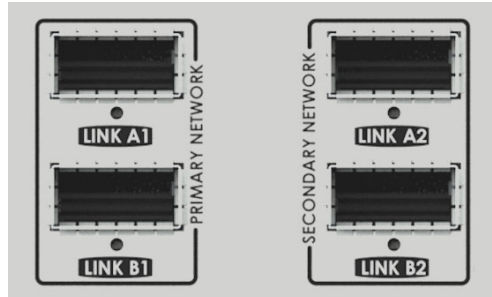
Fig. 4-2: Rear Panel QSFP+ Cages

The control screens for MV-821*Video IP block(s)* are described in this section.

> Note: Control screens for the *Multiviewer block* of a MV-821 are described in the 'MV-8 Series Multiviewer' user manual.

Video IP Block Input and Output Spigots:

The control screens of an MV-821-IP Video IP block are derived from the control screens of a Grass Valley IQMIX modular card. However, unlike a Grass Valley IQMIX modular card, the MV-821-IP unit has a fixed Video IP input and IP output configuration. It exposes IP inputs and IP outputs externally. But a Video IP block's SDI inputs and SDI outputs are only *internal* to the MV-821-IP unit. (See Figure 1-6 in IP Routing Control, on page 15.)

For each Video IP block:

- **Spigots 1 to 4** source up to 4 video IP signals for external consumption. (Converted from 4 internal SDI video signals carrying multiviewer head display output images.)
- **Spigots 5 to 16** receive up to 12 video IP signals from external sources. (Converted to 12 internal SDI video signals which pass to the multiviewer block - multiviewer inputs).

> Note: Tools:
>
> **GV Orbit Client:**
>
> The GV Orbit Client software tool is used to configure Grass Valley products. A RollCall-protocol or Densité-protocol device's control screen may be viewed with and used with GV Orbit Client.
>
> **RollCall Control Panel:**
>
> The Grass Valley RollCall Control Panel tool may be used to view control screens for RollCall-protocol devices. It is part of the RollCall Suite. (For RollCall installation instructions, see the "RollCall V4 Suite & RollCall Lite" Introduction manual.)
>
> Install the RollCall Control Panel software on your computer. See the RollCall Control Panel User Manual and contact Grass Valley Support for information. Use RollCall Control Panel version 4.19 or later for MV-821 (part of RollCall Suite 4.18.1).
>
> Making a RollCall Control Panel connection to a Video IP block is described in Initial RollCall Connection and Configuration, on page 53 and in RollCall Control Panel Connection to MV-821, on page 54.
>
> For default IP addresses of the control network ports, see MV-821-IP Ethernet Connector Interfaces, on page 146.

Navigating Video IP Control Screens

When RollCall Control Panel has connected to the Video IP block, several control screens are available: The initial screen is shown. See Figure 4-3.

The screens are listed in the **Template Selection** box. Click on an item in the **Template Selection** box to go to that control screen (RollCall template).

Template Selection box
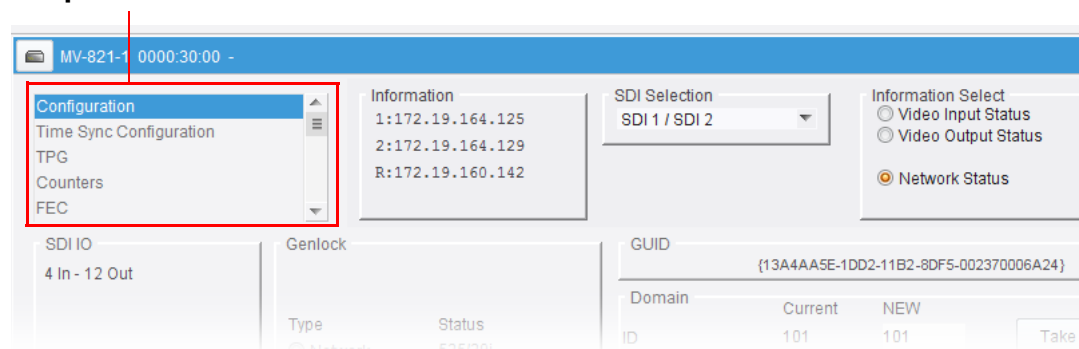
Fig. 4-3: Initial Control Screen

Alternatively, to navigate to another control screen:

1 Right-click anywhere in a control screen.
   A pop-up list of the unit's control screens is shown.

   (Figure 4-4 shows a list of MV-821-IP Video IP block control screens.)

2 Click on an item in the list to go to that screen.

Configuration
Time Sync Configuration
TPG
Counters
FEC
Ethernet 1
Ethernet 1 RTP Sender
Ethernet 1 RTP Receiver
Ethernet 2
Ethernet 2 RTP Sender
Ethernet 2 RTP Receiver
Ethernet RTP Receiver Video Stats
Ethernet RTP Receiver Audio Stats
Ethernet RTP Receiver Meta Stats
Link Control
Destination Timing
Spigot 1
Spigot 2
Spigot 3
Spigot 4
Spigot 5
Spigot 6
Spigot 7
Spigot 8
Spigot 9
Spigot 10
Spigot 11
Spigot 12
Spigot 13
Spigot 14
Spigot 15
Spigot 16
Logging - Configuration
Logging - SDI Info
Logging - System
Logging - Network
Logging - SFP
Logging - Fpga
Logging - Spigot 1
Logging - Spigot 2
Logging - Spigot 3
Logging - Spigot 4
Logging - Spigot 5
Logging - Spigot 6
Logging - Spigot 7
Logging - Spigot 8
Logging - Spigot 9
Logging - Spigot 10
Logging - Spigot 11
Logging - Spigot 12
Logging - Spigot 13
Logging - Spigot 14
Logging - Spigot 15
Logging - Spigot 16
Logging - Card Diagnostics
Loopback Router
Setup
Ethernet Rear
Interop
SFP Configuration

Right-click anywhere in a template screen to see a pop-up list of all of the unit's template screens.

The following template screens are available:

- **Configuration** - see Configuration Template, on page 56.
- **Time Sync Configuration** - see Time Sync Configuration Template, on page 58.
- **TPG (Test Pattern Generator)** - see TPG (Test Pattern Generator) Template, on page 61.
- **Counters** - see Counters Template, on page 63.
- **FEC** - see FEC Template, on page 64.
- **Ethernet 1 and 2** - see Ethernet 1 and 2 Templates, on page 65.
- **Ethernet 1 and 2 RTP Sender** - see Ethernet 1 and 2 RTP Sender Templates, on page 69.
- **Ethernet 1 and 2 RTP Receiver** - see Ethernet 1 and 2 RTP Receiver Templates, on page 70.
- **Ethernet RTP Receiver Video Stats** - see Ethernet RTP Receiver Video Stats Template, on page 71.
- **Ethernet RTP Receiver Audio Stats** - see Ethernet RTP Receiver Audio Stats Template, on page 72.
- **Ethernet RTP Receiver Metadata Stats** - see Ethernet RTP Receiver Meta Stats Template, on page 73.
- **Link Control** - see Link Control Template, on page 74.
- **Destination Timing** - see Destination Timing Template, on page 75.
- **Spigot 1 to 16** - see Spigot 1 to 16 Templates, on page 77.
- **Logging Configuration** - see Logging Configuration Template, on page 89.
- **Logging SDI Info** - see Logging SDI Info Template, on page 90.
- **Logging System** - see Logging System Template, on page 91.
- **Logging Network** - see Logging Network Template, on page 94.
- **Logging SFP** - see Logging - SFP Template, on page 96.
- **Logging FPGA** - see Logging - FPGA Template, on page 99.
- **Logging Spigot 1 to 16** - see Logging - Spigot 1 to 16 Templates, on page 100.
- **Logging Card Diagnostics** - see Logging Card Diagnostics Template, on page 103.
- **Loopback Router** - see Loopback Router Template, on page 104.
- **Setup** - see Setup Template, on page 105.
- **Ethernet Rear** - see Ethernet Rear Template, on page 106.
- **Interop** - see Interop Template, on page 107.
- **SFP Configuration** - see SFP Configuration Template, on page 109.

Fig. 4-4: Right-Click to get a List of Control Screens (Templates)

Setting Values

Many of the settings within the control screens have values, either alpha or numeric.

When setting a value in a field, the value, whether text or a number, must be set by pressing the ENTER key, or clicking the $\boxed{S}$ **Save Value** button.

Clicking an associated $\boxed{P}$ **Preset Value** button returns the value to the factory default setting.

Common Information Display

An **Information Display** area appears at the top of each control screen and shows basic information about the input, standard and status of the Video IP blocks.

Information is displayed in an **Information** box and is selected in the **SDI Selection** and **Information Selection** sections of the **Information Display**. See Figure 4-5.

Information Display area

Information box   **SDI Selection** box   **Information Selection** box
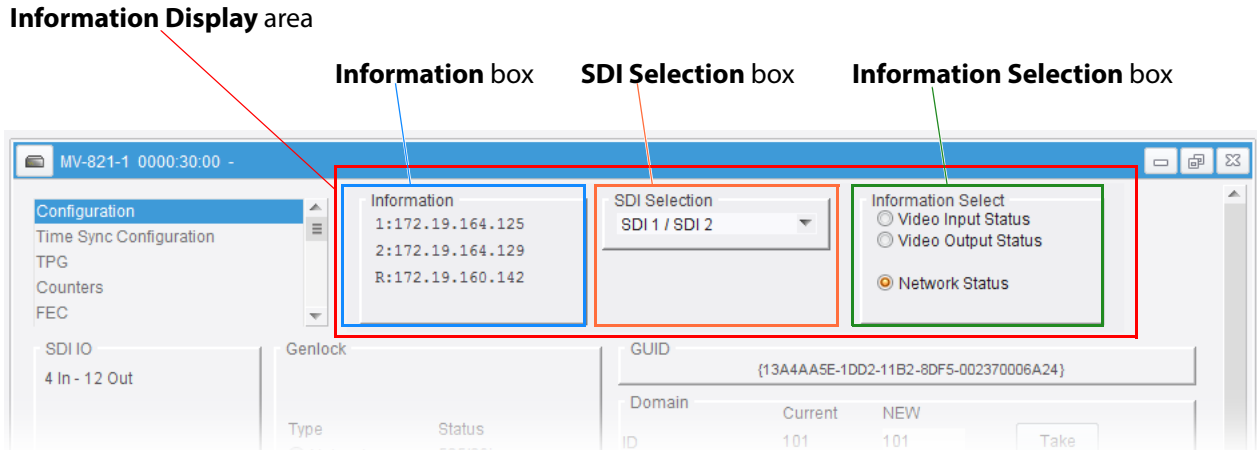
Fig. 4-5: Information Display Area

Selecting the Information to Display

- Select the outputs to display data for from the **SDI Selection** drop-down list.
  (For each MV-821-IP Video IP block, select from SDI 1 to SDI 12.)
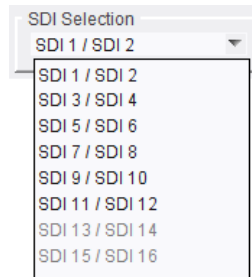
- Select **Video Input Status**, **Video Output Status** or **Network Status** from the **Information Selection** pane, as required.
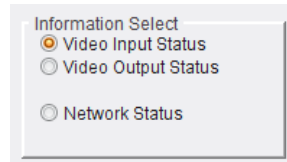
The selected information will be displayed on the **Information** box. Figure 4-6a, Figure 4-6b and Figure 4-6c show some example **Information Display** areas.

54
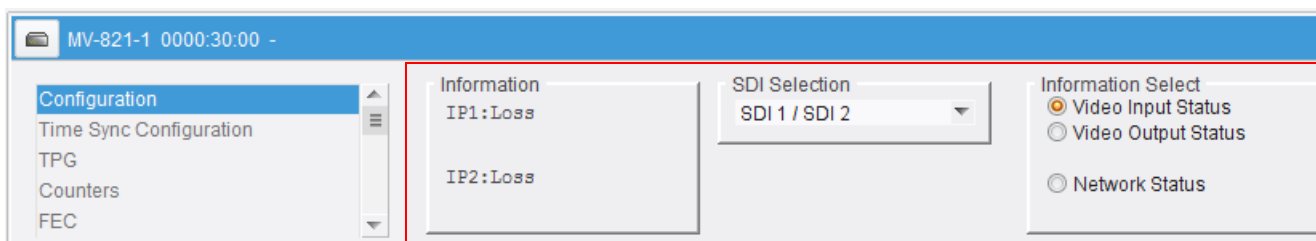
a) Video input status (for *internal* SDI 1 and SDI 2 video inputs to the Video IP block)

> **Note:** Video IP streams *from* the MV-821-IP unit's Video IP block carry multiviewer head display output pictures.
> (See IP Routing Control, on page 15.)
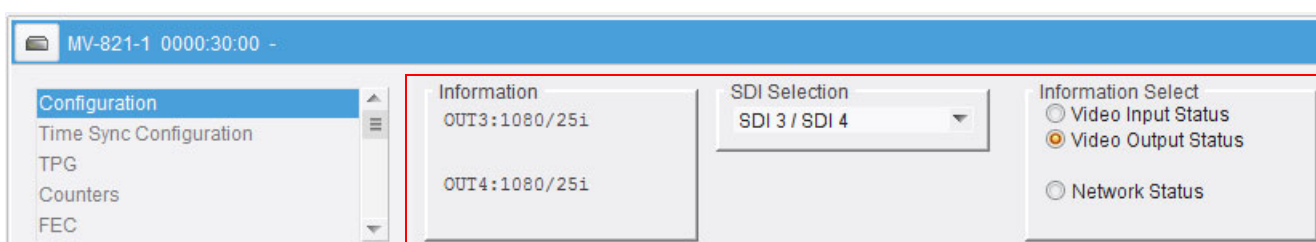
b) Video output status (for *internal* SDI 3 and SDI 4 video outputs from the Video IP block)

> **Note:** SDI video outputs *from* the Video IP block pass internally to the multiviewer block, within the MV-821-IP unit.
> (See Figure 1-5 on page 7 in MV-821-IP: Video IP Circuitry, on page 7, and see IP Routing Control, on page 15.)

Video IP block's media interfaces.

Video IP block's control interfaces.
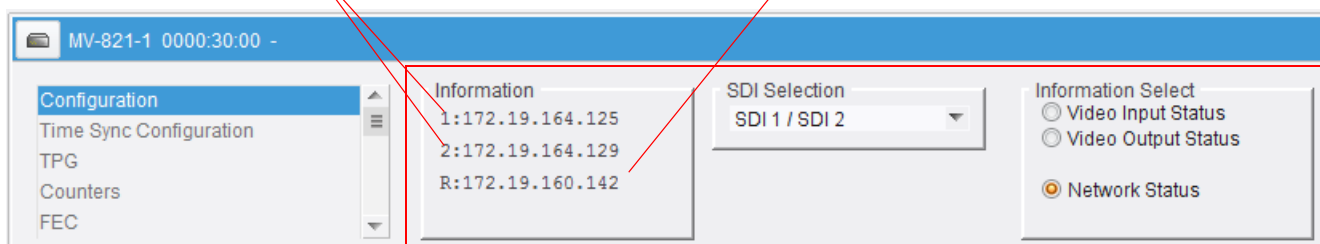
c) Network interface status example

> **Note:** Network interfaces of an MV-821-IP unit's Video IP block comprise two media and one control interface.
> (See MV-821-IP: Video IP Circuitry, on page 7 and MV-821-IP: Media Network Connection, on page 9.)

Fig. 4-6: Example Information Display Areas:
a) Video Input Status example.
b) Video Output Status example.
c) Network Status example.

Configuration Template

The **Configuration** template screen allows basic Video IP block parameters to be set.
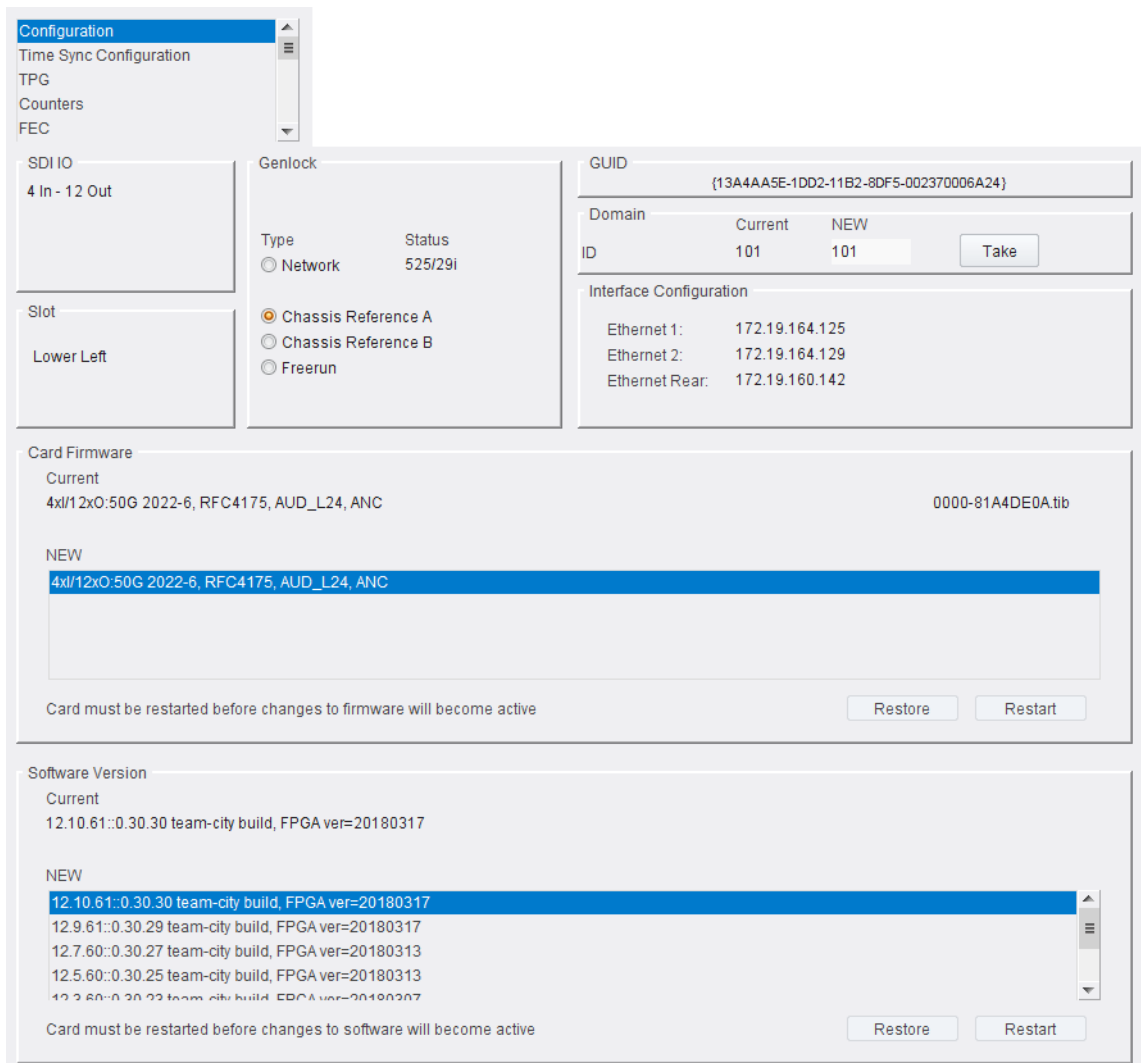
Fig. 4-7: Configuration Template

The following facilities are available from this template:
Table 4-2: Configuration Template Settings

Configuration Setting	Operation
SDI IO	Displays how the source and destination spigots are currently configured.

Slot	A Video IP blocks sets up and reports the status of one QSFP28 transceiver on the unit rear.
	Slot identifies the position of the Video IP block's designated QSFP+ cage and QSFP28 transceiver on the MV-821-IP unit rear:
	  • Lower Left, 'LINK B1'
	  • Lower Right, 'LINK B2'
	  • Upper Left, 'LINK A1'
	  • Upper Right, 'LINK A2'

Table 4-2: Configuration Template Settings (continued)

Configuration Setting	Operation
Genlock	Select **Genlock** type: • **Network** - click to select PTP. • **Chassis Reference A**/**B** - click to select which MV-821 external reference to use. • **Freerun** - click to allow free running.
GUID	Displays the absolute unique identifier associated with the MV-821-IP Video IP block.
Domain	RollCall+ uses domains to partition a RollCall+ network; only nodes on the same RollCall+ domain can communicate with one another. A domain is uniquely identified with a number and a friendly name/alias. 1. Set a new RollCall+ ID as required. 2. Press **Take** to confirm the change.
Interface Configuration	Displays the IP address for each of the network interfaces.
Card Firmware	The current firmware version is shown. Each software version may contain multiple firmware images. Typically, there is one firmware image for an MV-821-IP's Video IP block. Although, multiple images are possible (for example, for different spigot input/output and flow standard combinations). For MV-821-IP Video IP blocks, the firmware configures 4 SDI inputs and 12 SDI outputs. I.e. 4 'SDI-to-IP' conversions and 12 'IP-to-SDI' conversions.
Software Version	Each software version may contain multiple firmware images. The current software version is shown.

Load Different Card Firmware Version

Note: Selecting a firmware version is *not* normally required for MV-821-IP.

To use a new card firmware:

1 Select the firmware item in the list displayed in the **Card Firmware** pane.

> **Note**: **Restore** and **Restart** buttons are displayed only when a 'not-currently-loaded' firmware item is selected.

2 Click **Restore** to load the selected firmware.

3 Click **Restart** to restart the Video IP block.

Load Different Software Version

To use a new software version:

1 Select the required software in the **Software Version** pane.

> **Note**: **Restore** and **Restart** buttons are displayed only when a 'not-currently-loaded' software item is selected.

2 Click **Restore** to load the required software version.

3 Click **Restart** to restart the Video IP block.

Time Sync Configuration Template

The **Time Sync Configuration** template allows selection of the source to be used for synchronizing flows through the Video IP blocks, and configuration of any properties associated with the relevant source.

Media interfaces to Video IP block

Control interface to Video IP block

Select **Show Status** to see extra status panels
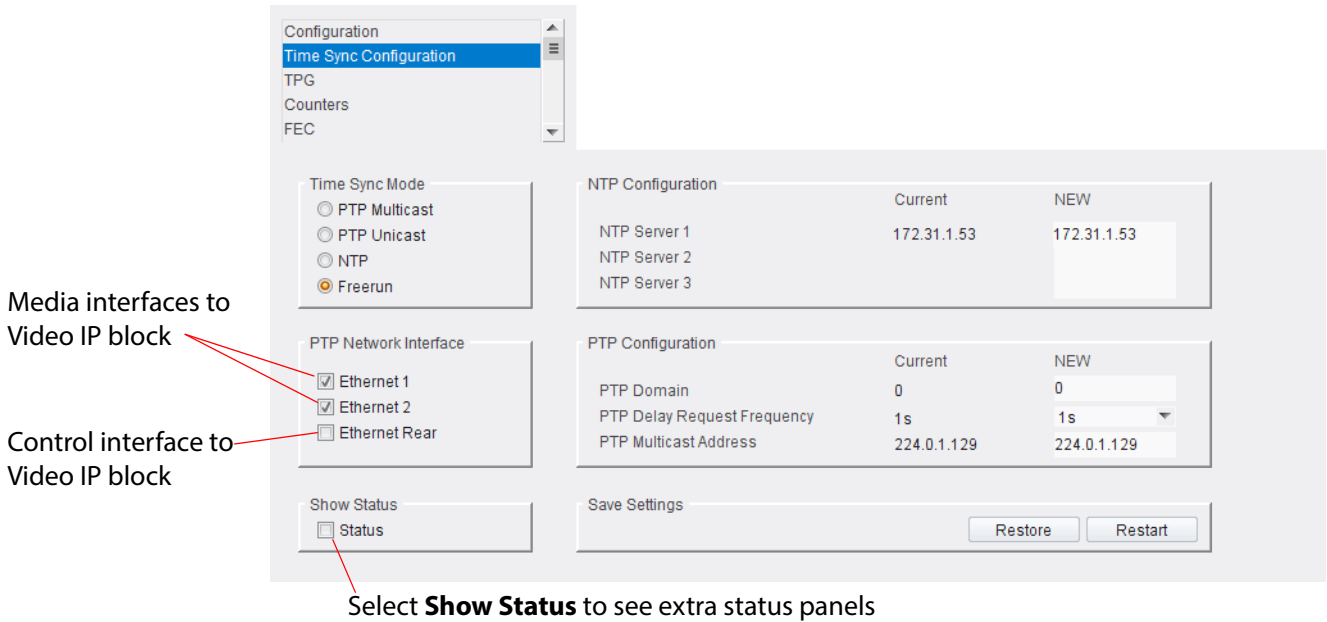
Fig. 4-8: Time Sync Configuration Template

Table 4-3:   Time Sync Configuration Template Settings

Time Sync Configuration Setting	Operation
Time Sync Mode	Select the required time sync mode. **Note:** PTP options require a grandmaster clock to be present in the network system.
NTP Configuration	NTP servers are listed. To add a new NTP server: • Enter server's IP address into the **New** field.
PTP Network Interface	Select one or more required network interfaces for PTP data traffic. If a network interface fails, the next interface on the list will be switched to automatically for PTP data traffic.
PTP Configuration	**PTP Domain:** Enter the PTP clock domain number. **PTP Delay Request Frequency**: Select the duration in the drop-down list, as required. **PTP Multicast:** Enter the appropriate IP address into the **PTP Multicast** address field.
Show Status	Select to display time sync status information in the template. See Time Sync Status Panel, on page 59.
Save Settings	Displayed only if settings on this template are changed.
Restore	Click **Restore** to discard the changes.
Restart	Click **Restart** to implement the changes made in the template and restart the MV-821-IP's Video IP block.

Time Sync Status Panel

Select **Show Status** in the **Time Sync Configuration** template to display extra status panels showing important system time status information on a single convenient panel.

Status check box selected in **Time Sync Configuration** template.

Status panel, expanded in Figure 4-10.

Histogram panel,
see Time Sync Histogram Panel, on page 60.

Status panel,
expanded in Figure 4-10 on page 59.

