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A **BELDEN** BRAND

DENSITÉ 3+ FR1

1RU Housing Frame for Densité Modular Products

User Manual

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www.grassvalley.com

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Important Safeguards and Notices

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

Symbols and Their Meanings



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



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



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



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



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



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



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



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



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



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



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



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

Warnings



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

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

Cautions



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

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

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

Electrostatic Discharge (ESD) Protection



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

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

Cautions for LCD and TFT Displays



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

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

Mesures de sécurité et avis importants

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

Signification des symboles utilisés



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



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



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



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



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



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



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



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



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



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



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



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

Avertissements



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

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

- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

Mises en garde



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

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.
- Si l'équipement n'est pas pourvu d'un module d'alimentation auto-adaptable, 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, débranchez tous les cordons d'alimentation avant toute opération d'entretien.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.

Protection contre les décharges électrostatiques (DES)



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

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.

- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Précautions pour les écrans LCD et TFT



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

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

Recycling

Visit www.grassvalley.com for recycling information.

Certification and Compliance

Safety Compliance



c

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

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

Safety of Laser Modules



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

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

Electromagnetic Compatibility



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

Note:

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



This equipment has been tested and found to comply with the requirements of the EMC directive 2004/108/EC:

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

Environmental Compliance

DENSITÉ 3+ FR1 CHASSIS 部件名称 Part name	有毒有害物质或元素 (Toxic or hazardous substances and elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
电缆及电缆组件 Cables and cable assemblies	X	O	O	O	O	O
电路模块 Circuit modules	X	O	O	O	O	O
组装风扇 Fan assemblies	X	O	O	O	O	O
金属零件 Metal parts	X	O	O	O	O	O
DENSITÉ 3+ FR1-PSU-AC 部件名称 Part name	有毒有害物质或元素 (Toxic or hazardous substances and elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
电路模块 Circuit modules	O	O	O	O	O	O
金属零件 Metal parts	O	O	O	O	O	O
DENSITÉ 3 CPU-ETH3, REF-1801-FR1 部件名称 Part name	有毒有害物质或元素 (Toxic or hazardous substances and elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
电路模块 Circuit modules	X	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11364-2014 规定的限量要求以下。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T 11364-2014.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11364-2014 规定的限量要求。

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T 11364-2014.

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1 Introduction

Chapter 1 is an introduction to the Densité 3+ FR1 Housing Frame.

Summary

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The Densité 3+ FR1 Housing Frame

Overview

The 1RU Densité 3+ FR1 frame offers true multi-format operation, with the ability to process simultaneously 3Gbps, HD, SD, and analog video, as well as AES and analog audio. The frame provides advanced monitoring and back-up capabilities. It can be fitted with 3RU and 2RU Densité modules (using card extenders). The frame features dual hot-swappable power supplies and fans. The modules for the frame are also hot-swappable, and can be configured automatically when a card is replaced. The frame is air-cooled and all modules, redundant PSUs and fans are monitored to provide status via GPI or the Ethernet port. The basic frame configuration includes one PSU and a controller card, which allows card adjustments by the front panel. Front panel multi-color LEDs provide status reporting. Multiple video and audio formats can be fitted in a single chassis.



Key Features and Benefits

- Multiple video and audio formats can be fitted in a single chassis.
- Up to 4 cards in a single 1RU frame.
- Backwards compatible with Densité 2 or Densité 3 modules.
- Easy configuration by front panel or remotely via Ethernet.
- Remote control by RCP-200 advanced control panel, and by Grass Valley's iControl system.

- Hot-swappable power supply, with optional redundant power supply.
- Supports full range of interfacing, distribution and monitoring modules.
- Can be stacked without additional cooling spaces.
- Redundant Ethernet connections.
- A fifth slot is reserved for system cards such as REF-1801-FR1 or GPI-1501.

Available Options

Second power supply for redundant power security.

Modular Cards

The Densité 3+ FR1 Housing Frame housing frame supports all current Densité 3 series cards directly. Many Densité 2 series cards can also be installed with the use of an adapter that fits on the card, plus an additional adapter to extend the rear panel.

Designated System Card

An additional slot is provided in the frame for a designated system card. It is NOT a general-purpose slot, and cannot be used for non-designated cards.

At the time of publication, only the following cards are designated and can be used in this slot:

- REF-1801-FR1
- GPI-1501

Densité 3+ FR1 Housing Frame



Chapter 2 describes the Densité 3+ FR1 housing frame and details of its installation.

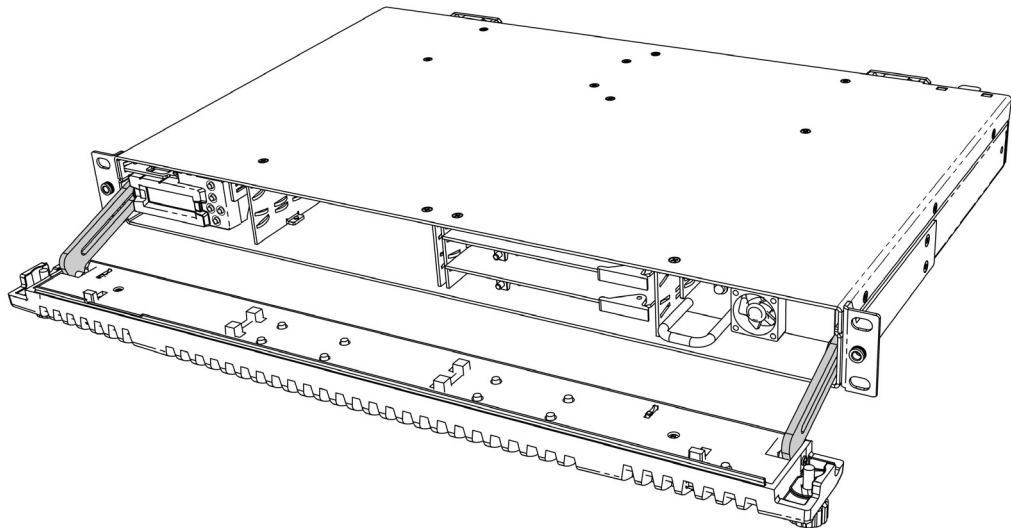
Summary

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Description

Mechanical Layout

Front of the frame



When the frame door is opened, the front of the unit is visually divided into three sections:

- Left side - the Controller card with its attached control panel is seen on the left. The card itself is installed in a horizontal slot near the top. A power supply is located below the controller card in the frame.
- Center - four Densité 3 slots are laid out horizontally, two across by two down.

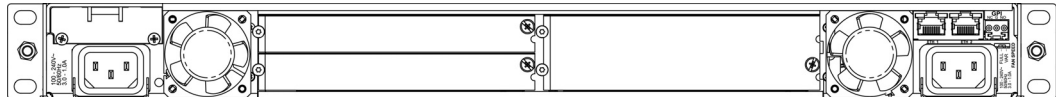
- Right side - a second power supply is located on the lower right, and above it is a single slot reserved for System Cards.

Note: This slot supports ONLY designated System Cards; do not insert any other cards. At the time of writing, only the REF-1801-FR1 or the GPI-1501 card is supported.

- If the system card slot is occupied by a REF-1801-FR1 card and you need a GPI-1501 card in your frame, you can install one in one of the four standard slots using a 3RU adapter.
- For an up-to-date list of available System Cards, go to the Grass Valley website at www.grassvalley.com

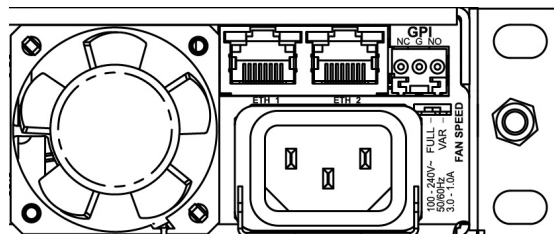
When the frame door is closed, the status LED on each of the cards in the frame is visible via a light pipe in the door. No other controls or indicators are present.

Rear of the Frame

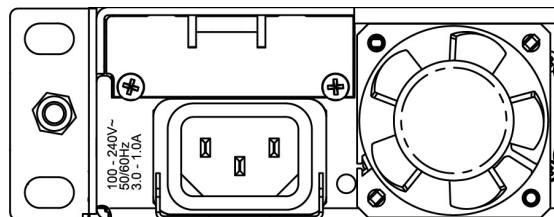


The rear of the Densité 3+ FR1 frame is visually divided into three sections:

- **Right side** - this area contains inputs and outputs for the Controller Card - the Fan Speed control setting switch, the GPI port and the two Ethernet ports. It also contains the power socket for the power supply located beneath the controller card, and one of the two frame fans.



- **Center** - this area holds the rear panels associated with the frame's four Densité-3 slots
- **Left side** - this area contains the rear panel for the System Card, the power socket for the power supply located beneath the System Card, and one of the two frame fans.



Installation

Unpacking

Make sure the following items have been shipped with your Densité 3+ FR1 frame:

- Densité 3+ FR1 frame, including 1 Power Supply unit (AC in) with power cord

- CPU-ETH2 controller card
- Power cord retaining clips (2)
- A second power supply and AC cord (optional)
- A system card, per order
- Densité-series cards (per order) with associated rear panels

Opening the Front Door

The front door of the Densité 3+ FR1 frame is fastened in place by two captive thumbscrews, one at each end of the door.

- To open the door, turn both thumbscrews counterclockwise until they release, and pull the door away from the front of the frame.
- The door is attached to the frame by guides that slide out of the frame as the door is pulled, and allow the door to be lowered below the frame so that cards and power supplies can be removed and installed.
- The door can be removed completely by slipping the ends of the guides off the posts on the door assembly. Note that you must tilt the door on an angle so the guide can move freely.

There are no electrical connections to the door.

Close the door by sliding it into position against the front of the frame, and turning the captive thumbscrews clockwise until the door is securely fastened into place

Mounting

The Densité 3+ FR1 housing frame occupies 1RU in a standard 19" rack.

To mount the frame

- 1 Open the front door to expose the rack mounting flanges at the ends of the chassis.
- 2 Install the frame in the rack using 4 standard rack-mounting screws (not supplied) through the four holes in the mounting flanges.

Installing Cards in the Densité 3+ FR1 Frame

All cards can be installed with the frame power on. Each card has a connector which plugs into the frame's backplane for distribution of power and connection to the controller card, and a second connector that plugs into the associated rear panel for inputs and outputs.

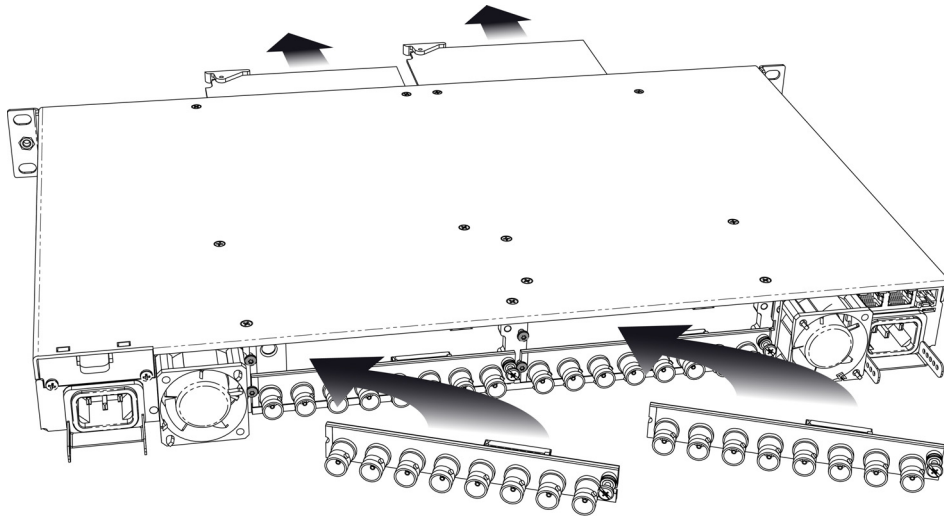
IMPORTANT - the rear panel must be installed before the card is inserted into the frame.

If you need to install a Densité 2 series card in this frame, which has Densité 3 slots, please see [Using Densité 2 cards in the Densité 3+ FR1 Frame](#), on page 6

To install the rear connector panel

- 1 If a card is installed in the slot whose rear panel is being changed, remove it as described below.
- 2 Remove the existing panel (either blank or belonging to an existing card that is being changed) by releasing the captive screw(s) on the right-hand side

- 3 Position the new panel and secure it in place with the captive screw(s) on the right-hand side.



