grass valley

KAHUNA

PRODUCTION SWITCHER

Installation Manual

13-06514-040

2020-12-11

www.grassvalley.com

FCC Compliance

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

Patent Information

This product may be protected by one or more patents.

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

Copyright and Trademark Notice

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

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

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

Title	Kahuna Installation Manual
Part Number	13-06514-040
Revision	2020-12-11, 15:50

Important Safety Information

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

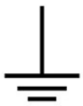
Symbols and Their Meanings

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

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

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

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



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

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

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

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

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

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

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

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

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

Warnings

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

•Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the rated mains voltage.

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

Cautions

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

- This equipment is meant to be installed in a restricted access location.
- When installing this equipment, do not attach the power cord to building surfaces.
- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.
- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.

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

Electrostatic Discharge (ESD) Protection

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

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

Battery Handling

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

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

Cautions for LCD and TFT Displays

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

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

Mesures de sécurité et avis importants

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

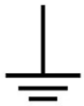
Signification des symboles utilisés

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

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

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

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



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

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

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

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

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

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

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

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

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

Avertissements

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

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

Mises en garde

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

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.

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

Protection contre les décharges électrostatiques (DES)

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

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

Manipulation de la pile

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

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

Précautions pour les écrans LCD et TFT

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

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

Environmental Information

European (CE) WEEE directive.

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

Visit www.grassvalley.com for recycling information.

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

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

Lithium Batteries

Battery Warning

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

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

Battery Disposal

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

1. Make sure the AC adapter / power Cord is unplugged from the power outlet.
2. Remove the protective cover from your equipment.
3. Gently remove the battery from its holder using a blunt instrument for leverage such as a screwdriver if necessary. In some cases the battery will need to be desoldered from the PCB.
4. Dispose of the battery and equipment according to your local environmental laws and guidelines.

WARNING

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

Laser Safety - Fiber Output SFP and QSFP Modules Warning

LASER SAFETY

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

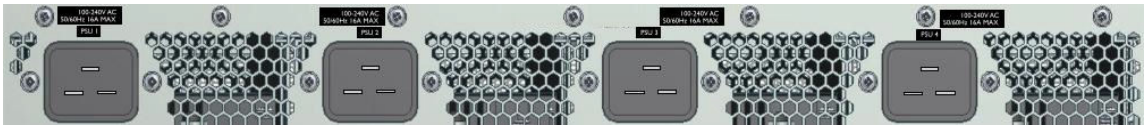
Even though the power of these lasers is low, the beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fiber is connected to the board's fiber outputs before power is applied. If a fiber cable (e.g. patchcord) is already connected to an output, make sure that the cable's other end is connected, too, before powering up the board.
- **Do not** look in the end of a fiber to see if light is coming out. The laser wavelengths being used are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

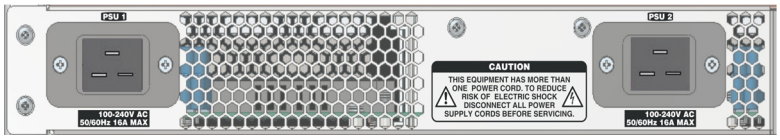
Mainframe Mains Supply Voltage

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

Mains Inputs to the Kahuna 9600 - 11RU Mainframe



Mains Inputs to the Kahuna 6400 - 6RU Mainframe



Mains Input to Kahuna 9600 and Kahuna 6400 Mainframes

To 11RU Mainframe PSU (RMY5 PSU4)100-240V at 50 and 60Hz

To 6RU Mainframe PSU (SAADZ 9668360X)100-240V at 50 and 60Hz

External DC PSU for the GUI

External DC PSU for the GUI panel (9648703A) 100-240V at 50 and 60Hz

External DC PSU for the MAV-GUI and Mav Remote

Two external DC PSU's for the MAV-GUI (RMY8 12V100W) 100-240V at 50 and 60Hz

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

Safety and EMC Standards

This equipment complies with the following standards:

Safety Standards

CE

Information Technology Equipment - Safety Part 1

EN60950-1: 2006

Safety of Information Technology Equipment Including Electrical Business Equipment.

UL1419 (4th Edition)

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

EMC Standards

This unit conforms to the following standards:

EN55032:2015 (Class A)

Electromagnetic Compatibility of multimedia equipment - Emission requirements

EN61000-3-2:2014 (Class A)

Electromagnetic Compatibility - Limits for harmonic current emissions

EN61000-3-3:2013

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

EN55103-2:2009 (Environment E2)

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

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

FCC / CFR 47:Part 15 (Class A)

Federal Communications Commission Rules Part 15, Subpart B

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

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

EMC Performance of Cables and Connectors

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

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

SIGNAL/DATA PORTS

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

COAXIAL CABLES

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

D-TYPE CONNECTORS

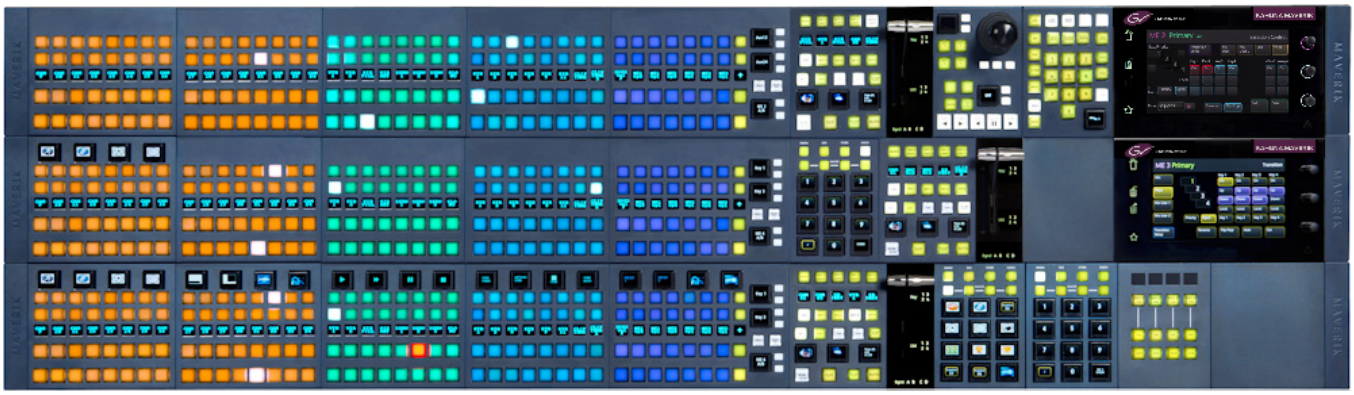
D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having “dimples” which improve the contact between the plug and socket shells, are recommended.

Table of Contents

1 About this Manual

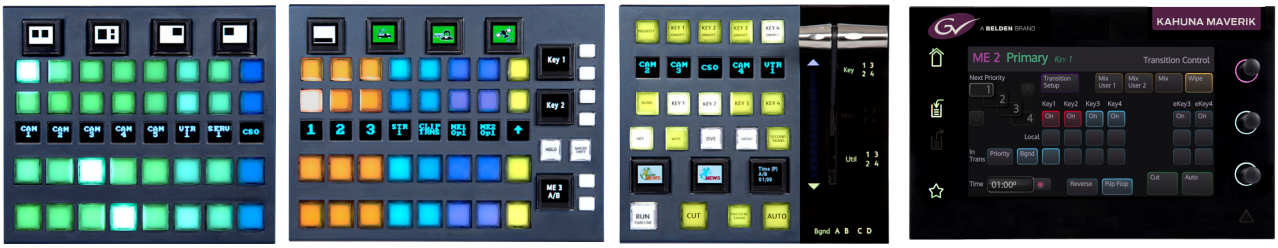
Introduction

Thank you for purchasing your new Kahuna Maverik Production Switcher Control Surface and Kahuna Production Switcher Mainframe.
This installation manual will help you through each stage of the physical installation of each component and advise you of all relevant safety aspects. For user setup and configuration please consult the User Instruction Manual.



Kahuna Maverik is a revolutionary style of control surface that throws away the rule book for how a switcher control surface should be configured. The Maverik modules can be assembled in a huge variety of configurations without expending precious desk space. Operators can easily put together the modules that make sense for their productions and provide the quickest access to multiple key functions.

Kahuna Maverik is manufactured to Grass valley's usual very high standard of build quality. It is designed to work with, control and complement the market leading Kahuna 9600 and Kahuna 6400 production switcher mainframes, giving the operator a level of unrivalled flexibility.



If you have any questions regarding the installation of your product, please refer to the contact details listed at the rear of this manual.

Note: **Please note** that all diagrams are for illustration purposes only and may differ slightly from the purchased product. Grass Valley operates a policy of continuous improvement and development. Grass Valley reserves the right to make changes and improvements to any of the products described in this document without prior notice.

2 Product Information

On Receipt of the Kahuna Maverik Control Surface

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

- Carefully unpack the system components and check them against the packing list. If there is anything incorrect notify your Grass Valley Partner, or Grass Valley, at once.
- Check that the equipment has not been damaged in transit. If any damage has occurred notify your Grass Valley Partner (or Grass Valley directly) and the carrier immediately.
- Always retain the original packing materials if possible, they could prove useful should it ever be necessary to transport or ship the system units.
- Always read the installation guide and the user instructions (separate manual) carefully, it will provide you with helpful hints and tips about care and maintenance and help you get the most out of your Kahuna Maverik control surface.

In the unlikely event of an equipment failure, contact your Grass Valley Partner, or Grass Valley, at once, contact details are at the rear of this manual.

What is supplied with Kahuna Maverik

The Kahuna Maverik packaging is split into two categories:

- The MAVRow Frames
- The MAV Modules and Accessories

The boxes with the MAVRow frames will contain:

- MAVRows
- Spacer Bars - if supplied (to connect the MAVRows together)
- Screws (to attach the MAVRows to the Spacer Bar)
- Cable Tie Brackets and plastic fasteners (to attach the Comms cables)
- A3 Assembly Instructions

The box that contains the MAV Modules will contain:

- The individually packed MAV Modules
- Accessories box - PSU’s, Cables (mains for the PSU’s), Cables (Comms), MAVRow Ears and USB Memory device

- Box containing the User Manual and full Installation Manual

What is supplied with the Mainframe

- Mainframe 11RU Kahuna 9600 or 6RU Kahuna 6400
(customer order dependent).
- 4x or 2x Mains Power Leads for the Mainframe (mainframe dependent).

Note: Installation and User Manuals are supplied regardless of system components purchased.