Histogram panel,
see Time Sync Histogram Panel, on page 60.
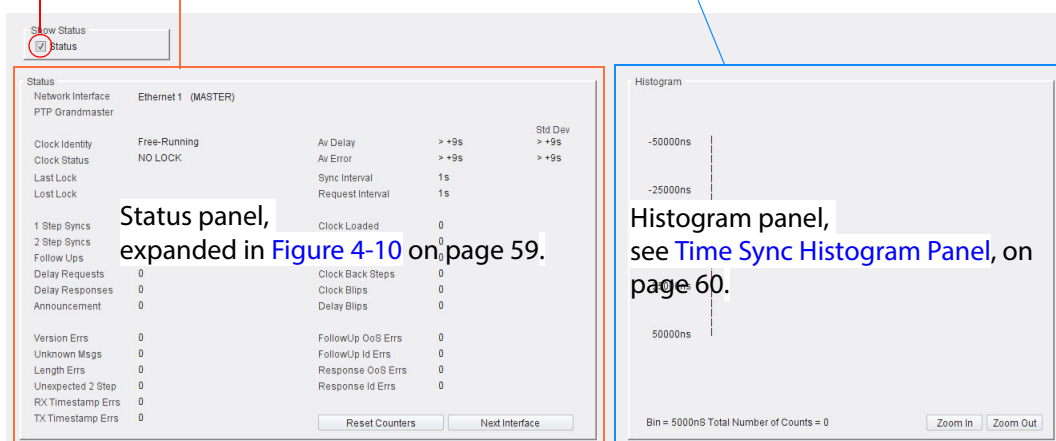
Fig. 4-9: Time Sync Status

Network interface shown
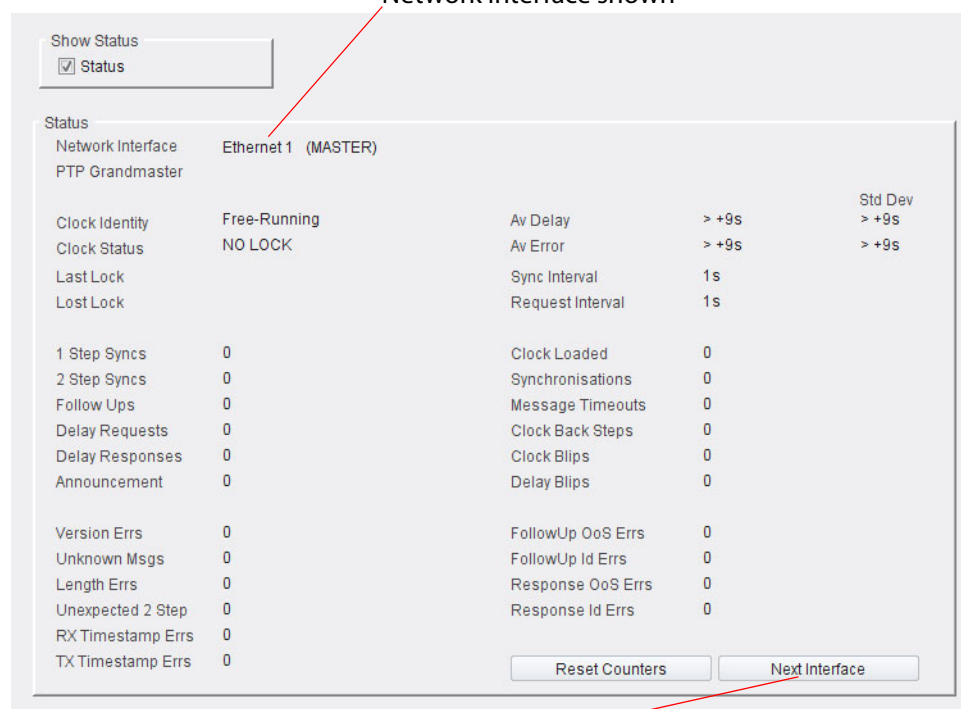
Click to see status of next network interface

Fig. 4-10: Time Sync - Status Panel

To see the status of another network interface of the Video IP block in the **Status** panel:

- Click the **Next Interface** button. (This cycles through the interfaces.)

Time Sync Histogram Panel

Select **Show Status** in the **Time Sync Configuration** template to display extra status panels showing important system time status histogram information on a single convenient panel.

The **Histogram** panel is located to the right of the **Status** panel and it provides a graphical representation of the distribution of differences between the Video IP block's own clock and the network system's PTP grandmaster clock. The histogram is available when a Video IP block is locked.

- Use the **Zoom-in** and **Zoom-out** controls to see the corresponding histogram.
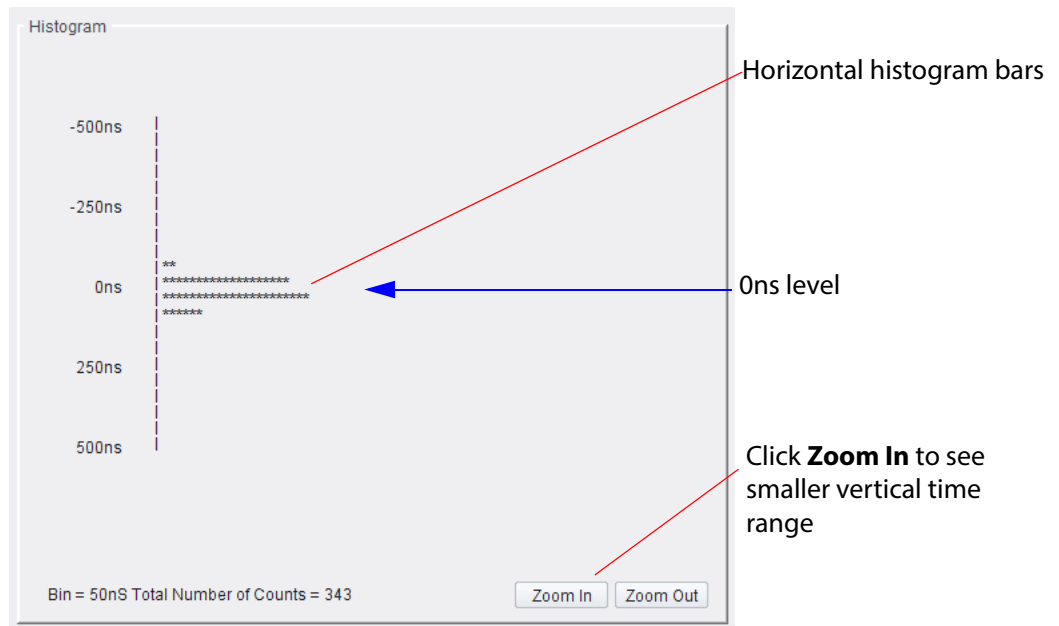
Fig. 4-11: Time Sync Status - Histogram Panel

Every time a clock difference is recalculated, the relevant horizontal histogram bar is incremented and shown.

A correctly functioning system will show a distinct peak around the 0ns level.

TPG (Test Pattern Generator) Template

The **TPG** template allows test patterns to be applied on a spigot-by-spigot basis for IP output. For an MV-821-IP's Video IP block, there are four spigot test pattern panels (corresponding to the four spigots that are configured for video IP output). See Figure 4-12a.

Note: When a test pattern is applied to a spigot (either a video test pattern or an audio test tone), then that test pattern appears on the IP flow from that spigot
and the spigot cannot be used for video streaming any other IP flow.
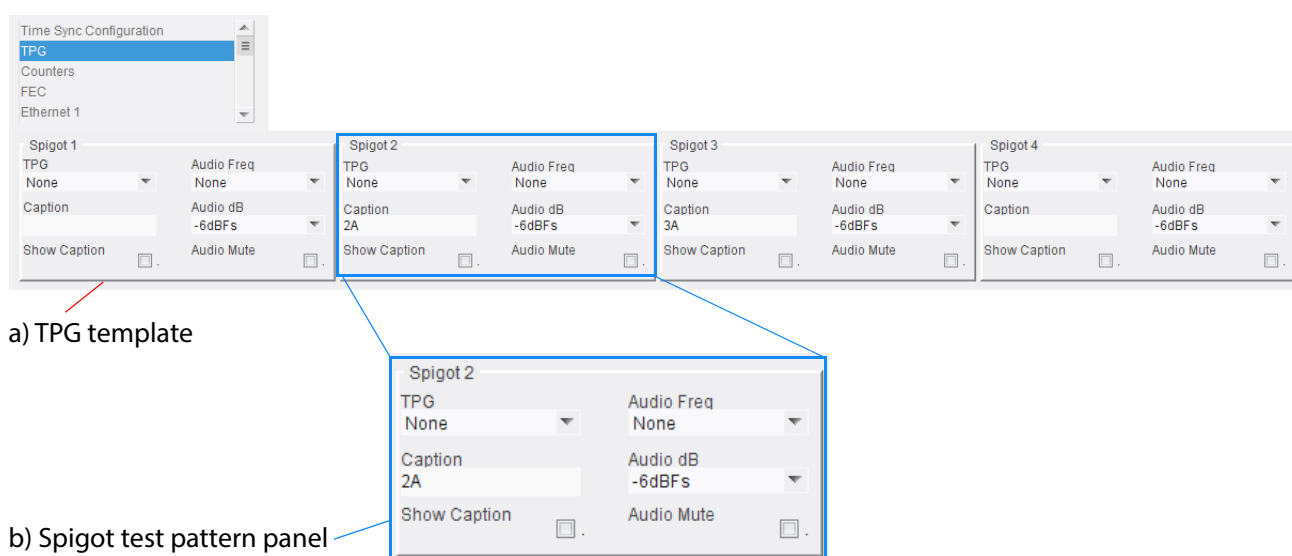
Fig. 4-12: TPG Template and Spigot Test Pattern Panel:
a) Template.
b) Spigot Test Pattern Panel.

The following options are available for each spigot:

Table 4-4: Spigot Test Pattern Panel Settings
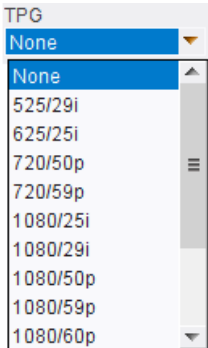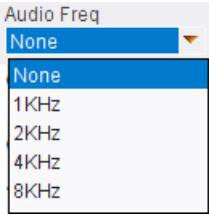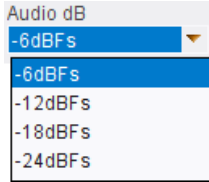
Spigot Test Pattern Setting	Operation
TPG	Select the video standard of the 'moving color bars' test pattern to apply to the spigot from the drop-down list. Select 'None' to turn off the test pattern.

Table 4-4:   Spigot Test Pattern Panel Settings (continued)

Spigot Test Pattern Setting	Operation
Audio Freq	Select the audio frequency to apply to the spigot from the drop-down list.
Caption	Enter a caption (maximum 19 characters) to optionally be overlaid onto the test pattern.
Audio dB	Select the dB level to apply to the spigot from the drop-down list.
Show Caption	Select to display the **Caption** with the test pattern.
Audio Mute	Select to mute the audio tone.

Counters Template

The **Counters** template contains controls to clear various global counters on Video IP block templates, which count various types of error conditions that might occur.
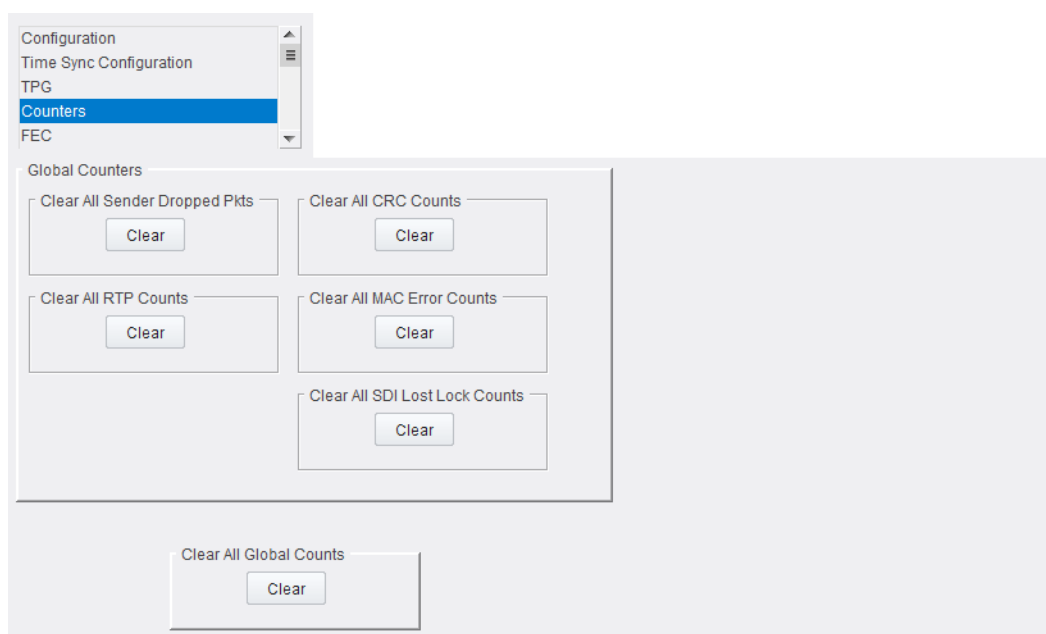
Fig. 4-13: Counters Template

Table 4-5:   Counters Template Settings

Control	Click to clear the counters for ...
Clear All Sender Dropped Pkts	Sender dropped data packets counters. Counts the number of data packets an IP sender has had to drop. For example, if an IP connection were oversubscribed, a sender may drop data packets to prevent the total IP sending bandwidth being exceeded.
Clear All CRC Counts	CRC counters. These count any SDI video CRC errors in the *internal* multiviewer head display output video signals (from the multiviewer block to the Video IP blocks).
Clear All RTP Counts	All RTP packet counters. Counts jumps in an RTP packet ID sequence in an IP flow. This indicates any lost, dropped or out-of-sequence RTP packets. Counters are found on RTP Receiver and Ethernet templates.
Clear All MAC Error Counts	All MAC error counters. Counts packets marked as bad, for example, for a data packet CRC error. (Such an error is normally also accompanied by an RTP error because a packet would be dropped.)
Clear All SDI Lost Lock Counts	All SDI lock error counts. Counts the number of times an (internal) SDI input to the Video IP block comes and goes. Counters found on the SDI input spigot templates and published via RollCall log fields.
Clear All Global Counts	All the global counts.

FEC Template

The **FEC** template allows forward error correction (FEC) to be enabled on the spigot and FEC logging to be activated, if required. FEC is implemented to Clause 74 FEC of IEEE 802.3. FEC statistics are also available.
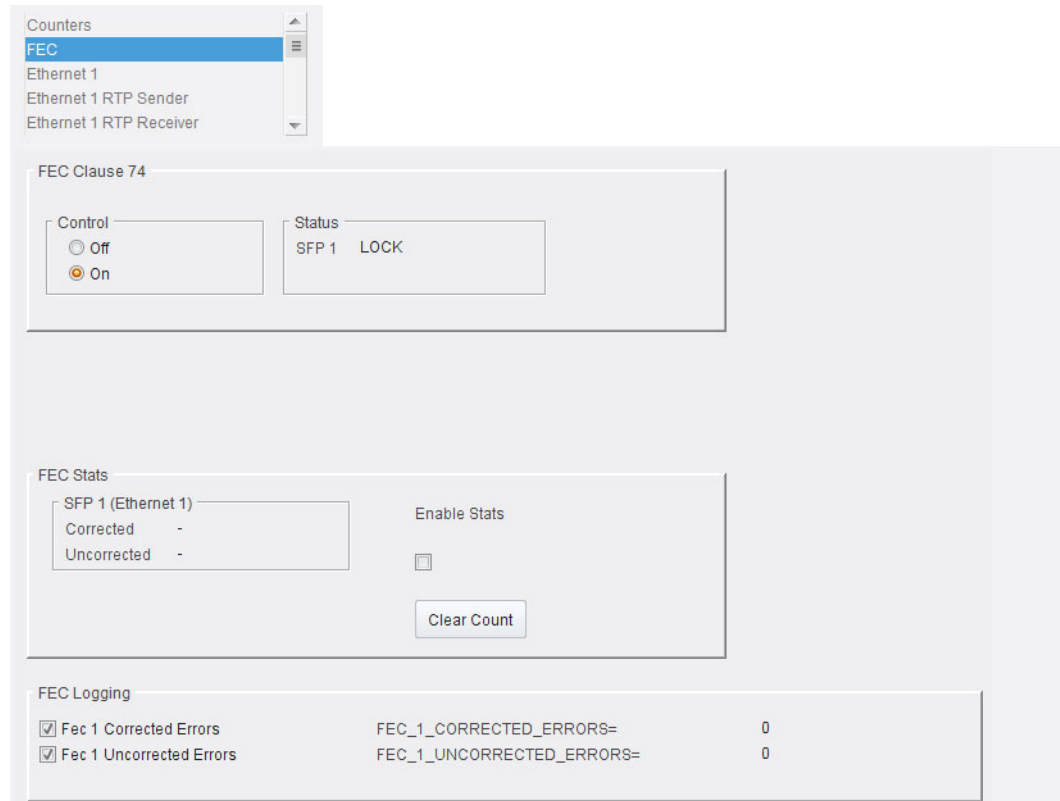
Fig. 4-14: FEC Template

Table 4-6: FEC Template Settings

FEC Setting	Description
FEC Clause 74	Allows low-latency FEC Clause 74 error correction to be used. • Select **On** to enable FEC. • Select **Off** to disable FEC.
Status	Displays lock status for the QSFP28 of the Video IP.
FEC Stats	Displays the number of corrected and uncorrected errors received via the QSFP28 modules. • Select **Enable Stats** to activate the display. • Click **Clear Count** to clear the counters.
FEC Logging	Information on several parameters can be made available to a logging device connected to the RollCall network. Select the check boxes to activate log fields, as required. Available log fields are shown in Table 4-7.

Table 4-7: FEC Log Fields

Log Field	Description
FEC_1_CORRECTED_ERRORS	Number of corrected errors for FEC 1.
FEC_1_UNCORRECTED_ERRORS	Number of uncorrected errors for FEC 1.

Ethernet 1 and 2 Templates

Note: **Ethernet 1 and 2** templates refer to two the media network connections (primary/secondary or main/backup) to each MV-821-IP Video IP block.

Each media network connection is 50G Ethernet.
For a description of the media network connection,
see MV-821-IP: Video IP Circuitry, on page 7.

Both the **Ethernet 1** and **Ethernet 2** templates show IP configuration details and status for a media network interface. The Video IP block defaults to use DHCP for the interface, but this can be overridden and a static IP address defined if required.

Fig. 4-15: Ethernet 1 and Ethernet 2 Template (Ethernet 1 Template shown)

The various panels in the template are described below:
- **Ethernet** panel - see Ethernet Panel, on page 65.
- **Switch LLDP Info** panel - see Switch LLDP Info Panel, on page 67.
- **All Traffic** panel - see All Traffic Panel, on page 67.
- **CPU Traffic** panel - see CPU Traffic Panel, on page 68.

Ethernet Panel

The **Ethernet** panel displays details of the currently selected media network interface and allows a static IP address to be defined. Additionally some summary link status and QSFP28 transceiver status is shown.
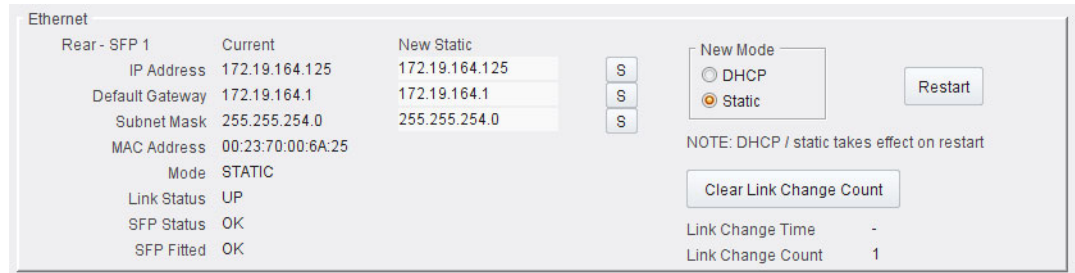
Fig. 4-16: Ethernet Panel (of Ethernet 1 or 2 Templates)

Table 4-8: Ethernet Panel Settings and Controls

Ethernet Panel Item	Description
IP Address	Shows current IP address of the network interface.
	Allows entry of a new, static IP address. Click **S** to enter a new value into the text box.
Default Gateway	Shows current default gateway IP address.
	Allows entry of a new default gateway IP address.
Subnet Mask	Shows current subnet mask of the network interface.
	Allows entry of a new mask.
MAC Address	Shows the MAC address of the interface.
Mode	Shows the current mode of the network interface: DHCP or Static.
New Mode	Radio buttons. Note: Changes take effect after clicking Restart.
DHCP	Select for DHCP interface mode.
Static	Select for static interface mode.
Restart	Button. Click to make IP address and mode change take effect.
Link Status	Reports network link status: UP or DOWN.

SFP Status	Reports the status of the designated QSFP cage/transceiver:
	• OK
	• Fail
	• See other MV -
	  Look on Video IP block's other Ethernet template
	  (Eg. on **Ethernet 2** template instead of **Ethernet 1** template.)

SFP Fitted	Reports the fitted status of a QSFP cage/transceiver: • OK • Not Fitted
Clear Link Change Count	
	Button. Click to clear the link change count.

Table 4-8: Ethernet Panel Settings and Controls (continued)

Ethernet Panel Item	Description
Link Change Time	Shows date and time of the last network link up or link down status change.
Link Change Count	Counts number of times the network link has changed state (link up or link down).

To change the mode of a network interface:

1 Select **DHCP** or **Static** for a new mode, as required.

Then, as applicable:

2 Enter IP address information
 and click **S** to save.

3 Enter default gateway information
 and click **S** to save.

4 Enter subnet mask information
 and click **S** to save.

The new DHCP/static settings are applied when **Restart** is clicked and the Video IP block is restarted.

Switch LLDP Info Panel

The **Switch LLDP Info** panel displays information about the IP switch connected to the Video IP block's network interface. Information is obtained via the LLDP (Link Layer Discovery) protocol. See Figure 4-17.

Switch LLDP Info

  Name Arista7504R   Port ID Ethernet4/18/3   Port VLAN 164
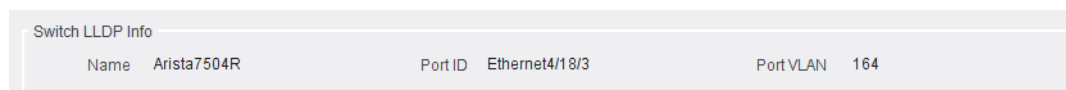
Fig. 4-17: IP Switch LLDP Info Panel

Table 4-9: IP Switch LLDP Panel Settings

IP Switch LLDP Item	Description
Name	Shows the name assigned to the network IP switch.
Port ID	Shows the IP switch port ID.
Port VLAN	Shows the VLAN ID number used by the network interface.

All Traffic Panel

Select **Enable Stats** in the panel to display information on traffic through the MV-821-IP Video IP block network interface link. See Figure 4-18 (and see Figure 4-19).

Enable Stats

Fig. 4-18: All Traffic Panel

CPU Traffic Panel

When **Enable Stats** is selected *in the* **All Traffic** panel, the **CPU Traffic** panel displays information on traffic through the CPU of the MV-821-IP Video IP block. See Figure 4-19.

Fig. 4-19: CPU Traffic Panel

Ethernet 1 and 2 RTP Sender Templates

The **Ethernet 1 RTP Sender** and **Ethernet 2 RTP Sender** templates displays the amount of data transmitted on a spigot-by-spigot basis. Units are megabits per second. (MV-821-IP Video IP blocks transmit 'multiviewer head display output' video IP data packets on spigots 1 to 4.) See Figure 4-20.

- Select **Enable Stats** to display values.
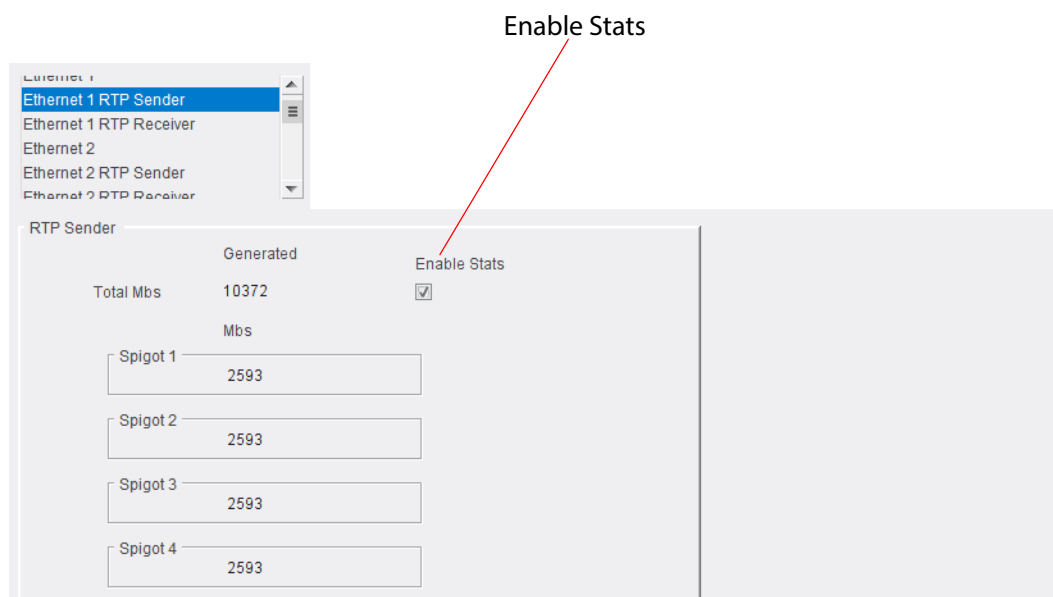
Fig. 4-20: Ethernet RTP Sender Template

Ethernet 1 and 2 RTP Receiver Templates

The **Ethernet 1 RTP Receiver** and **Ethernet 2 RTP Receiver** templates display information on a spigot-by-spigot basis about:

- the amount of data received;
- packet loss; and
- any unwanted multicast traffic.

Units are megabits per second.

MV-821-IP Video IP blocks receive video IP data packets on spigots 5 to 16.

- Select **Enable Stats** to display the values.

Fig. 4-21: Ethernet RTP Receiver Template

Ethernet RTP Receiver Video Stats Template

The **RTP Receiver Video Stats** template displays information on the video IP flows to both network interfaces 1 and 2 of the Video IP block on a spigot-by-spigot basis.

- Select **Enable Stats** to display the values.

Fig. 4-22: Ethernet RTP Receiver Video Stats Template

Ethernet RTP Receiver Audio Stats Template

The **RTP Receiver Audio Stats** template displays information on the audio IP flows to the network interfaces 1 and 2 of the Video IP block on a spigot-by-spigot basis.

- Select **Enable Stats** to display the values.

Fig. 4-23: Ethernet RTP Receiver Audio Stats Template

Ethernet RTP Receiver Meta Stats Template

The **RTP Receiver Meta Stats** template displays information on the metadata IP flows to the network interfaces 1 and 2 of the Video IP block on a spigot-by-spigot basis.

• Select **Enable Stats** to display the values.

Fig. 4-24: Ethernet RTP Receiver Meta Stats Template

Link Control Template

The **Link Control** template allows quad-link 4K inputs to be aggregated and synchronized by the MV-821-IP Video IP block.
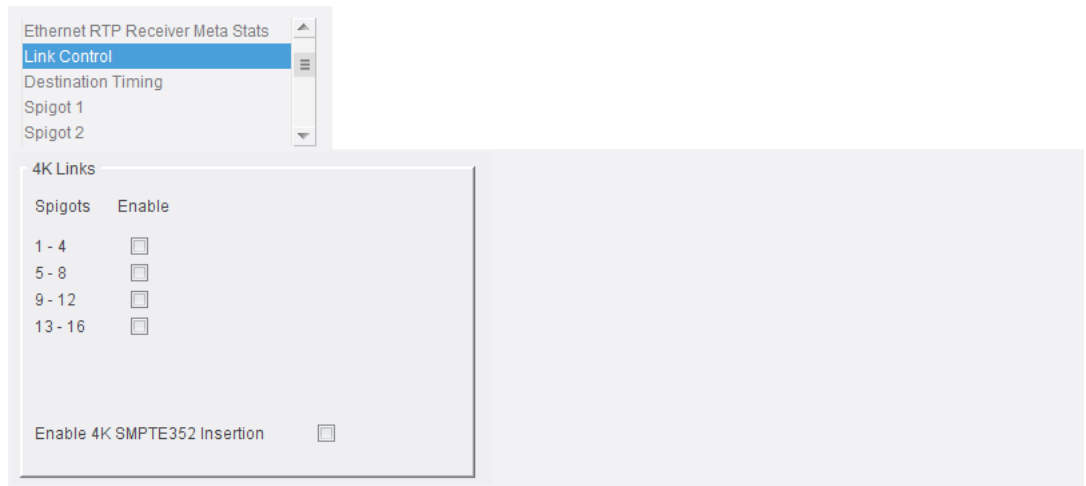
Fig. 4-25: Link Control Template

To enable 4K quad-link video input IP streams on spigots:

- Select the 'Enable' check box for quad-link **Spigots**, as required:
    - '1 - 4'
    - '5 - 8'
    - '9 - 12'
    - '13 - 16'

To insert a 4K SMPTE352 payload identifier into a video IP output stream:

- Select the **Enable 4K SMPTE352 Insertion** check box.