To remove and/or install a card

- 1 Open the front door of the frame
- 2 To install a card into an empty slot, slide the card into the slot with the swivel handle to the right, and push gently on the handle to seat the connectors. If the card requires a double-width rear panel to accommodate a large number of connectors, it should be inserted into the lower slot. Inserting the card into the wrong slot will not damage the card, and will be flagged by the on-card status LED flashing red to indicate that there is no connection to the rear panel.

N.B. the rear panel must be installed before the card.

- 3 To remove a card from a slot, tilt the swivel handle on the front of the card to lever the connectors apart, then use the handle to pull the card straight out of the slot.
- 4 Close the front door of the frame

Note: Detailed information about the rear panel connections is included in the user manual for the card.

Using Densité 2 cards in the Densité 3+ FR1 Frame

The Densité 3+ FR1 frame supports Miranda Densité 2 series cards. Should you need to install a Densité 2 card in your Densité 3+ FR1 frame, you will need two adapters – one for the card, and one for the rear panel. These adapters extend the height of the Densité 2 devices so that they will fit into the slots of the Densité 3+ FR1 frame.

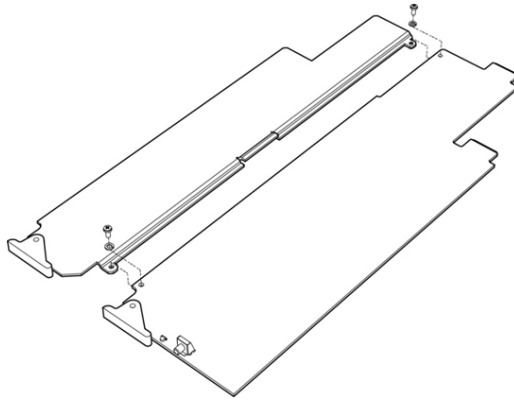
Card adapters

There are 3 different types of adapters that can be used, depending on the Densité 2 card geometry:

- DENSITE 3-EXT-A
- DENSITE 3-EXT-B
- DENSITE 3-EXT-C

To install these on the Densité 2 card

- 1 Fit the top edge of the card into the holding slot along the bottom edge of the adapter.
- 2 Align the holes in the top of the card with the holes on the adapter, and secure them together with the two provided screws and lock washers, as shown in the figure.



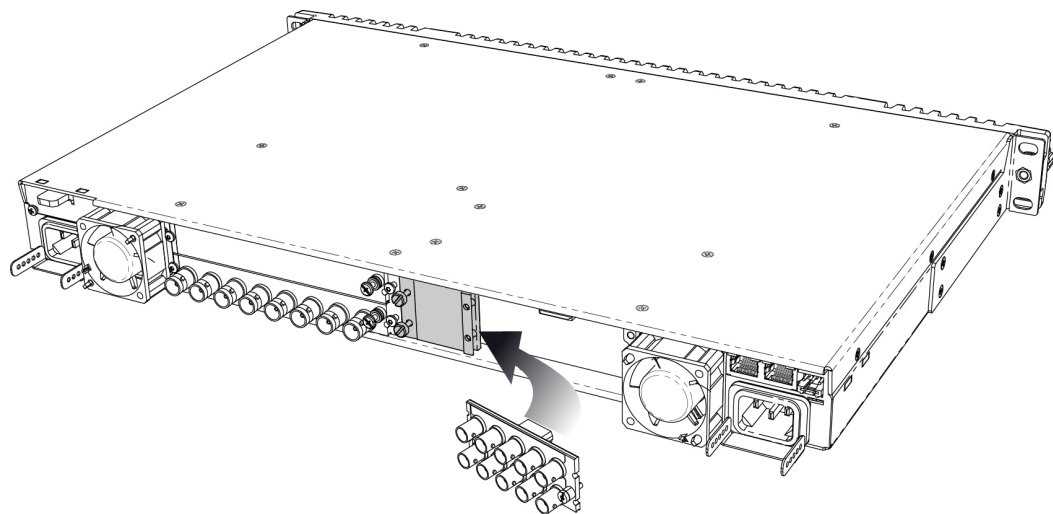
Rear Adapters

3-RU rear panel adapters are available for Single and Double Densité 2 rear panels:

- DENSITE SRP-3RU for single slot-width rear panels
- DENSITE DRP-3RU for double slot-width rear panels

To install the adapter and the rear panel

- 1 Position the adapter at the left of the empty slot(s) on the rear of the frame.
- 2 Use the captive screw in the adapter to fasten it securely in position.
- 3 Slip the top of the 2RU rear panel into the slot on the right of the adapter, and secure the panel to the frame using the captive screw at the bottom of the panel.



Installing the Power Cord Retaining Clips

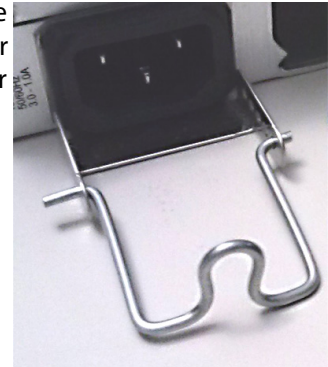
Each power supply is provided with a power cord retaining clip that holds the power cord in place to prevent inadvertent disconnections.

To install the retaining clips

- 1 With the power cord removed, install the clip into the plate that extends out beneath the power cord socket on the rear of the frame, by slipping the two ends of the clip into a pair of holes in the plate

Several pairs of holes are provided to accommodate different sizes of plugs. Use the holes that position the clip closest to the body of the plug.

- 2 Position the clip vertically and insert the plug into the socket.
- 3 Rotate the clip down and press the cord into the gripping loop of the clip.



Ventilation

Ventilation for the frame is provided by two fans, one located at each end of the rear panel. The fans draw air through the frame from the front and exhaust it to the rear. Ventilation slots are provided in the front door of the frame to allow air to flow into the frame.

An air filter is installed in the front door behind the slots.

- Ensure that the front door ventilation slots are not obstructed.
- Check the air filter regularly to ensure that it is not plugged up with debris.

The filter may be cleaned by rinsing in warm water. **Dry it thoroughly** before replacing it in the frame.

In addition to the main frame cooling fans, each installed power supply has its own fan that pulls air into the front of the supply. This fan only operates when the frame temperature is high.

Fan Speed Control

A slider switch beside the controller-side fan on the rear panel allows the speed of the two rear-panel fans to be specified by the user. Two settings are provided:

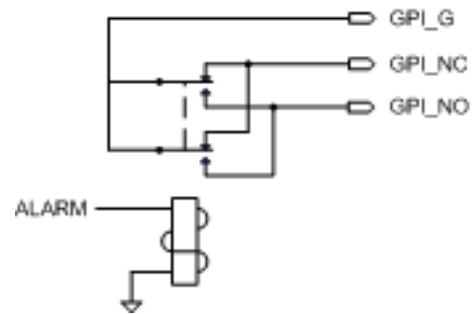
- FULL - the fans operate at top speed at all times.
- VAR - the fan speed is managed by the controller card, which is monitoring the temperature inside the frame.

Use a small tool (e.g. a pen tip or a small screwdriver) to change the switch setting.

GPI

Alarms generated on the controller card may be reported on the GPI connector on the rear panel.

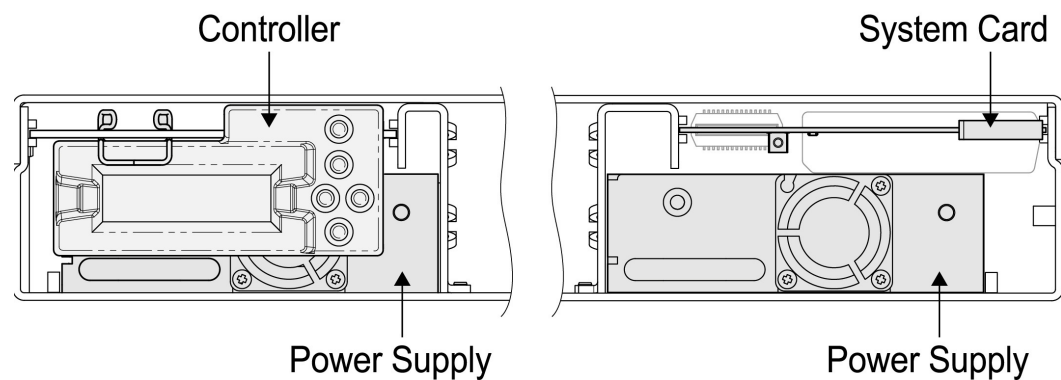
Users who wish to utilize this alarm reporting mechanism should be aware of the circuit driving the GPI connector, in order to correctly interpret its signalling.



Field-Serviceable Items

Field-serviceable items on the Densité 3+ FR1 frame itself include the power supplies, the controller card, the system card, and the ventilation fans.

The power supplies, controller card and system card are located behind the door on the front panel.



Changing the Power Supply

- The Densité 3+ FR1 frame supports dual redundant hot-swappable power supplies. The basic configuration includes a single supply, plus an empty slot for the optional redundant power supply. Installing a second power supply module and applying power to it automatically engages the redundant supply mode. Each power supply has its own power socket on the rear panel, and should be connected to the AC supply using the supplied power cord or other approved cord.
- A single power supply can be installed in either of the two slots, but it makes sense to install it in the right hand slot so that it is not necessary to remove the controller card if you need to remove the power supply.
- Power integrity is enhanced if the two supplies are plugged into different circuits

To install or change a power supply module

- 1 Open the front door of the frame
- 2 If you are removing the left-side power supply, you must first remove the controller card. See [Replacing the Controller Card](#), below.

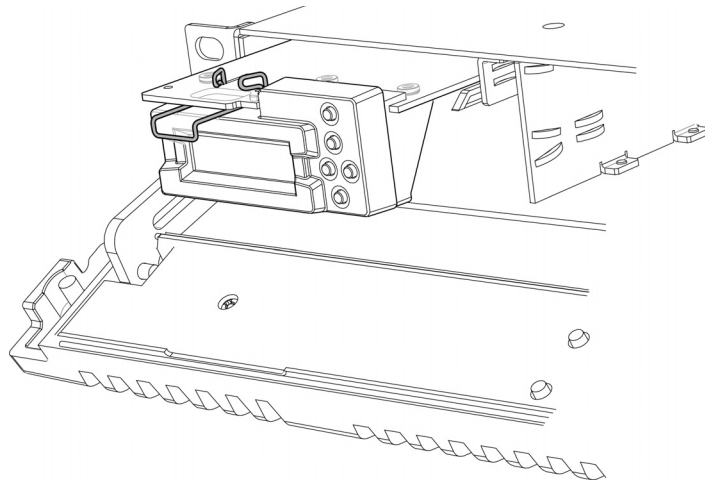
- 3 Remove the power supply module by pulling on the handle on its front panel and sliding it out of the frame
- 4 Slide the new power supply module into the slot, and push it gently into position to seat the connectors. There is no guiding slot - the supply base sits on the floor of the frame.
- 5 If you removed the controller card in step 2, reinstall it according to the instructions in [Replacing the Controller Card](#), below.
- 6 Close the front door of the frame. The door secures the power supplies in place.

Replacing the Controller Card

The Controller card is located on the upper left-hand side of the frame, above the power supply.

To replace the controller card

- 1 Open the front door of the frame.
- 2 Grasp the metal handle on the upper left-hand side of the card; it will slide out so that it can be gripped properly.
- 3 Pull gently on the handle until the card is released from the rear connector, and then slide the card out of the frame.
- 4 Slide the new card into the controller slot, and push gently on the card edge to engage the rear connectors.
- 5 Be sure to close the front door before operating the Densité 3+ FR1 frame, to ensure proper ventilation.

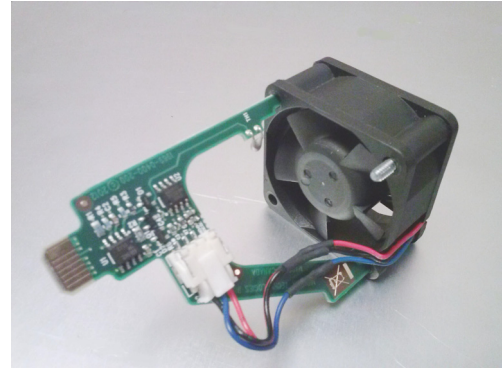


Replacing the Frame Ventilation Fans

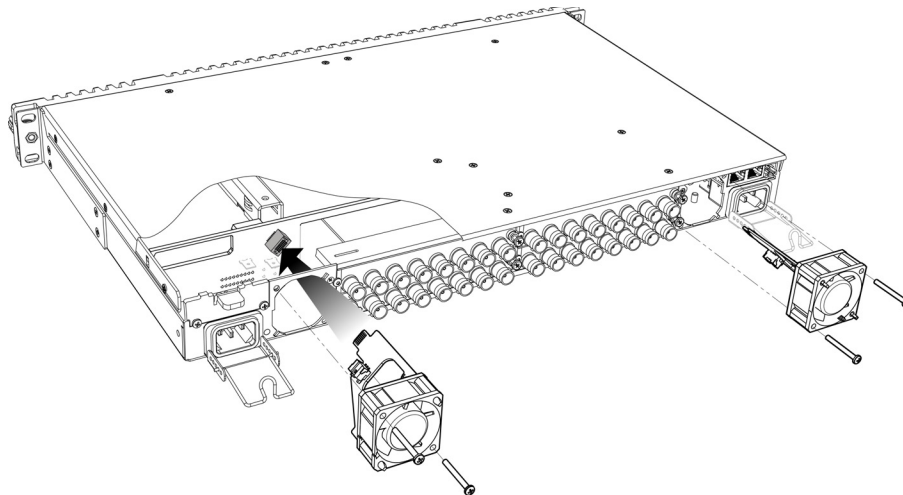
If one of the two cooling fans on the rear of the frame fails, the fan assembly can easily be replaced.