Kahuna Maverik Order Codes

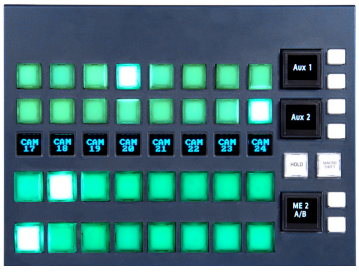
Pre Configured Maverik Panels

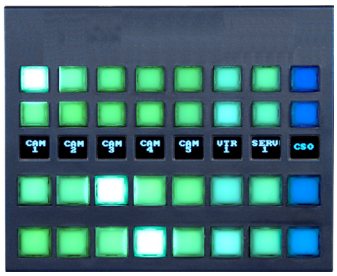
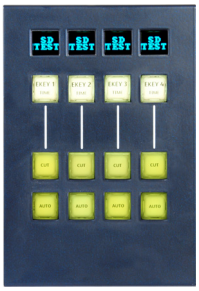
Ordering Information	
Part Number	**Description**
MAV-PNL-100-16	Maverik 1 ME Panel with 16 buttons - Includes: 1x MAV-GUI, 1x MAV-8XPT-DEL-FS, 1x MAV-8XPT-FS, 1x MAV-TRANS, 1x MAV-KEYER, 1x MAV-UFBPAD, 1x MAV-JOY, 1x MAV-KEYPAD, 1x MAV-BP-40. NOTE - Must order separately :2x MAV - RowFrame - 620 - MAV-PNL-ROW-620
MAV-PNL-200-24	Maverik 2 ME Panel with 24 buttons - Includes: 1x MAV-GUI, 2x MAV-8XPT-DEL-FS, 4x MAV-8XPT-FS, 2x MAV-TRANS, 1x MAV-KEYER, 1x MAV-UFBPAD, 1x MAV-DSK, 1x MAV-JOY, 1x MAV-KEYPAD, 1x MAV-BP-40, 1x MAV-BP-160 NOTE- Must order separately :3x MAV - RowFrame - 780 - MAV-PNL-ROW-780

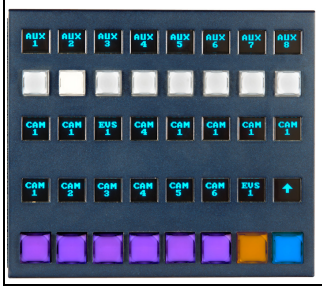
MAV-PNL-300-24-1G	Maverik 3 ME Panel with 24 buttons - Includes: 1x MAV-GUI, 3x MAV-8XPT-DEL-FS, 6x MAV-8XPT-FS, 3x MAV-TRANS, 1x MAV-KEYER, 1x MAV-UFBPAD, 1x MAV-JOY, 1x MAV-KEYPAD, 1x MAV-BP-40, 1x MAV-BP-60 NOTE- Must order separately :3x MAV - RowFrame - 940 - MAV-PNL-ROW-940
MAV-PNL-300-24-2G	Maverik 3 ME Panel with 24 buttons - Includes: 2x MAV-GUI, 3x MAV-8XPT-DEL-FS, 6x MAV-8XPT-FS, 3x MAV-TRANS, 1x MAV-KEYER, 1x MAV-UFBPAD, 1x MAV-DSK, 1x MAV-JOY, 1x MAV-KEYPAD, 2x MAV-BP-40 NOTE- Must order separately :3x MAV - RowFrame - 1040 - MAV-PNL-ROW-1040
MAV-PNL-300-32	Maverik 3 ME Panel with 32 buttons - Includes: 2x MAV-GUI 3x MAV-8XPT-DEL-FS 9x MAV-8XPT-FS 3x MAV-TRANS 1x MAV-KEYER 3x MAV-UFBPAD 1x MAV-JOY 1x MAV-KEYPAD 1x MAV-DSK 1x MAV-BP-60 NOTE- Must order separately :3x MAV - RowFrame - 1260 - MAV-PNL-ROW-1260

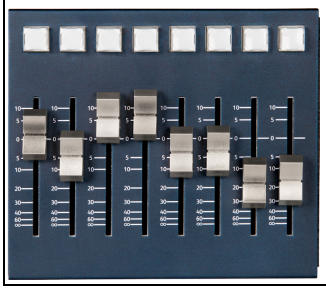
MAV-PNL-400-32	Maverik 3 ME Panel with 32 buttons - Includes: 2x MAV-GUI 3x MAV-8XPT-DEL-FS 9x MAV-8XPT-FS 3x MAV-TRANS 1x MAV-KEYER 3x MAV-UFBPAD 1x MAV-JOY 1x MAV-KEYPAD 1x MAV-DSK 1x MAV-BP-60 NOTE- Must order separately :3x MAV - RowFrame - 1260 - MAV-PNL-ROW-1260
MAV-PNL-400-40	Maverik 4 ME Panel with 40 buttons - Includes 2x MAV-GUI, 4x MAV-8XPT-DEL-FS, 16x MAV-8XPT-FS, 4x MAV-TRANS, 1x MAV-KEYER, 3x MAV-UFBPAD, 1x MAV-DSK, 1x MAV-JOY, 1x MAV-KEYPAD, 1x MAV-BP-60, 1x MAV-BP-20 NOTE- Must order separately :4x MAV - RowFrame - 1320 - MAV-PNL-ROW-1320
MAV-PNL-400-40-OL	Maverik 4 ME Panel with 40 buttons plus OLEDS - Includes 2x MAV-GUI, 3x MAV-8XPT-DEL-FS, 1x MAV-8XPT-DEL-OB, 12x MAV-8XPT-FS, 4x MAV-8XPT-OB, 4x MAV-TRANS, 1x MAV-KEYER, 3x MAV-UFBPAD, 1x MAV-DSK, 1x MAV-JOY, 1x MAV-KEYPAD, 1x MAV-BP-60, 1x MAV-BP-20 NOTE- Must order separately :4x MAV - RowFrame - 1320 - MAV-PNL-ROW-1320

MAV Module Order Codes

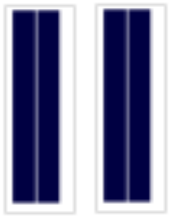
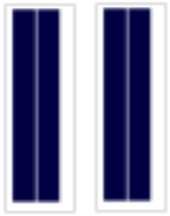
Ordering Information			
MAV Module	**MAV Name/Part Number**	**Description**	**Width**
	**MAV-GUI**	MAV Touch screen GUI interface Module with dual redundant external PSUs and comms to the mainframe. Power and control for up to 16 MAV modules.	220 mm 8.66 Inches
	**MAV-TRANS**	Maverik Transition Module with two(2) programmable OLED buttons. Key, Background and Wipe selection.	160 mm 6.29 Inches
	**MAV–8XPT–DEL-OB**	Maverik 8-crosspoint Delegate Source select Module with programmable OLED buttons.	200 mm 7.87 Inches
	**MAV–8XPT–DEL-FS**	Maverik 8-crosspoint Source select Module. No programmable OLED buttons.	200 mm 7.87 Inches

Kahuna Maverik Ordering Information - continued			
MAV Module	**MAV Name/Part Number**	**Description**	**Width**
	**MAV-8XPT-OB**	Maverik 8-crosspoint Source select Module with programmable OLED buttons.	160 mm 6.29 Inches
	**MAV-8XPT-FS**	Maverik 8-crosspoint Source select Module. No programmable OLED buttons	160 mm 6.29 Inches
	**MAV-DSK**	Maverik Downstream Keyer Control Module for eKeys on an M/E bank.	100 mm 3.93 Inches
	**MAV-JOY**	Maverik Joystick Module with controls for internal Stores and external playback devices. Fade-To-Black and Timeline control.	100 mm 3.93 Inches

Kahuna Maverik Ordering Information - continued			
MAV Module	**MAV Name/Part Number**	**Description**	**Width**
	**MAV-KEYPAD**	Maverik Numeric Keypad Module for memories recall, Macros and clones enable, Live Mode set, plus Save Menu access.	100 mm 3.93 Inches
	**MAV-UFBPAD**	Maverik User Function Button Pad Module with programmable OLED buttons. Direct load DMEMs, GMEMs, DVEMEMs, Stores, and Macros.	100 mm 3.93 Inches
	**MAV-KEYER**	Maverik Keyer Control Module with buttons and parameter knobs. Select and set functions/features for individually selected key layers.	160 mm 6.29 Inches
	**MAV-AUTO**	Maverik Automation Module with programmable OLED buttons. Load DMEMs, GMEMs, DVEMEMs. Stores, and Macros.	160 mm 6.29 Inches
	**MAV-AUX**	Maverik Aux Bus Module with three(3) mnemonic displays.	160 mm 6.29 Inches

Kahuna Maverik Ordering Information - continued			
MAV Module	**MAV Name**	**Description**	**Width**
	**MAV-AUD-FADER**	Maverik Audio Fader Module with eight(8) motorized faders. Control specific functions of external audio mixers.	160 mm 6.29 Inches

MAVRow Ears and Blanking Modules Order Codes

MAVRow Ears and 19" MAVRow Frame		
	Part Number	**Description**
	**MAV-EARS-PR**	Maverik Panel pair of metal ears to cover each end of a MAVRow. Pair consists of one(1) engraved ear and one(1) plain ear.
	**MAV-ROW-EARS-PR**	Maverik Panel pair of metal ears to cover each end of a MAVRow. Pair consists of two(2) engraved ears.
	MAV-PNL-RACKMOUNT	Mav - RowFrame - 19". Single MavRow frame 19" rackframe

The Blanking Modules fill the spaces in the control surface where MAV modules are not required, their function is aesthetic.

Note: The widths of the blanking modules are in 20 mm (0.78 inch) increments, the smallest is 20mm (0.78 inch) up to 220 mm (8.66 inches).