    This inserts the same time-stamp information is inserted into each of the four 'quad-linked' video IP streams.

Destination Timing Template

The **Destination Timing** template shows video timing information for each destination spigot of the MV-821-IP Video IP block. For MV-821-IP, Video IP block spigots 5 to 16 are configured as destination spigots, they receive video IP streams, and spigots 1 to 4 are grayed out (because they are configured as source spigots).

Spigots 1 to 4 are grayed out because they are configured as IP output spigots (source spigots).

Spigots 5 to 16 configured as input spigots (destination spigots). See Figure 4-27.

Fig. 4-26: Destination Timing Template

Note: An MV-821-IP Video IP block:

- Sources up to 4 video IP streams (3G video) on spigots 1 to 4.

- Receives up to 12 video IP streams (up to 3G video) on spigots 5 to 16.

The template shows a panel of information for each spigot, see Figure 4-27. A spigot panel is greed out for spigots not configured as destination spigots.
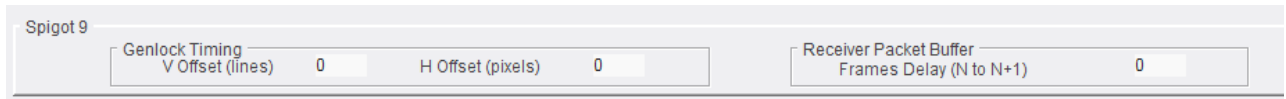
Fig. 4-27: Destination Timing - Spigot Panel

Table 4-10: Destination Timing - Spigot Panel Information

Spigot Panel Item	Description
Genlock Timing:	Displays video timing with respect to the chosen video reference signal.
V Offset (lines)	Displays vertical timing offset in units of video lines.
H Offset (pixels)	Displays horizontal timing offset in units of pixels.
Receiver Packet Buffer	The receiver packet buffer can provide additional buffering to a received IP flow.
Frames Delay (N to N+1)	Enter number of frames of buffering (0, 1, or 2).
	Note: Adding buffering can affect the time it takes to switch between IP flows at a spigot.

Spigot 1 to 16 Templates

A separate template is provided for each of the active spigots. These templates are dynamically configured by the MV-821-IP Video IP block to reflect the capabilities of its selected software version and firmware. Templates for destination spigots and source spigots are slightly different and are described separately below.

Note: Reminder:
For MV-821-IP Video IP blocks:

- **Spigots 1 to 4**:
(See Source Spigot Template (Spigots 1 to 4), on page 78.)
Configured as **Source Spigots** to transmit video IP streams.

- **Spigots 5 to 16**:
(See Destination Spigot Template (Spigots 5 to 16), on page 83.)
Configured as **Destination Spigots** to receive video IP streams.
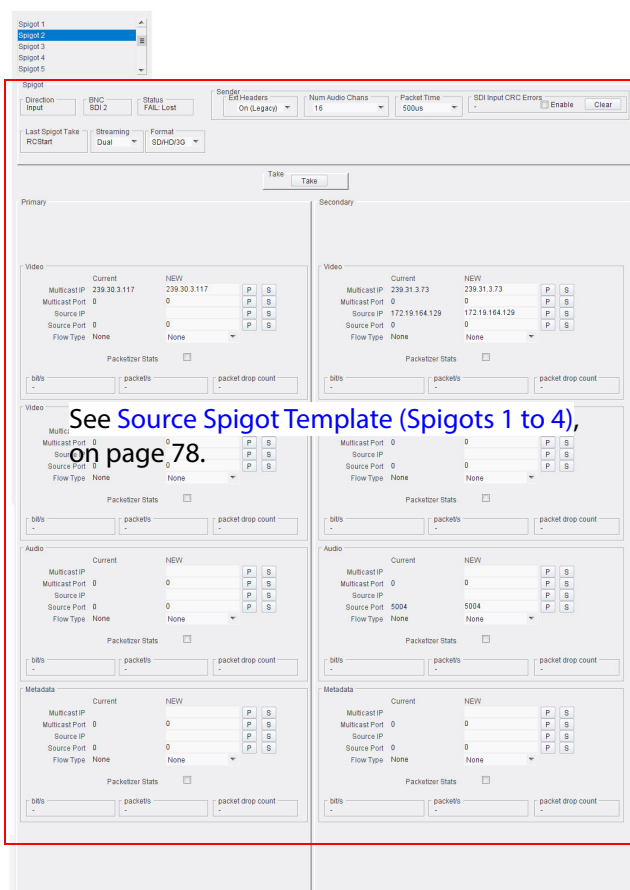
a) **Source** spigot template
(for example, spigots 1 to 4)
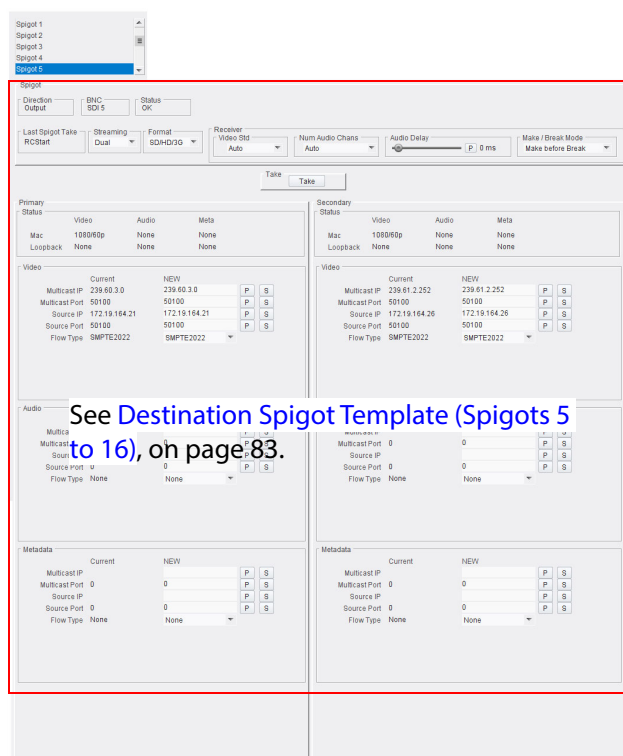
b) **Destination** spigot template
(for example, spigots 5 to 16)

Fig. 4-28: Spigot Template:
a) for a Source Spigot.
b) for a Destination Spigot.

Source Spigot Template (Spigots 1 to 4)

The **Source Spigot** template is shown in Figure 4-29.

Spigot panel, see Spigot Panel (Source Spigot), on page 79.

Take, see Take, on page 81.

Flow panels, see Flow Panels (Source Spigot), on page 81.

Fig. 4-29: Source Spigot Template

Spigot Panel (Source Spigot)

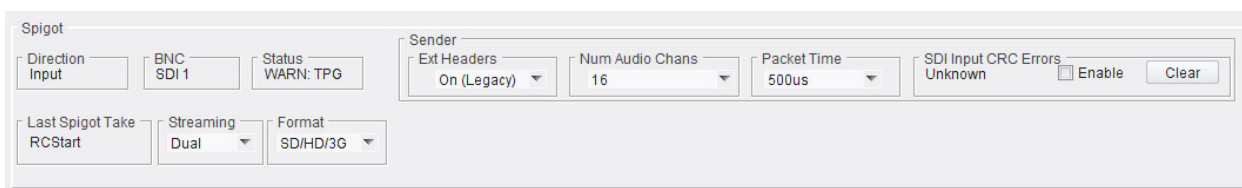The **Spigot** panel provides basic monitoring for the selected **Spigot**.

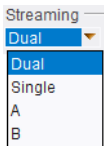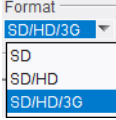*Fig. 4-30: Spigot Panel (Source Spigot)*
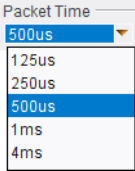
Table 4-11: Spigot Panel Information (Source Spigot)

Spigot Panel Item (Source Spigot)	Description

Direction	Shows the direction of the spigot.
	
	• 'Input':
	
	    Within the MV-821-IP unit, the spigot has an SDI input and it provides a video IP output externally.
	
	• 'Output':
	
	    Within the MV-821-IP unit, the spigot has an SDI output and it receives a video IP input externally.

BNC	Shows the associated (notional) SDI connector number. (Spigots 1 to 16 use notional BNC-type connectors 1 to 16 respectively.)
Status	Reports the current status of the spigot. • OK • Warn:TPG • FAIL:Lost
Last Spigot Take	Reports the 'control agency' which last performed a **Take** on the spigot. • RC - RollCall. Operation from a control panel or by an external agent, like VSM. • IPCtrl - Grass Valley Orbit.

Streaming	Drop down box.
	Select the Video IP block's Ethernet connections to use for this spigot. This will also determine the bandwidth to be used. Options are:
	
	    • **Dual** - use both connections and all the available bandwidth.
	
	    • **Single** - use either connection and half of the available bandwidth.
	
	• A or B - use one particular connection and half of the available bandwidth.

Table 4-11: Spigot Panel Information (Source Spigot) (continued)

Spigot Panel Item (Source Spigot)	Description
Format	Drop down box. Select the video format to be used on this spigot. This will ensure that the appropriate level of bandwidth is allocated.
Sender:	
Ext Headers	Drop-down box. Select extended headers mode in the sourced IP data packets. • **Off** - extended headers disabled. • **On** - extended headers enabled, SMPTE 2110 compliant. • **On (Legacy)** - extended headers enabled, compatible with older (legacy) Grass Valley IQMIX or IQUCP modular cards. To set the extended headers mode: 1. Select the **Ext Headers** mode in the drop-down box. 2. Click **Take**. **Note:** Extended header operation can be disabled for TR-03/TR-04 compatibility.
Num Audio Chans	Drop down box. Select the number of audio channels. (1 to 16) This setting allows the number of audio channels in use to be restricted. Select from the list the highest audio channel number to be used.
Packet Time	Drop down box. Select the duration of an audio data packet.
SDI Input CRC Errors	Shows a count of any CRC errors on the SDI input. Select **Enable** to enable the count. Click **Clear** to clear the count.

Take

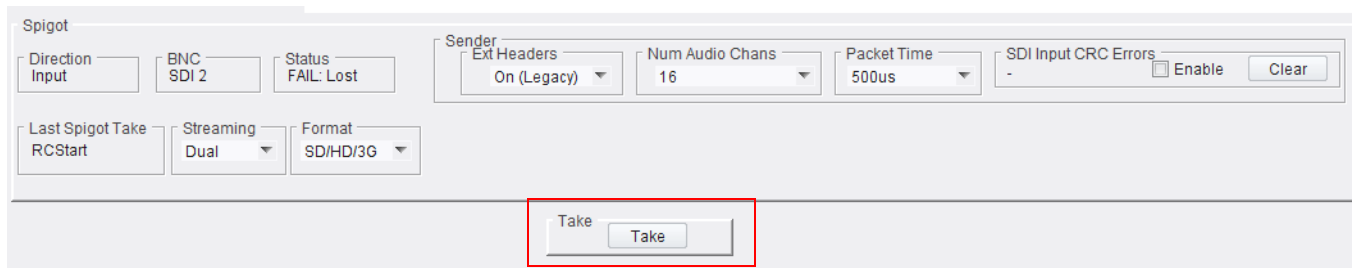Click **Take** to apply any changes made to spigot or flow properties in the Spigot panel.

Fig. 4-31: Take

Flow Panels (Source Spigot)

The **Flow** panels are arranged into two columns: **Primary** flows and **Secondary** flows. (Primary flows pass through one network connection to the Video IP block, secondary through the other.)

Each network connection can carry more than one flow. For spigots 1 to 4, there are two video flows, one audio flow and one metadata flow. Each flow has a **Flow** panel.

The **Flow** panel allows multicast IP flow and IP port details to be defined for the selected spigot. Statistics for the spigot can also be enabled. Figure 4-32 shows an example **Flow** panel.

In a Grass Valley IP routing system, some of these settings are set up by GV Orbit. This is indicated in Table 4-12.
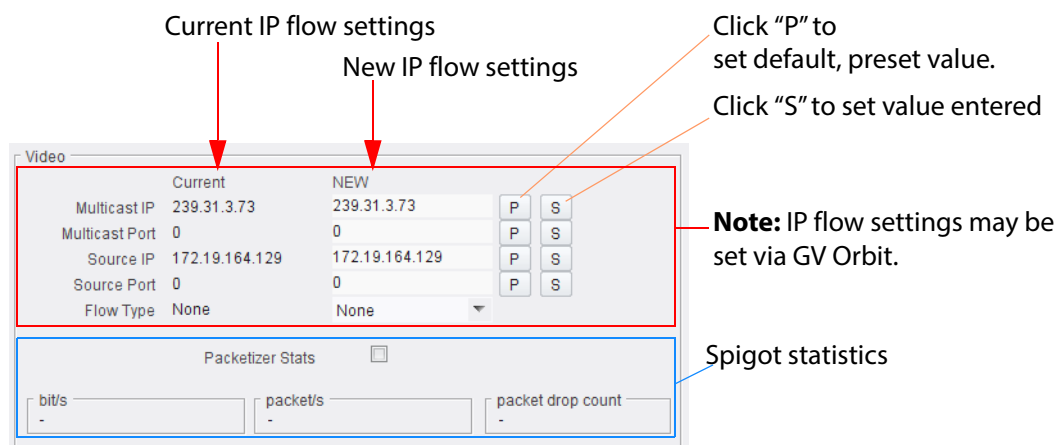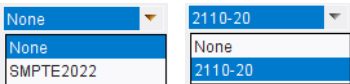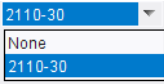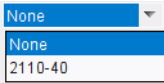

Fig. 4-32: Flow Panel (Video Flow Example shown)

Table 4-12:   Flow Panel Information and Settings (Source Spigot)

Flow Panel Item	Description
Multicast IP	Multicast group IP address. See **Note 1**.
Multicast Port	Multicast group IP port number.See **Note 1**.
Source IP	Source IP address.See **Note 1**.
Source Port	Source IP port number.See **Note 1**.
Flow Type	Drop down box.See **Note 1**. Select the flow type. • Video flow types: (**Note:** Two simultaneous video flows are possible from the source spigot.) • Audio flow types: • Metadata flow types:
Packetizer Stats	Check box. Select to enable statistics on spigot IP data packets.
bits/s	Bits per second.
packet/s	Packets per second.
packet drop count	Number of dropped packets.

> **Note 1:** These settings may be set by GV Orbit.

> Note: **"S" and "P" buttons -**
> After entering information in each text box,
> always click on the adjacent "**S**" button or press "**return**" to locally
> save the new setting. Do this for each text box.
> (Note: Clicking on the "**P**" button will return the setting to its preset
> default value).
>
> "**S**" - Locally save new, entered setting value (or press "return").
>
> "**P**" - Locally save default setting value.

To set multicast details:

1 Enter IP address and IP port number details in the 'New settings' column, as required. (Remember to click **S** or press the enter key to enter each new value.)

2 Select the **Flow Type**.

3 Click **Packetizer Stats** to view network statistics for an outgoing flow, if required.

4 Click **Take**.

In order to provide redundancy, primary and secondary flows are available on separate network connections to the MV-821-IP Video IP block. These require setting up separately.

Destination Spigot Template (Spigots 5 to 16)

The **Destination Spigot** template is shown in Figure 4-33.

Spigot panel, see Spigot Panel (Destination Spigot), on page 84.

Take, see Take, on page 86.

Status and **Flow** panels, see Status and Flow Panels (Destination Spigot), on page 86.

Fig. 4-33: Destination Spigot Template

Spigot Panel (Destination Spigot)

The **Spigot** panel provides basic monitoring for the selected **Spigot**.
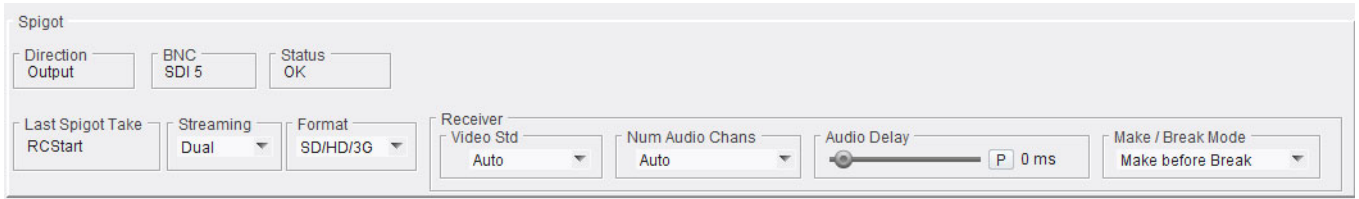
Fig. 4-34: Spigot Panel (Destination Spigot)

Table 4-13: Spigot Panel Information (Destination Spigot)

Spigot Panel Item (Destination Spigot)	Description

Direction	Shows the direction of the spigot.
	• 'Input':
	  Within the MV-821-IP unit, the spigot has an SDI input and it provides a video IP output externally.
	• 'Output':
	  Within the MV-821-IP unit, the spigot has an SDI output and it receives a video IP input externally.

BNC	Shows the associated (notional) SDI connector number. (Spigots 1 to 16 use notional BNC-type connectors 1 to 16 respectively.)
Status	Reports the current status of the spigot. • OK • Warn:TPG • FAIL:Lost
Last Spigot Take	Reports the 'control agency' which last performed a **Take** on the spigot. • RC - RollCall. Operation from a control panel or by an external agent, like VSM. • IPCtrl - Grass Valley Orbit.

Table 4-13: Spigot Panel Information (Destination Spigot) (continued)
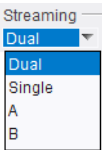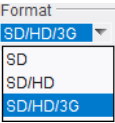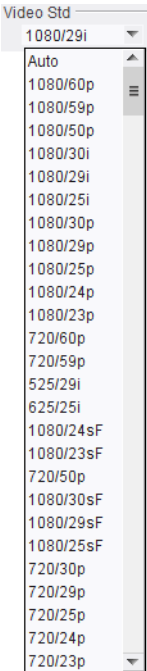
Spigot Panel Item (Destination Spigot)	Description
Streaming	Drop down box. Select the Video IP block's Ethernet connections to use for this spigot. This will also determine the bandwidth to be used. Options are: • **Dual** - use both connections and all the available bandwidth. • **Single** - use either connection and half of the available bandwidth. • A or B - use one particular connection and half of the available bandwidth.
Format	Drop down box. Select the video format to be used on this spigot. This will ensure that the appropriate level of bandwidth is allocated.
Receiver: **Video Std**	Drop down box. Select the video standard (resolution / frame rate) for the receiving spigot. This is the video standard output from the spigot as SDI video.

Table 4-13:   Spigot Panel Information (Destination Spigot) (continued)

Spigot Panel Item (Destination Spigot)	Description
Num Audio Chans	Drop down box. Select the number of audio channels to use. (1 to 32) This setting allows the number of audio channels in use to be restricted. Select from the list the highest audio channel number to be used.
Audio Delay	Slider control. Select the audio delay. (-10 ms to 255 ms) Click **P** to set the preset, default value. Audio Delay [P] 0 ms
Make / Break Mode	Drop down box. Select the make/break mode when changing the video IP signal to the spigot. **Make before Break** - causes the destination spigot to buffer new IP stream data packets before connection to current IP stream is broken; this results in a smoother transition on-screen, but requires more bandwidth. **Break before Make** - simply swaps IP data stream received at the destination spigot without buffering. Make / Break Mode Make before Break Make before Break Break before Make

Take

Click **Take** to apply any changes made to spigot or flow properties in the Spigot panel.
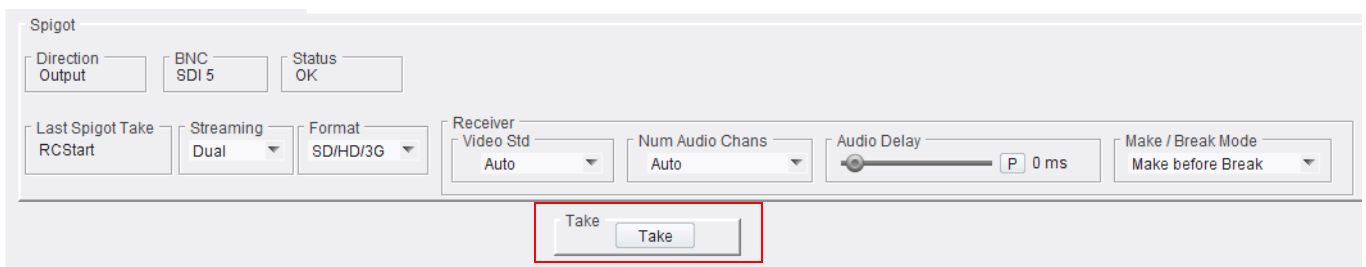
Fig. 4-35: Take

Status and Flow Panels (Destination Spigot)

The **Flow** panels are arranged into two columns: **Primary** flows and **Secondary** flows. (Primary flows pass through one network connection to the Video IP block, secondary through the other.) Additionally, for each primary and secondary network connection, there is a summary **Status** panel (see Figure 4-36).

Each network connection can carry more than one flow. For spigots 5 to 16, there is: one video flow, one audio flow and one metadata flow. Each flow has a **Flow** panel.

Status Panel:

Fig. 4-36: Status Panel

The **Status** panel reports status information for each enabled flow.

 • **Mac** - IP flow received over IP network.
 • **Loopback** - IP flow received looped back from the Video IP block.
   (Either by setting the Video IP block to receive a flow from itself,
   or by using the loop-back router facility offered by the block.)

Flow Panel:

The **Flow** panel allows multicast IP flow and IP port details to be defined for the selected spigot. Statistics for the spigot can also be enabled. Figure 4-32 shows an example **Flow** panel.

In a Grass Valley IP routing system, some of these settings are set up by GV Orbit. This is indicated in Table 4-14.

Current IP flow settings

New IP flow settings

Click "P" to
set default, preset value.

Click "S" to set value entered

Note: IP flow settings may be
set via GV Orbit.

Fig. 4-37: Flow Panel (Video Flow Example)

Table 4-14:   Flow Panel Information and Settings (Destination Spigot)

Flow Panel Item (Destination Spigot)	Description
Multicast IP	Multicast group IP address. See **Note 1**.
Multicast Port	Multicast group IP port number. See **Note 1**.
Source IP	Source IP address. See **Note 1**.
Source Port	Source IP port number. See **Note 1**.
Flow Type	Drop down box. See **Note 1**. Select the flow type. • Video flow types: • Audio flow types: • Metadata flow types:

Note 1: These settings may be set by GV Orbit.

Note: **"S" and "P" buttons -**
After entering information in each text box,
always click on the adjacent "**S"** button or press "**return"** to locally
save the new setting. Do this for each text box.
(Note: Clicking on the "**P"** button will return the setting to its preset
default value).

"**S**" - Locally save new, entered setting value (or press "return").

"**P**" - Locally save default setting value.

Setting Multicast Details:

To set multicast details:

1   Select the required **Video Std** (video output standard from spigot as SDI video).

2   Enter IP address and IP port number details in the 'New settings' column, as required. (Remember to click **S** or press the enter key to enter each new value.)

3   Select the **Flow Type**.

4   Click **Take**.

In order to provide redundancy, primary and secondary flows are available on separate network connections to the MV-821-IP Video IP block. These require setting up separately.

Logging Configuration Template

The **Logging Configuration** template configures a connection to a RollCall LogServer. Figure 4-38 shows an example template. Logging connection is made via the Video IP block's control interface (referred to as 'Rear Ethernet Port' on the template).
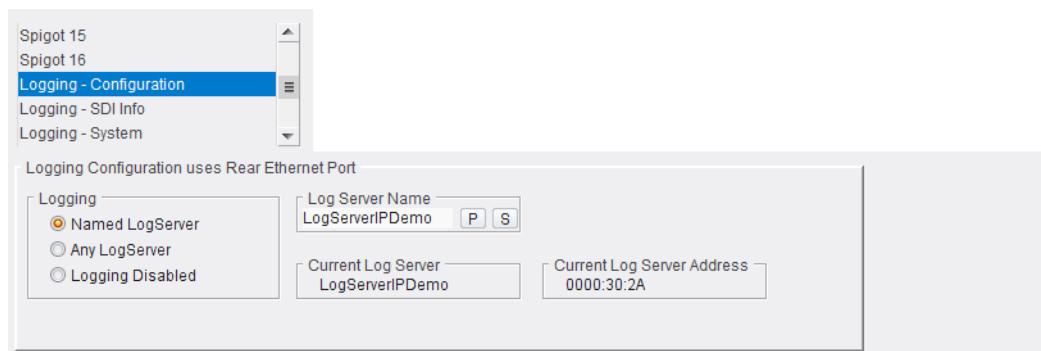
Fig. 4-38: Logging Configuration Template

Table 4-15: Logging Configuration Template Settings

Logging Configuration Item	Description
Logging:	
Named LogServer	Radio button. Select to log to a named RollCall log server device.
Any LogServer	Radio button. Select to log to any discovered RollCall log server device.
Logging Disabled	Radio button. Select to disable logging.
Log Server Name	Text. Enter the log server host name. (Click **S** or press the enter key to set the name. Click **P** to set the default name.)
Current Log Server	Shows the current log server name.
Current Log Server Address	
	Shows the current log server's RollCall address.

Note: **"S" and "P" buttons -**
After entering information in each text box,
always click on the adjacent "**S**" button or press "**return**" to locally save the new setting. Do this for each text box.
(Note: Clicking on the "**P**" button will return the setting to its preset default value).

"**S**" - Locally save new, entered setting value (or press "return").

"**P**" - Locally save default setting value.

Logging SDI Info Template

The **Logging SDI Info** template shows SDI log message types: Log field names and current log values are listed. Each log message type can be enabled by selecting it in the template.