To replace a frame ventilation fan

- 1 Procure a replacement fan assembly. It is comprised of a fan and an attached circuit board. It is available from Grass Valley as part #0969-2100.

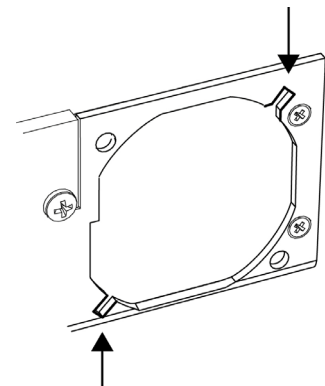


- 2 Remove the two screws that secure the fan assembly to the frame and pull the fan assembly straight out of the frame.
- 3 Retain the screws, as they will be used to install the replacement fan assembly.
- 4 Slide the new fan assembly into the opening on the rear panel, pushing it straight in and ensuring that the connector on the assembly mates with the socket in the frame.



NOTE: the two ventilator fans are mounted at different angles, as shown in the above figure. Align the circuit board on the fan assembly with the notches in the edge of the rear-panel opening (see arrows in figure at right) to ensure the correct alignment.

The socket into which the circuit board connects is hidden from view by the fan assembly during installation and there is no guide to ensure that they are aligned. The easiest way to make sure that the connector and socket have mated properly is to install the fan with the frame power turned on. You will hear the fan start up when the connection is made.



- 5 Use the two screws that were retained when the old fan assembly was removed to secure the new fan assembly to the rear panel.

Installing and Replacing the System Card

The system card is located in the upper right-hand-side of the Densité 3+ FR1 frame, as seen from the front. The system card is optional, and may be factory-installed when the system is ordered, or installed by the user later.

At the time of writing, there are two system cards that may be used in the Densité 3+ FR1 frame:

REF-1801-FR1 HD/SD Frame Reference Module

- This version of the REF-1801 card can only be used in the Densité 3+ FR1 frame.
- Its user manual is included as Chapter 4 of this document.

GPI-1501 GPI I/O Module

- The GPI-1501 requires a special rear panel when used with the Densité 3+ FR1 frame.
- See the GPI-1501 User Manual for instructions on installing and using this card and its associated rear panel.

Note: As with all Densité cards, you must install the rear panel before inserting the card into the system card slot.

Specifications

MECHANICAL

Dimensions	1RU x 19" W (485 mm) x 11.25" D (286 mm) with connectors
Weight:	7.16 lbs (3,25 kg) with 1 PSU and controller card installed

POWER

Input Range:	AC 100-240V, 50-60 Hz
Rating:	150 W max each power supply
Operating Temp. Range:	0-40° C

COOLING

Fans:	2 on frame, serviceable 1 on each installed power supply
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COMMUNICATION

Connectors:	RJ45 (2)
Compliant to:	Ethernet 10/100 Base-T

ALARM

Connectors:	GPI
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CPU-ETH2 Controller Card

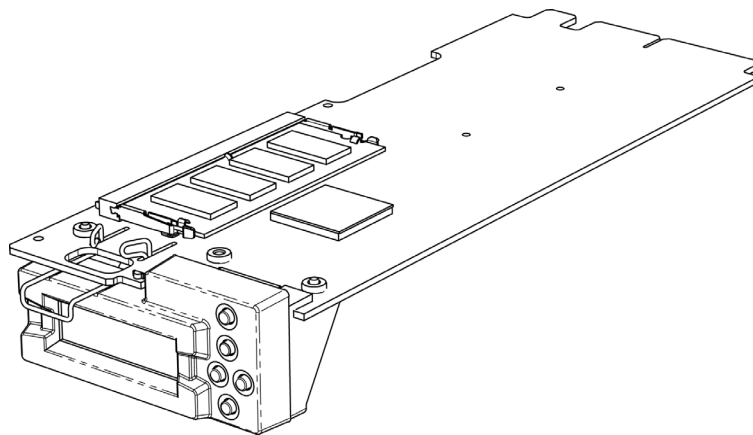
Chapter 3 describes the installation and functionality of the CPU-ETH2 Controller card in the Densité 3+ FR1 housing frame.

Summary

<i>Overview</i>	13
<i>Control Interfaces</i>	14
<i>Configuring the CPU-ETH2 Controller</i>	17
<i>Local Control Panel Menu</i>	32

Overview

The CPU-ETH2 Controller installed in the Densité 3+ FR1 frame supports all on-frame communication between cards, and incorporates a front control panel for local control and adjustment of the frame and installed cards. The CPU-ETH2 Controller serves as the communications port for control and alarm information entering and leaving the frame. The CPU-ETH2 controller features two Ethernet ports for system-wide monitoring and control of the frame, using Miranda's control solutions or a third party monitoring system. This controller card is compatible with the TCP/IP protocol and can support polling or report on error modes (unsolicited messaging).



Features

- Dual Ethernet RJ-45 ports (10/100Base-T) - the two ports can be configured independently for full network redundancy
- In addition to static IP address configuration, each port allows DHCP dynamic addressing

- Provides ultra-robust Ethernet connectivity for LAN/WAN
- Accelerated data throughput: allows video thumbnail and audio level meter and line scope streaming from all installed modular cards
- Linux-based operating system for robust, mission-critical operations
- Removable Compact Flash memory card for portable and quickly-recoverable device and frame configuration
- User-configurable GPI alarm port
- Features front display panel and push-buttons for local configuration of cards and frame
- Can be remotely configured via iControl
- Provides card and frame health monitoring and status reporting
- Provides extensive frame monitoring:
 - Ethernet port monitoring, with communication settings and overall bit rate
 - detailed bitrate and communication throughput from individual cards
 - self-monitoring with CPU load, memory usage
- Power Supply and GPI status reporting
- Individual Card parameter storage for easy card swapping
- Communication speeds of up to 10 Mbps via Ethernet ports

Control Interfaces

The CPU-ETH2 controller is the control point for the Densité 3+ FR1 frame and the Densité-series cards installed in the frame. There are no separate operating controls on the frame or cards.

The CPU-ETH2 supports two methods for card control, and these two are also used to configure and operate the CPU-ETH2 itself.

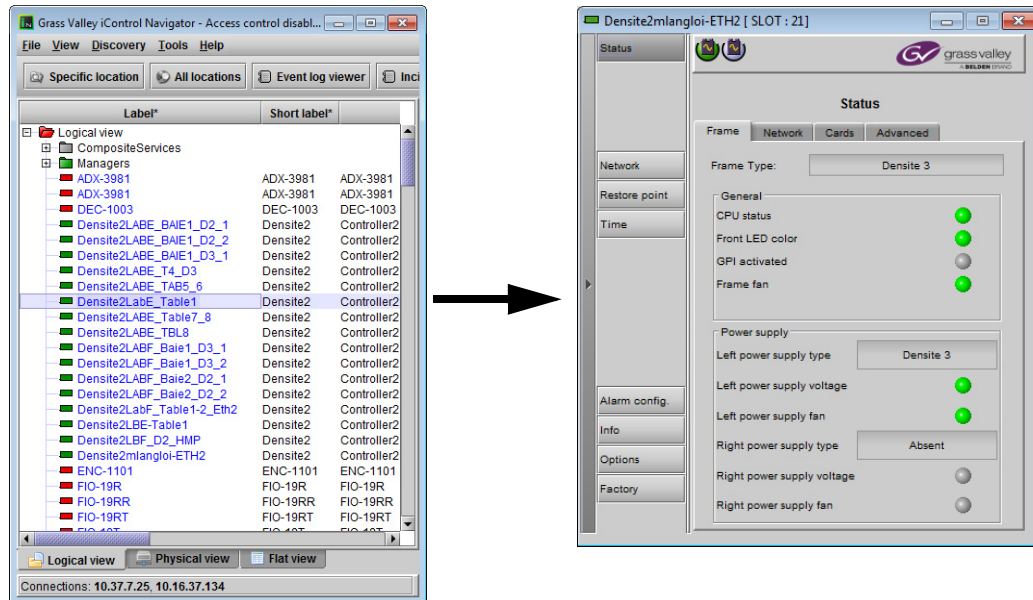
Using the Ethernet interface

The CPU-ETH2 controller supports remote operation through two rear-panel 10/100 Base-T ethernet ports, using Grass Valley's iControl or a third-party solution. The command set available for communicating with a DENSITÉ frame permits more complex and comprehensive control, parameter storage, and field upgrading than is supported by the local control panel.

- This manual describes the iControl panels associated with the CPU-ETH2 and their use.
- Please consult the iControl User's Guide for information about setting up and operating iControl.

To open the iControl service panel for the CPU-ETH2

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



- CPU-ETH2 controllers are identified as Controller2 in the Type column of the iControl Navigator window.
- For convenience, enter a descriptive Label in the Info panel of the card, to make it easy to locate this specific frame controller amongst those in the list. See [Identification](#), on page 19 for instructions.

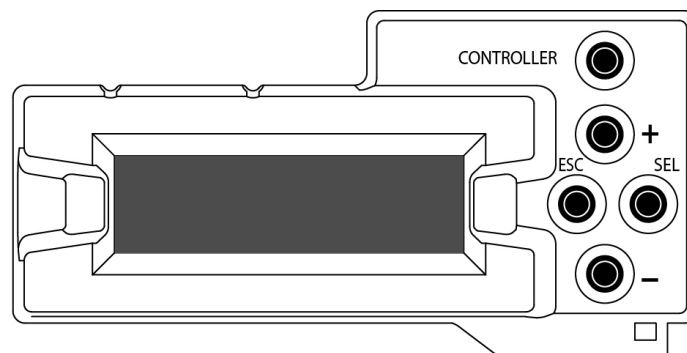
The iControl panel for the CPU-ETH2 controller displays a series of buttons down the left-hand side. Clicking a button changes the contents of the main window to display status reports and controls related to the topic named on the button.

A full description of the use of the iControl interface to configure the CPU-ETH2 card is given below, beginning on [page 17](#).

Using the local control panel

The local control panel is fastened to the front of the CPU-ETH2 controller card, and when installed is located in the top left of the frame, above the left-hand power supply.

The panel consists of a display unit capable of displaying two lines of text, each 16 characters in length, and five pushbuttons.



Pushing the CONTROLLER button on the control panel assigns the panel to operate the CPU-ETH2 card itself. The STATUS LED on the CPU-ETH2 card flashes yellow to show that it is selected for control.

The local control panel displays a menu that can be navigated using the four pushbuttons located beside the display.

The full menu is shown beginning on [page 32](#).

The functionality of the four pushbuttons is as follows:






- [+] [-] Move up and down the menu when a parameter name is shown
Change to the next or previous value when a variable value is shown and change has been enabled using the [SEL] button
- [SEL] Gives access to the next menu level. When a parameter value is shown, pushing this button once enables modification of the value using the [+] and [-] buttons; a second push confirms the new value
- [ESC] Cancels the effect of parameter value changes that have not been confirmed; pushing [ESC] causes the parameter to revert to its former value.
Pushing [ESC] moves the user back up to the previous menu level. At the main menu, [ESC] does *not* exit the menu system. To exit, re-push the [CONTROLLER] button.

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

Card-Front Status LED

The status LED is located on the front card-edge of the controller module, and is visible through the front access door of the Densité 3+ FR1 frame. This multi-color LED indicates module status by color, and by flashing/steady illumination, according to the chart below. The chart also indicates fault reporting for this card on the DENSITÉ frame's serial and GPI interfaces.

The table shows how the various error conditions are flagged on the CPU-ETH2 status LED.