Blanking Module Ordering Information		
	Part Number	**Description**
	**MAV-BP 20**	Maverik Module Blank 20mm Wide GV
	**MAV-BP 40**	Maverik Module Blank 40mm Wide GV
	**MAV-BP 60**	Maverik Module Blank 60mm Wide GV
	**MAV-BP 80**	Maverik Module Blank 80mm Wide GV
	**MAV-BP 100**	Maverik Module Blank 100mm Wide GV
	**MAV-BP 120**	Maverik Module Blank 120mm Wide GV

	**MAV-BP 140**	Maverik Module Blank 140mm Wide GV
	**MAV-BP 160**	Maverik Module Blank 160mm Wide GV
	**MAV-BP 180**	Maverik Module Blank 180mm Wide GV
	**MAV-BP 200**	Maverik Module Blank 200mm Wide GV
	**MAV-BP 220**	Maverik Module Blank 220mm Wide GV

Periodic Maintenance of Mainframes

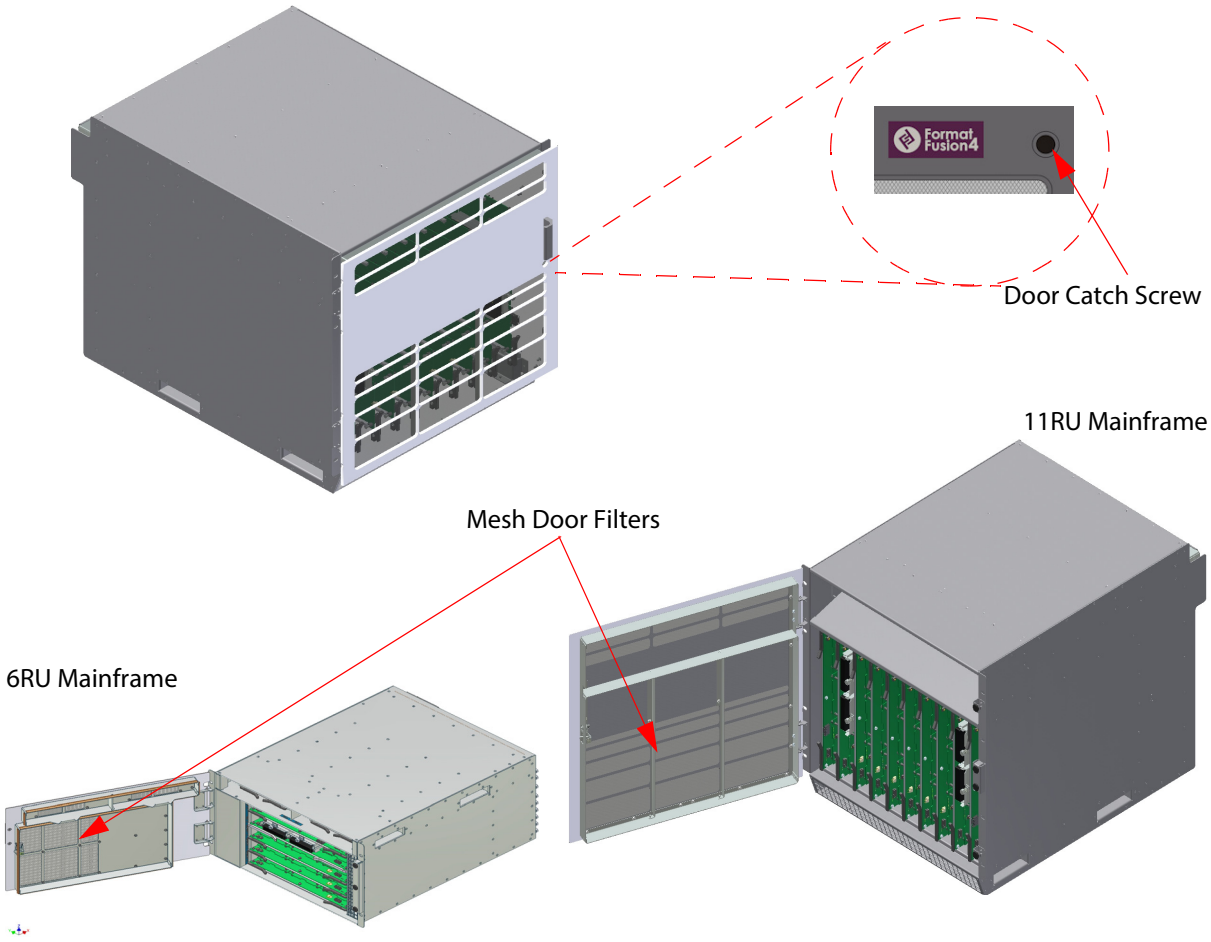
Mainframe Filter Maintenance

Extreme caution needs to be taken when inspecting the mainframe. Do Not touch any components or parts within the main cabinet. **Electric Shock Hazard!**

The metal mesh in the mainframe front door should be inspected regularly for dust accumulation with a maximum inspection frequency of 6 months, the mainframe can be cleaned from the outside by vacuuming the mesh door filters, or by opening the door and cleaning as explained below:

Opening the Mainframe Doors for Maintenance

1. Turn the door catch screw located under the door handler counter clockwise.
2. Take hold of the door handle and carefully pull the door open, a little force may be needed as the door has a ball catch.
3. With the door open, remove any excessive dust that has accumulated on the mesh using a vacuum cleaner. The front door and PSU fronts should also be periodically vacuumed.
4. When finished, close the door and secure the door catch screw.



In the unlikely event of an equipment failure, contact the Grass Valley Customer Support Department, contact details are at the rear of this manual.

3 Environment and Location

Environmental Considerations

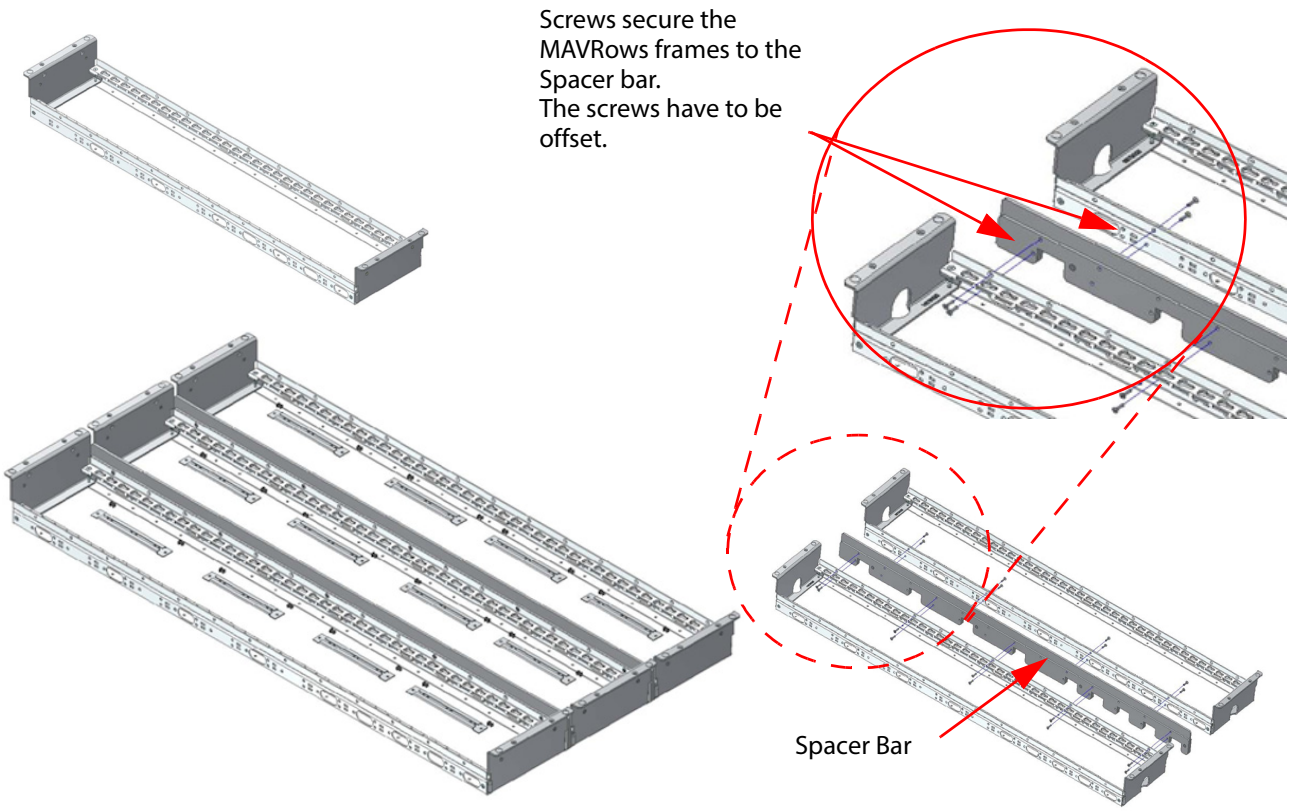
The ambient temperature for all the supplied equipment should not exceed the limits of 5 and 40°C (41 to 104°F) at a relative humidity of 10 to 90% (non-condensing).

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

Assembling the MAVRow's

The number of MAVRows that have to be assembled will depend on the size of the control surface ordered. A single row of MAV modules will not need any assembly, more than one row will need fixing together before mounting into a desk.
The MAVRows have a spacer bar between them and are secured to the spacer bar using the supplied screws.
When attaching the MAVRow frames to the spacer bar, the screws have to be offset (as shown in the diagram below).

Note: If a control surface is going to be built with MAV rows of different lengths. The right hand ends should be either aligned or offset from each other by a multiple of 60 mm (2.36 inches).



With the MAVRows assembled, they can now be mounted into the desk.

Mounting the Kahuna Maverik Control Surfaces into a Desk

Note: Each MAVRow width and depth dimensions are unique to a customers requirements, please use the information below to calculate the dimensions of the control surface and the cut-out dimensions. ***Important: The cutout has to be a minimum of 110mm (4.3 inches) into the desk to allow clearance for cables and airflow underneath the MAVRow frame.***

How to calculate the Width and Depth of a Control Surface

Control Surface Width - The calculation is:-
Total Width MAV Modules and Blanking Modules in a row + 54mm (2.12 in)
Control Surface Depth - The calculation is:-
Number of Rows x 140 mm (5.15 in)

Note: Widths of MAV Modules and Blanking Modules can be found in Table 1 and Table 3 of this manual.