Figure 4-39 shows an example template.
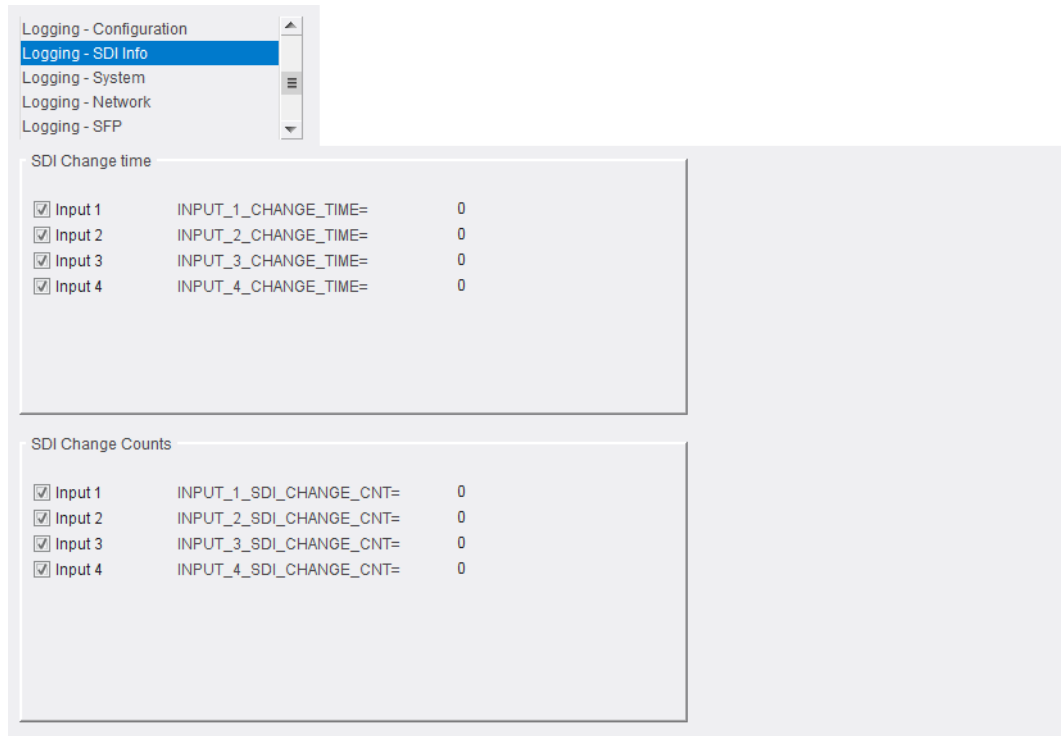
Fig. 4-39: Logging SDI Info Template

Table 4-16: Logging SDI Info Template - Settings

Log Message	Description
SDI Change Time	
INPUT_N_CHANGE_TIME	The time when the state of the SDI input changed. (I.e. input lost or input standard changed.)
SDI Change Count	
INPUT_N_CHANGE_CNT	The number of times the state of the SDI input has changed.

Logging System Template

The **Logging System** template shows system message types: Log field names and log values are listed in the 'Log Field' and 'Log Value' columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network.

Each log message type can be enabled by selecting it in the template in the 'Log Enable' column.

Figure 4-40 shows an example template.
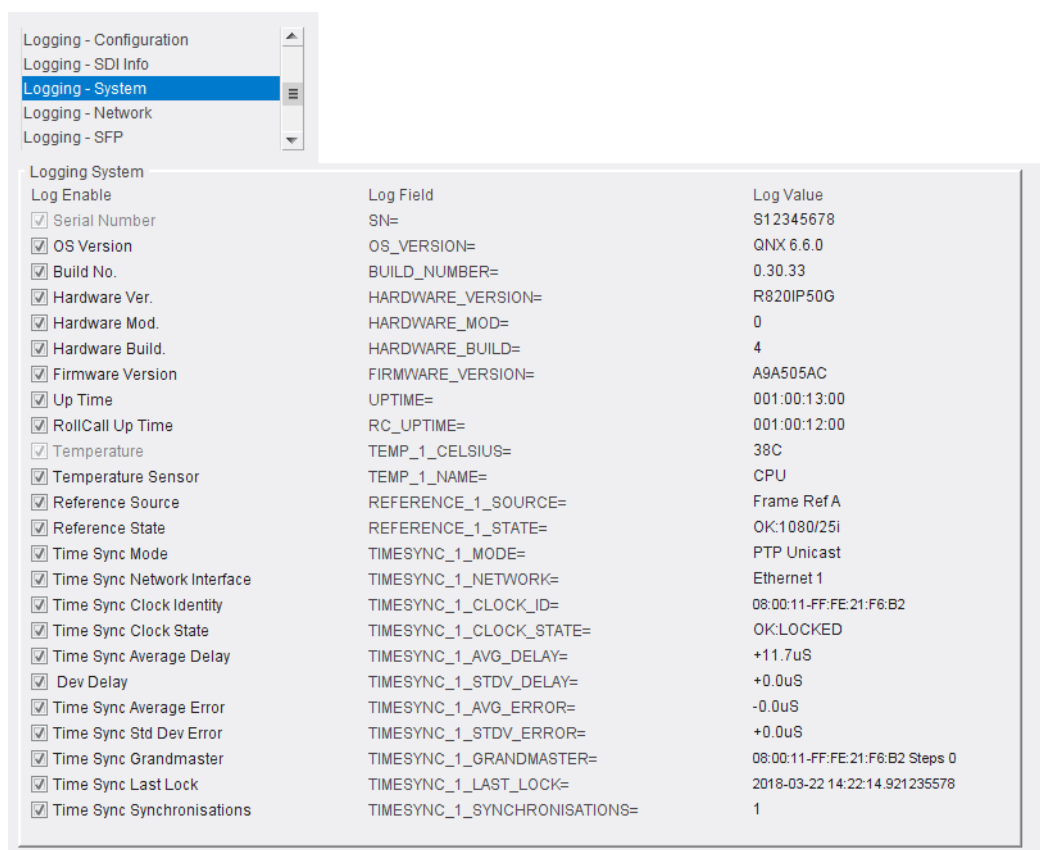
Fig. 4-40: Logging System Template

Log fields are described in Table 4-17:.

Table 4-17: Logging System Log Fields

Log Field	Description
SN	Reports the module serial number, which consists of an *S* followed by eight digits. **Note**: this cannot be deselected.
OS_VERSION	Reports the operating system name and version.
BUILD_NUMBER	Reports the build number.
HARDWARE_VERSION	Reports the hardware version number.
HARDWARE_MOD	Reports the hardware modification number.
HARDWARE_BUILD	Reports the hardware build number.
FIRMWARE_VERSION	Reports the firmware version number.

Table 4-17: Logging System Log Fields (continued)

Log Field	Description
UPTIME	Reports the time since the last Video IP block restart in the format *ddd:hh:mm:ss*.
RC_UPTIME	Reports the time since the last RollCall logserver restart in the format *ddd:hh:mm:ss*.
TEMP_N_NAME	Temperature measurement name.
TEMP_N_CELSIUS	Reports the temperature status.
REFERENCE_N_SOURCE	Reports time reference source.
REFERENCE_N_STATE	Valid values are: • OK: Locked • OK: Input • WARN: Freerun • WARN: CrossLock
TIMESYNC_N_MODE	Valid values are: • **Free running:** Card is using its own clock with no reference to any other source**.** • PTP Multicast: Card is synchronizing to a PTP grandmaster clock using multicast network messages. • **PTP Unicast:** As **PTP Multicast** but using the delay request. Reply messages are unicast to minimize network traffic**.** • NTP: Module clock is synchronized to an NTP clock. Generally less precise than PTP.
TIMESYNC_N_NETWORK	Network port currently being used for synchronization for IQMIX modules, dependent on the choice of interfaces made on the Time Configuration template. If PTP and multiple interfaces are enabled, the PTP synchronization will switch ports if it doesn't see regular sync messages on the port.
TIMESYNC_N_CLOCK_ID	Identification number of PTP clock being used for synchronization. This is not necessarily the grandmaster clock identity, as there can be intermediate clocks between the grandmaster and the card, depending on network configuration.
TIMESYNC_N_CLOCK_STATE	Valid values are: • Free running: Card is not being synchronized. • No Lock: PTP being used but clocks haven't synchronized within +/- 1mS. • Locked: PTP being used and clocks are within the accepted range. • NTP: Module using NTP to synchronize.
TIMESYNC_N_AVG_DELAY	The current network delay time between the card and the clock sending the synchronization messages. This should be relatively constant and is dependent on network configuration.

Table 4-17: Logging System Log Fields (continued)

Log Field	Description
TIMESYNC_N_STDV_DELAY	The current standard deviation in the network delay time between the card and the clock sending the synchronization messages. Should be a low number as the network delay is expected to be constant.
TIMESYNC_N_AVG_ERROR	The current difference between the cards time and the grandmaster time. Should be close to zero once card has synchronized.
TIMESYNC_N_STDV_ERROR	The standard deviation in the average error.
TIMESYNC_N_ GRANDMASTER	Identity of network clock acting as PTP grandmaster. This is the source of the PTP synchronization messages used by all PTP slave clocks on the network. If there are multiple grandmasters, they should negotiate between themselves to identify the most accurate and then silence the others.
TIMESYNC_N_LAST_LOCK	Time when the module last changed from not locked to locked. Ideally this will be a few seconds after the module has powered up. This allows the user to confirm which clock the module has synchronized to.
TIMESYNC_N_ SYNCHRONISATIONS	Reports the number of times the card has synchronized since it was powered up. Ideally this will be a low number, as cards are expected to synchronize and stay synchronized. Large numbers indicate possible problems with the network or grandmaster clock.

Log Field	Description

Logging Network Template

The **Logging Network** template shows network message types: Log field names and current log values are listed in the 'Log Field' and 'Log Value' columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network.

Each log message type can be enabled by selecting it in the template in the 'Log Enable' column.

Figure 4-41 shows an example template.

Fig. 4-41: Logging Network Template

Table 4-18: Logging Network Log Fields

Log Field	Description
LAN_PORT_N_NAME	Ethernet port name as defined by the OS running on the MV-821-IP Video IP block.
LAN_PORT_N_SPEED	Ethernet connection speed. (50 Gb/s for MV-821-IP)
LAN_PORT_N_IPADDRESS	Ethernet port IP address.
LAN_PORT_N_MACADDRESS	Ethernet port MAC address.
LAN_PORT_N_STATE	Ethernet connection state. Valid values are: • Active • Inactive
LAN_PORT_N_TRAFFIC_IN	Traffic in. Valid values are: • NNN.n kbps, Mbps, Gbps
LAN_PORT_N_TRAFFIC_OUT	Traffic out. Valid values are: • NNN.n kbps, Mbps, Gbps
LAN_PORT_N_CPU_TRAF_IN_STATE	Reports whether there is an incoming control data traffic connection on port N. OK, Fail.
LAN_PORT_N_CPU_TRAF_OUT_STATE	Reports whether there is an incoming control data traffic connection on port N. OK, Fail.
LAN_PORT_N_RTP_DIS_RATE	Reports the number of RTP discontinuities on port N.
LAN_PORT_N_LINK_STATE	Reports the state of Ethernet link N. OK, FAIL:Down.
LAN_PORT_N_MAC_LINK_STATE	Reports the state of the MAC (Media Access Controller) sub-circuit. OK, FAIL:Down.
LAN_PORT_N_SWITCH_NAME	Name of IP network switch that the media network connection of the MV-821-IP Video IP block is connected to.
LAN_PORT_N_SWITCH_PORT_ID	Name of IP network switch port that the media network connection of the MV-821-IP Video IP block is connected to.
LAN_PORT_N_SWITCH_VLAN	Name of IP network switch VLAN number that the media network connection of the MV-821-IP Video IP block is connected to.

Logging - SFP Template

The **Logging SFP** template shows SFP message types relating to the QSFP28 modules fitted: Log field names and current log values are listed in the 'Log Field' and 'Log Value' columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network.

For a Video IP block, only the designated QSFP28 module is reported.

Each log message type can be enabled by selecting it in the template in the 'Log Enable' column.

Figure 4-42 shows an example template.

Fig. 4-42: Logging SFP Template

Table 4-19: Logging SFP Log Fields

Log Field	Description
SFP_N_FITTED	Displays presence of the QSFP module. Valid values are: • OK • Missing
SFP_N_STATUS	Displays status of the QSFP module. Valid values are: • OK • Fail - The reason for a failure will be appended to the fail message. It is as reported by the QSFP28 module itself, per INF-8074 and SFF-8472.
SFP_N_TYPE	Displays QSFP28 identifier from device.
SFP_N_VENDOR	Displays QSFP28 manufacturer from device.
SFP_N_VENDOR_PN	Displays QSFP28 model number from device.
SFP_N_SERIAL_NR	Displays the module serial number, which consists of an S followed by eight digits.
SFP_N_REVISION	Displays manufacturer revision number.
SFP_N_CONNECTOR	Displays connector type.
TEMP_N_NAME	Displays temperature sensor name.
TEMP_N_CELSIUS	Displays current temperature sensor reading.
TEMP_N_STATE	Displays temperature sensor state. Valid values are: • WARN: Disabled - Temperature sensor disabled. • WARN: Low - Low, but in tolerance. • WARN: High - High, but in tolerance. • OK. • FAIL: Low - Low and out of tolerance. • FAIL: High - High and out of tolerance.
VOLTAGE_N_NAME	Displays voltage sensor name.
VOLTAGE_N_VALUE	Displays current voltage reading.
VOLTAGE_N_STATE	Displays temperature sensor state. Valid values are: • OK. • WARN: Low - Low, but in tolerance. • WARN: High - High, but in tolerance.
SFP_N_WAVELENGTH	Displays transmit wavelength in nm.
SFP_N_X_LASER_BIAS	Displays bias level in mA.
SFP_N_X_TX_POWER	Displays transmit power level in dBm.
SFP_N_X_TX_POWER_ STATE	Displays transmit power level. Valid values are: • OK. • WARN: Low - Low, but in tolerance. • WARN: High - High, but in tolerance. • FAIL: Low - Low and out of tolerance. • FAIL: High - High and out of tolerance.
SFP_N_X_RX_POWER	Reports receive power level in dBm.

Table 4-19: Logging SFP Log Fields (continued)

Log Field	Description
SFP_N_X_RX_POWER_STATE	Reports receive power level. Valid values are: • OK. • WARN: Low - Low, but in tolerance. • WARN: High - High, but in tolerance. • FAIL: Low - Low and out of tolerance. • FAIL: High - High and out of tolerance.
Where: • **N** is the input/(Q)SFP number; and • **X** is the lane number.	

Logging - FPGA Template

The **Logging FPGA** template shows FPGA message types reporting temperature and voltages on an FPGA device: Log field names and current log values are listed in the 'Log Field' and 'Log Value' columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network.

Each log message type can be enabled by selecting it in the template in the 'Log Enable' column.

Figure 4-43 shows an example template.

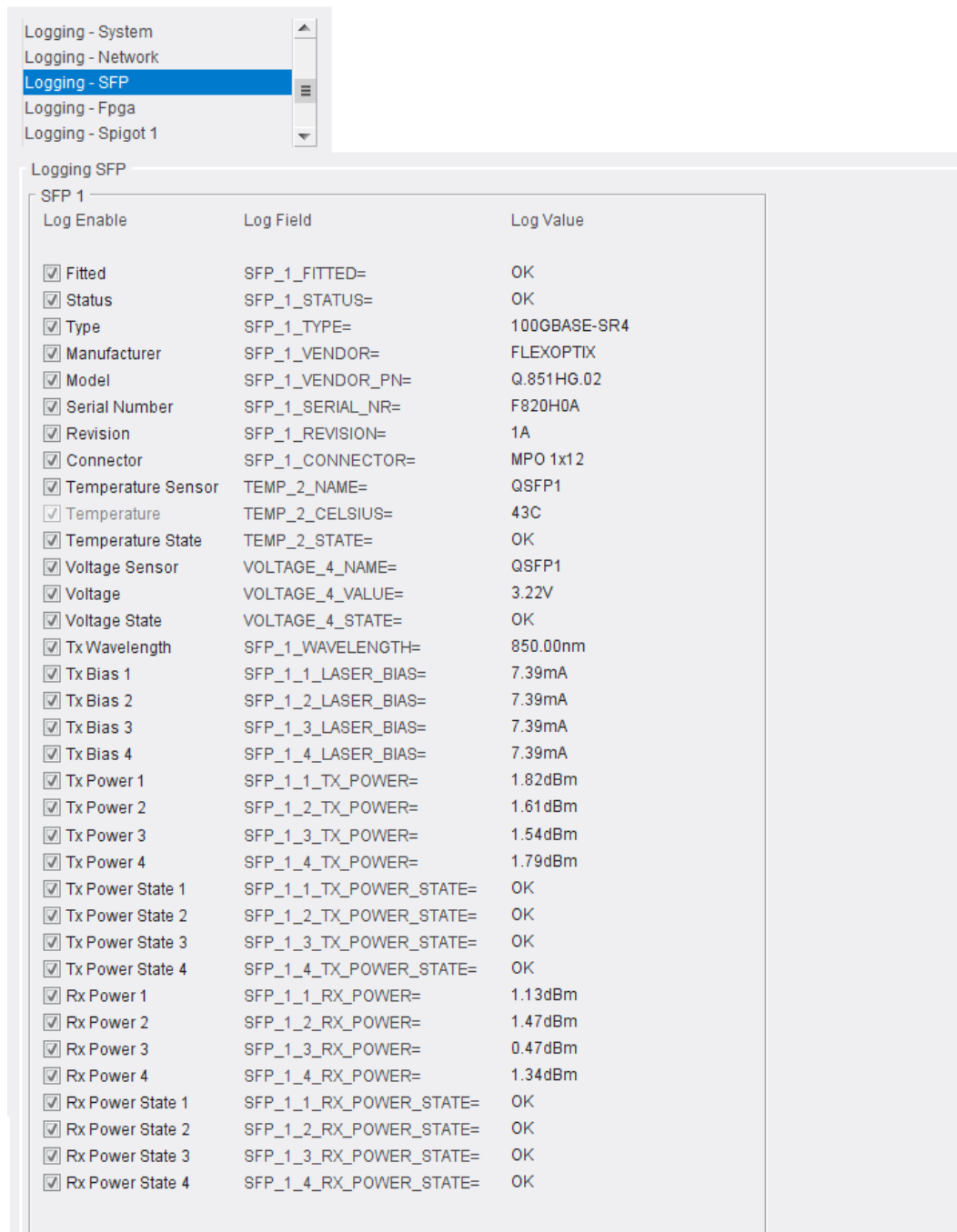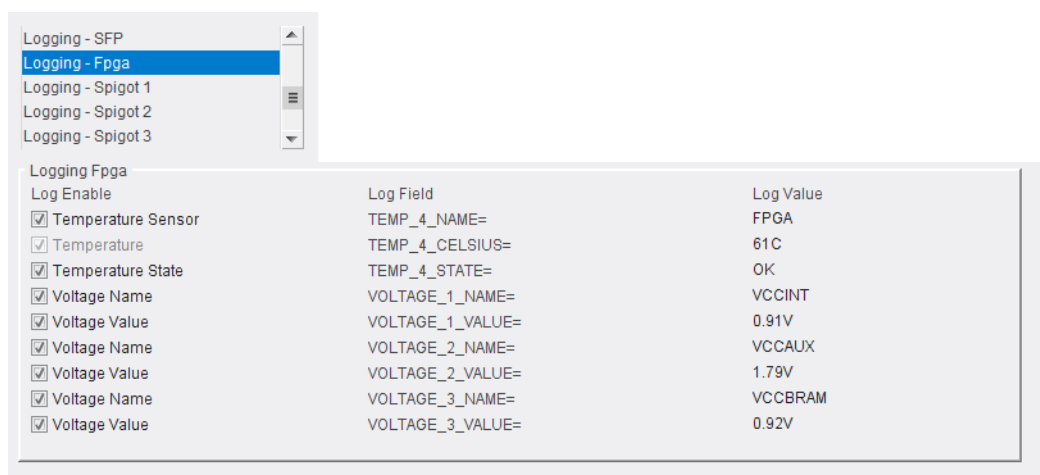*Fig. 4-43: Logging SFP Template*

Table 4-20: Logging SFP Log Fields

Log Field	Description
TEMP_*N*_NAME	Reports temperature sensor N name.
TEMP_*N*_CELSIUS	Reports current temperature sensor N reading.
VOLTAGE_*1*_NAME	Voltage sensor name. For example, VCCINT.
VOLTAGE_*1*_VALUE	Reports current voltage reading.
VOLTAGE_*2*_NAME	Voltage sensor name. For example, VCCAUX.
VOLTAGE_*2*_VALUE	Reports current voltage reading.
VOLTAGE_*3*_NAME	Voltage sensor name. For example, VCCBRAM.
VOLTAGE_*3*_VALUE	Reports current voltage reading.
Where: • **N** is the input number (1 to 16) for the MV-821-IP Video IP block.	

Logging - Spigot 1 to 16 Templates

The **Logging - Spigot** templates are used to view and select the Spigot log fields to be enabled for each available spigot. Each log message type can be enabled by selecting it in the template in the 'Log Enable' column.

Depending on whether the spigot is an IP source spigot ("Input N ...") or an IP destination spigot ("Output N ..."); the appropriate log fields are shown. Figure 4-44 and Figure 4-45 show example templates for source and destination spigots respectively.

The spigot can be given a name ("Input N Name" or "Output N Name"). Destination spigot names form the logging names of the MV-821-IP IP video inputs.

Spigots 1 to 4 are IP source spigots. ("Input N ...")

(These may source some multiviewer head display outputs as video IP streams.)
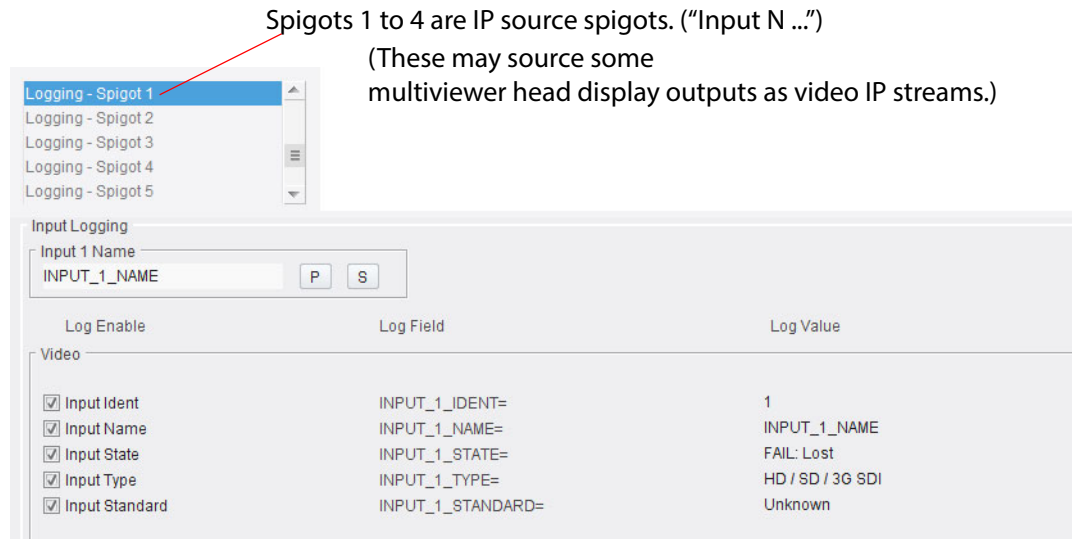
Fig. 4-44: Logging Spigot Template (Source Spigots, Spigots 1 to 4)

Spigots 5 to 16 are IP destination spigots. ("Output N ...")

(Spigots 5 to 16 receive the multiviewer video IP stream inputs.)
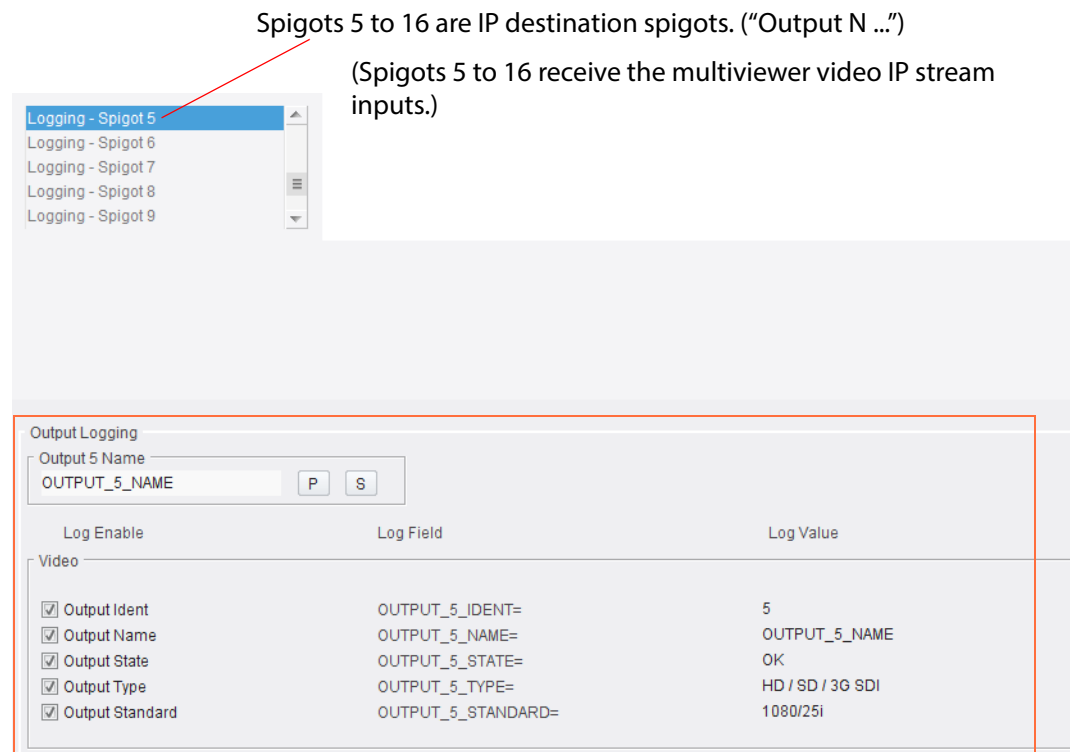
Fig. 4-45: Logging Spigot Template (Destination Spigots, Spigots 5 to 16)

Log field names and current log values are listed in the 'Log Field' and 'Log Value' columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network.

An additional field is provided for the user to optionally specify a name for the spigot.

To specify a name for a source spigot:

- Enter a name in the **Input N Name** text field.
  (Remember to click **S** or press the enter key to enter the new name.)

To specify a name for a destination spigot:

- Enter a name in the **Output N Name** text field.
  (Remember to click **S** or press the enter key to enter the new name.)

Note:	**"S" and "P" buttons -** After entering information in each text box, always click on the adjacent "**S**" button or press "**return**" to locally save the new setting. Do this for each text box. (Note: Clicking on the "**P**" button will return the setting to its preset default value). "**S**" - Locally save new, entered setting value (or press "return"). "**P**" - Locally save default setting value.

Log fields are described in Table 4-21 and Table 4-22.

Table 4-21: Logging Spigot 1 to 4 Templates - Log Fields

Log Field (Source Spigot)	Description
INPUT_N_IDENT	System-defined identifier for the input, based on the rear ID.
INPUT_N_NAME	Name of the input, as defined by the user on the **Setup** template. Setup Template, on page 105.
INPUT_N_STATE	Valid values are: • **OK**: input signal good. • **FAIL**: input signal not detected.
INPUT_N_TYPE	HD/SD/3G SDI
INPUT_N_STANDARD	PAL/NTSC/625 Mono/525 Mono

Where:
- **N** is the input/output spigot number (1 to 16).

Table 4-22: Logging Spigot 5 to 16 Templates - Log Fields

Log Field (Destination Spigot)	Description
OUTPUT_N_IDENT	Name of the output as shown on the rear panel.
OUTPUT_N_NAME	Name of the output as defined by the user.
OUTPUT_N_STATE	Valid values are: • OK - output signal good. • FAIL - output signal not detected. • WARN: Freeze • WARN: Pattern • WARN: Black

Table 4-22: Logging Spigot 5 to 16 Templates - Log Fields (continued)

Log Field (Destination Spigot)	Description
OUTPUT_*N*_TYPE	Valid values are: • SD SDI • HD SDI • HD/SD/3G SDI
OUTPUT_*N*_STANDARD	Reports the output standard in the format: **\<Lines\>(\<Active\>)/\<Rate\>\<i/p/sf\>** Where: • Lines = Total lines • Active = Active lines • Rate = Frame rate • I = interlaced • P = Progressive • SF = Segmented Frame For example: **1080/50p** or **1125(1080)/25i**
Where: • **N** is the input/output spigot number (1 to 16).	