Alarm/Status	Priority	LED
Power supply failure	1	FLASHING RED 
Fan failure	1	FLASHING RED 
Internal error	2	RED 
Normal (no errors)		GREEN 
LOCAL CONTROL SELECTED		FLASHING YELLOW 

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

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

Configuring the CPU-ETH2 Controller

This section introduces the operating features of the CPU-ETH2 controller, and describes how to access and control them using:

- The iControl interface
- The local control panel and menu.

The local control panel must be used to configure the network settings for the controller. Beyond that, the iControl interface is more comprehensive and easier to use, so it will be used as the primary interface for purposes of describing the configuration process.

In each case, the menu path which must be navigated on the local control panel to access the configuration item under discussion will also be given.

The following topics are covered:

<i>Network Configuration</i>	17
<i>Identification</i>	19
<i>Status Monitoring</i>	20
<i>SNMP functionality</i>	22
<i>Data Restoration</i>	23
<i>Factory Alignment</i>	25
<i>Time Management</i>	26
<i>Alarms</i>	27
<i>Options</i>	30

Network Configuration

The CPU-ETH2 card is shipped with the following settings for ETH 1:

IP address:	192.168.3.1
Subnet mask:	255.255.0.0
Gateway:	0.0.0.0

To control the frame using iControl in your network, you must reset the IP address. This can only be done using the local control panel.

Preparation: Obtain the IP address, Network Mask and Gateway values for this controller in your network.

Note: The menu function will timeout if there is no activity for 30 seconds, so be prepared to enter your values efficiently.

To reset the IP address

- 1 Open the frame door to view the controller panel.
- 2 Click the **Controller** button on the panel.
The controller menu is shown on the display.
- 3 Click [-] until ETH1 OPTIONS appears in the display.
- 4 Click [SEL], then click [-] until IP ADDRESS appears in the display.
- 5 Click [SEL].
The current IP address is shown.

- 6 Click [SEL] and [ESC] to select a number, and [+] and [-] to change its value.
- 7 When done, click [ESC] until the IP ADDRESS menu item appears.
- 8 Click [-] until NETWORK MASK appears in the display.
- 9 Repeat [step 5](#) to [step 7](#) above to set a new network mask value.
- 10 Click [-] until GATEWAY appears in the display.
- 11 Repeat [step 5](#) to [step 7](#) above to set a new gateway value.
- 12 Click [-] until MII STATUS appears in the display.
- 13 Click [SEL], and then click [+] or [-] until AUTONEGOTIATION appears.
- 14 Click [ESC] until ETH1 OPTIONS appears in the display.
- 15 Click [-] until ETH2 OPTIONS appears in the display.
- 16 Repeat [step 4](#) to [step 14](#) above to set up the ETH2 port.
- 17 Click the Controller button to exit the menu

You will now be able to access this controller from your local network using iControl or iControl Solo.

iControl - click the **Network** button and select the **ETH** tab

The current IP address information for the controller's two ethernet ports is shown at the bottom of the panel.

Enter the HOSTNAME in the box at the top.

- The hostname is the unique name by which this Densité CPU-ETH2 is known on the network. The hostname should be 15 characters or less, and may contain only the ASCII letters 'a' through 'z' (case-insensitive), the digits '0' through '9', and the hyphen.

The **Ethernet Link Redundancy** option is configured in this panel.

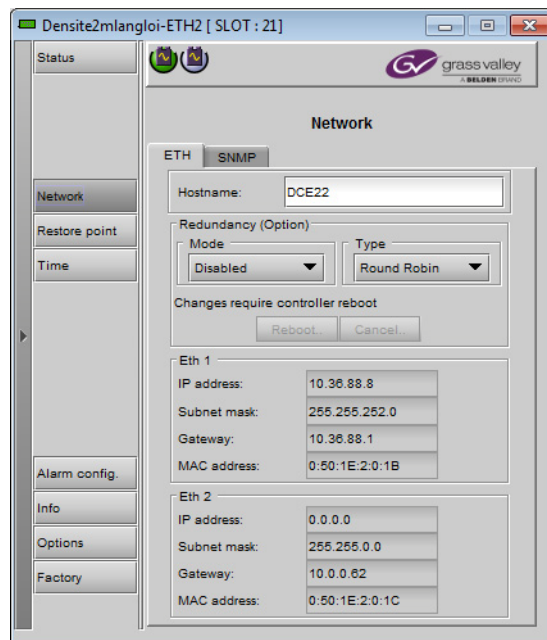
Note that the option must be purchased and activated before these controls become available. See [Options](#), on page 30 for details.

Mode: enable or disable the link redundancy function

Type: select one of the available bonding modes

- Round Robin
- Active Backup

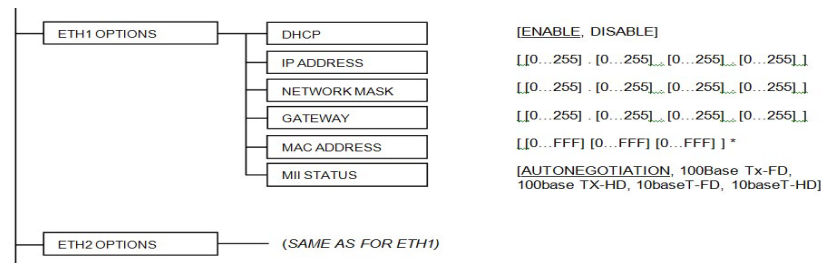
See [Options](#), on page 30 for more information about channel bonding modes.



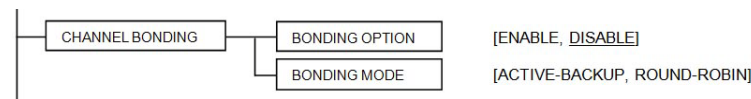
Changes to these parameters require a controller reboot. Click **Reboot...** to accept the changes and restart the controller. Click **Cancel...** to reject the changes and leave the settings unchanged.

Using the Menu:

To change the IP address::



To enable/disable the Redundancy option, and select the bonding mode:



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

Identification

iControl - click the *Info* button

The CPU-ETH2 controller is accessible on a network, and must be identifiable in order to function in the iControl environment. The identification data is entered in the iControl INFO control panel. This panel also shows other data that is not user-adjustable.

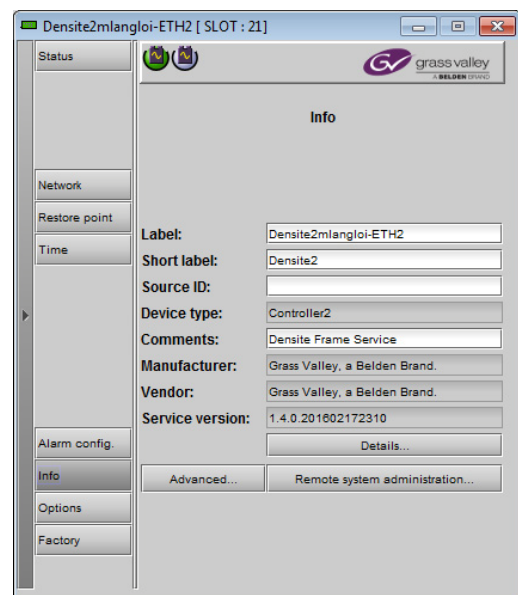
You can enter the following information by clicking and typing in the data box:

Label: allows the user to define the label that identifies this device when it appears in iControl applications

Short Label: allows the user to define the short-form label for iControl (8 characters)

Source ID: type a descriptive name for this CPU-ETH2 controller

Comments: type any desired text



The remaining data boxes show manufacturing information about this card.

Three buttons in the panel give access to other information:

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

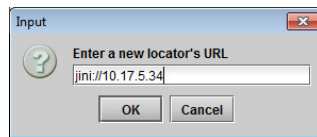
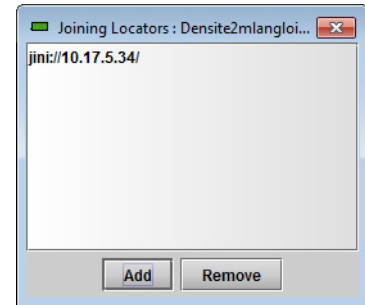
Advanced: Shows the LongID for this card. The LongID is the address of this CPU-ETH2 controller in the iControl network.

Remote System Administration: Opens the Joining Locators data box, which lists remote lookup services to which this CPU-ETH2 is registered.

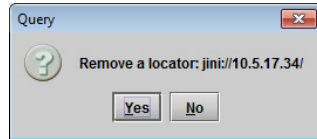
Add: Force the iControl service for this AMX-3981 to register itself on a user-specified Jini lookup service, using the following syntax in the data box:

jini://<ip_address>

where <ip_address> is the IP address of the server running the lookup service, e.g.:



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



Using the menu

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

Status Monitoring

The CPU-ETH2 controller continuously monitors the operating condition and status of the housing frame's power supplies and ventilating fans. It also monitors the status and usage of its two ethernet ports, and the status of its on-board memory, as well as the data throughput of all cards installed in the frame.

In addition to the information displayed on the [Card-Front Status LED](#) (see page 16), status information acquired by the controller can be viewed in the iControl interface, and on the local controller display through the menu.

iControl - click the *Status* button

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

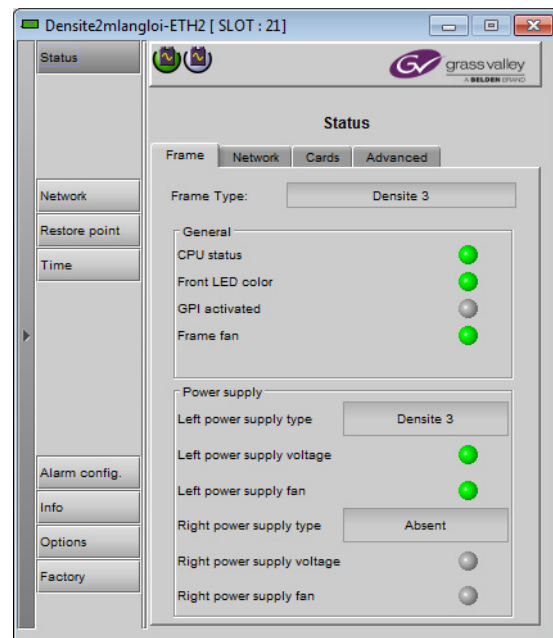
The graphic shows the possible icon displays and the associated messages that appear below them. Error messages are always displayed; other status messages appear only upon mouse-over of the icon.



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

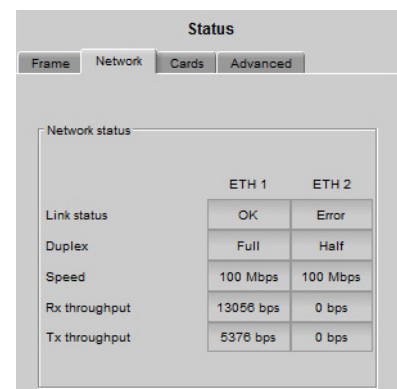
Status - Frame

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



Status - Network

Select the *Network* tab to see a report on the status of the two Ethernet ports on the CPU-ETH2 card.



Status - Cards

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

Note that in the Densité 3+ FR1 frame, only slots 1 to 4 are available.

- A GPI-1501 or a REF-1801-FR1 card installed in the dedicated system card slot will appear in slot 5.

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

Slot	Rx [bps]	Tx [bps]	Speed
Slot 1	136	112	1x
Slot 2	50072	560	8x
Slot 3			
Slot 4	169544	560	8x
Slot 5			
Slot 6			
Slot 7			
Slot 8			
Slot 9			
Slot 10			
Slot 11			
Slot 12			
Slot 13			
Slot 14			
Slot 15			
Slot 16			
Slot 17			
Slot 18			
Slot 19			

Status - CPU-ETH2 Resource Usage

Select the *Advanced* tab to view a report on the usage of the card's resources:

Resource	Usage
CPU use average 2 min	0 %
Load average 1 min	0.0
Load average 5 min	0.0
Load average 15 min	0.0
Memory usage	60 %
Compact Flash usage	70 %
Flash (disk 0) usage	26 %

Using the Menu

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

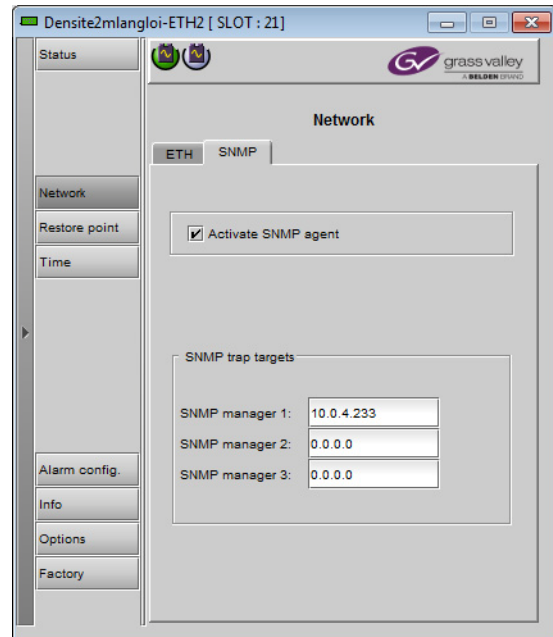
SNMP functionality

The CPU-ETH2 card can function as an SNMP agent, sending SNMP traps to designated targets.

iControl - click the *Network* button and select the *SNMP* tab.