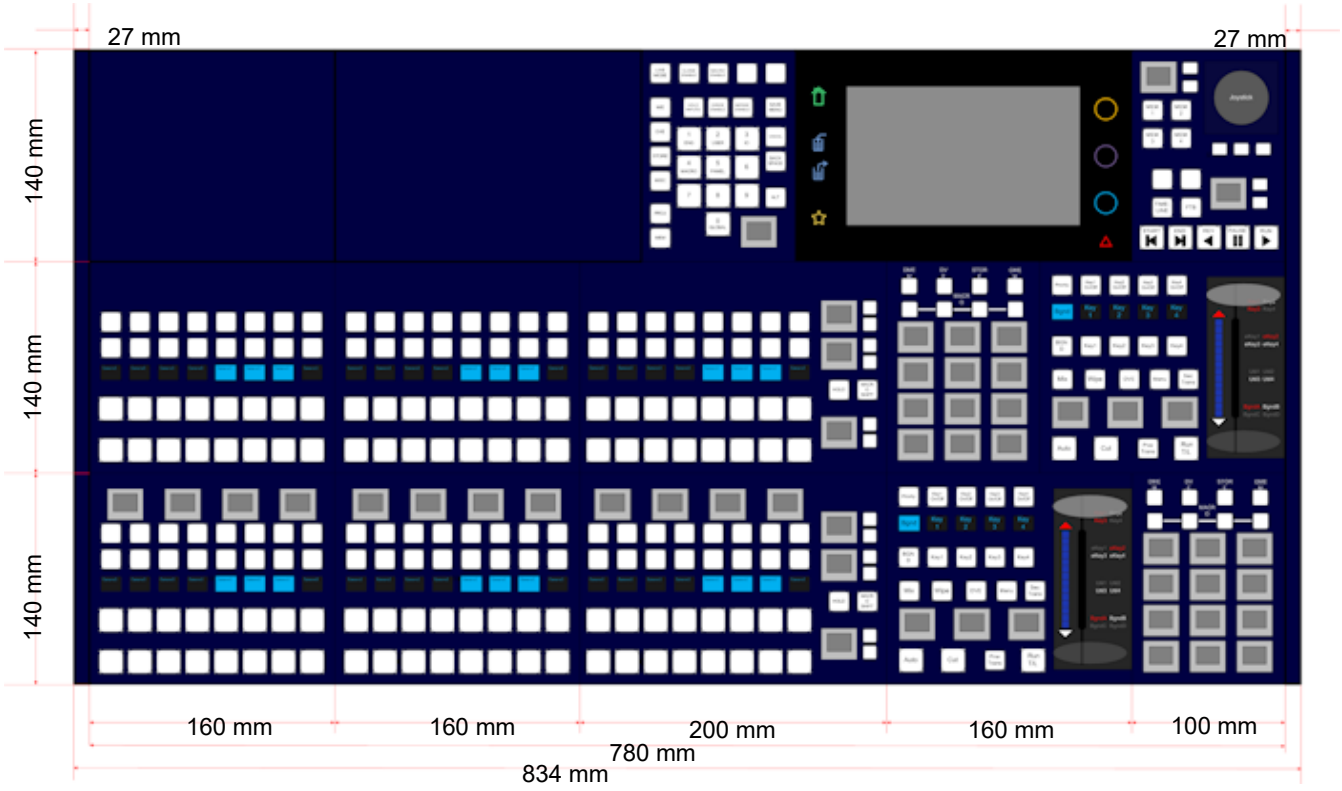
Example: The diagram below is an example of how to calculate the overall width of a Kahuna Maverik control surface.
Control Surface Width:- Add up all the **Widths** of the MAV modules (bottom Row):
160 mm + 160 mm + 200 mm + 160 mm + 100 mm = 780 mm
Then add 54 mm to that total:- 780 mm + 54 mm = 834 mm
(54 mm is the combined width of the End Caps)

Control Surface Depth:- 3x Rows so the Depth = 140 mm x 3 = 420 mm

Calculation in Inches:-
Width:- 6.29 in + 6.29 in + 7.87 in + 6.29 in + 3.93 in = 30.67 in
Then add 2.12 in to that total:- 30.67 in + 2.12 in = 32.79 in

Depth:- 5.15 in x 3 = 15.45 in

Example of a Kahuna Maverik Control Surface



How to calculate a Desk Cut-out Width and Depth

Note: The cutout has to be a minimum of 110mm (4.3 inches) into the desk to allow clearance for cables and airflow underneath the MAVRow frame.

Cut-out Width - The calculation is:-
Total Width MAV Modules and Blanking Modules in a row + 29 mm (1.14 in).

Cut-out Depth - The calculation is:-
Number of Rows x 140 mm - 5 mm (**Number of Rows x 5.15 in - 0.19)**.

Note: Widths of MAV Modules and Blanking Modules can be found in Table 1 and Table 3 of this manual.

Example:

In the diagram below, the black line is the outline of if control surface from the previous page. The calculation below describes how to calculate the cut-out (red dotted line) for the control surface.

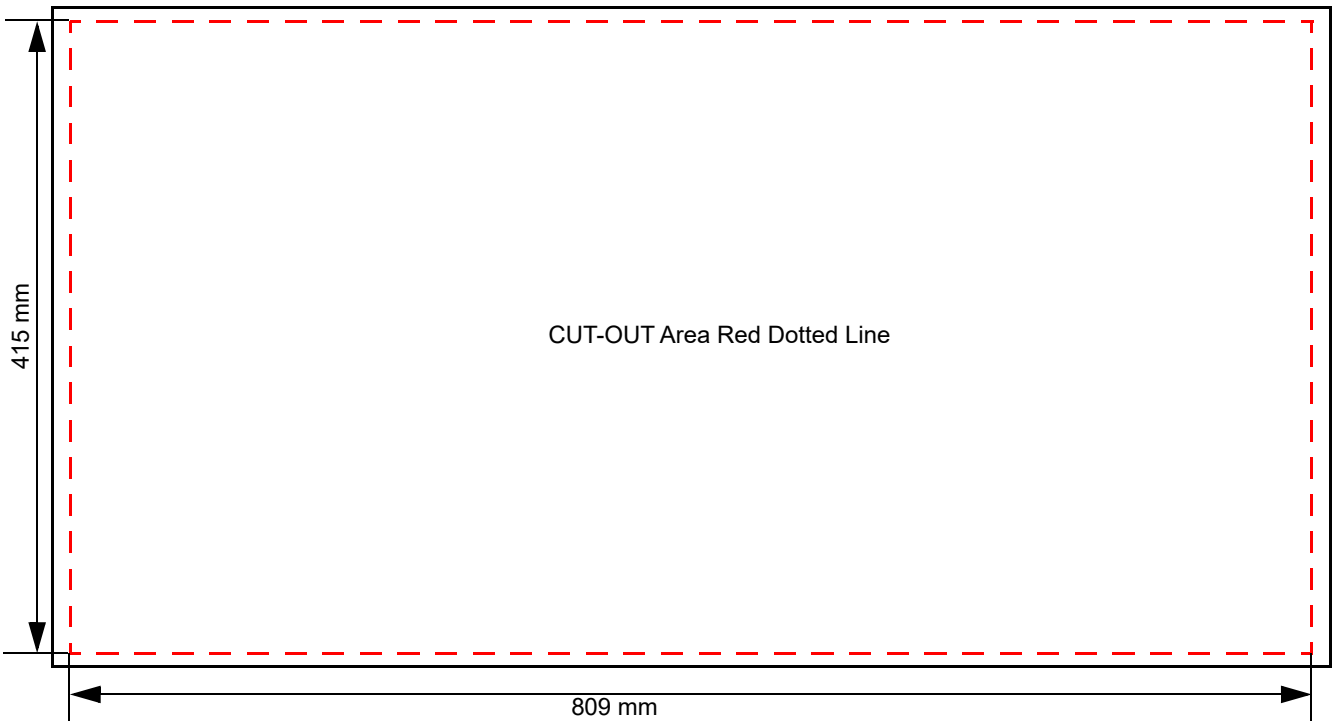
Cut-out Width - Add up all the **Widths** of the MAV modules (bottom row):-
160 mm + 160 mm + 200 mm + 160 mm + 100 mm = 780 mm
Then add 29 mm to that total:- 780 mm + 29 = 809 mm (cut-out Width).

Calculation in Inches:-
6.29 in + 6.29 in + 7.87 in + 6.29 in + 3.93 in = 30.67 in
Then add 0.98 into that total:- 30.67 in + 1.14 = 31.81 in (cut-out Width).

Cut-out Depth - 140 mm x 3 = 420 mm, then take away 5mm = 415 mm (cut-out Depth).

Calculation in Inches:-
5.15 in x 3 = 15.45 in, then take away 0.19 in = 15.26 in (cut-out Depth).

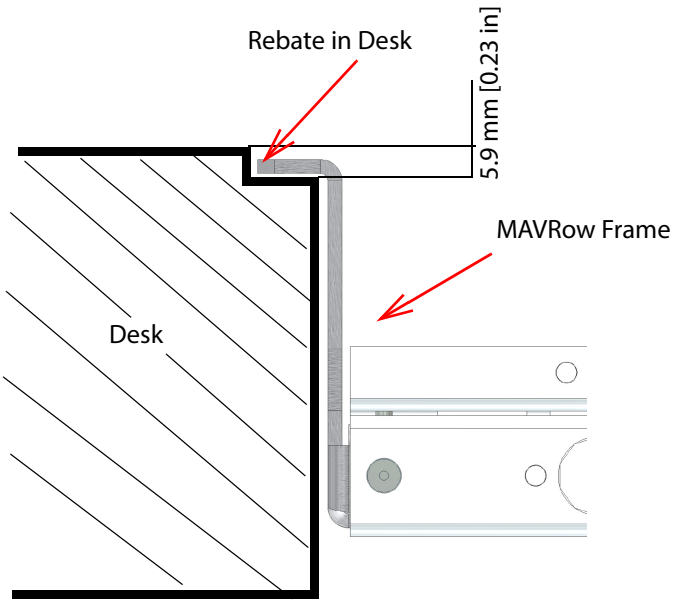
Example of a Control Surface Cut-out



Optional Rebate in Desk

The MAVRow frame can be rebated into the desk to make the **Control Surface Flush** with the surface of the desk.

The **Rebate** has to be cut the entire way around the desk and cut to 5.9 mm (0.23 in).



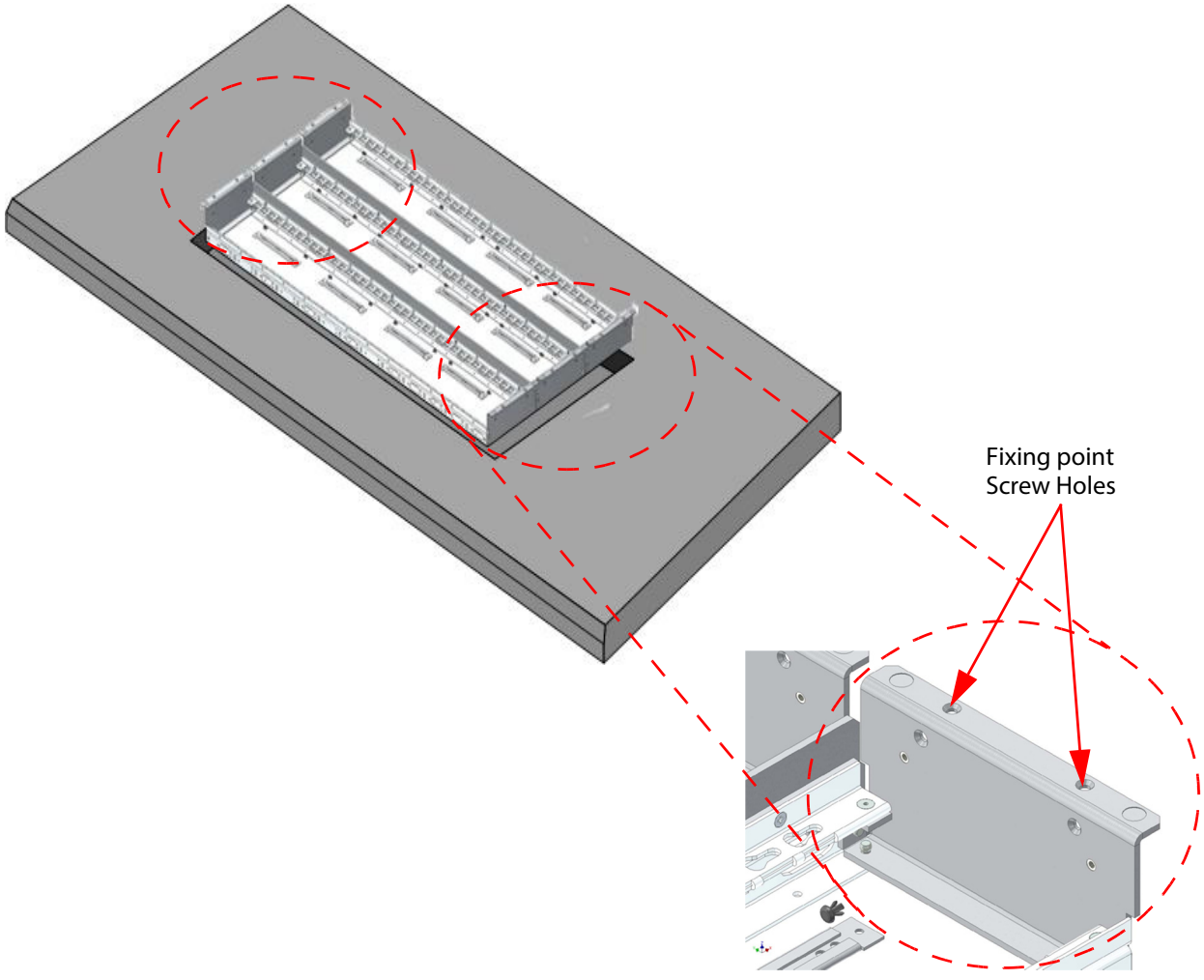
Note: Creating a rebate in a desk is very difficult. It should only be attempted by a qualified person or company.