Logging Card Diagnostics Template

The **Logging Card Diagnostics** template is used to view log fields of the MV-821-IP Video IP block and select those log fields to be enabled.

Log field names and current log values are listed in the 'Log Field' and 'Log Value' columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network.

Each log message type can be enabled by selecting it in the template in the 'Log Enable' column.

Figure 4-46 shows an example template.
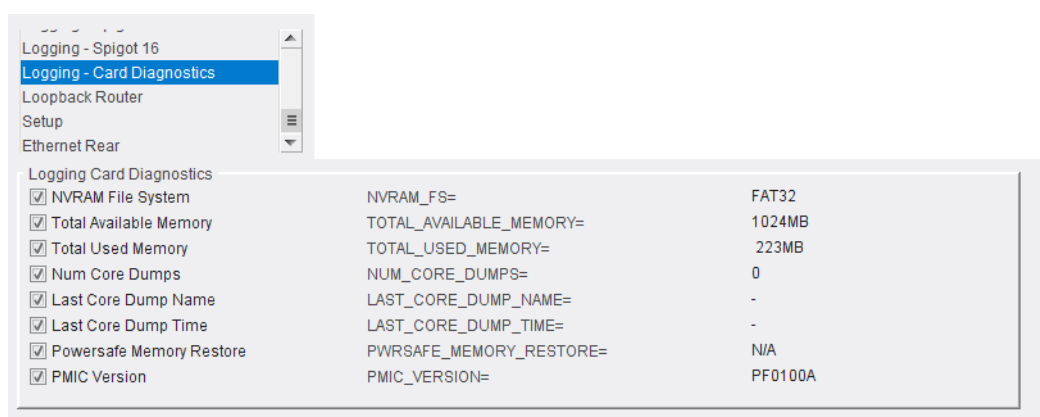
Fig. 4-46: Logging Card Diagnostics Template

Table 4-23:   Logging Card Diagnostics Template Log Fields

Log Field	Description
NVRAM_FS	Reports file system type. FAT32, or QNX6 PowerSafe FX
TOTAL_AVAILABLE_MEMORY	Reports amount of CPU free memory.
TOTAL_USED_MEMORY	Reports total amount of used CPU memory.
NUM_CORE_DUMPS	Reports number of CPU core dumps. For diagnostics purposes only.
LAST_CORE_DUMP_NAME	Reports name of last CPU core dump. For diagnostics purposes only.
LAST_CORE_DUMP_TIME	Reports time of last CPU core dump. For diagnostics purposes only.
PWRSAFE_MEMORY_RESTORE	Reports "OK".
PMIC_VERSION	Reports Power Management IC version. For diagnostics purposes only.

Loopback Router Template

The **Loopback Router** template is used to control a basic IP routing facility, which will loop IP flows from source spigots back into destination spigots. The flows are looped back and are not transmitted externally. The loop-back routing is all local to the Video IP block.

Figure 4-47 shows an example template.
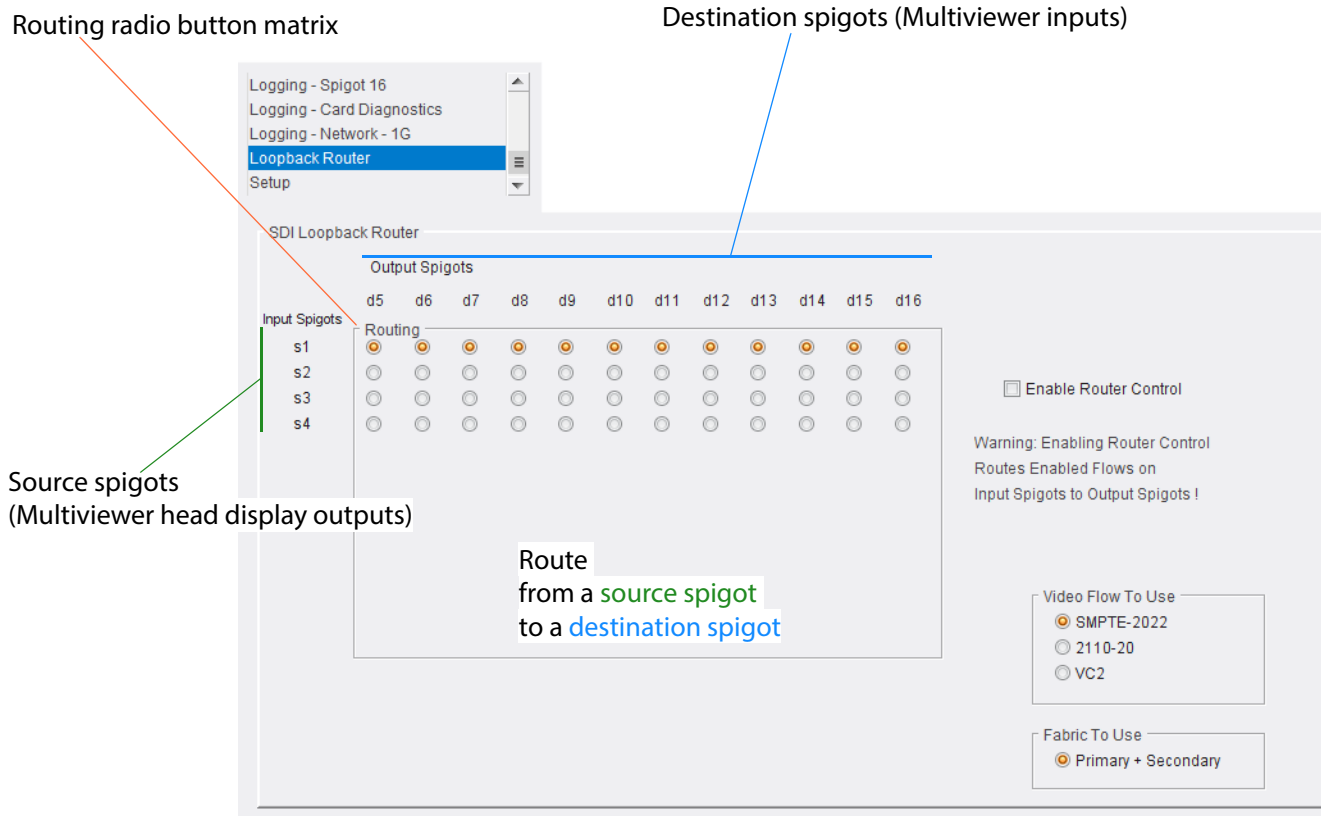
Fig. 4-47: Loopback Router Template

To use the **Loopback Router**:

1 In router radio button matrix,
    select the source spigots (SDI input) to be routed to destination spigots (SDI outputs).

2 Select the **Video Flow to Use**. (SMPTE-2022, SMPTE-2110)

3 Select the **Primary + Secondary** IP fabric to use.

When all is set as required:

4 Select **Enable Router Control**.
    The selected routing is activated.
    Flows on source spigots are sent to destination spigots.

Setup Template

The **Setup** template (see Figure 4-48) displays basic information about the MV-821-IP Video IP block, such as the serial number and software version. This information may be required by Grass Valley Support if technical assistance is needed.
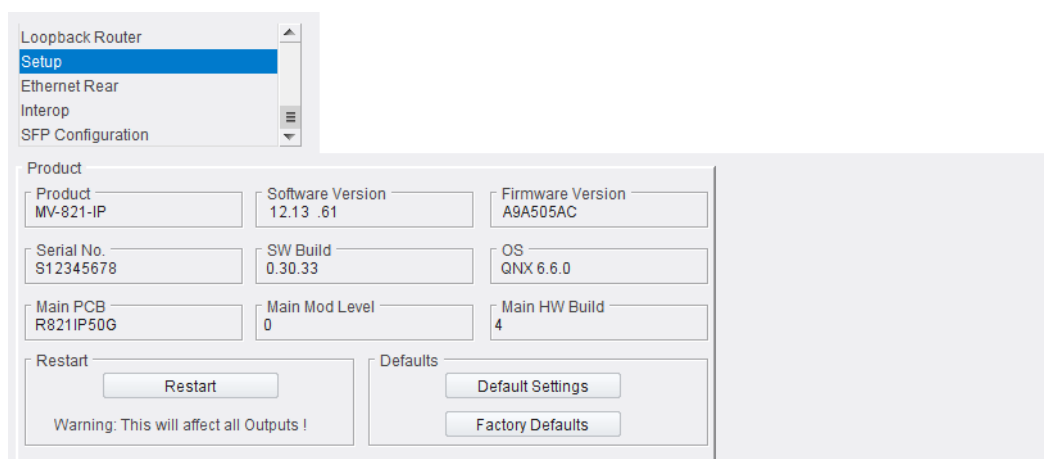
Fig. 4-48: Setup Template

The **Product** panel displays technical information about the MV-821-IP Video IP block, and contains some restart and default-setting controls.

Table 4-24: Setup Template Settings and Controls

Item	Description
Product	**Name of the MV-821-IP Video IP block.**
Software Version	Currently installed software version number.
Firmware Version	Currently installed firmware version number.
Serial No.	Serial number of the MV-821-IP Video IP block.
SW Build	Factory software build number. This number identifies all parameters of the MV-821-IP Video IP block.
Main PCB	Printed Circuit Board (PCB) version number.
Main Mod Level	Main PCB modification level.
Main HW Build	Factory main hardware build number.
Restart	Button. Click to restart the Video IP block. **Note:** A restart power-cycles the Video IP blocks, producing disturbances at the *block's* outputs (*internal* to MV-821-IP). The block feeds some inputs to the MV-821-IP multiviewer block and may result in some on-screen disturbance on multiviewer head display outputs.
Defaults:	Provides options to reset the module to its defaults.
Default Settings	Button. Click to return all Video IP block settings to their default values, *except* for network configuration and IP addresses.
Factory Defaults	Button. Click to return all Video IP block settings to their factory values, *including* network configuration and IP addresses.

Ethernet Rear Template

The **Ethernet Rear** template (see Figure 4-49) displays details and the status of the control network connection of the MV-821-IP Video IP block.
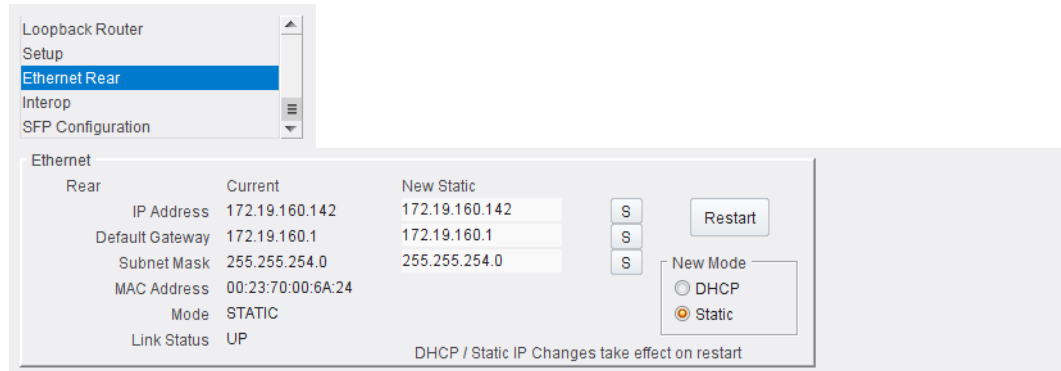
Fig. 4-49: Ethernet Rear Template

Information is shown in a tabular format. DHCP or static IP address modes may be used. The template displays the current IP settings and allows new static IP details to be entered.

Table 4-25: Setup Template Settings and Controls

Ethernet Rear Item	Description
IP Address	Displays the current IP address.
	Enter a new (static) IP address in the text box. Click **S** or press the enter key to enter the new value.See **Note 1**.
Default Gateway	Displays the current default gateway IP address.
	Enter a new (static) IP address in the text box. Click **S** or press the enter key to enter the new value.See **Note 1**.
Subnet Mask	Displays the current subnet mask.
	Enter a new (static) subnet mask in the text box. Click **S** or press the enter key to enter the new value.See **Note 1**.
MAC Address	Displays the MAC address of the Video IP block's control network connection.
Mode	Displays the IP mode in use by the Video IP block's control network connection (STATIC or DHCP).
Link Status	Displays the link status of the Video IP block's control network connection (UP or DOWN).
New Mode:	Radio buttons. See **Note 1**.
DHCP	Select to set DHCP IP address mode.
Static	Select to set a static IP address etc.
Restart	Button. Click to restart.See **Note 1**.
Note 1: DHCP / Static IP address changes take effect on a restart of the Video IP block.	

Note: **"S" button -**
After entering information in each text box,
always click on the adjacent "**S**" button or press "**return**" to locally save the new setting. Do this for each text box.

"**S**" - Locally save new, entered setting value (or press "return").

Interop Template

The controls and settings of the **Interop** template should normally *not* be changed.

The template (see Figure 4-50) controls various settings to enable interoperability with third parties, including disabling extended headers, and setting payload types.

> IMPORTANT
> In normal circumstances and operation, do not change the settings on the **Interop** template.
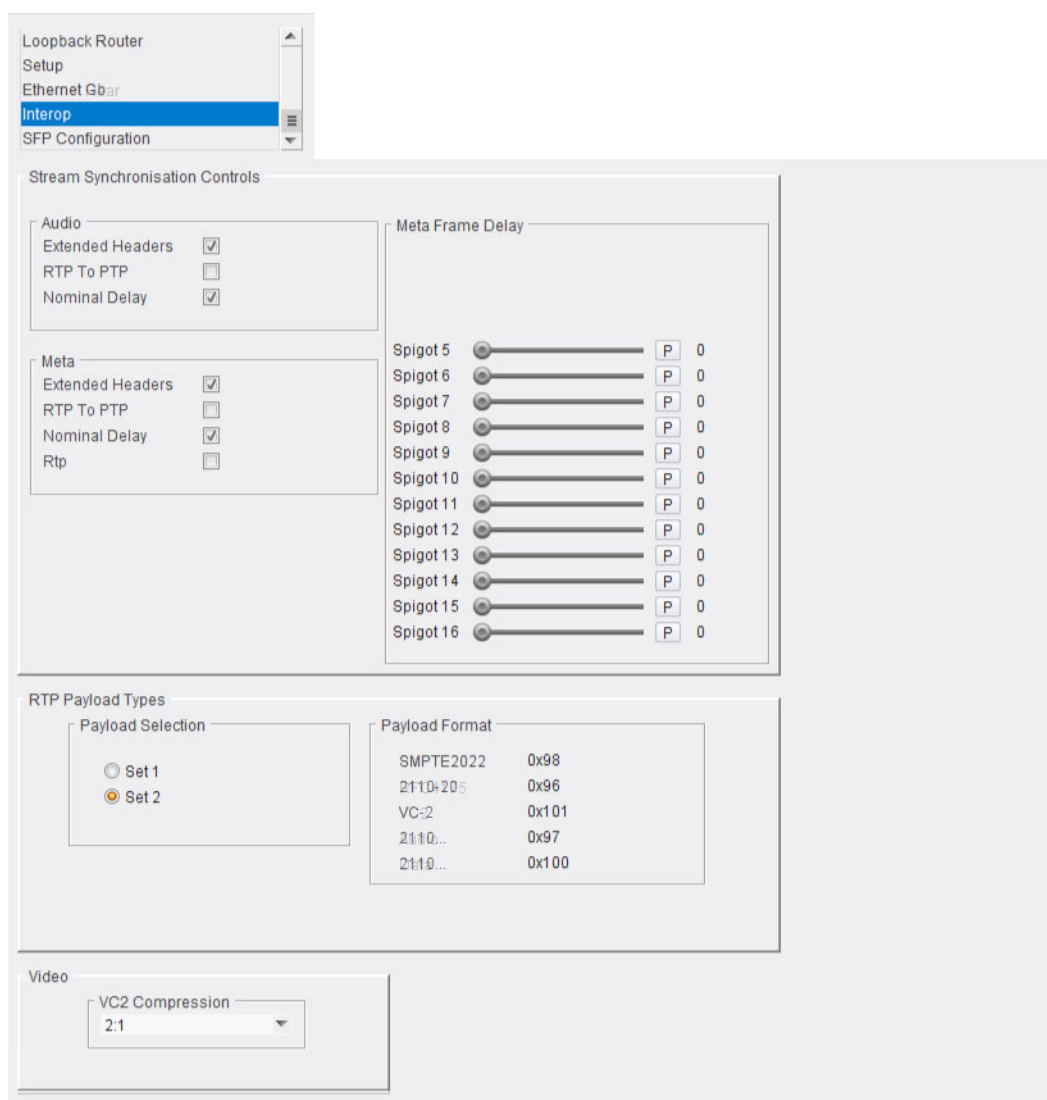
Fig. 4-50: Interop Template

The template displays the following panels:

- Stream Synchronization Controls
- RTP Payload Types
- Video.

Table 4-26, Table 4-27 and Table 4-28 describe each panel.

Table 4-26: Interop Template - Stream Synchronization Controls

Stream Synchronization Controls Item	Description
Audio:	Check boxes:
Extended Headers	Select to use extended headers in the RTP audio stream.
RTP to PTP	Select to synchronize RTP to PTP.
Nominal Delay	Select to set up nominal delay at the spigot.
Meta:	Check boxes:
Extended Headers	Select to use extended headers in the RTP metadata stream.
RTP to PTP	Select to synchronize RTP to PTP.
Nominal Delay	Select to set up nominal delay at the spigot.
Rtp	Select to enable the use of RTP timestamps only to synchronize metadata to video.
Meta Frame Delay:	A slider control per destination spigot (spigots 5 to 16):
Spigot N	Select required frame delay for metadata received at spigot. Frame delay value in range 0 to 5. Click **P** to select the factory default value (0).

Table 4-27: Interop Template - RTP Payload Types

Interop RTP Payload Types	Description
Payload Selection:	Radio buttons:
Set 1	Select to use payload set 1. (Pre-standards-ratification value)
Set 2	Select to use payload set 2. (Post-standards-ratification value, default)
Payload Format:	Hexadecimal code used for payload types:
SMPTE2022	SMPTE 2022 payload type.
SMPTE2110	SMPTE 2110 payload type.
VC2	VC2 payload type (not supported, possible future feature).
Audio	Audio payload type identifier.
Data	Metadata payload type.

Table 4-28: Interop Template - Video

Interop Video Item	Description
VC2 Compression	Drop-down box. Select VC2 compression ratio. (**Note:** VC2 is not currently supported.)
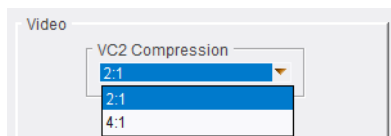
SFP Configuration Template

The **SFP Configuration** template allows various QSFP28 module parameters to be adjusted, if required. See Figure 4-51. The QSFP28 module adjusted is the designated QSFP module for the Video IP block concerned (see Table 4-1 on page 49).
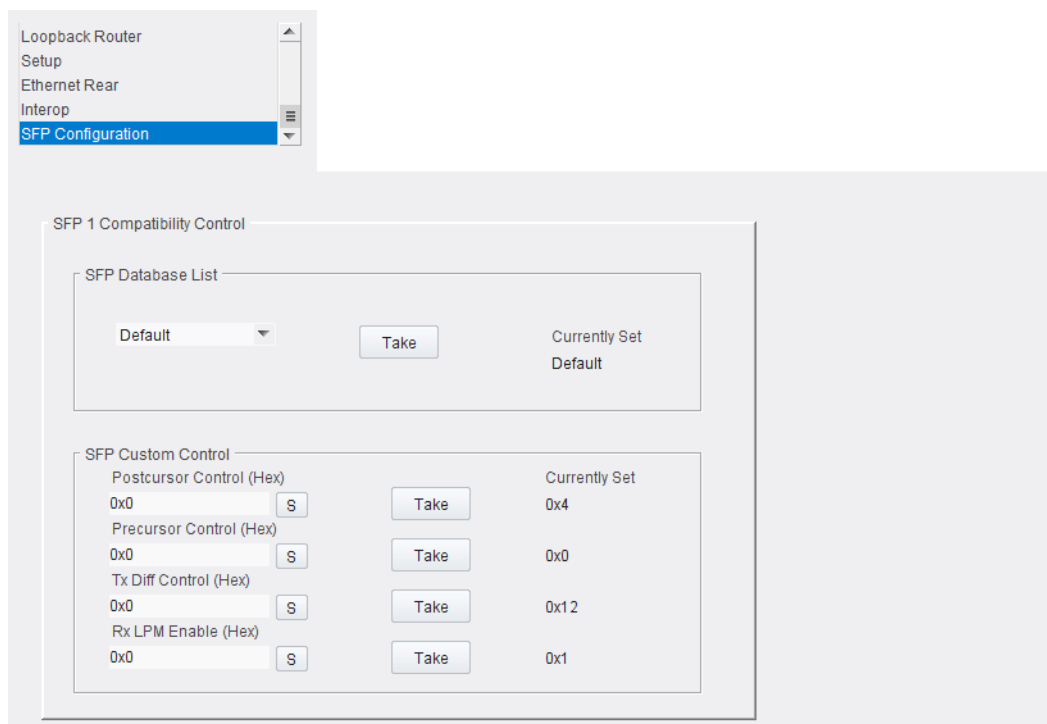
Fig. 4-51: SFP Configuration Template

The majority of QSFP28 modules will operate correctly with the MV-821-IP Video IP block, without any need for adjustment. Some QSFP28 modules, however, may need to have some QSFP28 module parameters adjusted.

Table 4-29: SFP Configuration Template

SFP Configuration Item	Description
SFP Database List:	Drop-down box: Select the SFP type from the drop-down list.
Take	For **Custom** setting only, click to apply settings and save to memory.
Currently Set	Shows the current SFP type.
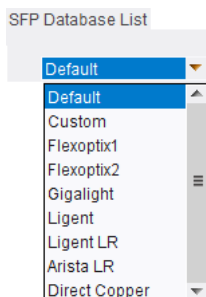
Table 4-29: SFP Configuration Template (continued)

SFP Configuration Item	Description
SFP Custom Control:	Custom settings are set here. Select **Custom** in the SFP database list.
	Text boxes. Enter a new hexadecimal value for the Tx/Rx sub-circuits of the QSFP28 module.
	Parameters: • Postcursor Control (Hex) • Precursor Control (Hex) • Tx Diff Control (Hex) • Rx LPM Enable (Hex)
	Click **S** or press the enter key to save the value. The new value is then shown in the text box.
	The **Currently Set** value is also shown in the same row.
	Buttons. Click **Take** to change to the new value.

If difficulties are encountered with a QSFP28 module not working as expected, follow these instructions:

1 Select the appropriate SFP type in the **SFP Database List**,
 and click **Take**.

 Verify whether the SFP is now working correctly.
 If it is now working correctly, then no further action is required;
 otherwise, continue.

2 Select **Custom** in the **SFP Database List**.
 This allows all the QSFP28 module settings shown in the **SFP Custom Control** panel to be adjusted as required.

 Change settings and click **Take** to apply each of them.

3 When a working settings configuration is found,
 click **S** beside each setting to save the setting value for future use.

Getting Started 5

Getting Started

This section describes how to get started with an MV-821.

    a) MV-821-HDBNC products have the same instructions.

    b) MV-821-IP is the same as a) with *additional* steps to set up all video IP inputs.

Table 5-1: Getting Started with MV-821

Product	Use Getting Started Instructions for...	
	Multiviewer Block	**Video IP Input Block**
MV-821-HDBNC	✔	
MV-821-IP	✔	✔ **(x 4)**

Install the hardware, configure the multiviewer block, followed by the Video IP blocks (MV-821-IP only).

MV-821Hardware Installation

1 Unpack the unit.
    (See Unpacking, on page 19.)

2 Install the unit in a rack.
    (See Rack Mounting, on page 42.)
Do not connect the IP network connections to the house IP network yet, because IP addresses etc. will need to be set up to suit the house IP network.

3 Power up the unit.
    (See MV-821 Booting, on page 46.)

Multiviewer Block

These 'getting started' instructions are applicable to all MV-821s and describe getting the unit's MV-8 Series multiviewer block started.

For the configuration of the multiviewer block, refer to the 'MV-8 Series Multiviewer' user manual. See the 'Getting Started' chapter, which includes:

· initial unit configuration;

· further configuration; and the

· start-up splash screen.

Refer To: 'MV-8 Series Multiviewer' user manual, 'Getting Started' chapter, for information about configuring MV-821 multiviewer block.

Video IP Blocks

This sub-section is applicable to MV-821-IP products only and should be carried out after Multiviewer Block, on page 112.

A prerequisite for getting started with the MV-821-IP is a working video IP routing network infrastructure. Setting up of a house video IP network is beyond the scope of this manual. Typically, this includes a video IP routing system and router controller, which is the case for a Grass Valley video IP routing system.

After an MV-821-IP unit is hardware-installed and the multiviewer block set up, the next step is to configure the unit's video IP interfaces; this is described in this sub-section.

The MV-821-IP unit video IP interface comprises four Video IP blocks. Each block must be individually configured to accept and convert up to 48 video IP inputs into internal SDI video signals for the Multiviewer block.

> Note: Relevant information about the MV-821-IP specific rear IP network connections is found in appendix sub-sections:
>
> - Rear Network Connectors for MV-821-IP, on page 146;
> - Rear QSFP Cages - Media Network Interface Information, on page 147; and
> - Rear QSFP Cages - Media Network Interface Information, on page 147.

Configuring Network Interfaces of Each Video IP Block

For each MV-821-IP Video IP Block in turn, carry out the instructions steps below:

Step 1: Connection to House Video IP Network

1 Connect the QSFP cable/transceivers to the rear QSFP cages.

Typically, for multiviewer video IP inputs over the QSFP connections:
- Use **Link A1** for inputs 1 to 24.
- Use **Link B1** for inputs 25 to 48.
- Additionally, use **Link A2** and **Link B2** for IP link redundancy.

2 Connect the QSFP cables to the house video IP network.

Step 2: Connect RollCall Control Panel to Video IP Block

Using rear control network connection 'Control A':

1 Connect RollCall Control Panel to the Video IP block's default IP address, see Table A-3 on page 147.
(Use a similar connection method to that described in RollCall Control Panel Connection to MV-821, on page 54.)

Step 3: Configure Control Network Interface
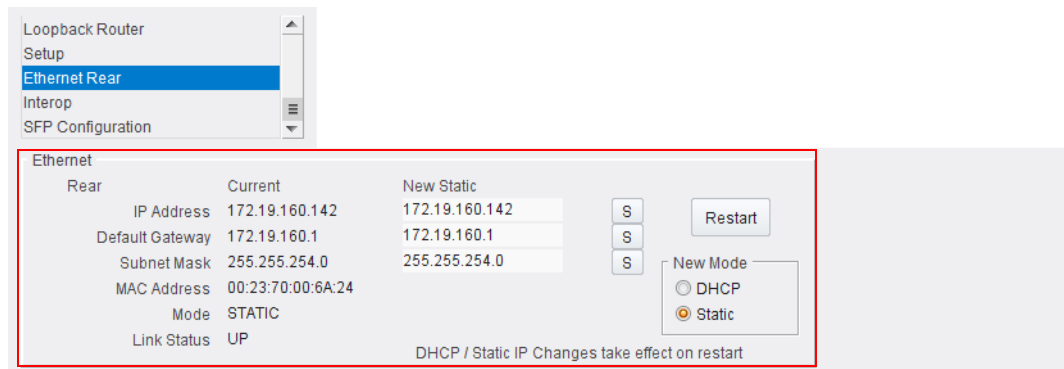
Fig. 5-1: Ethernet Rear RollCall Template (Control Screen)

On the **Ethernet Rear** RollCall template:

1   Select 'Static' mode.

2   Set up the IP settings, including: IP Address, Default Gateway, and Subnet Mask.

> Note: Enter a value into a control screen text field. Then press the 'enter' key on your keyboard, or simply click **S,** to enter the value into the template field.