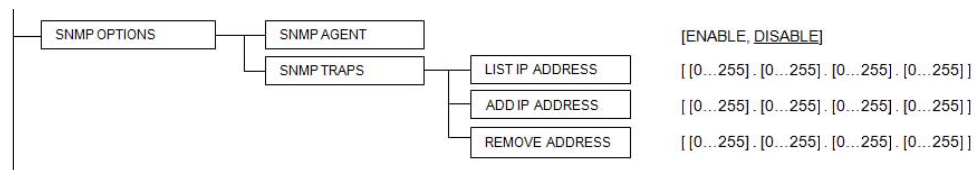
Click the **Activate SNMP Agent** box to activate this feature

Enter the IP addresses of up to three SNMP trap targets in the boxes provided.



Using the Menu:

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



Data Restoration

Many of the Densité-series cards that can be installed in the Densité 3+ FR1 frame are complex and have a lot of data stored on-board related to their configuration and parameter values. The CPU-ETH2 controller provides a backup of this data, which can be restored to the card when needed. This is valuable if the card is inadvertently reconfigured, or is replaced after failure with a new card of the same type. The saving of the current data into the controller’s memory, and restoring the data onto the Densité-series card, can be done manually or automatically.

For manual operation:

iControl - click the *Restore Point* button and view the Cards tab.

The tab show a list of the slots available in the Densité frame, with a check box, name, and status box for each.

- The Densité 3+ FR1 frame uses only slots 1 to 4.
- A GPI-1501 or a REF-1801-FR1 inserted in the dedicated system card slot will appear in slot 5.

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

-or-

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

Click **Save to controller** at the bottom to copy all restorable data from the cards in the selected slots into the memory on board the CPU-ETH2 controller.

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

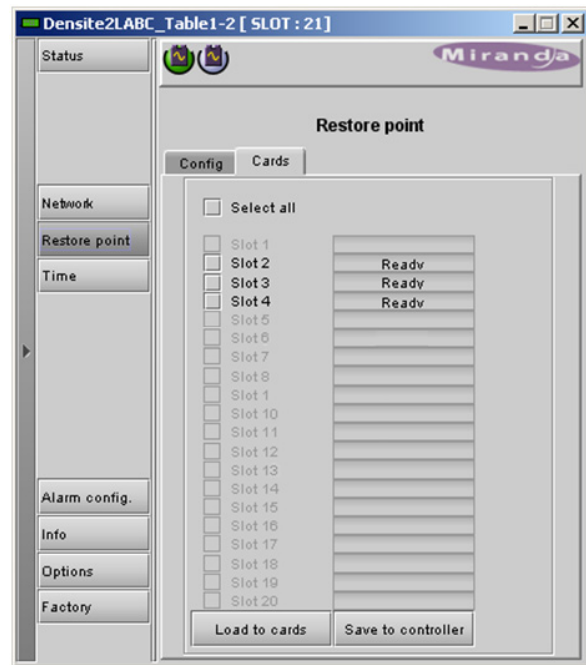
Note that a data restore will only work if the card in the slot is the same type as the card that was there when the data was saved.

For automatic restore and save:

iControl - click the *Restore Point* button and view the Config tab.

Restore: The CPU-ETH2 card can be set up to automatically update a card when it is inserted in a slot previously occupied by a card of the same type whose data was saved. Thus, a new card can be configured automatically to replace the card that was removed, saving a lot of time when cards are swapped.

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



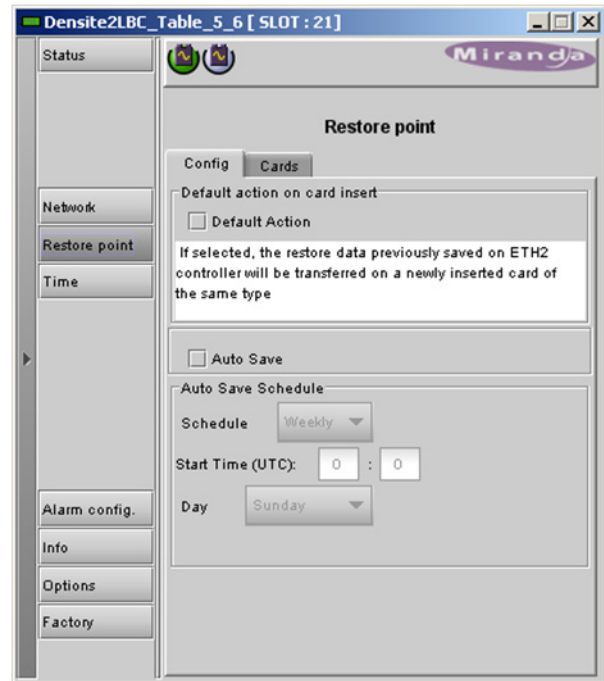
Save: The CPU-ETH2 card can be configured to automatically back up the data on the cards in its slots according to a set schedule.

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

Set up the schedule for data backup using the controls provided.

Schedule: Daily, Weekly, Monthly

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

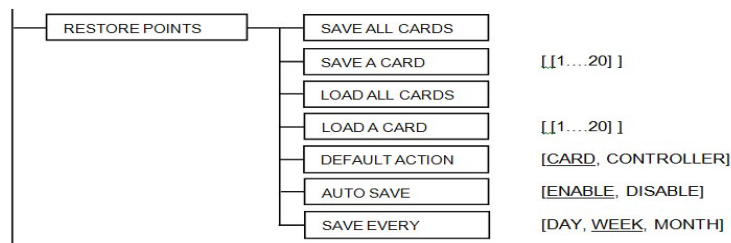


The label and function of the pulldown at the bottom changes to follow the Schedule selection:

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

Using the menu:

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



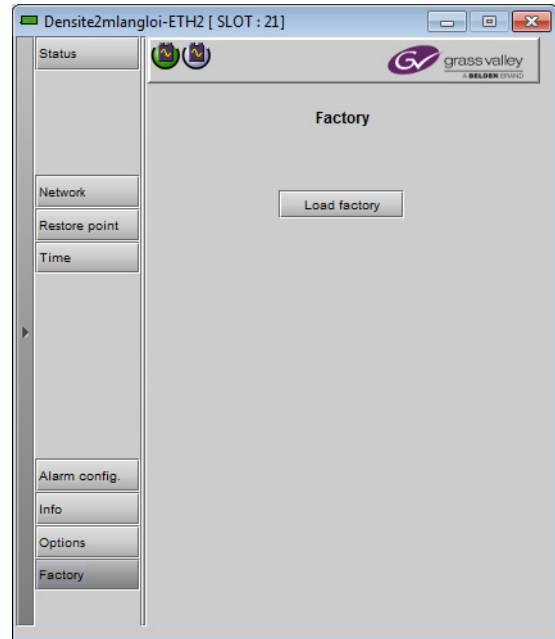
Factory Alignment

There may be times when the CPU-ETH2 settings have been adjusted and it is useful to restore them to a normalized condition. The CPU-ETH2 controller maintains a "Factory Default" alignment in its memory, to which it can be restored at any time.

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

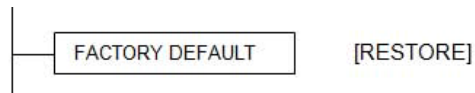
iControl - click the *Factory Control* button

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



Using the menu

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



The default values are shown underlined in the menu listing beginning on [page 32](#).

Time Management.

The CPU-ETH2 controller is time-aware, and its internal clock can be updated manually or via NTP.

iControl - click the *Time* button

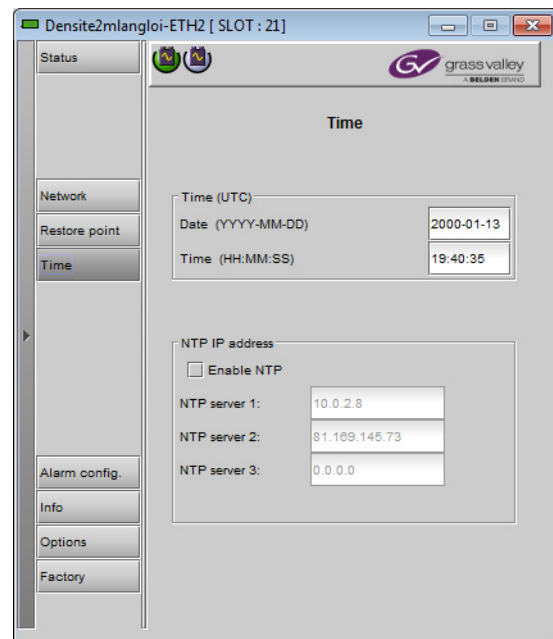
Time (UTC)

The data boxes in this section display the time and date currently held in the card.

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

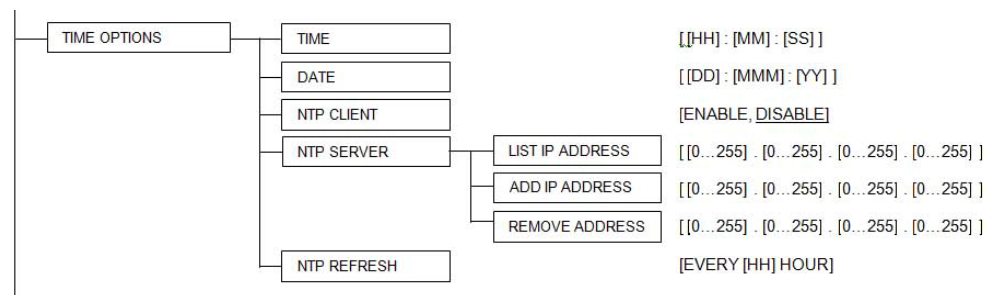
NTP IP address

Click the *Enable NTP* box to use an NTP (Network Time Protocol) source. Enter up to three IP addresses of NTP servers. The CPU-ETH2 card will use the first source of valid time it finds in this list.



Using the menu

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



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

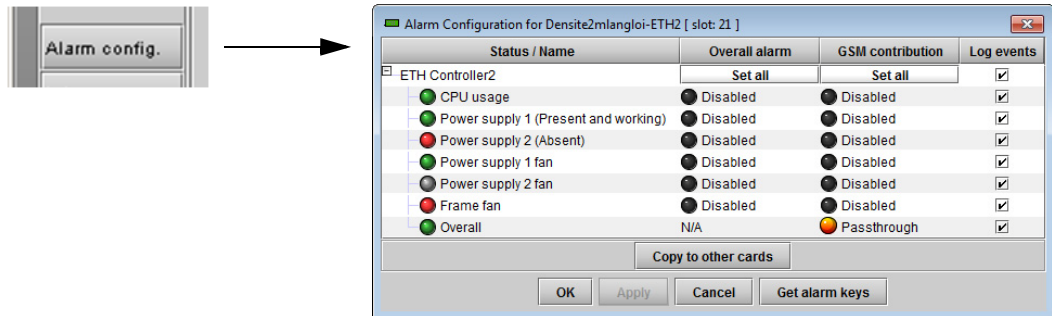
Alarms

The CPU-ETH2 controller generates alarms for the frame in which it is installed when error conditions are detected. These alarms are used to set the card-front Status LED and the status icon in the top left of the iControl window.

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

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

iControl - click the *Alarm Config* button



The iControl Alarm Configuration panel opens in a new window when the *Alarm Config* button is clicked, and can be resized if needed. It allows the alarm reporting of the CPU-ETH2 to be configured. The panel is organized in columns.

Status/Name

This contains an expandable tree listing all the alarms reported by this CPU-ETH2 controller.

Each alarm name includes an icon that shows its current status

The **Overall alarm** and **GSM contribution** columns contain pulldown lists that allow the level of contribution of each individual alarm to the alarm named in the column heading to be set. Click on the alarm status in either of these columns to show the status options that are available, then click on one to select it. If no options appear, the alarm is not user-configurable

Overall Alarm

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






GSM Contribution

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

- If the Overall alarm contribution is selected as Disabled, the GSM alarm contribution can be set to any available value
- If the Overall alarm contribution is selected as any level other than disabled, the GSM contribution is forced to follow the Overall Alarm.