Mounting a MAVRow Frame into a Desk

Note: The MAVRow frame should preferably be mounted in a desk which is open underneath.
If the desk is not open underneath, enough room has to be left underneath for ventilation and for routing the PSU and Comms cables to the underside of the MAVRow frame.
Important: The cutout has to be a minimum of 110mm (4.3 inches) into the desk to allow clearance for cables and airflow underneath the MAVRow frame.
Note: It is essential to ensure the air temperature does not exceed 40°C

The MAVRow frame has to be empty of any MAV modules or Blanking modules before attempting to insert the frame into the desk.
With the desk cut to the correct size, the MAVRows are secured into a desk using appropriate counter sink flat head wood screws. At each end of the MAVRow frame there are fixing point holes for the screws (as shown on the diagram below).

Note: Make sure that every MAVRow is secured to the desk using the fixing points at both ends.



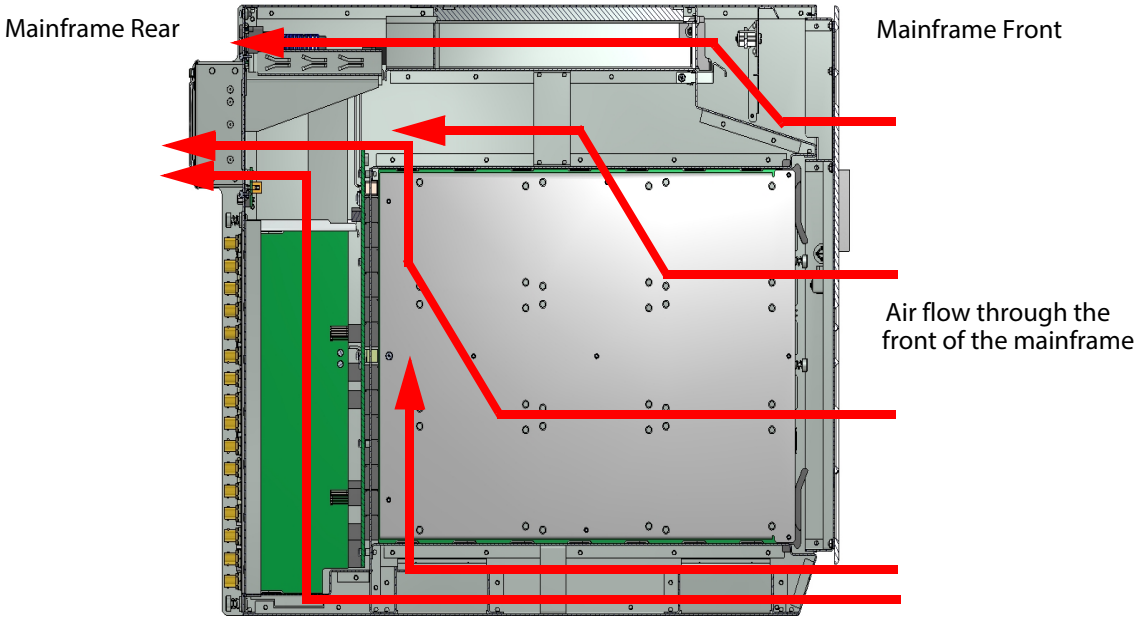
Mainframe Location and Environment

Location Instructions

The Kahuna mainframes can be used freestanding (tabletop configuration) or installed in a standard 483mm (19 inch) equipment rack. The following precautions should be observed:

1. The cooling fan exhausts at the rear of the unit must not be obstructed - a minimum clearance of 200mm (8 inches) is **ESSENTIAL**.
2. Air intakes situated at the front, located at the top and bottom are to allow the inlet of cooling air and **MUST NOT BE OBSTRUCTED.** The front door allows airflow through the mainframe.

Kahuna 9600 11RU Mainframe Air Flow

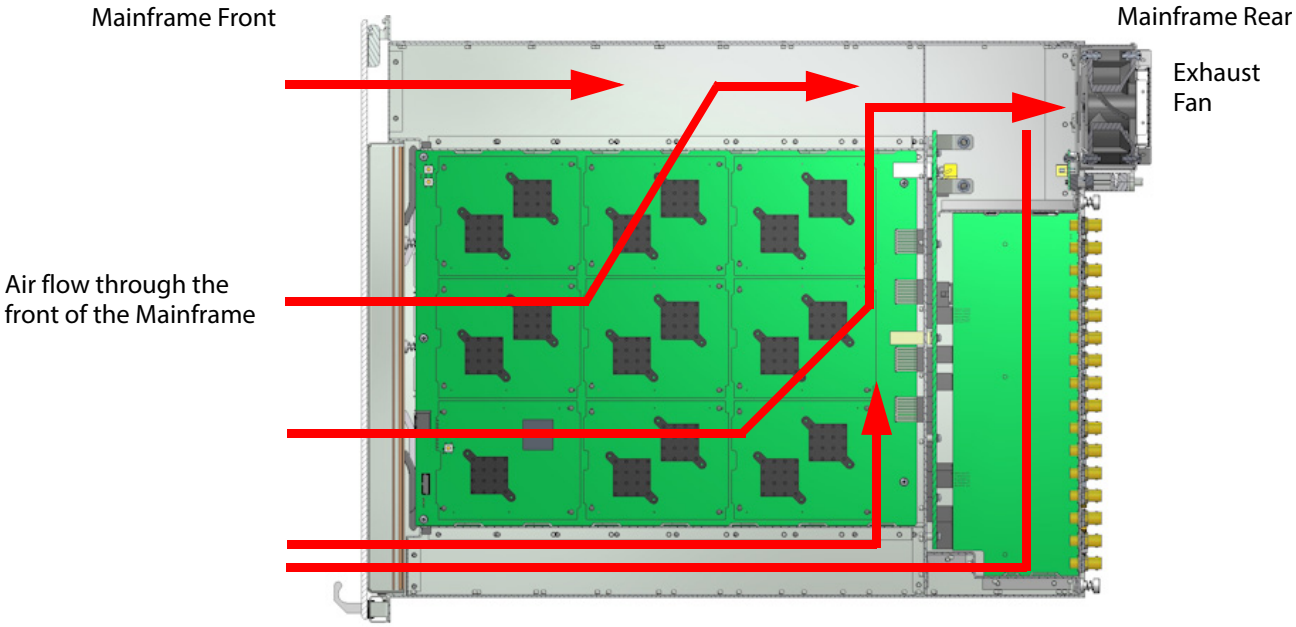


The diagram above shows how cooling is provided by fans drawing air in at the front of the mainframe and exhausting it at the rear. The mainframe should never be operated for any significant period of time with the door open, as this will affect the internal air flow and cause overheating.

Note: Where Fins are not fitted to the mainframe rear; correct blanking plates have to be fitted to ensure air-flow through the mainframe.

Kahuna 6400 6RU Mainframe Air Flow

Note: This diagram is looking down through the top of the mainframe chassis.



The diagram above shows how cooling is provided by fans drawing air in at the front of the mainframe and exhausting it at the rear. The mainframe should never be operated for any significant period of time with the door open, as this will affect the internal airflow and cause overheating.

Cooling Fan Failure

IF THE COOLING FANS AT THE REAR OF THE SWITCHER MAINFRAME SHOULD STOP FOR ANY REASON, THEN THE SYSTEM SHOULD BE SWITCHED OFF IMMEDIATELY OR PERMANENT DAMAGE MAY RESULT.

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

Warning!

Note: Do not obstruct air intakes to fans and air vents on any piece of equipment listed in this manual. Please pay particular attention to the vents at the rear of the Control Surface tub and the rear of the Mainframe.

Mounting the Kahuna 9600 11RU Mainframe

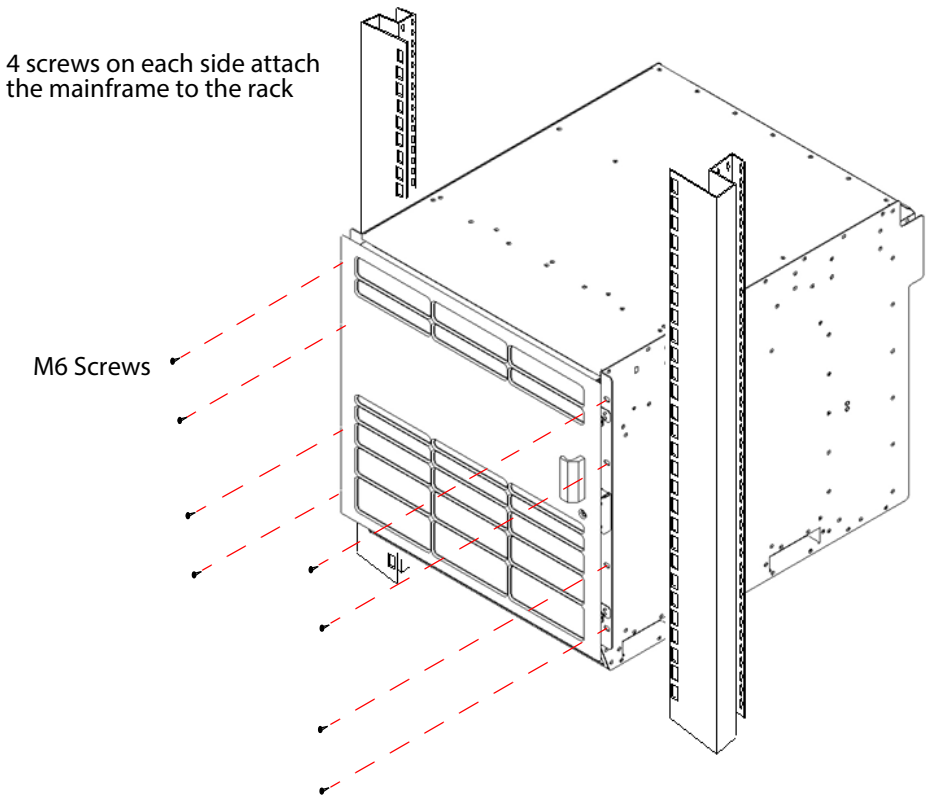
Warning!