Step 4: Configure Media Network Interface 1
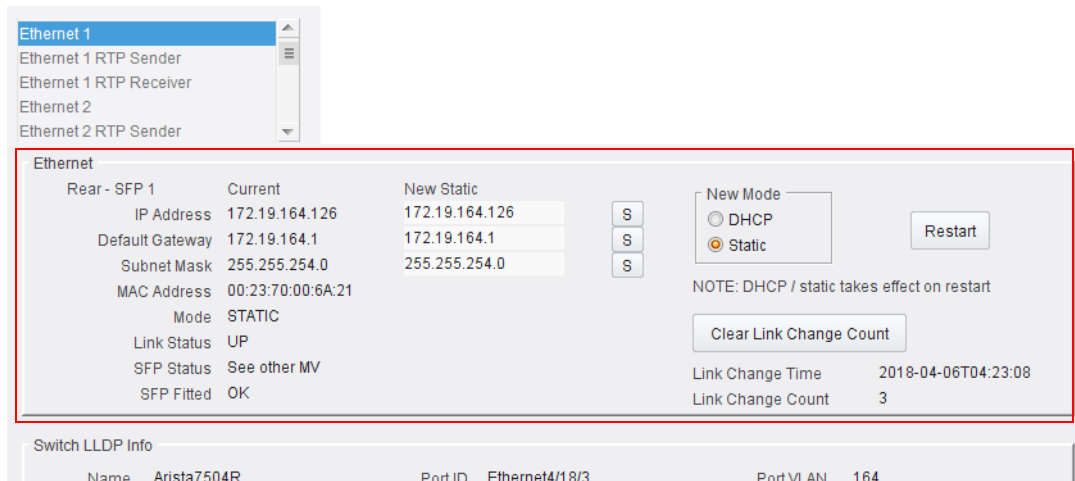
Fig. 5-2: Ethernet 1 Template

On the **Ethernet 1** RollCall template:

1   Set 'Static' mode.

2   Set up the IP settings, including: IP Address, Default Gateway, and Subnet Mask.

> Note: Enter a value into a control screen text field. Press the 'enter' key on your keyboard, or simply click **S,** to enter the value into the template field.

Step 5: Check SFP Status

On the **Ethernet 1** RollCall template:

1   Check that **SFP Fitted** is 'OK'

> Note: If **SFP Status** is not 'OK', check the QSFP cable is fitted to the:
>
> - MV-821-IP rear QSFP cage; and
> - to the house video IP network switch.

2 Check that **SFP Status** is 'OK' or 'See other MV'

> Note: If **SFP Status** is not correct, then go to the **SFP Configuration** RollCall template to change settings for the QSFP. See SFP Configuration Template, on page 109.

3 Check that IP **Link Status** is 'UP'

> Note: If **Link Status** is not correct, check:
>
> - QSFP fitting.
> - House Video IP network.

Step 6: Configure Media Network Interface 2

On the **Ethernet 2** RollCall template:

1 Repeat the actions of sub-sections Step 4: Configure Media Network Interface 1, on page 114, and Step 5: Check SFP Status, on page 114, but for the *other* media network interface, 'Ethernet 2' network interface.

Step 7: Restart

On the **Ethernet Rear**, or **Ethernet 1**, or **Ethernet 2** RollCall template:

1 Click **Restart**.

The Video IP block is restarted. This takes approximately 2 minutes.
During this time, RollCall Control Panel disconnects. When the Video IP block restart is complete, the block is shown in the left-hand pane of RollCall Control Panel.

Step 8: Repeat for Each Video IP Block

1 For each of the MV-821-IP Video IP blocks, re-do:

- from sub-section Step 2: Connect RollCall Control Panel to Video IP Block, on page 113;
- to sub-section Step 7: Restart, on page 115.

Lastly

When all Video IP blocks are configured, then the media IP network interfaces are then ready to be configured to send/receive video IP streams. This is typically done with the GV Orbit Client tool to configure IP flows.
See Configuring IP Flows, on page 116 for video IP stream configuration instructions.

> Note: The control interface of a Video IP block is accessible via:
>
> a) the 'CONTROL A' or 'CONTROL B' rear network connectors (for out-of-band control); and
>
> b) the block's (configured) media network (QSFP) interfaces (for in-band control).

Configuring IP Flows

This sub-section is applicable to MV-821-IP products and should be carried out after Video IP Blocks, on page 113. A house video IP routing system is required.

After an MV-821-IP unit is set up as per Video IP Blocks, on page 113, the unit's media IP network connections are ready to be configured to send or receive video IP streams. This may be done in the following ways:

a) GV Orbit (recommended)

Use the GV Orbit Client IP routing tool in a Grass Valley video IP routing system. (See Setting Up with Orbit, on page 116.)

b) Manually (not recommended)

(See Setting Up IP Flows Manually, on page 120.)

c) Third-party

Use a Grass Valley IQTIC modular card to interface to a third-party video routing controller system. This uses the SDC-01 open-API protocol (specification available from Grass Valley).

Setting Up with Orbit

Use this sub-section if using a Grass Valley video IP routing system and Orbit.

When the media IP interfaces are connected to the house video IP network, the four MV-821-IP Video IP blocks are discoverable by Orbit. (GV Orbit Client runs on a client PC connected to the house video IP network.)

Set up Orbit Devices:

In the Orbit **Devices** tab:

1 Find the four newly-discovered **Device** items which are the four Video IP blocks of the MV-821-IP unit.
Note: GV Orbit treats each Video IP block as a *separate* video IP device.

Note: Identify the four individual Video IP blocks by the media network interface IP addresses listed.

The newly-discovered devices are assigned a unique GUID (**Device GUID**) which is also initially used as the **Device Name**.

Fig. 5-3: Discovered Devices in Orbit

2 For each newly-discovered device,
   enter a **Device Name** for each MV-821-IP Video IP block:

   • Click in the **Device Name** text field and type in the new name.

   • Press 'enter' on the keyboard to enter the new name into the text field.

New device names added

Fig. 5-4: New Device Names Added

To check IP link connection from Orbit Client to the devices:

3 Click the **Connection Scan** button in the menu bar and
   click **Start** in the **Connection Scan** dialog shown.

   Orbit tests its IP link connections to all devices.
   Link connection status is reported via icons adjacent to each IP address.

Connection status

🟢 Device reports its IP link is up.

⛔ Device reports its IP link is down.
   (Note: Reporting may use another open
   network connection.)

⬛ No IP link interface reported by device.
   (For example, the SFP may be not fitted or
   wrongly fitted.)

✅ Orbit has successfully pinged the device
   over the IP link.

⛔ Orbit unable to successfully ping the device
   over the IP link.

Fig. 5-5: Connection Status

Assign Router Ports In the Spigots Tab:

The MV-821-IP Video IP block's available spigots (input and output) are not yet assigned to router ports of the Grass Valley IP routing system. When they are assigned, then video routing to the MV-821-IP can be done.

For each MV-821-IP Video IP block device, do the following:

4 Expand the device item to view all of its spigots.

Click to expand or collapse item   Empty **Port Name** and **Port Number** columns
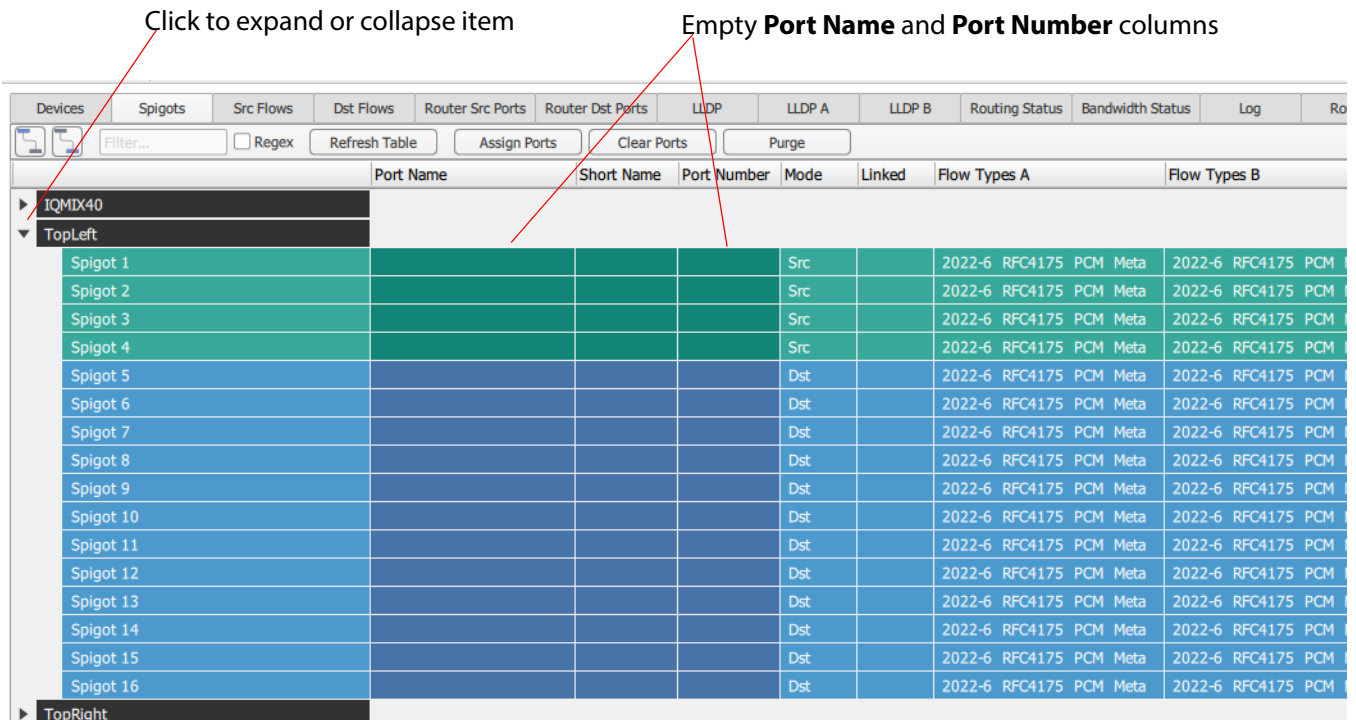
Fig. 5-6: Expanded Device to Show Spigots in Spigots Tab

There are four output spigots and 12 input spigots:

- Spigots 1 to 4 are outputs; these can transmit video multicast IP streams. They can act as video router sources.

- Spigots 5 to 16 are inputs; these can receive video multicast IP streams. They can act as video router destinations.

5 Right-click on one of the MV-821-IP Video IP block devices and click **Assign Ports** in the drop-down menu.

The **Assign Port Mappings** dialog is shown. See Figure 5-7.
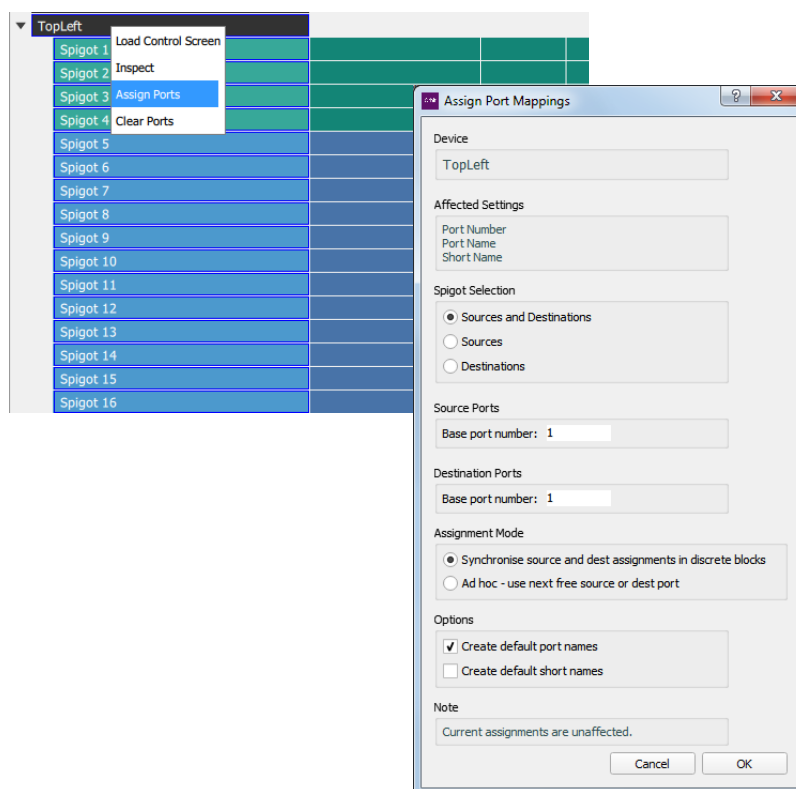
Fig. 5-7: Assign Port Mappings Dialog

In the **Assign Port Mappings** dialog:

6 Verify that:

 a) The selected device shown is correct.

 b) **Sources and Destinations** is selected.

 c) Source 'Base port number' is set to '1' and destination 'Base port number' is set to '1'.

 d) **Create default port names** is selected.

7 Click **OK**.

 Router port numbers and port names are assigned to the Video IP block's spigots.

8 Repeat from step 5 for each Video IP block.

This has now assigned video router ports (of a Grass Valley IP routing system) to all video IP inputs (router sources) and outputs (router destinations) of the MV-821-IP unit.

Routing Video IP Signals:

Video signals of the video IP router can now be routed to destinations ports of the MV-821-IP unit.

9 Route video IP signals to each of the 48 video inputs of the MV-821-IP unit in the usual way for the video IP router system. For example, via a soft or a hard router control panel.

 The Grass Valley video IP routing control system then:

 a) interprets the control panel route commands;

 b) routes the multicast IP flows to the device; and

 c) sets up the destination device to receive the multicast IP flows.

Setting Up IP Flows Manually

Manual setting of video IP stream parameters is not recommended because several precise settings changes are required when routing just one video IP signal to the MV-821-IP unit. With up to 48 video inputs to the multiviewer, such manual changes are not practicable.

The following instructions are presented to illustrate which settings changes occur within a Video IP block when a video IP signal is routed to a video IP input spigot in a video IP routing system.

Details of the house video IP routing system must be known, including IP addresses and IP port settings of devices and multicast streams.

Each video IP signal may comprise a video, an audio and a metadata essence. Each essence is carried in an IP data flow. Each type of IP flow is a multicast IP stream and requires both multicast and source IP address and IP port parameters to be set.

Setting Up IP Flows for a Video IP Input Spigot:

Each Video IP block has 12 video IP input 'spigots' (spigots 5 to 16, destination spigots).

Note: The first video IP input of a Video IP block is spigot 5.

The instructions below use spigot 5 as an example to set up IP flows for the spigot.

With the Video IP block connected to the house video IP network via the QSFP cables, to configure the spigot to accept a certain video IP signal:

1 Show the Video IP block's **Spigot 5** RollCall template.

(Figure 5-8 shows a Spigot template.)

Take button
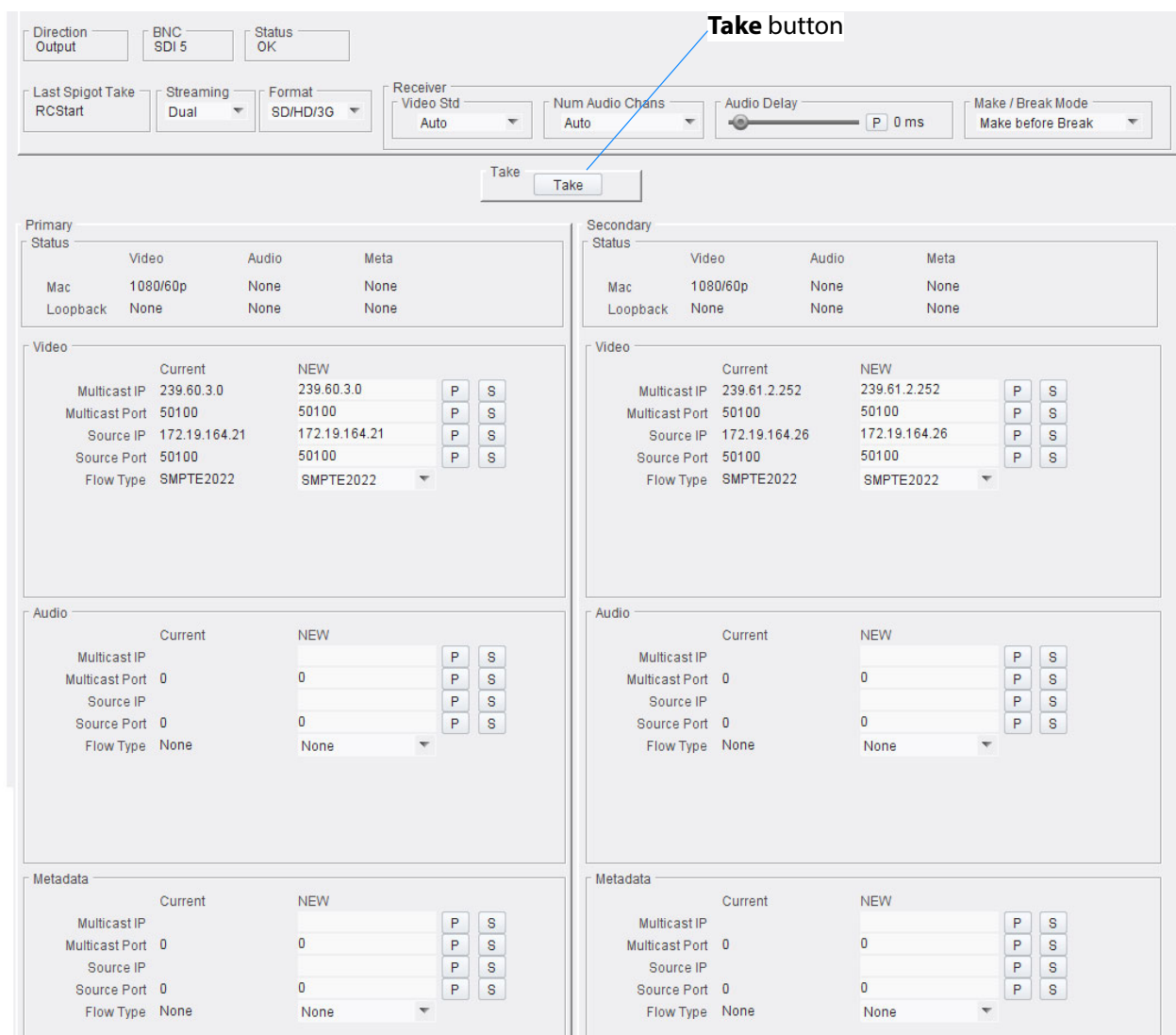
Fig. 5-8: Spigot Template

2 Type new parameter values into the template's data fields for the following settings, shown in Table 5-2 (click **S** each time to enter the value into the field):

Table 5-2: Destination Spigot IP Flow Parameters

Template Panel		Multicast IP address	Multicast IP port	Source IP address	Source IP port	Flow Type
Primary	**Video**	✓	✓	✓	✓	✓
	Audio	✓	✓	✓	✓	✓
	Metadata	✓	✓	✓	✓	✓
Secondary (redundancy)	**Video**	✓	✓	✓	✓	✓
	Audio	✓	✓	✓	✓	✓
	Metadata	✓	✓	✓	✓	✓

3 Click **Take** on the template to make the new spigot IP flow settings take effect.

Note: This template **Take** is a non-optimized operation and may take up to 10 seconds to complete.

The spigot will now accept the new multicast flows. But only if they are presented on the corresponding rear media IP interfaces of the MV-821-IP - i.e. the multicast IP flows must be routed to the corresponding MV-821-IP media network interfaces.

Changing a Video Input to the MV-821-IP Unit

The full sequence of events for a change over of video IP input signal to the unit is:

1 Route new video IP signal (i.e. all the corresponding multicast IP streams) to the MV-821-IPs media network interface(s).

2 Set the spigot to accept the new video IP signal. (See the steps above.)

3 'Unroute' the old video IP signal.

Setting Up a Video IP Output

Each Video IP block has four video IP output 'spigots' (spigots 1 to 4, source spigots).

With the Video IP block connected to the house video IP network via the QSFP cables, to set the spigot to transmit video data:

1 Show the Video IP block's **Spigot 1** RollCall template.

(Figure 5-9 shows a source spigot template.)

2 Enter new parameter values in the template's data fields for the following settings in Table 5-3 (click **S** each time to enter the value into the field):

Table 5-3: Destination Spigot IP Flow Parameters

Template Panel		Multicast IP address	Multicast IP port	Source IP address	Source IP port	Flow Type
Primary	**Video**	✔	✔	✔	✔	✔
	(Video†)	(✔)	(✔)	(✔)	(✔)	(✔)
	Audio	✔	✔	✔	✔	✔
	Metadata	✔	✔	✔	✔	✔
Secondary (redundancy)	**Video**	✔	✔	✔	✔	✔
	(Video†)	(✔)	(✔)	(✔)	(✔)	(✔)
	Audio	✔	✔	✔	✔	✔
	Metadata	✔	✔	✔	✔	✔
† Two video flows are possible from the spigot. Only one needs defining per Primary or Secondary spigot to get started.						

3 Click **Take** on the template to make the new spigot IP flow settings take effect.

The spigot will now transmit multicast IP flows on the rear media IP interfaces of the MV-821-IP.

Note: This **Take** operation from the template is a non-optimized operation
and may take up to 10 seconds to complete.

Take button

Fig. 5-9: Source Spigot Template

Test Pattern Generator

Each of the four Video IP blocks in an MV-821-IP unit can source up to four video IP streams.

- Three blocks may be used to output full-resolution copies of the multiviewer head display outputs 1 to 12. Licenses are required for display outputs 5 to 12.

- One block has four IP outputs which are unused for multiviewer head display outputs.

  (Rear QSFP Cages - Media Network Interface Information, on page 147 defines which blocks source display outputs
  and Rear QSFP Cages - Media Network Interface Information, on page 147 defines which QSFP connector is used.)

Any of the blocks can source a video IP test pattern on any of their IP outputs. IP flow settings must be set up on the output spigot (source spigot) concerned (with the corresponding **Spigot** RollCall template).

A block's **TPG** RollCall template controls the test pattern generation.

Loopback Router

The Loopback Router is a useful facility on each Video IP block. It enables any of the block's four video IP outputs to be locally route to any of the block's 12 video IP inputs. This is controlled with the block's **Loopback Router** RollCall template. (See Loopback Router Template, on page 104.)

Maintenance - Hardware

<div style="text-align: right">6</div>

Maintenance - Hardware

This section contains instruction on the removal and fitting of various hardware module items. Some removal/re-fitting operations are only for trained personnel to carry out and this is marked in each sub-section.

Fitting Video SFP Modules

SFP modules are fitted into the MV-821 Multiviewer chassis at the rear for:

- Video head display outputs (Coax, Fiber or HDMI Video SFPs).
- Network interface ports (Ethernet SFPs).

> Note: SFP module types:
>
> Ethernet SFP modules and Video SFP modules are *different*.

Ethernet SFPs (Multiviewer Control and Monitoring Interface)

Ethernet SFP modules are already fitted to the MV-821 unit. They are not interchangeable with video SFP modules. However, fitting and removal instructions are similar to video SFPs.

Video SFPs (Multiviewer Head Display Outputs)

This sub-section provides SFP video module fitting guidelines.

> Note: It is possible to hot-plug SFP modules.

Before inserting the SFP modules, take notice of the required SFP orientation for fitting into the SFP cages of the MV-821 Rear Panel, as shown in Figure 6-1.

Note the orientation of the SFPs in this figure.

Coax SFP   Fiber SFP

SFP Fiber Blanking Plug
(Black plastic protective dust cap, fits into Fiber SFP)

Specimen SFP module

SFP Blank plug
(fits into cage)

Display Outputs 1&2,   3&4,   5&6,   7&8,   9&10,   11&12.
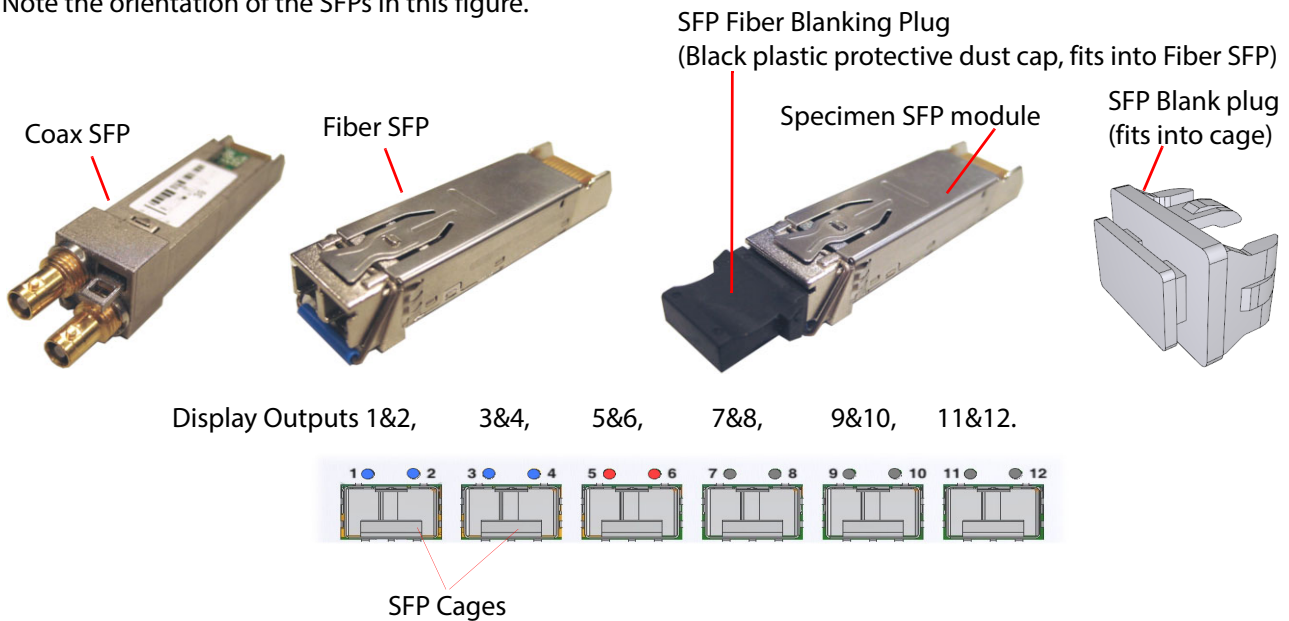
SFP Cages

Fig. 6-1: SFP orientation for fitting into MV-821 Rear Panel SFP cages

> Note: SFP orientation:
>
> The SFP orientation in the MV-821 chassis may be different to other equipment. This is because of the internal mechanics of the MV-821 chassis.
>
> See Figure 6-1 for SFP orientation.

Inserting SFPs:

Start by filling the SFP cage for output pair 1 & 2, then 3 & 4 etc., see Figure 6-1.

Procedure:

  1 Insert the SFP video modules into the SFP cages on the MV-821 Rear.

  2 The SFP modules slide in until there is an audible click.

  3 Fill any remaining cages with the supplied SFP blanking plugs (SFP-BLANK).

Removing SFPs:

SFP module removal, if required, is achieved by operating a small lever or lever-bar on the SFP module before sliding the SFP video module out of its cage.