Levels associated with these alarms:

The alarm status list may contain some or all of the following options:

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

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

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

Log Events

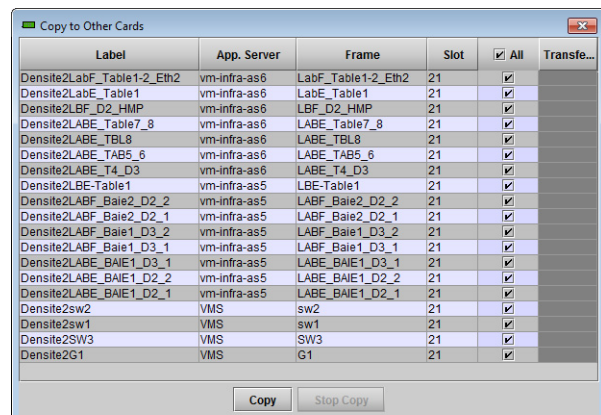
iControl maintains a log of alarm events associated with the card. The log is useful for troubleshooting and identifying event sequences. Click in the checkbox to enable logging of alarm events for each individual alarm.

At the bottom of the window are several other controls:

Copy to other cards

Click this button to open a panel that allows the alarm configuration set for this card to be copied into other CPU-ETH2 controllers in other frames.

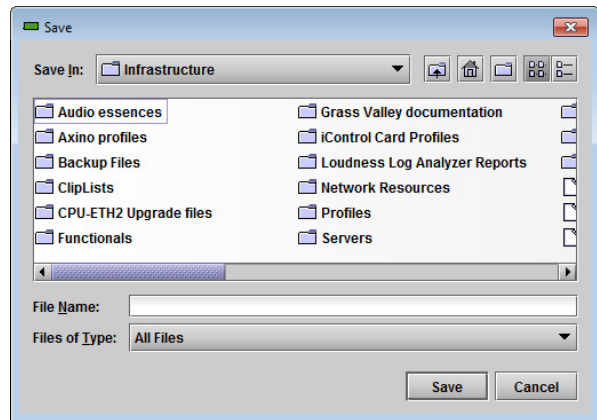
Select one or more destination controllers from the list in the window by clicking in the checkboxes, or all of them by clicking in the *All* checkbox



Get alarm keys

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

The file is saved in .csv format



OK, Apply, Cancel

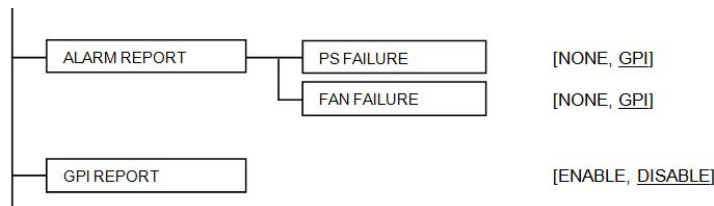
OK accepts the settings and closes the window once the controller confirms that there are no errors.

Apply accepts the settings, but leaves the window open

Cancel closes the window without applying any changes, and leaves the previous settings intact.

Using the Menu

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



Options

The Ethernet Link Redundancy option uses channel bonding between the two rear panel ethernet interfaces to achieve redundancy (Active Backup mode) or increased throughput (Round Robin mode).

Round-Robin: This mode provides load balancing, fault tolerance and increased throughput. Transmissions are received and sent out sequentially on each bonded slave interface beginning with the first one available. This mode requires that the remote equipment (host or switch) be configured to aggregate traffic over several ports (Trunk, EtherChannel, etc).

Active-Backup: This mode provides fault tolerance. Transmissions are received and sent out via the first available bonded slave interface. Another bonded slave interface is only used if the active bonded slave interface fails. This mode doesn't require any configuration of the remote equipment.

When Channel Bonding is enabled, the two Ethernet interfaces are seen as one, and configured as ETH1 in the Network-ETH panel.

Once this option is activated, the bonding mode can be selected, and the option itself enabled or disabled, in the ETH tab of the Network iControl panel – see [page 17](#), or in the CHANNEL BONDING menu item.

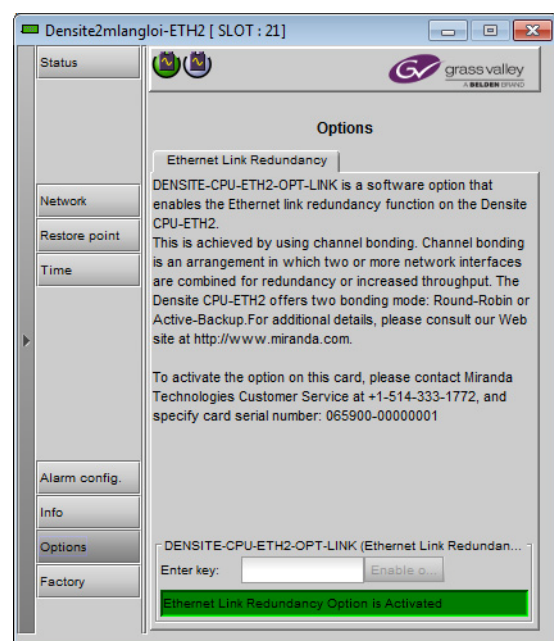
iControl - click the *Options* button

To activate this option, you must

Obtain a licence key from Miranda Technologies Inc.

Type the licence key in the *Enter Key* box

Click on ENABLE OPTION to activate the option's features.



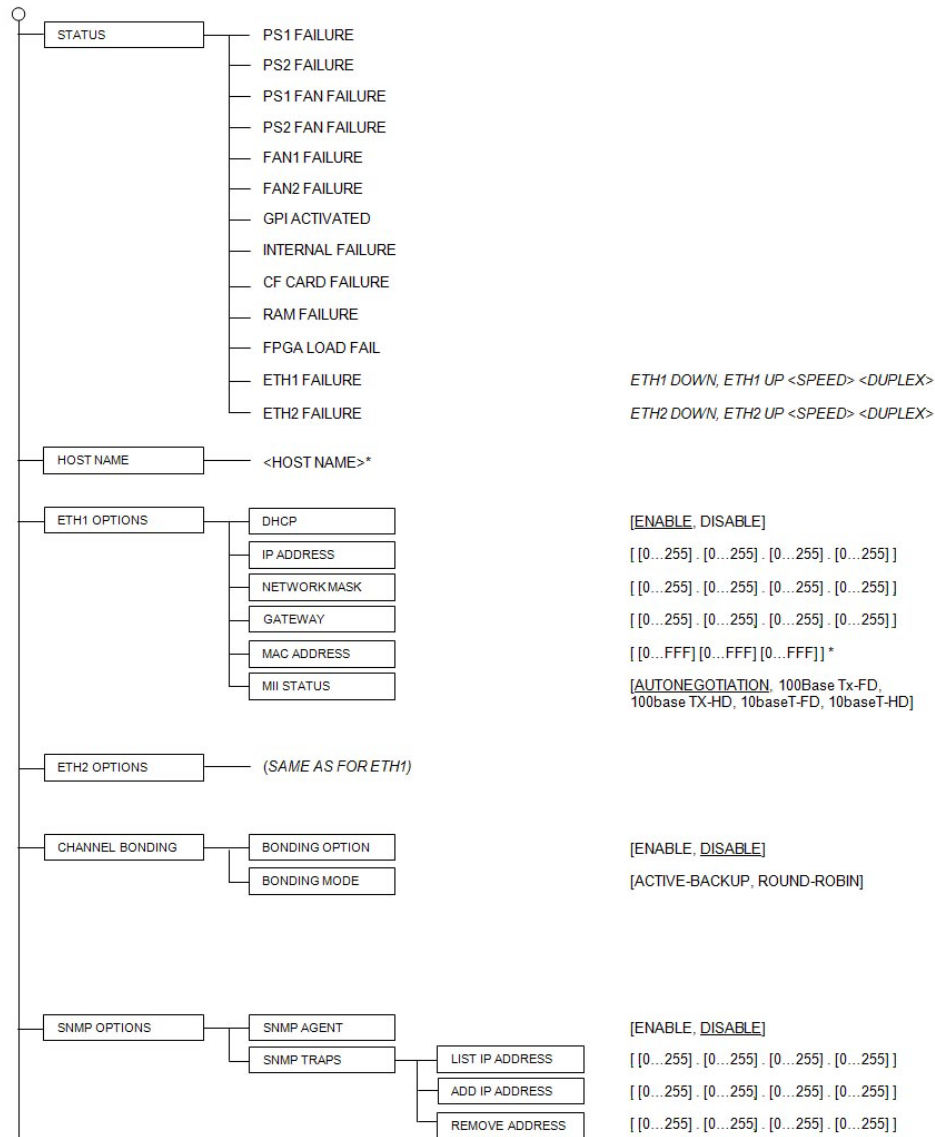
Using the menu

The option cannot be installed and activated from the menu. Use the iControl *Options* panel.

Once it has been installed and activated, you can enable or disable it from the CHANNEL BONDING menu item.

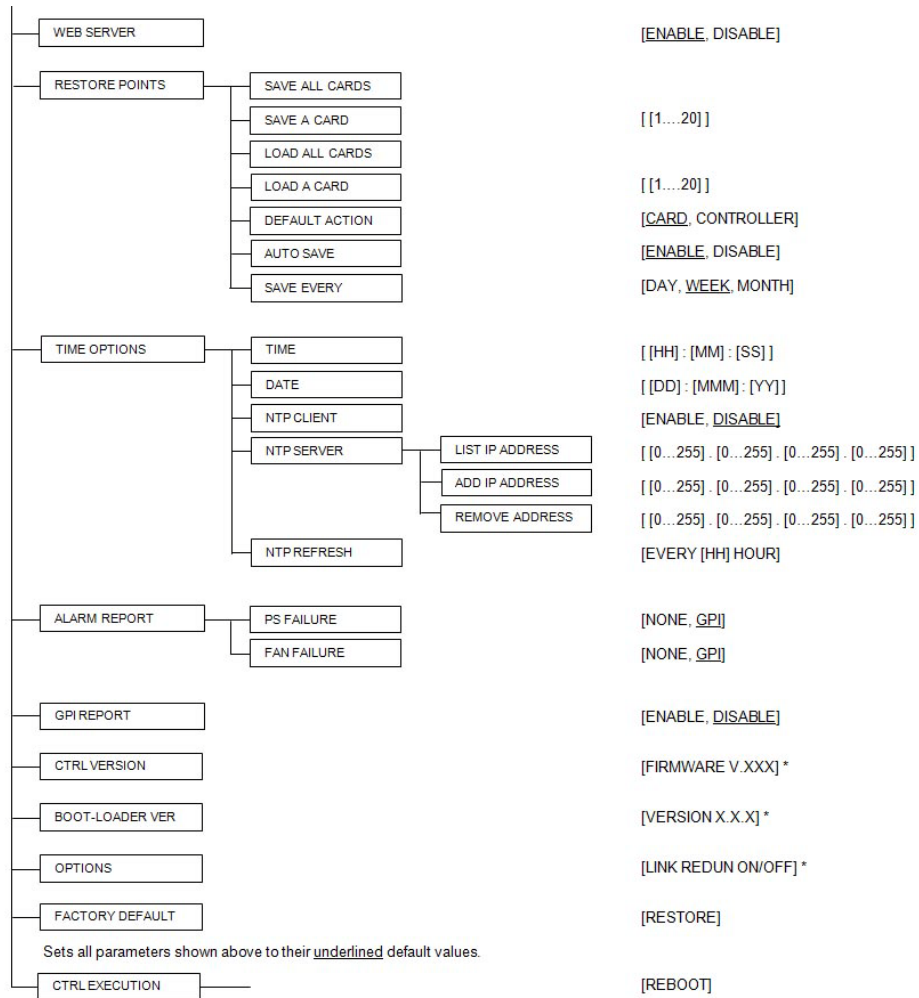
Local Control Panel Menu

Here is the complete on-board menu for the CPU-ETH2 controller, accessed through its local control panel.



continued...

Local Control Panel Menu continued.



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

REF-1801-FR1 Frame Reference

4

Chapter 4 describes the installation and functionality of the REF-1801-FR1 Frame Reference card in the Densité 3+ FR1 frame.

Summary

<i>Overview</i>	35
<i>Applications</i>	36
<i>Installation</i>	37
<i>Operation</i>	38
<i>Local control using the Densité frame's control panel</i>	38
<i>Remote control using iControl</i>	39
<i>Specifications</i>	49

Overview

The REF-1801-FR1 is a reference module that distributes a Universal Reference Signal (URS4D) to all the cards within a Densité 3+ FR1 frame.

The unique URS4D concept provides significant advantages as it generates a digital reference signal and simplifies inter-format processing by using a unique reference signal for all video and audio frame rates.