Note: The **Kahuna 9600 - 11RU Mainframe** is extremely heavy (70kg – 155lb) and will require several people to lift into position using correct lifting procedures. If you are unsure of the lifting procedures, ask a Health and Safety adviser for information.

The Mainframe will require an 11RU space within a rack system. Please read the above warning before attempting to fit the mainframe into a rack. It may be of assistance to remove the power supplies from the mainframe before lifting (See ***Removing the Mainframe Power Supplies*** on page 72).

1 Check that the rack is rigid enough to take the weight of the mainframe.
2 Once moved into position, the mainframe will require support.

   A suitable rack tray may be of assistance to take the weight of the mainframe whilst securing it to the rack.
3 There are 4 pre-cut slots running down the left side of the front door these allow access to the mounting holes on the mainframe rack flanges, to access the mounting holes on the right side of the mainframe, the mainframe front door will have to be opened, to do this; unscrew the lock screw above the door handle counter-clockwise then pull on the door handle to open.
4 The mainframe is fastened to the rack system using 8 x M6 (1/4 inch) screws (screws are available from rack suppliers).



Mounting the Kahuna 6400 6RU Mainframe

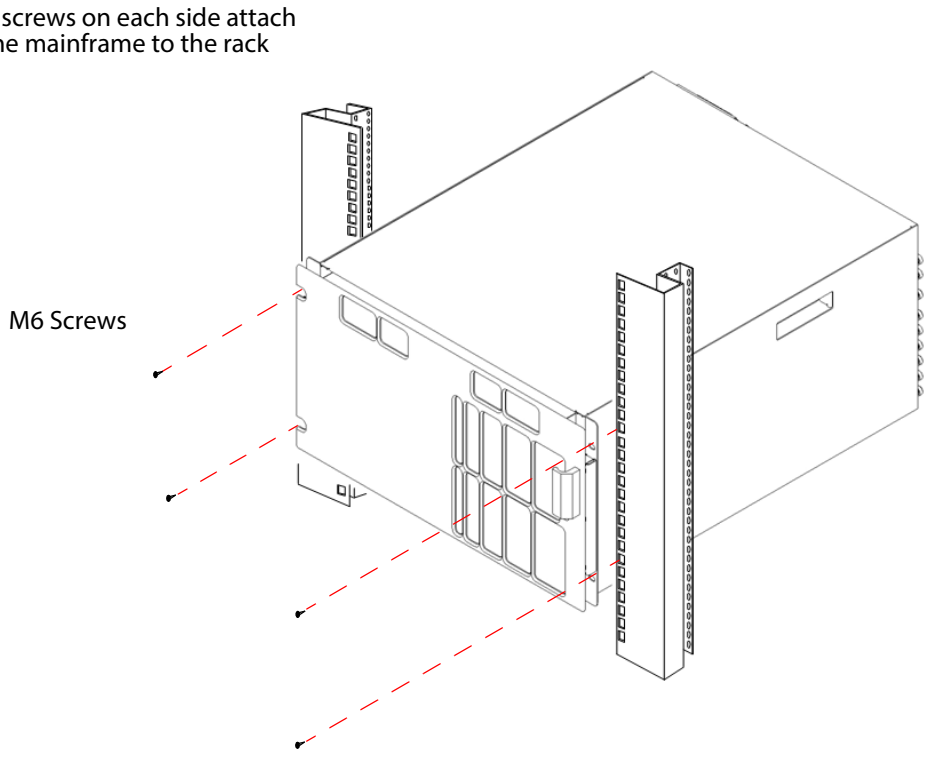
Warning!

Note: The **Kahuna 6400 6RU Mainframe** is very heavy (40kg – 88lb) and will require several people to lift into position using correct lifting procedures. If you are unsure of the lifting procedures, ask a Health and Safety adviser for information.

The Mainframe will require an 6RU space within a rack system. Please read the above warning before attempting to fit the mainframe into a rack. It may be of assistance to remove the power supplies from the mainframe before lifting (See ***Removing the Mainframe Power Supplies*** on page 72).

1 Check that the rack is rigid enough to take the weight of the mainframe.
2 Once moved into position, the mainframe will require support.

   A suitable rack tray may be of assistance to take the weight of the mainframe whilst securing it to the rack.
3 There are 2 pre-cut slots running down the left side of the front door these allow access to the mounting holes on the mainframe rack flanges, to access the mounting holes on the right side of the mainframe, the mainframe front door will have to be opened, to do this; unscrew the lock screw above the door handle counter-clockwise then pull on the door handle to open.
4 The mainframe is fastened to the rack system using 4x M6 (1/4 inch) screws (screws are available from rack suppliers).



Mounting the Mav Remote

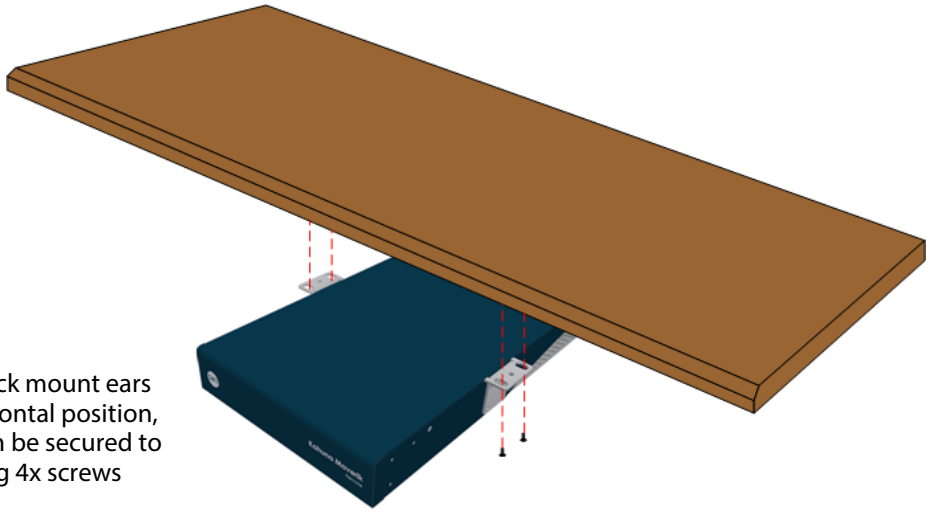
There are three ways to mount the Mav Remote:

- Desk Mount
- Half Rack Mount (with rack mount tray as support)
- Rack Mount using 2x Mav Remote units with a joining plate

Desk Mount

The rack mount ear mounting brackets can be set to two different positions, horizontal with the mounting holes facing upwards, and vertically (for Rack Mount as described in the 19""Rack Mount description), this will allow the unit to be secured to the underside of a desk

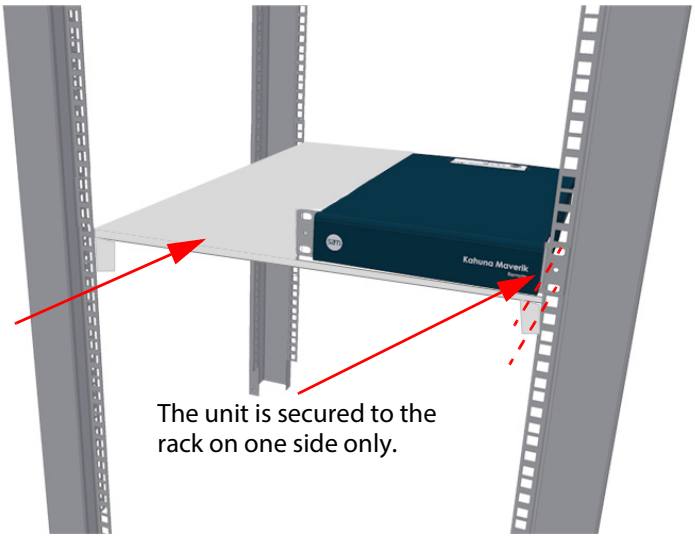
Mounting the unit to the underside of a desk



With the rack mount ears in the horizontal position, the unit can be secured to a desk using 4x screws

Half 19" Rack Mount

The mounting brackets may also be set to a vertical position to fit the unit into a 19" rack, the unit is 1RU high and only half 19" wide, so will need to have support from below using a rack mount tray, as only one side of the unit can be secured to the rack sides.

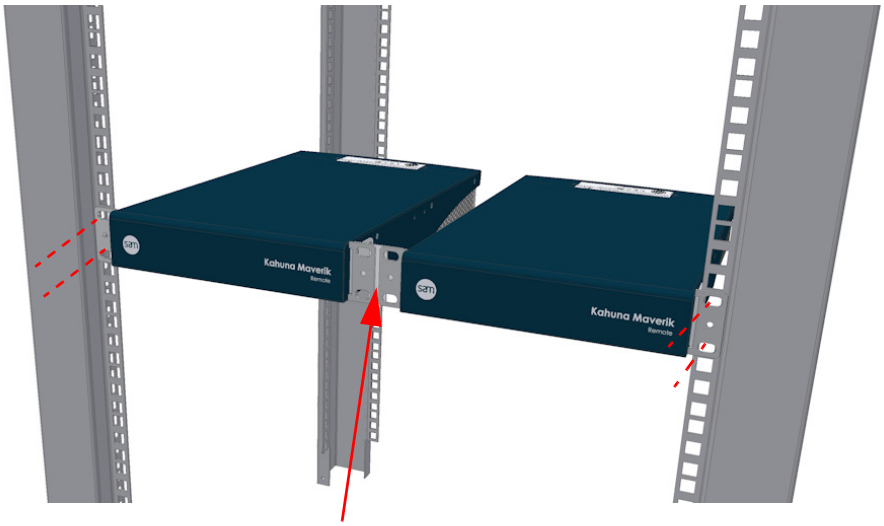


Support for the unit with a rack tray

The unit is secured to the rack on one side only.