Fitting/Removing Video QSFP28 Transceiver Modules

QSFP28 transceiver modules may be fitted into the MV-821-IP unit in the rear QSFP+ cages, for the media IP network interface connections.

Note:	QSFP28 modules may be hot-plugged.

The MV-821-IP unit ships with QSFP blanking covers fitted into each rear QSFP+ cage.

MV-821-IP unit rear QSFP28 module connections

1) Remove QSFP+ blanking cover.

2) Push QSFP28 module into the rear QSFP+ cage until a click is heard

MV-821-IP Rear QSFP+ cages

3) Pull handle to remove QSFP28 module from cage

QSFP28 transceiver module

QSFP28 module handle
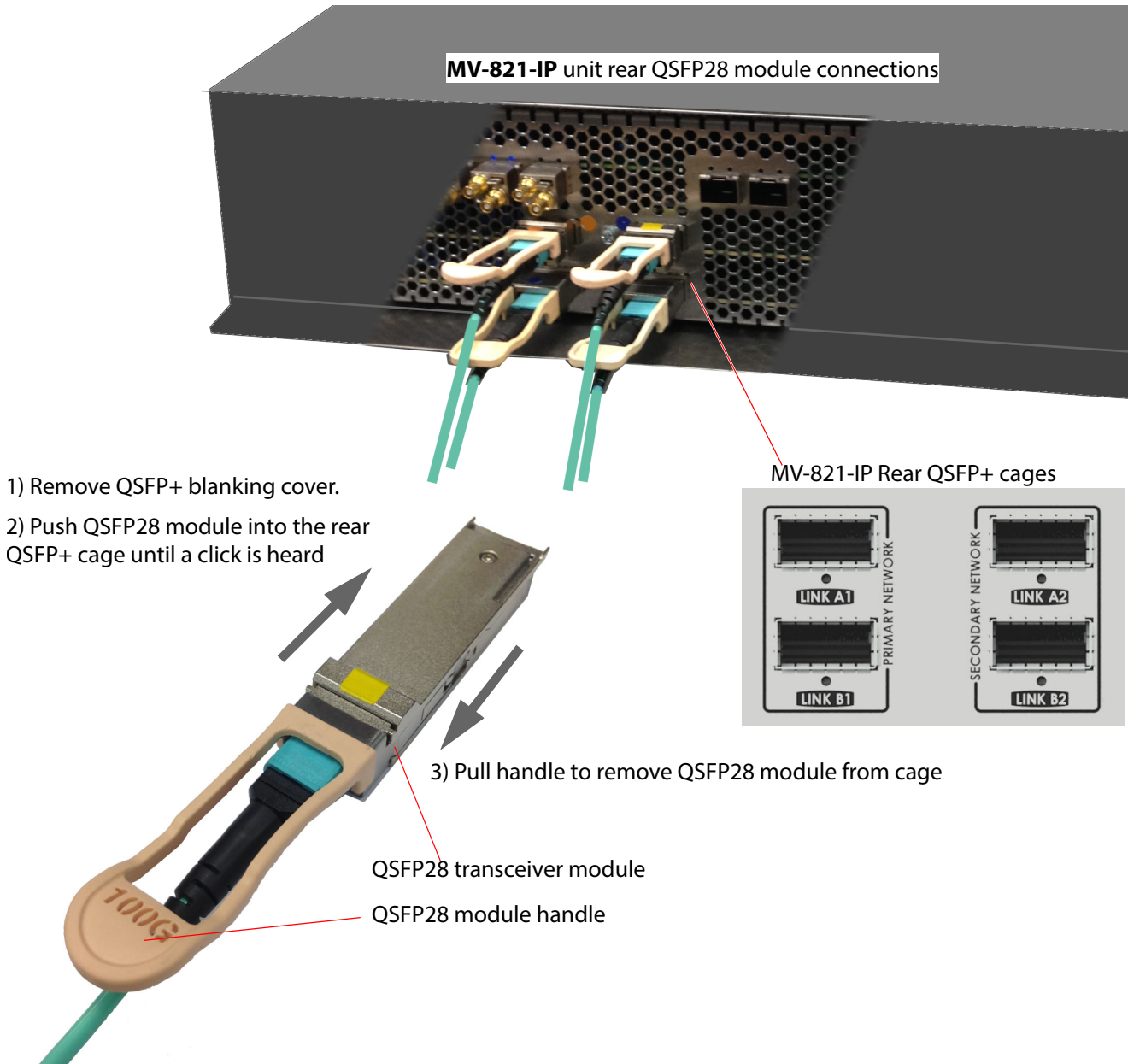
Fig. 6-2: QSFP28 Transceivers and MV-821-IP Rear QSFP+ Cages

Power Supply Units

> **WARNING**
>
> To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

The MV-821 Multiviewer has independent modular dual-redundant power supply units (PSUs). Either PSU can supply enough power to the MV-821 chassis. The units are hot-swappable.

Note: To ensure full dual redundancy, the two power supplies must be powered from independent power sources.
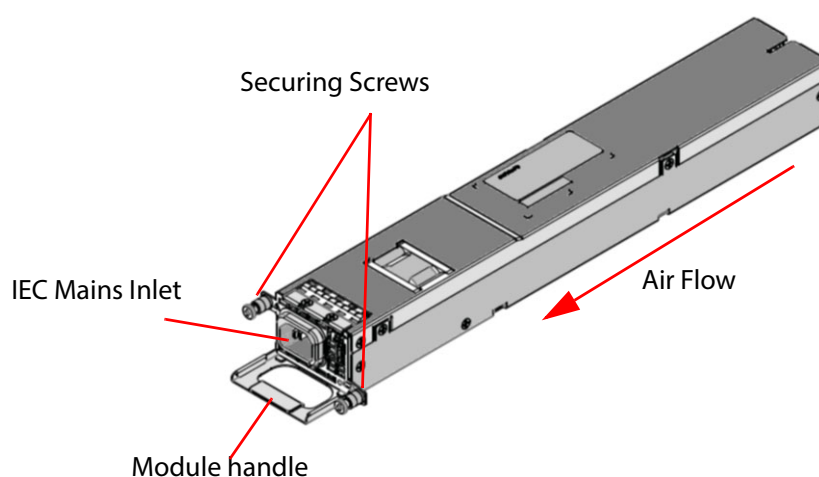
Fig. 6-3: MV-821 Multiviewer PSU Module (Grass Valley stock code FGAMV 820-PSU)

Two PSU modules are fitted into the rear of the MV-821 chassis. Each is secured with two fixing screws, see Figure 6-4.

Each PSU has an IEC mains inlet and a status LED. The PSU status LEDs are described in Rear Connectors - Mains Inlets, on page 34.
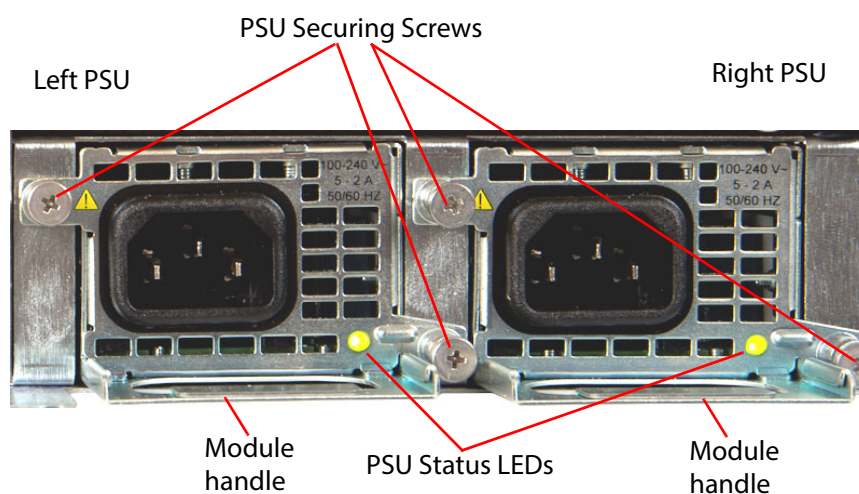
Fig. 6-4: MV-821 Multiviewer Rear PSU modules

There are no On/Off switches for the power supplies; the MV-821 Multiviewer will power up as soon as the AC Power Cords are plugged into the IEC connectors and the AC mains supply is on.

⚠️ IMPORTANT
The PSU modules are marked with a symbol, indicating that hazardous voltages are present inside the module.

IMPORTANT
PSU Modules:

- Contain **No User Serviceable Parts**.
- Contain an integral fuse, which is not user replaceable.
- Should only be replaced or serviced by trained personnel.

A faulty PSU module should be replaced immediately by a trained person.

The PSU modules are hot-swappable.

The MV-821 Multiviewer may be powered on while one PSU module is removed or fitted.

PSU Module Removal

IMPORTANT Removal of PSUs should only be attempted by trained personnel.

A pozidriv screwdriver is required.

To remove a PSU module:

1 Identify the PSU module to be removed and disconnect its mains power cord.
   If the MV-821 Multiviewer is powered on, it should continue to operate using the second PSU module.
2 Unscrew two PSU securing screws, see Figure 6-4.
3 Carefully pull the PSU module out of the MV-821 chassis, using the PSU handle, see Figure 6-3.

PSU Module Fitting

IMPORTANT Fitting of PSUs should only be attempted by trained personnel.

A pozidriv screwdriver is required.

To fit a PSU module:

1 Note the orientation of a PSU module in the MV-821 chassis, see Figure 6-4.
2 Carefully insert the PSU module into the empty PSU module slot at the chassis rear. When the module is nearly fully pushed in, an increased resistance is met as the module's DC connector engages with the chassis.
   The module should be finally fully pushed in.
3 Tighten the two PSU securing screws, see Figure 6-4.
   Do not over-tighten the screws.
4 Connect a power cord and switch the mains supply on.
   The module starts up and the PSU status LED should be lit green.

The MV-821 Multiviewer operation should be uninterrupted if only one of the two PSU modules are removed.

The status LED is described in Rear Connectors - Mains Inlets, on page 34.

MV-821 Main Front Module

The MV-821 main front module fits into the front of the MV-821 Multiviewer and is common to all product versions; the module is not a serviceable item and is not normally removed. The MV-821 Multiviewer does not function without the main module and the module is not hot-pluggable.

> IMPORTANT
> Removal of the Main Front Module should only be attempted by trained personnel.

For front door opening instructions, see Chassis Front, on page 22.
With the front door open and dropped down, the front MV-821 Main Module can be seen in the top half of the chassis frame, see Figure 6-5.

MV-821 Main Module
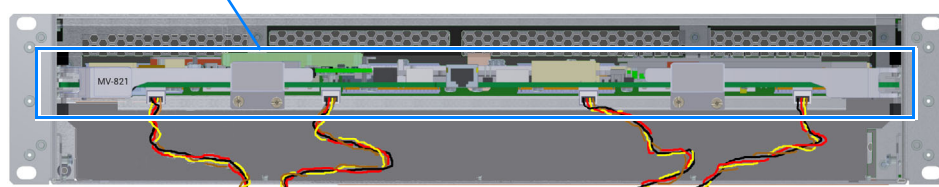
Fig. 6-5: MV-821 Multiviewer Front View with Front Door Open

> Note: Keep chassis door closed:
>
> The front door should not need to be opened in normal operation. The MV-821 Main Module is not a serviceable item.
>
> Close the front door when the equipment is powered, to maintain cooling airflow.

The module is shown in Figure 6-6.

Ejector levers

Module Retention Brackets
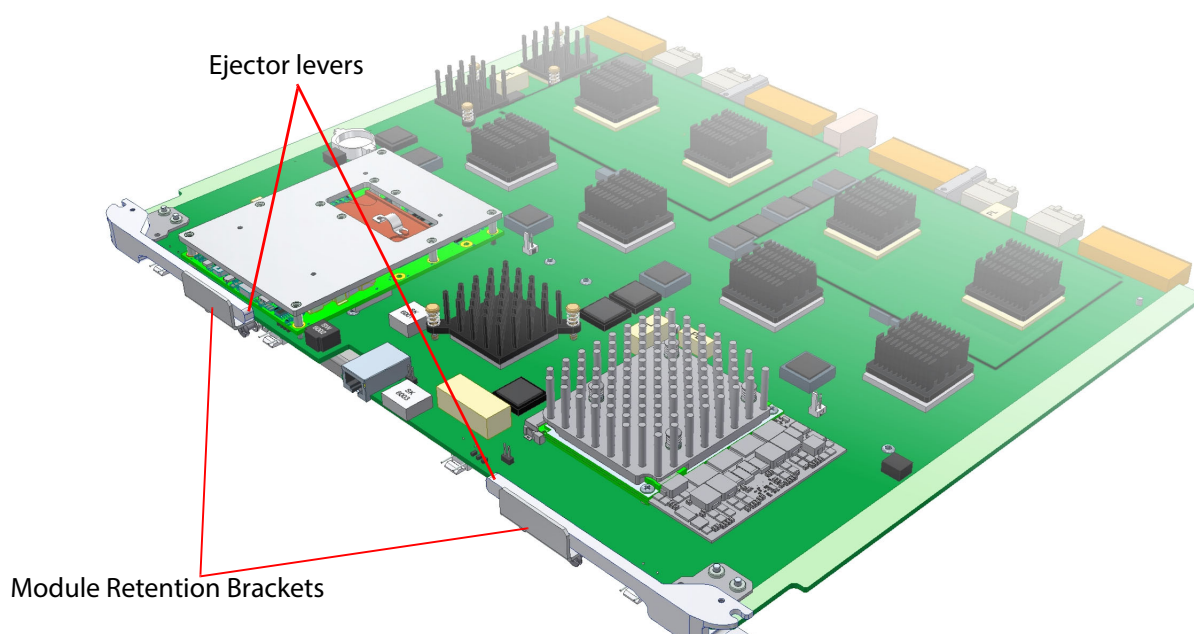
Fig. 6-6: MV-821 Multiviewer Main Front Module

LED status indicators and connectors on the upper and lower front edge of the main module are described in Front Controls and Indicators, on page 24.

The Main Module is retained in the chassis with two Retention Brackets, each attached to the module's lower Strengthener Bar with two captive screws. See Figure 6-7.

Note: Do not remove the MV-821 top lid. (This photograph was only taken with the lid removed for lighting reasons.)

Main Module

MV-821 front open

Ejector Lever

Strengthener Bar

Retention Bracket

Fan supply connector (1 of 4) on front edge of front main module

Retention Bracket securing screws (captive)
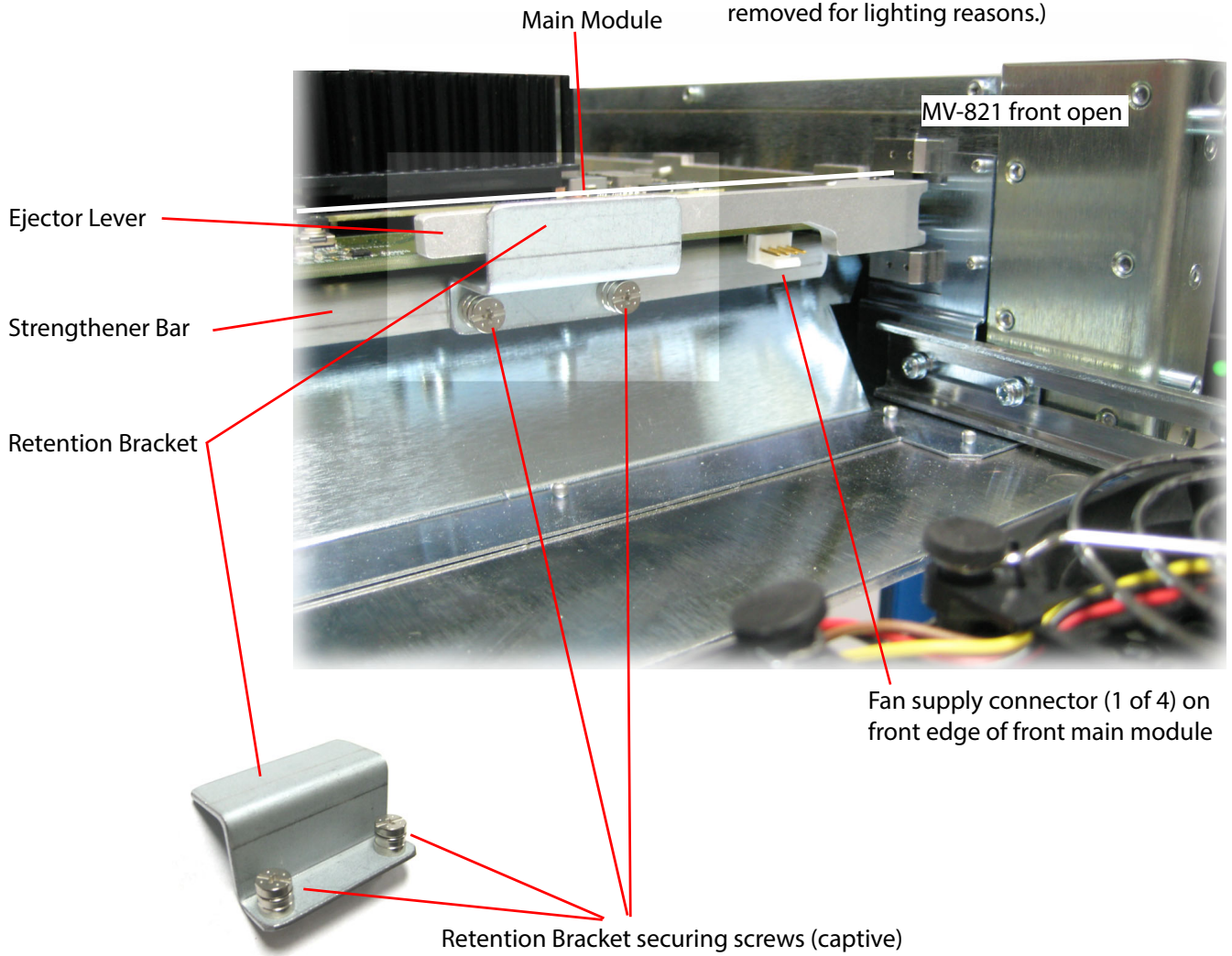
Fig. 6-7: Main Module Retention Bracket and Strengthener Bar

Main Front Module Removal

The MV-821 main front module is not a serviceable item and is not normally removed.

> IMPORTANT
> Removal of the Main Front Module should only be attempted by trained personnel.

Electrostatic Damage

Static precautions must be observed when touching or handling modules.

Note: When removing or fitting the main front module, the front door should be closed as soon as possible after opening. This ensures correct ventilation and operation of the router frame.

Removal of the MV-821 main front module is only required if the module were to have a fault.

Note: Tools required:
  • Small pozi-drive screw driver, or a flat blade screwdriver.

The MV-821 Multiviewer should be powered down for main module removal/fitting.

To remove the MV-821 main front module:

1 Disconnect both mains cords from the MV-821 Multiviewer unit.
   This powers down the unit.
2 Open the front door of the MV-821. (See To Open the Front Door, on page 22.)

3 Disconnect the four door-fan supply wires from the front of the MV-821 main front module. See Figure 6-8.

a)

b)

Fig. 6-8: Door-Fan Supply Wires:
  a) Fan Wires Connected to MV-821 Main Module.
  b) Fan Wires Disconnected.

4 Unscrew the two captive screws securing one of the Retention Brackets. Remove the Retention Bracket and keep it aside. See Figure 6-7 and Figure 6-9.

5 Similarly, remove the other Retention Bracket.

Retention Brackets
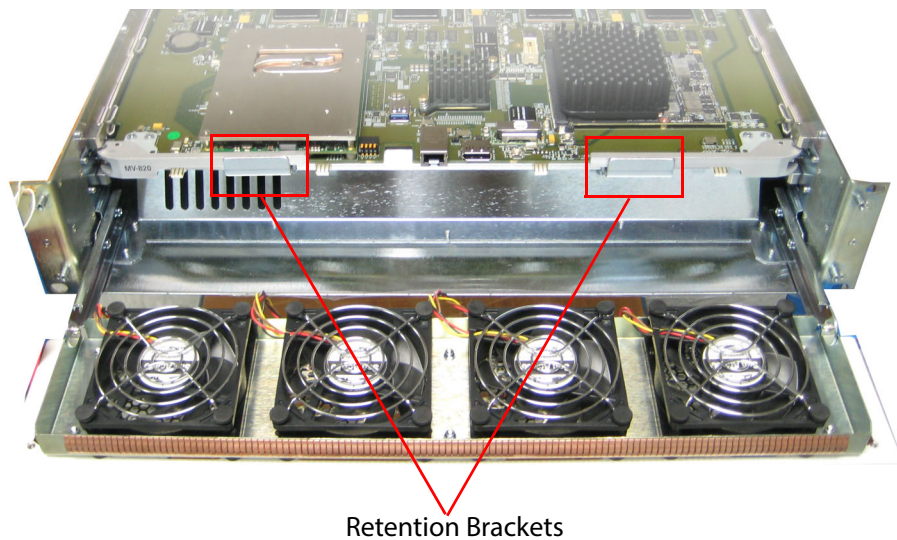
Fig. 6-9: Retention Bracket Locations

6 Remove the front module by pulling on the two module eject levers, which hinge on the left and right. See Figure 6-10.
The module disengages with the chassis and slides out.

Chassis

(1) Pull Out Ejector Levers

Main Module

Chassis

(2) Pull Out Module with Levers

Chassis

(3) Slide Module out of Chassis
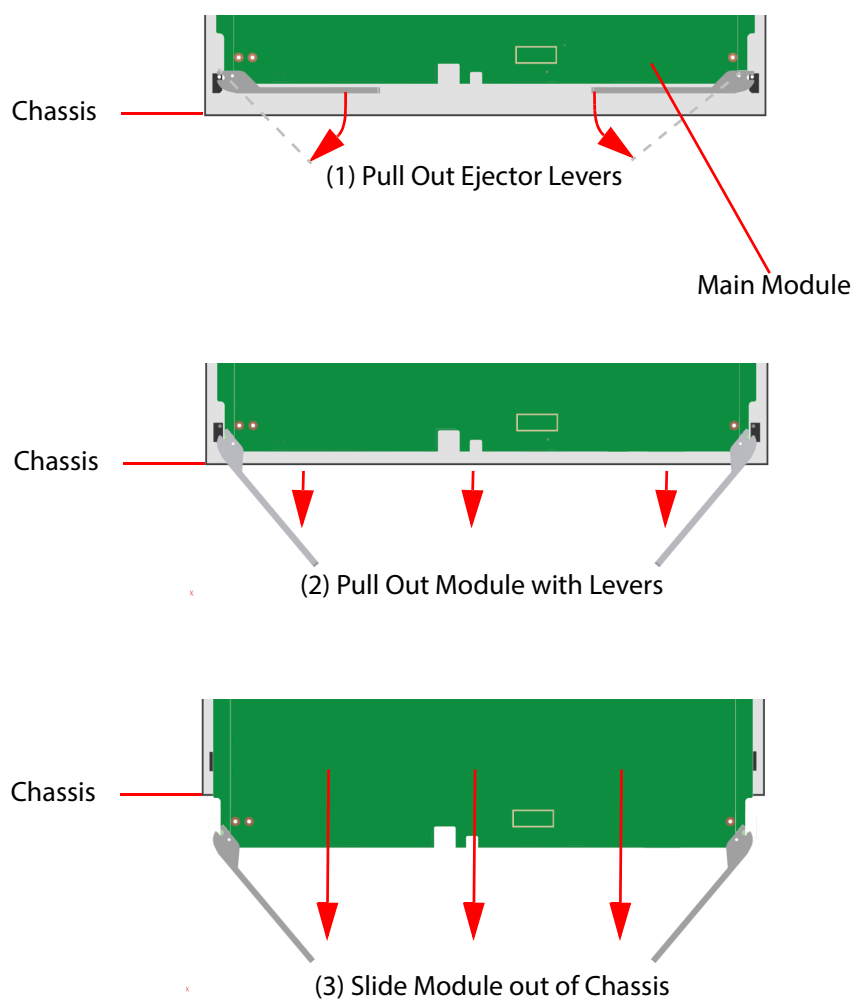
Fig. 6-10: Removing MV-821 Multiviewer Main Module

IMPORTANT
When removing a module:
- Take care not to knock high components mounted on the top- or on the bottom-side of the module.
- Take care to avoid snagging on the fan wiring.

The Main Module is now removed.

7 Proceed to fit a replacement Main Module,
see Main Module Fitting, on page 136.

The MV-821 will not operate without a main front module.

Main Module Fitting

The MV-821 main front module is not a serviceable item and is not normally removed/re-fitted.

IMPORTANT
Re-fitting of the Main Front Module should only be attempted by trained personnel.

Electrostatic Damage

Static precautions must be observed when touching or handling modules.

Note: When removing or fitting the main front module, the front door should be closed as soon as possible after opening. This ensures correct ventilation and operation of the router frame.

Note:

When inserting a module into the front of a MV-821 Multiviewer chassis:

- Check the module is the correct one for the chassis frame.
- Check there are no obstructions or damage at the module connectors.
- Check for any high components on the module's top- or under-side. Do not knock these during fitting.
- Insert the module into the chassis module slot and slide the module into the chassis frame.
- In the last few millimeters of travel, the module connectors mate with the chassis. Some resistance will be met; ease, but do not force, the module in with the levers.
- If excessive resistance is met:
  - Remove the module and re-check that the module and slot are correct.
  - Check the slot for any obstruction.
  - Check the module connectors for any damage or foreign objects.
- In the final few millimeters of travel, the levers engage with the chassis frame, locking the module into position.

IMPORTANT **High Components:**

When inserting a module - Take care not to knock high components which are mounted on the top- or on the under-side of the module.

CAUTION
The MV-821 Main Front Module is **not** hot-pluggable.

These instructions follow on from the module removal instructions of

> Note: Items required:
> - Small pozi-drive screw driver, or a flat blade screwdriver.
> - 2-off Module Retention Brackets.

The unit should already be powered down and have no main module fitted.

To fit a main module:

1 If the Main Module has the Retention Brackets already fitted,
   then remove the brackets by unscrewing two captive screws securing each of them.