The REF-1801-FR1 extracts timecode from the input as per the SMPTE-318 standard, which allows for perfect audio / video phasing.

The REF-1801-FR1 should be installed in the dedicated system slot of a Densité 3+ FR1 frame.

Features

- Digitally generated reference for intra-frame distribution
- Time code extraction and embedding
- Supports SMPTE 318M for perfect audio/video phasing
- Easy control & monitoring

Block Diagram

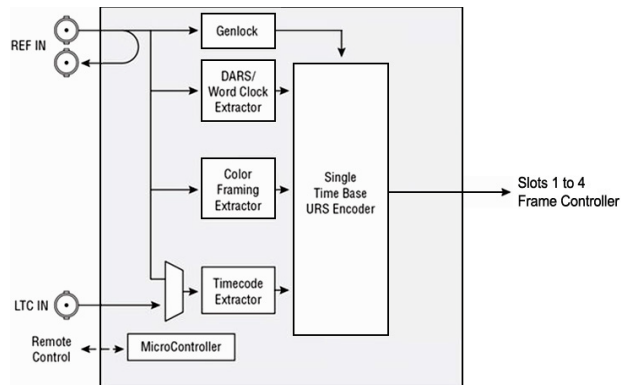


Fig. 4-1: Functional block diagram

Card Front Edge Layout

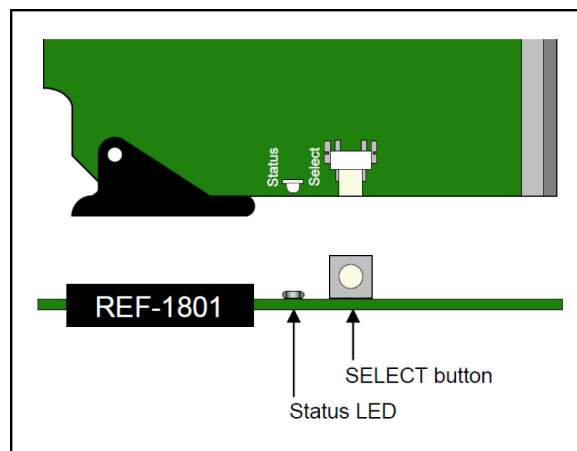


Fig. 4-2: Card edge layout

Applications

Referencing converters and frame sync modules

In this application, the REF-1801-FR1 accepts a reference input and generates a URS4D signal that is distributed to the four slots within the same frame.

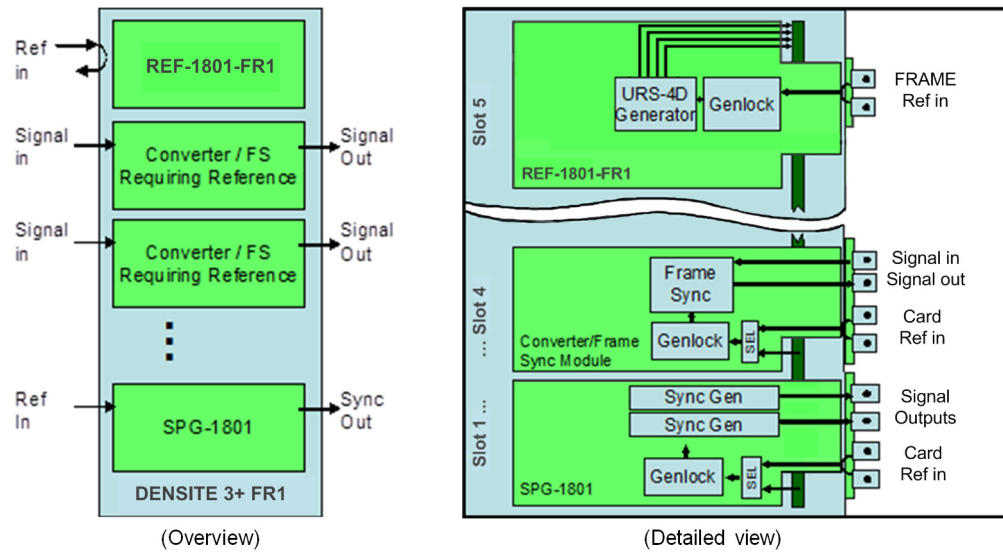


Fig. 4-3: Application - referencing converters and frame sync modules

Slaving cards in a frame to another REF-equipped frame

In this application, the reference signal is distributed in order to slave another Densité frame. The ability to carry time code and SMPTE-318 information will allow the slaved frame to operate with the same A/V phasing information as the master frame.

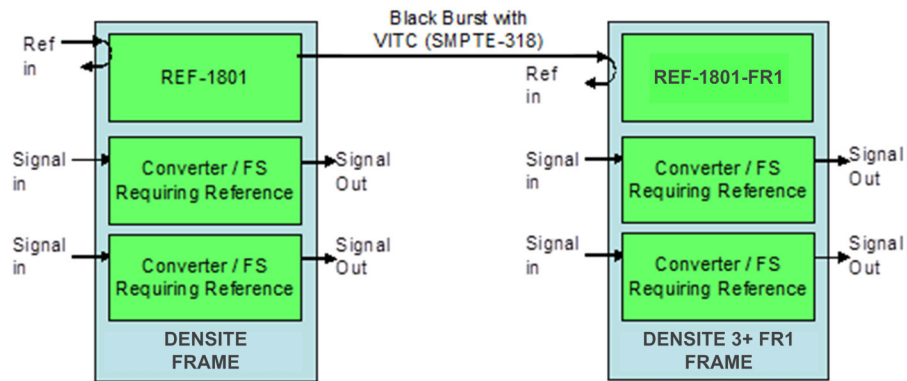


Fig. 4-4: Application - slaving cards in a frame to another REF-equipped frame

Installation

Unpacking

The following items should be included in the REF-1801-FR1 package:

- REF-1801-FR1 HD/SD Frame Reference Module
- REF-1801-RP-FR1 rear panel

Installation in the Densité 3+ FR1 frame

The REF-1801-FR1 must be mounted in a Densité 3+ FR1 frame. The installation includes both the REF-1801-FR1 module, and the rear panel module. It is not necessary to switch off the frame's power when installing or removing the card.

- The REF-1801-FR1 must be installed in the dedicated system card slot, above the right side power supply of the frame.
- Install the rear panel before inserting the card into the slot.

Connection

All connections are made on the rear panel:

- Connect the input reference signal to one of the DIN 1.0/2.3 connectors marked **REF IN**. The other REF-IN connector is a loop-through, which should be terminated if unused.
- Connect LTC time-code to the DIN 1.0/2.3 connector marked **LTC IN**

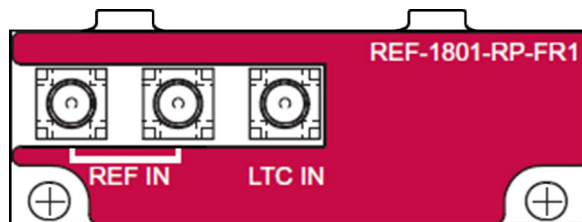


Fig. 4-5: REF-1801-FR1 rear panel

Operation

Control Options

The REF-1801-FR1 has two primary control interfaces:

- The local control panel attached to the Densité frame's controller
- Remote control using Grass Valley's iControl system

These are explained in detail in the following sections.

Local control using the Densité frame's control panel

The REF-1801-FR1 can be controlled using the **local control panel**, which is mounted on the frame's controller card.

See [Using the local control panel](#) on page 15 for a description of how to use this panel.

To assign the panel to control the REF-1801-FR1 card, push the **Select** button on the card's front edge. See [Card Front Edge Layout](#) on page 36.

Menu for local control

The REF-1801-FR1 has operating parameters which may be adjusted locally at the controller card interface. After pressing the **Select** button on the REF-1801-FR1 module, use the keys on the local control panel to step through the displayed menu and adjust the parameters. The menu is shown below.

```

STATUS
REFERENCE      SOURCE      [ AUTO, EXTERNAL, INTERNAL ]
                URS GEN MODE [ NORMAL, FREERUN ]
TIME CODE      SOURCE      [ AUTO, LTC, VITC, OFF ]
                PROCESSING MODE [ NORMAL, PASS THROUGH ]
                USER BITS    [ OFF, ON ]
CONFIG ALARMS  NO INPUT SIGNAL  ALARM LEVEL  [ GREEN, YELLOW, RED, FLASH RED ]
                ALARM REPORT [ NONE, GPI ]
                NO TIME CODE  ALARM LEVEL  [ GREEN, YELLOW, RED, FLASH RED ]
                ALARM REPORT [ NONE, GPI ]

VERSION        MAJ.MIN.Number.Build
FACTORY DEFAULT RESTORE
  
```

Status LED

The status monitor LED is located on the front card-edge of the REF-1801, and is visible through the front access door of the Densité frame. This multi-color LED indicates module status by color, and by flashing/steady illumination, according to the chart below. The chart also indicates fault reporting for this card on the Densité frame's serial and GPI interfaces.

Fault	Serial Report	GPI Report	Green	Yellow	Red	Flashing Red
Mode Freerun				★		
No Signal					★	
I/O Mismatch				★		
No Time Code					★	
Hardware failure						★

★ : Factory default.

A **Flashing Yellow** Status LED indicates that the **SELECT** button on the front panel has been pushed.

Remote control using iControl

The operation of the REF-1801-FR1 may be controlled using Grass Valley's iControl system.

- This manual describes the control panels associated with the REF-1801-FR1 and their use.

- Please consult the iControl User's Guide for information about setting up and operating iControl.

In iControl Navigator or iControl Websites, double-click on the REF-1801-FR1 icon to open the control panel.

NOTE: REF-1801 is the "short label" for a REF-1801-FR1 inside iControl.

The iControl graphic interface window

The basic window structure for the REF-1801 is shown in figure 3. The window identification line at the top gives the card type (*REF-1801*), and the slot number in which the card is installed in the Densité frame. On the left is a Status icon for the card.

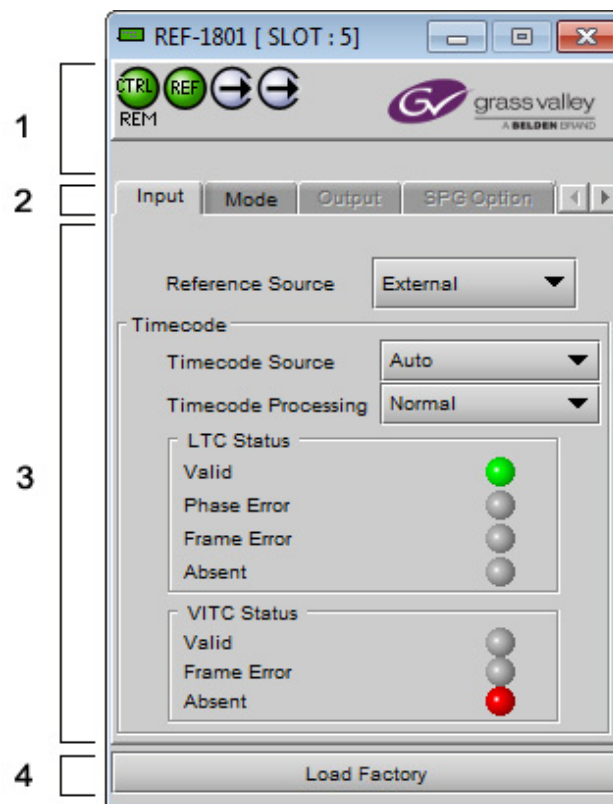


Fig. 4-6: REF-1801-FR1 iControl graphic interface window

There are four main sections in the window itself, identified in Figure 4-6:







- 1 The top section displays four status icons on the left. These icons report card communication status and input reference signal format and status.



1 2 3 4

Move the cursor over an icon to see its current status in the message area below the icons. If there is an error status, the message will appear automatically. If there are multiple error messages, the display will cycle through them

- Hovering the cursor over the Reference Status icon will show the format of the input reference

Icon #	Indicates	Appearance	Interpretation
1	Card control status	 	Green if the card is controlled remotely. Yellow when locally controlled.
2	Input reference status	 	Green if OK. Red if error detected.
3	Output 1		Always grey - no SPG option in the REF-1801-FR1
4	Output 2		Always grey - no SPG option in the REF-1801-FR1

- 2 Tabs are provided to give access to the various controls.
 - Single row of tabs, with arrow buttons to move along until desired tab is displayed. Click on a tab to select it.
- 3 The contents of the selected tab, with operating controls and status monitors as required.
- 4 The **Load Factory** button.
Clicking this button will reset all REF-1801-FR1 parameters to factory-default values (shown underlined in the [Menu for local control](#), on page 39), overriding settings made in the control panels.