19" Rack Mount using two Mav Remote units with a Joining Plate

Two Mav Remote units can be joined together using a joining plate, which allows the units to span across the full width of the rack and fasten to the rack without the support of a rack tray.



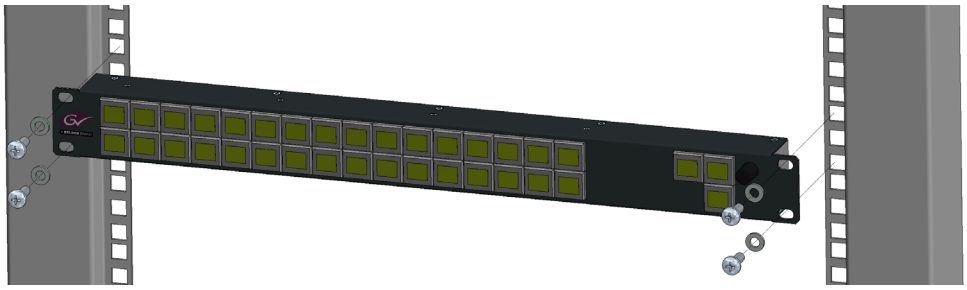
The units are joined using a "Joining Plate"

Note: The Mav Remote must have ventilation to allow cooling, and must not be installed into an enclosed space.

LCD and LED Aux Panel - 19" Rack Installation

The method of mounting the LCD and LED Aux Panels into a 19" rack is exactly the same for both Aux panels.

The ears of the Aux Panels have 2x holes on each side, use the correct rack mount screws and fixings in the 4x mounting holes, to secure the Aux panel to the rack as shown below.
Make sure that enough access is allowed behind the Aux panel to connect the external PSU and network cable.



4 Cabling and Connections

Comms Cables for the MAV Modules

Once the MAVRow frame or frames are mounted into the desk the next step is to place the Comms cables ready to connect up the MAV- GUI and the other MAV modules.

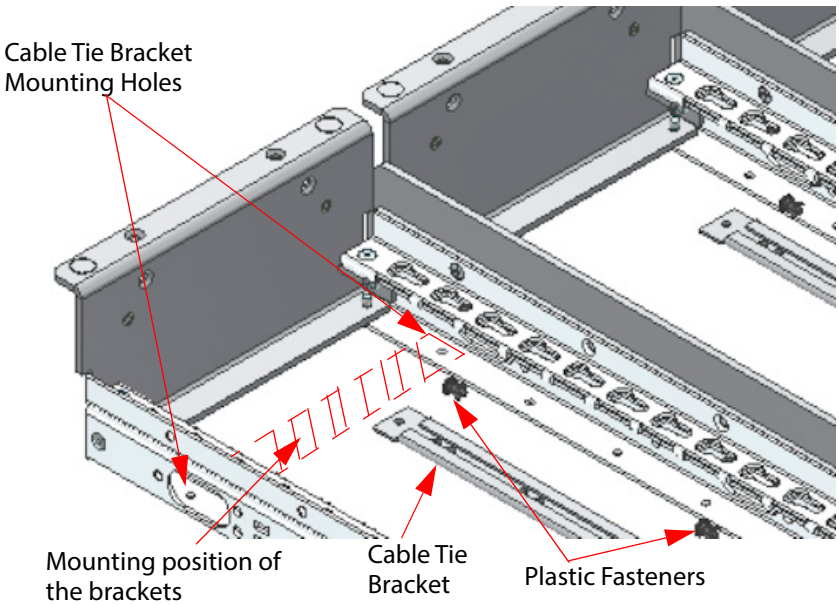
For each MAV-GUI that is purchased, there are 16x RJ45 Comms cables supplied, these will in turn, support up to 16 MAV modules. The different lengths of cables are as follows:

- 4x 0.5 meters ~ 1 foot 7.68 inches
- 8x 1 meters ~ 3 foot 3.37 inches
- 4x 2 meters ~ 6 foot 6.74 inches

Note: Due to the unknown distance between the Kahuna Maverik Control Surface and the Switcher Mainframe, the customer has to provide their own Network cables from the MAV-GUI/s to the Switcher Mainframe.

The layout of the control surface and the position of the MAV-GUI or MAV-GUI's will decide how the Comms cables are laid out.
Cable Tie Brackets are supplied with each MAVRow, they can be fastened to the bottom of the MAVRow, under the rail where the MAV modules are fitted. The brackets are fastened to the rail with plastic fasteners as shown below.
Cable Tie Brackets can be repositioned as required. The plastic fasteners are reusable, the head of the plastic fastener can be lifted up allowing removal.

Note: Cable tie brackets should not be fitted under the MAV-GUI



Note: Ensure that there is sufficient cable length to connect the cables to the MAV modules before fitting the modules to the MAVRow rails. Unless there is good enough access to allow cables to be connected with the MAV modules in place.

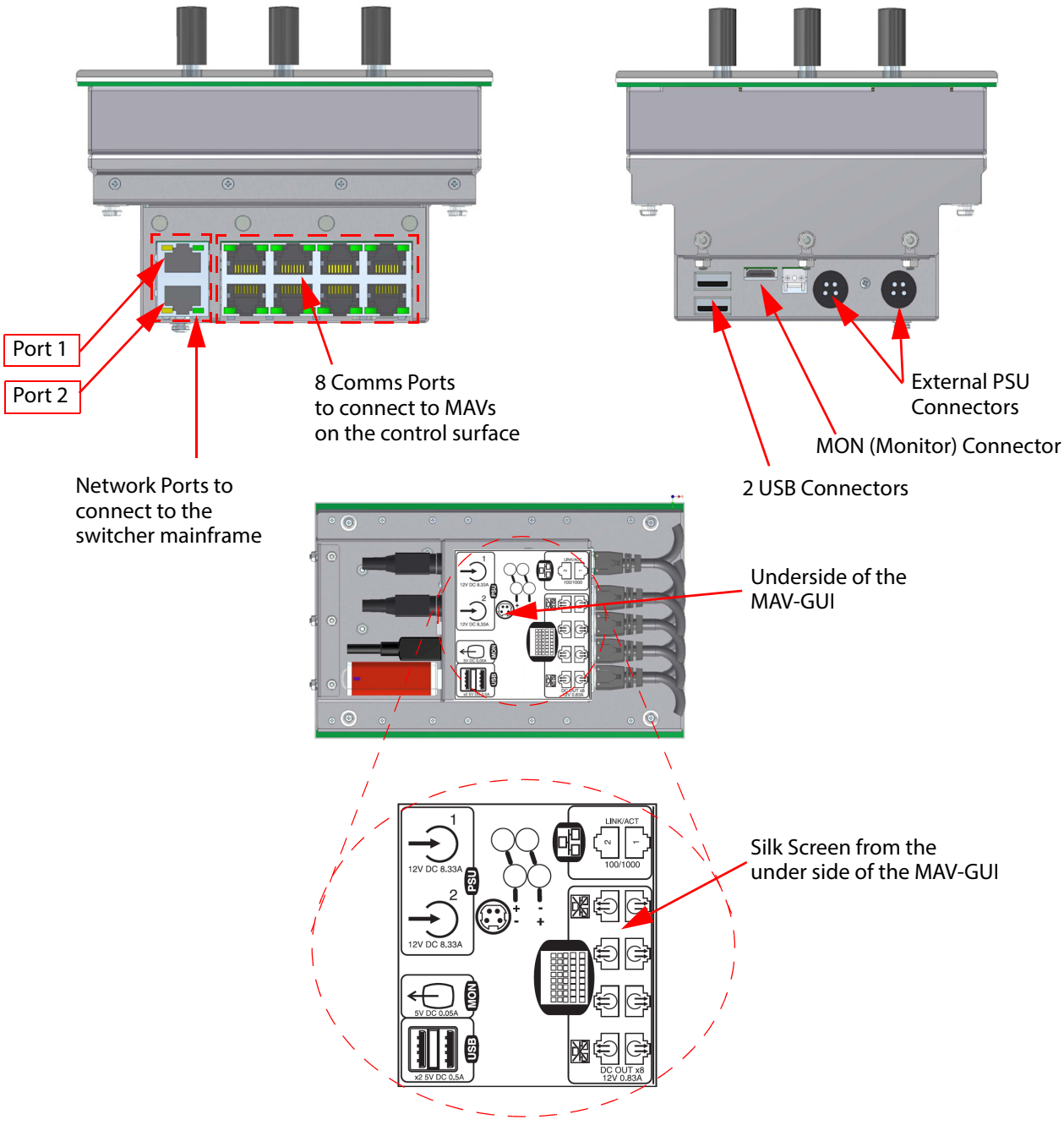
The Comms cables are laid along the width of the MAVRow and cable tied to the bracket. Cables that connect to a second MAVRow will run under the rails.

MAV-GUI and MAV Module Connections

MAV-GUI Connections

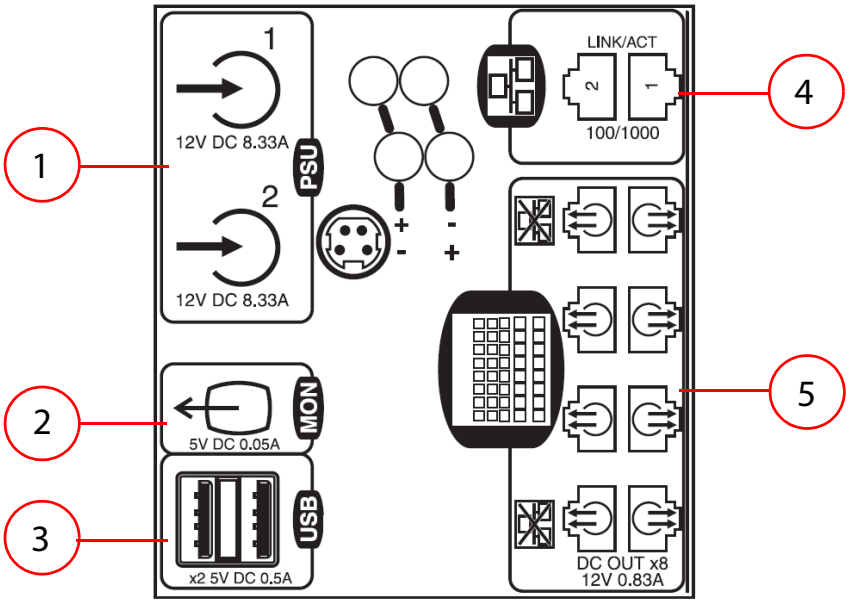
The MAV-GUI is the most important module in the control surface, they provide power and Comms to all the other MAV modules and network connection to the Production Switcher mainframe.

- The MAV-GUI has 2x external PSU connectors, one PSU can power the MAV-GUI, the other PSU is for redundancy.
- The MAV-GUI has 2x network ports which connect directly to the switcher mainframe.
- The MAV-GUI can have up to 16x individual MAV modules connected to it.