2 Open the front door of the MV-821.
   (See To Open the Front Door, on page 22.)

3 Engage the MV-821 Main Module sides with the guides in the chassis.

4 Push the module levers and slide the module into the slot.
   In the final few millimeters of travel, the module connectors mate with the internal chassis motherboard and the ejector levers engage with the router frame, locking the module into position. See Figure 6-11.
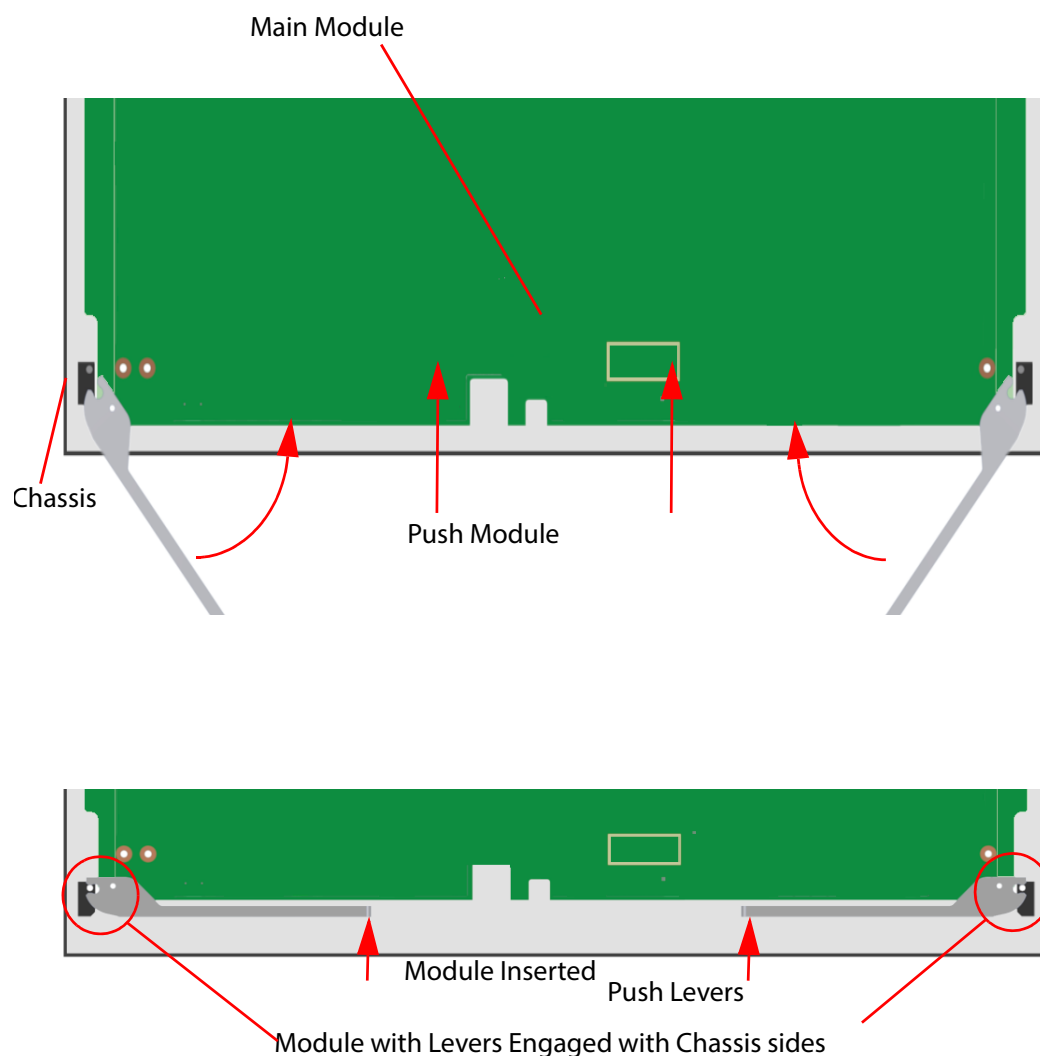
Fig. 6-11: Inserting MV-821 Multiviewer Main Front Module

The module is inserted into the chassis. Now fit the Retention Brackets and close the front door:

5   Fit one Retention Bracket onto the module's Strengthener Bar and secure by tightening the two captive securing screws.
    See Figure 6-7 and Figure 6-9.

    Similarly, fit the other Retention Bracket

6   Reconnect the four door-fan supply wires to the headers on the main front module.
    Check they are pushed onto the main front module headers fully and securely.
    See Figure 6-8.

7   Close and secure the chassis front door.
    (See To Close the Front Door, on page 22.)

8   Reconnect both mains cords to the MV-821 Multiviewer unit.
    This powers the unit.

9   Check that the front door-fans are all operating.

The main module is now fitted into the MV-821 Multiviewer chassis.

When the MV-821 is powered on, the main module starts to boot up. Start-up lasts 2 to 3 minutes and a splash-screen is shown on the head display outputs after 1 minute until booting is complete.

See Booting and Splash Screen, on page 49 for a description of the unit start up.

MV-821 Specification

MV-821 Specification

Physical/Electrical

Power

Power			
MV-821 Maximum Power consumption	**Unit:**	**Without 'H.264 Stream' option fitted:**	**With 'H.264 Stream' option fitted:**
	MV-821-HDBNC	275 W	290 W
	MV-821-IP	465 W	480 W
Inrush Current	6.5 A (MV-821-HDBNC) 6.5 A (MV-821-IP)		

Operating Environment

Environmental	
Operating Temperature	5ºC to 30ºC ambient.
Relative Humidity	10 to 90% (non-condensing)

Weight

Product	
MV-821-HDBNC	14 kg (~30.3 lb)
MV-821-IP	14.5 kg (~32.0 lb)

Overall Dimensions

Dimensions	
Width	482.6 mm (~ 19 in.)
Depth	604.8 mm (~ 23.8 in.)
Height	87.0 mm (~ 3.42 in.)
Note:	See MV-821 Dimensions, on page 149 for an MV-821 dimension drawing.

Video Inputs

T

Video Inputs	
MV-821-HDBNC	48-off 12G HD-BNCs. 75 ohm.
Data Rate	270 Mb/s to 11.88 Gb/s.
Return Loss	>15 dB, 10 MHz to 1.5 GHz >10 dB, 1.5 GHz to 3 GHz > 7 dB, 3 GHz to 6 GHz > 4 dB, 6 GHz to 12 GHz
Signal Amplitude	800 mV ±10% pk-pk
DC Offset	<5V
Cable Equalization	Automatic for: Up to 350 m (1150 feet) Belden 1694A at SD rates Up to 200 m (650 feet) Belden 1694A at HD Up to 90 m (295 feet) Belden 1694A at 3G Up to 60 m (195 feet) Belden 4694R at 12G
MV-821-IP	48-off video inputs via rear IP media network connections.
Video Standards	SD-SDI 525/59.94 and 625/50
	HD-SDI 720p (50,59.94, 60 frames/s)
	HD-SDI 1080i (25, 29.97 and 30 frames/s)
	HD-SDI 1080p (25, 29.97 and 30 sF)
	3G-SDI 1080p (50, 59.94 and 60 frames/s)
	6G-SDI 2160p (25, 29.97 and 30 frames/s)
	12G-SDI 2160p (50, 59.94 and 60 frames/s)

Analog Reference

Signal	
Reference Connection	Input + Loop-through Output
	2-off (MV-821-HDBNC)
	1-off (MV-821-IP)
Connector	BNC 75 ohm connector, unterminated.
Video Standard	±300mV tri-level HD sync or 300mV SD sync with burst according to system standard

TV Standards

Video Standard			
12G-SDI:	2160p	59.94Hz 60Hz 50Hz	SMPTE 2082 2160p 12G-SDI
6G-SDI:	2160p	29.97 Hz 30 Hz 25 Hz	SMPTE 2081 2160p 6G-SDI
3G-SDI:	1080p	59.94Hz 60Hz 50Hz	SMPTE 424M/Level A and SMPTE 424M/Level B
HD-SDI: **1.485 Gbps**	1080i	60Hz 59.94Hz 50Hz	(ANSI/SMPTE-274M(4), -292M(D)) (ANSI/SMPTE-274M(5), -292M(E)) (ANSI/SMPTE-274M(6), -292M(F))
	1035i	60Hz 59.94Hz	(ANSI/SMPTE-260M, -292M(A)) (ANSI/SMPTE-260M, -292M(B))
	1080p	30Hz sF 29.97Hz sF 25Hz sF 24Hz sF 23.976Hz sF	(ANSI/SMPTE-274M(12) as per RP211) (ANSI/SMPTE-274M(13) as per RP211) (ANSI/SMPTE-274M(14) as per RP211) (ANSI/SMPTE-274M(15) as per RP211) (ANSI/SMPTE-274M(16) as per RP211)
	1080p	30Hz 29.97Hz 25Hz 24Hz 23.976Hz	(ANSI/SMPTE-274M(7)-292M(G)) (ANSI/SMPTE-274M(8)-292M(H)) (ANSI/SMPTE-274M(9)-292M(I)) (ANSI/SMPTE-274M(10)-292M(J)) (ANSI/SMPTE-274M(11)-292M(K))
	720p	60Hz 59.94Hz 50Hz	(ANSI/SMPTE-296M(1)-292M(L)) (ANSI/SMPTE-296M(2)-292M(M)) (ANSI/SMPTE-296M(2)-292M(M))
SD Video Standards	525	60Hz/ 59.94Hz4:3/ 16:9	(ITU-R BT.601-5, ANSI/SMPTE-259M(2)
	625	50Hz4:3/ 16:9	(ITU-R BT.601-5, ANSI/SMPTE-259M(2)
Video IP Stream Inputs			Unicast and IGMPv3 source-specific multicast SMPTE 2022-6/7 SMPTE 2110 / RFC 4175 SMPTE-291M /IETF *RTP Payload for Ancillary Data*
IP Stream Timing and Synchronization			IEEE-1588v2 (PTP) compliant with SMPTE-2059-2

Outputs

Head Display Outputs	
SDI	6-off SFP cages to provide 4 to 12 enabled SDI video outputs via SFPs. • Outputs 1 to 4 on enabled as standard on MV-821. • Outputs 5 to 12 enabled with MV-821 output licenses. Optional SFPs: • Dual coax SFP, 2-off HD-BNC 75R • Dual Fiber SFP. • Single HDMI SFPs. (Up to 6 x HDMI outputs, 1080p)
Reference	Head Display Outputs locked to: • External Reference. • Or Internal Reference (free running).
Video Standard	Video Standard on head display outputs: • 3G 1080p, or HD 720p • 50, 59.94 & 60 frames/s.
Delay	Latency: Progressive: 1 input frame + 1 to 3 output frames. Interlaced: 1 input field + 1 to 3 output frames.
Streaming	MV-821-IP only. Head display outputs can be streamed out of rear media network connections. Links A1 through to Link B2. • SMPTE 2022-6/-7 • SMPTE 2110
H.264 Streaming Out of Scaled, H.264-encoded Video Input-Copies	
Output H.264 Streams	Up to 48-off RTSP H.264 streams. H.264-encoded, scaled copies of the multiviewer inputs. ('H.264 Stream' license required with factory-fitted codec modules.) User applications include: confidence monitoring, compliance monitoring. **Note:** The H.264 streams do not function for the following slower-frame-rate HD standards: • 1080p30 (and slower frame rates); and • 720p30 (and slower frame rates).
Ethernet Port	The H.264-encoded and scaled multiviewer input-copies are streamed out from the 'multiviewer block' 'control and monitoring' Ethernet ports (i.e. 'MV Control 1' and 'MV Control 2'). These H.264 streams can be viewed on desktop PCs via the GV Orbit Client, or other suitable software.

GPI and LTC

GPI	
Connector	26 Way High Density D-Type female connector.
	Programmable GPIO Tally with TTL-level/contact-closure inputs for GPI
	See Section Rear Connectors - LTC and GPI, on page 37, for wiring details and pinout.

Power Supplies

Connectors	
Redundancy	Two fully independent hot-swappable PSU modules.
	Dual PSU redundancy requires two PSU modules.
Voltage	100 V - 240 V 50/60 Hz, 2 to 5 A
Maximum Input Power	500 Watts
PSU module weight	~ 1 kg
PSU module dimensions	2.15" x 13.67" x 1.58" (54.5 mm x 347.2 mm x 40.2 mm)
PSU module overall length	14.97" (380.2 mm) includes handle

Ethernet Rear Panel Connectors

MV-821-HDBNC Ethernet Connectors

y

Table A-1: MV-821-HDBNC Rear Panel Ethernet Connectors

Connector	RollCall Control Panel Template Reference	Interface Type	Default IP Address	Comment
1G ENET Port 1	1G1	1G Ethernet	**10.54.31.221**	SFP+ cage for Ethernet SFP. Typically RJ45 Ethernet socket fitted. Used for control and monitoring of the MV-821 multiviewer block.
1G ENET Port 2	1G2	1G Ethernet	**10.54.31.222**	

MV-821-IP Ethernet Connector Interfaces

Rear Network Connectors for MV-821-IP

Table A-2: MV-821-IP Rear Panel Ethernet Connectors

Connector	RollCall Control Panel Template Reference	Interface Type	Default IP Address	Comment
Multiviewer Block:				
MV CONTROL 1	1G1	1G Ethernet	**10.54.31.221**	SFP+ cage for Ethernet SFP. Typically RJ45 fitted. Used for control and monitoring of the MV-821 multiviewer block.
MV CONTROL 2	1G2	1G Ethernet	**10.54.31.222**	
Video IP Blocks:				
CONTROL A	-	1G Ethernet	Not applicable, no default IP address for connections CONTROL A/B. See **Note 1**	RJ45 connected to internal IP switch. Used for Video IP block control and monitoring. See Table A-3.
CONTROL B	-	1G Ethernet		
LINK A1	Ethernet 1 and Ethernet 2	100G Ethernet (2x50G)	Media IP links are not configured with default settings for shipping. See **Note 2**	Media IP links use a QSFP+ cage for video media IP network physical connections via QSFP28 modules/cables. Media IP links are 100G per physical connection. And each physical connection works as 2x 50G links. Each 50G link carries up to 12-off video IP streams. See **Note 3**.
LINK B1	Ethernet 1 and Ethernet 2	100G Ethernet (2x50G)		
LINK A2	Ethernet 1 and Ethernet 2	100G Ethernet (2x50G)		
LINK B2	Ethernet 1 and Ethernet 2	100G Ethernet (2x50G)		

Note 1: **Control A** and **Control B** are connected to an internal IP switch which allows access to the internal control Ethernet ports of each Video IP block. It is these internal control Ethernet ports which have default IP addresses set. See Table A-3.

Note 2: Media IP connections are not configured for shipping and there is no default IP address. The Video IP block media IP links must be configured as part of configuration of the Video IP blocks.

Note 3: SMPTE 2110-21 RTP stream sender and receiver buffer types:
  - Media IP link inputs: 'Wide'.
  - Media IP link outputs: 'Narrow'.

Rear QSFP Cages - Media Network Interface Information

Primary/Main   Secondary/Redundant
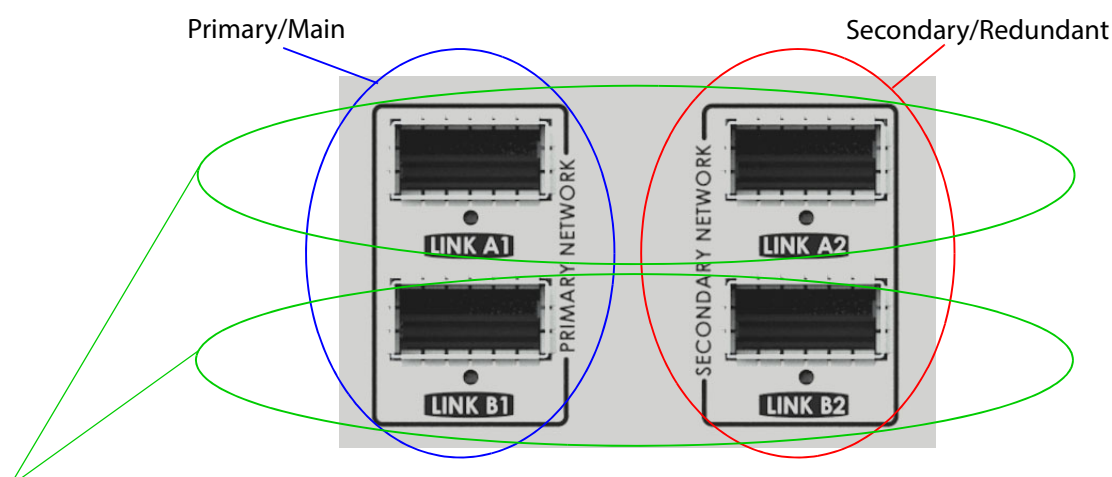
For details of which video input IP streams and multiviewer head display output video IP streams appear at these QSFP cages, see IP Input and Output Streaming, on page 13.

Fig. A-1: Four Rear Panel QSFP Cages

Video IP Blocks - Ethernet Control Interface Information

Use control interface rear connectors '**Control A**' or '**Control B**' to access the 1G Ethernet internal control port of each Video IP block. Table A-3 lists the default control IP address for each of the four internal Video IP blocks of an MV-821-IP unit. The table also shows which Video IP Input streams and which Head Display Output streams are associated with each block.

Table A-3: Default Control IP Addresses for Video IP Blocks of an MV-821-IP Unit

Internal Video IP block location (from rear of unit)	Video IP Block for...		Default Control Interface IP Address
	Video IP Inputs	**and Head Display Outputs**	
Top left	1 to 12	5 to 8	10.54.31.121
Top Right	13 to 24	1 to 4	10.54.31.122
Bottom Left	25 to 36	N/A, see Note 1	10.54.31.123
Bottom Right	37 to 48	9 to 12	10.54.31.124
Note 1:	Only three of the four video IP blocks within an MV-821-IP unit source Head Display Output IP streams (12 streams in total). Additionally, *any* video IP block (including the **Bottom Left** block) may be configured to source a video test pattern on each of its source spigots. (See TPG (Test Pattern Generator) Template, on page 61 for configuration information.)		

Unused Rear Panel Connectors

Connectors	
Monitor O/P	2-off. Not currently used.
USB	2-off (1-off for MV-821-IP): For engineering use.

Software Versions

Tool	Version	
RollCall Suite	4.19.8 or later	(Includes RollCall Control Panel)
RollCall Control Panel	4.20.5 or later	
RollMechanic	Use version from RollCall Suite	
Orbit	3.1 or later	
GV Orbit	4.0 or later	
Multiviewer	3.2.2 or later	(for all MV-8 series multiviewers)

> Note: For future releases:
>
> Please refer to software release notes for compatibility information.

B MV-821 Dimensions

Chassis dimensions are shown in Figure B-1.

Dimensional drawings showing the MV-821 Multiviewer with measurements:

589.5mm [23.2 in]

10.3mm [0.4 in]
70 mm [2.75 in]
87.0mm [3.42 in]
15.3 mm [0.6 in]
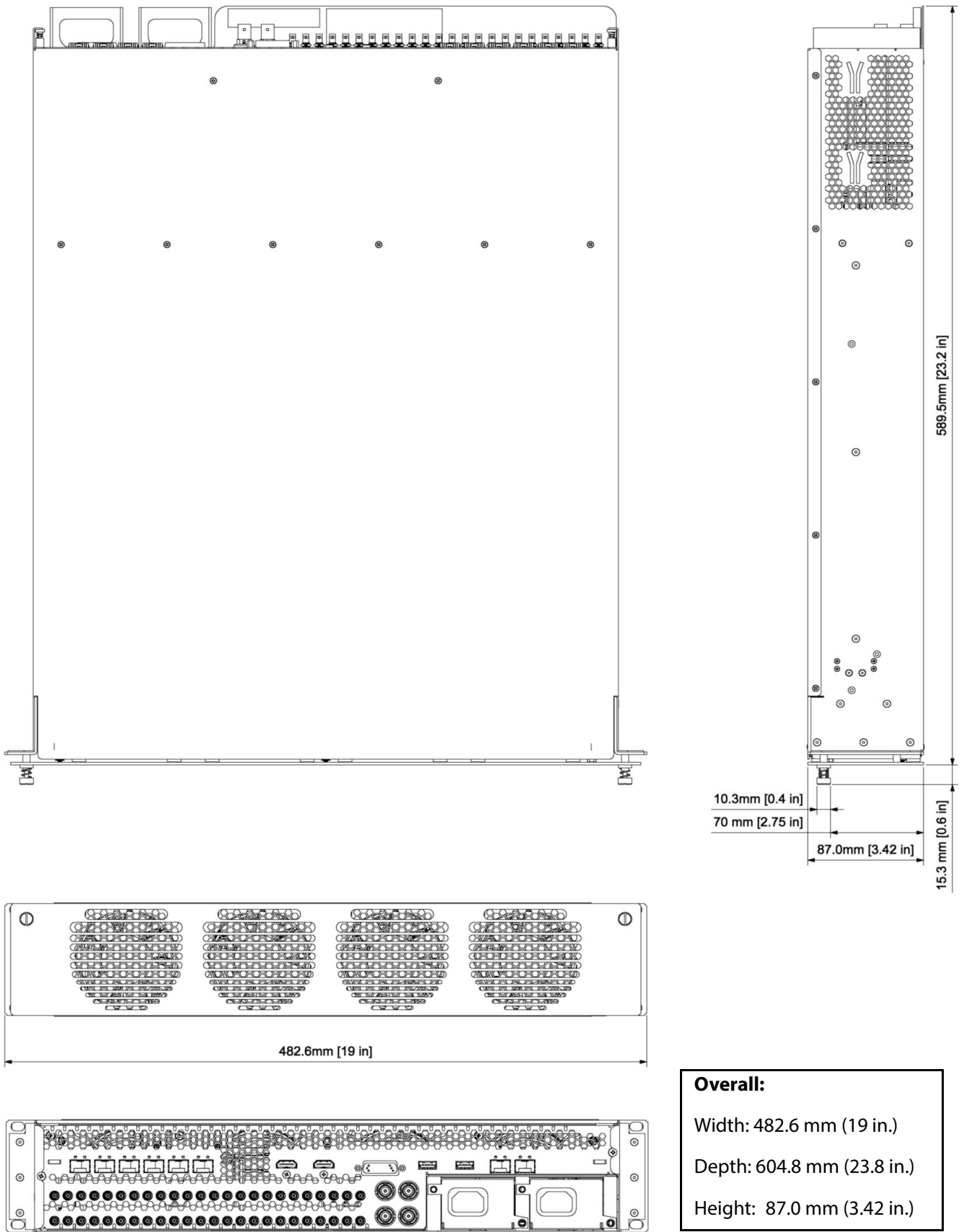
482.6mm [19 in]

Overall:

Width: 482.6 mm (19 in.)

Depth: 604.8 mm (23.8 in.)

Height: 87.0 mm (3.42 in.)

Fig. B-1: MV-821 Multiviewer Dimensions

IP Routing Terminology

Table C-1: Glossary of IP Routing Terms

Control network	Typically an Ethernet network dedicated for device control.
COTS	Commercial Off-The-Shelf. Refers to hardware that is not specific to an industry, but is generic and readily available. In this case, it is high-performance IT switching equipment,.
Destination	Receiver of one or more flows. Destination spigot.
Essence	A general term used to describe a component of a media signal. Video, Audio and Metadata are all essences.
Fabric	Term for the networks that can make up a redundant network system, comprising a main/primary fabric and a backup/secondary fabric.
FEC	Forward Error Correction. A technique for controlling errors in data transmission where the sender encodes message in a redundant way by using an error-correcting code. The redundancy allows the receiver to detect and correct errors.
Flow	Another term for an elementary IP stream, usually a sequence of real-time data sent as an RTP IP data stream. For example, TR-03 describes how a media stream (e.g. an original SDI stream) may be sent as three flows: Video, Audio and Ancillary essence data.
IEEE 1588	A Precision Time Protocol (PTP) to synchronize distributed clocks to within 1 microsecond via Ethernet networks. PTP runs on IP networks, transferring precision time to slave devices via a 1 GHz virtual clock (time base). It is used to synchronize TR-03 elementary streams.
IGMPv3	Internet Group Management Protocol. Communications protocol used in IP multicasting by client IP devices and an IP router to establish multicast group membership. The routing function of a traditional video router can be replicated with a IP Network Router Controller deice and a COTS IP Switch which supports the IGMPv3 protocol.
In-Band Control	Sending control messages for an IP routing system in the media IP network fabric.
IP Stream	Real-time data (for example, video and/or audio) sent over a network.
IP Flow	Flows form a stream. There may be Video and Audio IP flows in an IP stream.
IP Router	A device that connects networks together.

Table C-1: Glossary of IP Routing Terms (continued)

IP Switch	A device that connects many network lines together. Many users can communicate and more than one transaction can occur at a time on network.
IP-RSC	IP Routing System Controller (IP-RSC). A unit used in a Grass Valley video IP routing system. The unit controls a high-performance IP network to form a (real-time) video IP routing system. It presents the system as a traditional video router to the outside world, so that existing router control methods can be used to control an IP Routing-based video router.
IPRA	IP Router Adapter, a functional block within an IP-RSC. The IPRA interfaces to the IP Routing system.
IPRC	IP Router Controller, a functional block within an IP-RSC. The IPRC presents the IP routing system as a traditional video router to the outside world.
LLDP	Link Layer Discovery Protocol (LLDP). This is an open IP protocol used in IEEE 802.1ab to discover a network device's identity and abilities, and to make physical network topology information available. Information is readable via standard network management protocols, such as SNMP.
MAC Address	Media Access Control (MAC) address is a unique 48-bit identifier assigned to a network interface connection of a network device. For example: 5C-26-0A-39-21-EE.
Media network	A high-capacity network dedicated to carrying high bit rate media.
Multicast Stream	A one-to-many IP stream. Devices receiving the stream subscribe to the multicast stream's IP address.
Network	A group of two or more ethernet-enabled systems linked together via IP. In the case of broadcast video IP network, a local area network optimized for the transfer and broadcast of real-time, high bandwidth video IP streams
Northbound	Describes Control network data packet traffic.
Out-of-Band Control	Method of sending control messages for an IP routing system in a separate control network.
RFC-4175	TR-03 uses Internet Engineering Task Force's (IETF) RFC-4175 to pack (uncompressed) active video lines into an RTP IP stream.
RollCall	Grass Valley control and monitoring system.
RollCallv3	Traditional Grass Valley RollCall messages in the Grass Valley RollCall control and monitoring system product.
RollCall+	New extension to Grass Valley RollCall. Uses RollCall+ Domains to separate data flow types. Used in MV-8 series Multiviewers and in IP Routing control and configuration.
RTP	Real-time Transport Protocol. An IP standard which specifies a way to manage the real-time transmission of multimedia data over a network.

Table C-1: Glossary of IP Routing Terms (continued)

SDI	Serial Digital Interface.
	A method for packing real-time media (uncompressed video, audio and metadata essences) into a digital serial bit stream and sending it over a low-latency, point-to-point electrical link (typically a coaxial cable).
SMPTE 2022-6	A transport protocol for the real time transport of high bit-rate video/audio data over IP networks, where the entire payload of the SDI signal is encapsulated as one IP stream.
	Designed to be applied to television transport for broadcast production and is not intended for emission purposes.
SMPTE 2022-7	A standard for the seamless reconstruction of a stream from the transmission of two streams of identical content over potentially diverse paths.
	Enables cost-effective redundant network operation. Two network are used and a full stream is sent on each network. A receiving device can switch between two received streams and recover the content of the original full stream.
SMPTE 2110	A standard for an extensible RTP IP streams (essence streams, including uncompressed video) referenced to a common clock. Includes support for a variable raster size (up to 32Kx32K pixels), HDR, and a variety of color sampling schemes, bit depths and frame-rates.
Source	Originator of one or more flows. Source spigot.
Southbound	Describes Media network data packet traffic.
Spigot	A generic term for a source or a destination of one or more flows.
Stream	Term usually associated with delivery of constant, real-time media (e.g. Audio, Video) over IP networks with a stream of data packets.
TR-03	A Video Services Forum (VSF) Technical Recommendation concerning the transport of time-related uncompressed media over IP.
	Carriage of video, audio and ancillary data in separate elementary streams to provide greater flexibility in the production of media.
TR-04	A Video Services Forum (VSF) Technical Recommendation concerning the transport of media streams and elementary streams over a network.
VC-2	Also known as Dirac Pro, this is an open source video codec technology developed by the BBC and standardized by SMPTE.
	An intra-frame compression scheme aimed at professional production and post production. Compression ratios are in the range 2:1 to 16:1. It can provide near lossless compression.

User Notes:

User Notes:

Contact Us

Grass Valley Technical Support

For details of our Regional Customer Support Offices please visit the Grass Valley web site at:

https://www.grassvalley.com/contact/support/

Customers with a support contract should call their personalized number, which can be found in their contract, and be ready to provide their contract number and details.

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 on-line 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