Input tab

Click the Input tab.

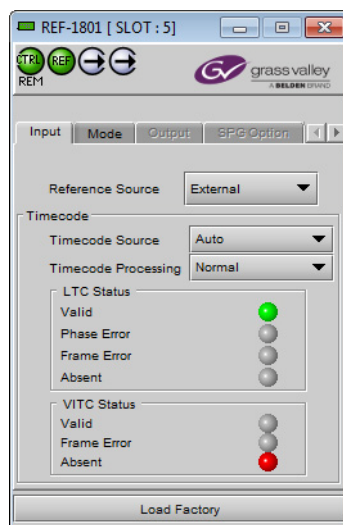


Fig. 4-7: Input tab

To select the reference source for this REF-1801-FR1

Use the pulldown to select the reference source:

- **Auto** – Use the external reference if available; switch to the internal reference if the external reference is lost or unavailable.
- **External** – use the reference connected to the rear panel
- **Internal** – use the internal reference source

To select the time code source for this REF-1801-FR1

Use the **Timecode Source** pulldown to select the source of timecode that will be inserted in the outgoing reference signals from this REF-1801-FR1. The choices are:

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





To select the timecode processing mode

Use the **Timecode Processing** pulldown to select how the timecode is processed in the REF-1801-FR1:

- **Normal** – use the timecode selected by the Timecode Source pulldown as the output timecode source.
- **Pass through** – pass the timecode selected by the Timecode Source pulldown directly to the output without internal processing.

The **Pass through mode** is required for correct operation when the time code is not standard running time code, e.g. when it is counting down. Using this mode will result in a 1-frame delay in the time code as it passes through the REF-1801-FR1. When pass through mode is selected, no new input timecode alarms (frame error, phase error) will be flagged.

The current status of timecode available at the REF-1801-FR1 input is shown in the **LTC Status** and **VITC Status** areas:

Indication		Meaning
Valid		Valid time code detected at the input.
Phase error		SMPTE-12 specifies the phase relation between LTC and video. If the LTC received does not match this alignment window, the card will flag this error.
Frame error		The time code must match the input reference frame rate. If not, an error is flagged.
Absent		No time code detected at the input. Note: The error detection algorithm uses the current reference format. So, when using internal reference, all information extracted from the input is out of phase, and the card may flag errors even if there are none.

Mode tab

Click the **Mode** tab.

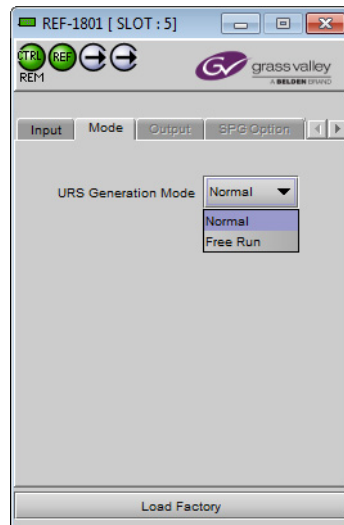


Fig. 4-8: Mode tab

URS (Universal Reference Signal) is a Grass Valley proprietary reference that is used within a Densité frame. It is generated by the REF-1801-FR1 (which must be located in slot 5), and distributed to other cards in the frame via the frame's midplane.

To select the URS generator operating mode

Use the pulldown to select between these options:

- **Normal** – In normal mode, the URS signal generated contains only the synchronization signals that match the reference format used by the REF-1801-FR1. That is, if input is NTSC, only 29.97Hz synchronization signals are sent.
- **Free Run** – If the free run mode is selected, all URS synchronization signals are generated, even the frame-rate-mismatched ones. So, in the same frame, some cards can work in 25Hz frame rate and other cards in 29.97Hz. The phase relation between these two frame rates will be arbitrary, thus the name “free run”.

Output and SPG Option tabs

Both tabs are greyed out because the SPG option (available on the standard REF-1801 card) is not available for the REF-1801-FR1.

For the same reason, the two Output status icons at the top of the panel are always gray.

Alarms tab

Click the **Alarms** tab

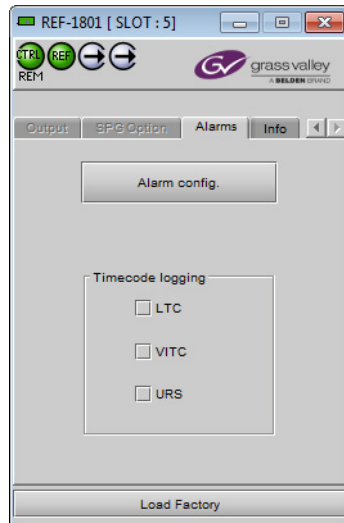


Fig. 4-9: Alarms tab

Timecode logging

Select a checkbox to send the indicated time code to the iControl GSM, where it can be used by other network devices.

- As this uses network resources, it is suggested that these boxes be left unchecked if there is no need to use the time code in this way.

Alarm Configuration

Click the **Alarm Config** button to open the *Alarm Configuration for REF-1801-FR1* panel in a new window. This panel allows the alarm reporting of the REF-1801-FR1 to be configured.

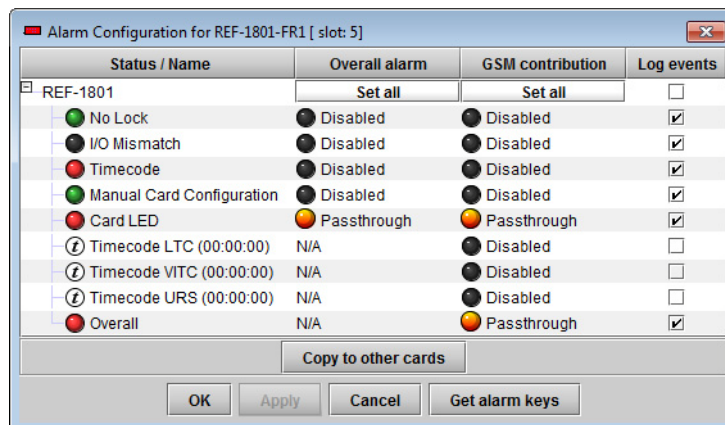


Fig. 4-10: Alarm Configuration Panel

The panel is organized in columns.

Status/Name

This contains an expandable tree listing all the alarms reported by this card. Each alarm name includes an icon that shows its current status

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

Overall Alarm

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






GSM Contribution

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

- If the Overall alarm contribution is selected as Disabled, the GSM alarm contribution can be set to any available value
- If the Overall alarm contribution is selected as any level other than disabled, the GSM contribution is forced to follow the Overall Alarm.

Levels associated with these alarms:

The pulldown lists may contain some or all of the following options:

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

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

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

Log Events

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

At the bottom of the window are several other controls:

Copy to other cards

Click this button to open a panel that allows the alarm configuration set for this card to be copied into another REF-1801 card.

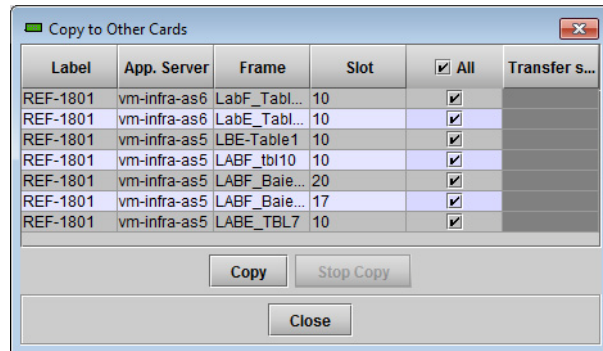
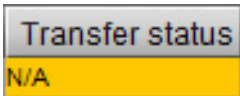
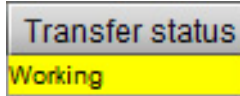
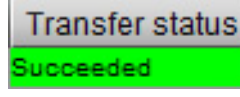
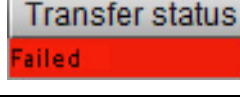


Fig. 4-11: Alarm configuration - Copy to other cards

To copy the alarm configuration

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

The status of the transfers for each destination card is shown in the Transfer Status column.

Transfer status report	
	The transfer to this destination card is not possible. Usually this is because the firmware versions do not match.
	The transfer is in progress.
	The transfer was successful. The destination card has been updated.
	The transfer failed. Try again, but you may need to troubleshoot the cause.

Get alarm keys

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

The file is saved in Excel.csv format.

OK, Apply, Cancel

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

Info tab

When the REF-1801 is included in an iControl environment, certain information about the card should be available to the iControl system. The user can enter labels and comments that will make this card easy to identify in a complex setup. This information is entered into data boxes in the **Info** panel.

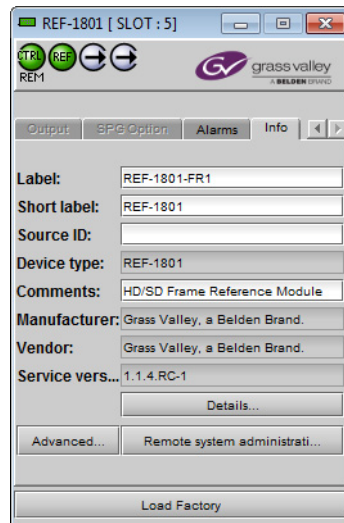


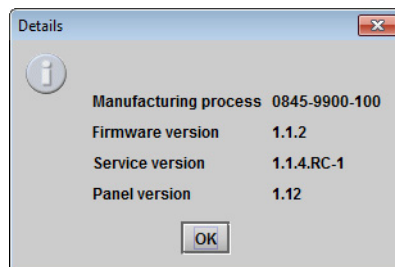
Fig. 4-12: Info tab

- Label:** Type the label used for this card when it appears in iControl applications
- Short Label:** Type the short-form label that iControl uses in some cases (8 characters)
- Source ID:** Type a descriptive name for this card
- Comments:** Type any desired text

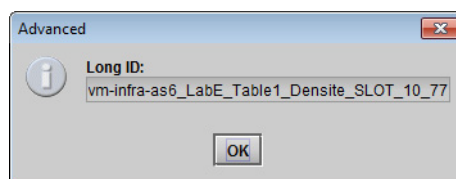
The remaining data boxes show manufacturing information about this card.

Three buttons in the panel give access to other information.

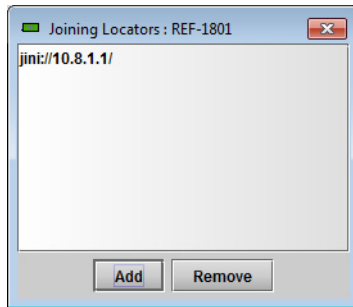
- **Details...**: Reports the Firmware version, service version, and panel version for this card



- **Advanced...**: Shows the LongID for this card. The LongID is the address of this REF-1801-FR1 in the iControl network.



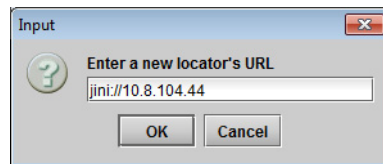
- **Remote System Administration...:** Opens the **Joining Locators** window, which lists remote lookup services to which this REF-1801 is registered.



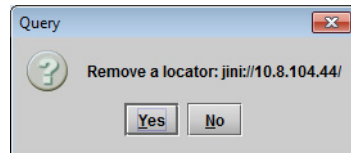
Add: Force the iControl service for this REF-1801 to register itself on a user-specified Jini lookup service, using the following syntax for the locator's URL in the Input data box:

jini://<ip_address>

where <ip_address> is the ip address of the server running the lookup service, e.g.:



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



Specifications

GENLOCK INPUT

CONNECTOR	DIN 1.0/2.3
LOAD	Passive Loop-Through
IMPEDANCE	75 Ohm bridging
RETURN LOSS	> 30 dB up to 30 MHz
FREQUENCY LOCK RANGE	compliant with RS-170M
SNR	> 40 dB

SIGNAL TYPE	Composite NTSC-M, PAL-B Black Burst with optional VITC
STANDARD	SMPTE-170M, ITU-R BT.1700-1, SMPTE-318M
SIGNAL LEVEL	1 V p-p

SIGNAL TYPE	HD Tri-Level Sync
STANDARD	SMPTE-274M, SMPTE-296M
SIGNAL LEVEL	600 mV p-p

SIGNAL TYPE	DARS AES-11 (48 kHz sampling frequency only)
STANDARD	SMPTE-276M
SIGNAL LEVEL	1 V p-p

SIGNAL TYPE	Word Clock
STANDARD	AES-11 Annex B (Informative)
SIGNAL LEVEL	2.0 V p-p

OTHER

MAXIMUM POWER	2.1 W
PHYSICAL FORMAT	Densité-2



Grass Valley Technical Support

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

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

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

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