MAV-GUI Connections - continued

Diagram below shows the connector information for the MAV-GUI



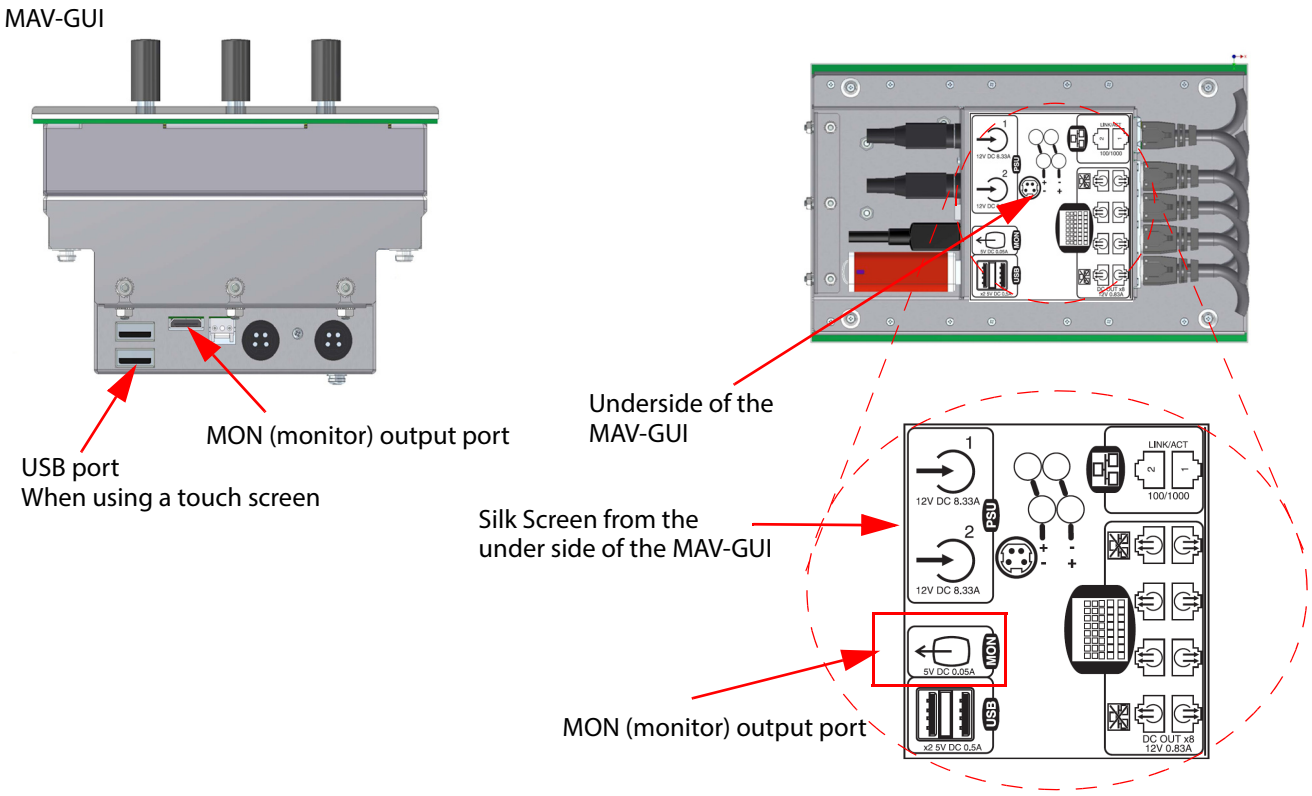
MAV-GUI Connectors	
Connector	Description
1	PSU Connectors - Kycon KPPX 4Pin or Compatible 12V DC 8.33A
2	Monitor Output
3	2x USB 2 Connectors
4	10/100/1000 base T, RJ45 network connectors to the switcher mainframe
5	Connection to other MAV modules These are **NOT** Ethernet, connections must be direct to MAV modules. **Do Not** use network switches or hubs. CAT5 or above cables - crossover cables are **Not** suitable.

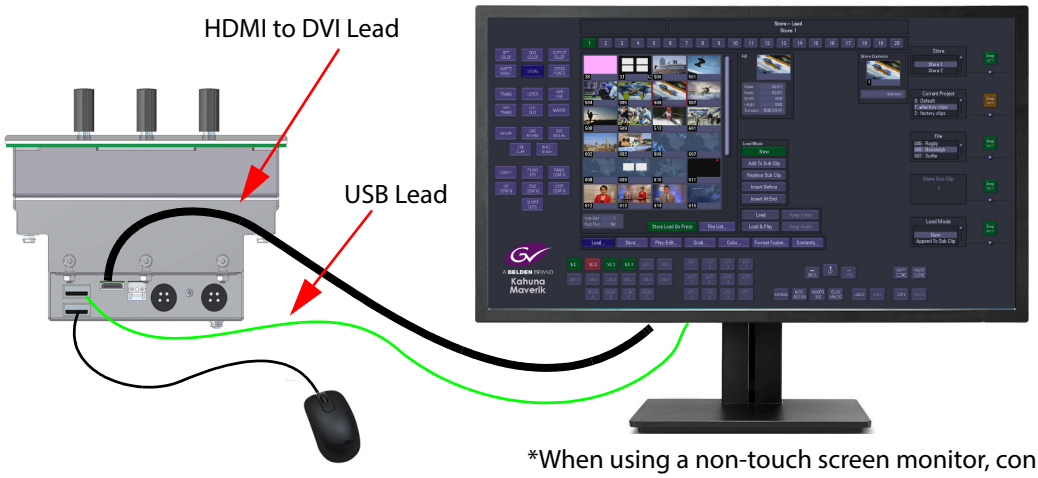
MAV GUI Dual Network Connectors

This allows the 2 network ports on the MAV-GUI to be used to connect to the mainframe. The panel will use one of the pair, referred to as "**Primary**" and "**Secondary**".
If the Primary link is broken the panel will switch over to using the Secondary link. Once working on the Secondary link, the panel will only return to the Primary link when the secondary link is broken (and the primary link is reconnected) or the panel is rebooted.
Only one of the links is in use at any one time. The switch over time is typically less than 10 fields.
The same rules for clustering apply to both links, so clustered MAV-GUIs should have all their network links connected to the same NET Fin; unless the mainframe is in "**16 Port Switch**" mode, in which case any port will be OK for the panels to share data across the cluster correctly.
The working state of the links is shown in the Logged off "**Panel Config**" menu and in the Logged in "**ENG Config - Status Monitor/Panel**" menu.

Connecting a Touch Screen Monitor

The MAV-GUI has a "monitor" output port on its underside near the USB ports, the monitor port can be used to connect to an external "computer" touch screen or normal display monitor. The external monitor will have to have a 1920 x 1080 display resolution and it is recommended that the monitor be larger than 21 inches.





*When using a non-touch screen monitor, connect a USB Mouse to control the menus.

*When using a touch screen monitor, connect the USB lead from the monitor to one of the USB ports on the MAV-GUI.

Touch screen monitor - once the external monitor is connected to the MAV-GUI, a USB control lead (also connected to the MAV-GUI - shown above) is connected, allowing the touch screen functions to be used.

Non- touch screen monitor - once the external monitor is connected to the MAV-GUI, a USB mouse (also connected to the MAV-GUI - shown above) is used to control the soft MLC menus on the monitor screen.

MAV Module Connections

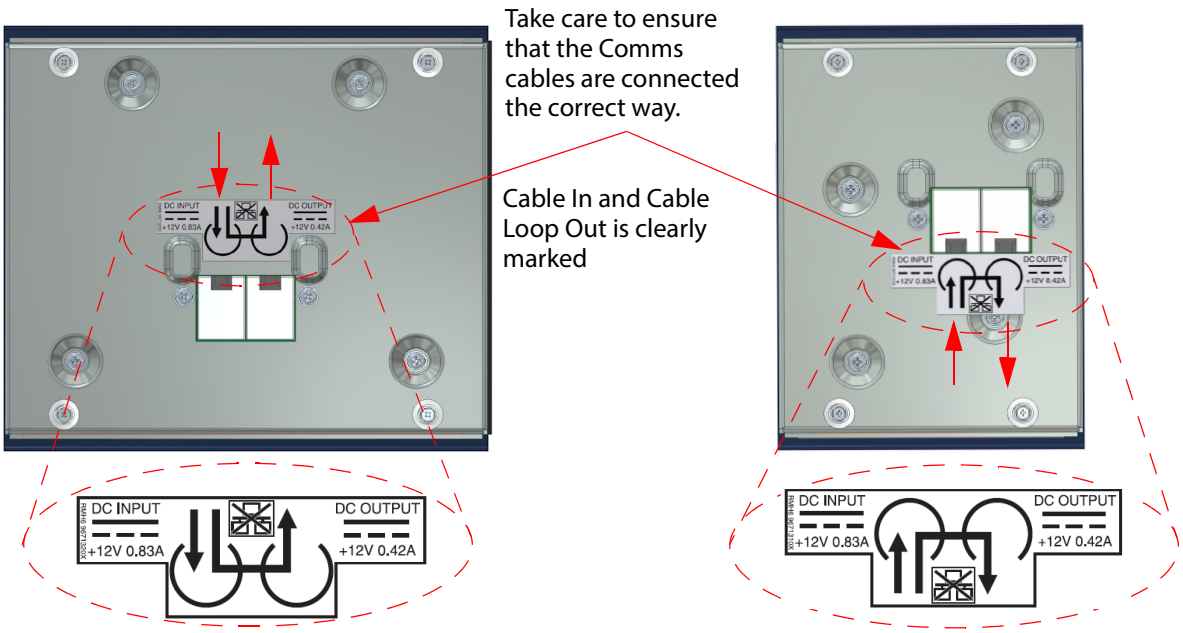
Even though the MAV-GUI has only 8 Comms ports, up to 16 MAV modules can actually be powered and controlled from one MAV-GUI. This is because each individual MAV has 2 Comms ports; one **Input** and one **"Loop Through" Output**.
The 8 MAV modules that are directly connected to the MAV-GUI, will loop through separate power and Comms to the further 8 MAV modules, 16 in total.

> Note: Power to the MAV Modules is supplied via the comms cable from the MAV-GUI, as Power over Maverik Ethernet (PoME). **DO NOT** connect any MAV Modules to an Ethernet Switch.

> Note: There are 2 different configurations of Comms ports on the underside of the MAV modules, the diagram below displays the configurations, taking care to note that Comms Input and Comms Loop Output are clearly marked.

The RJ45 comms cables connect horizontally into the Comms ports **not** vertically. This is so that the comms cables do not get trapped when mounting the MAV modules into the MAVRow.

> Note: Only one level of loop through to a second MAV module is supported.

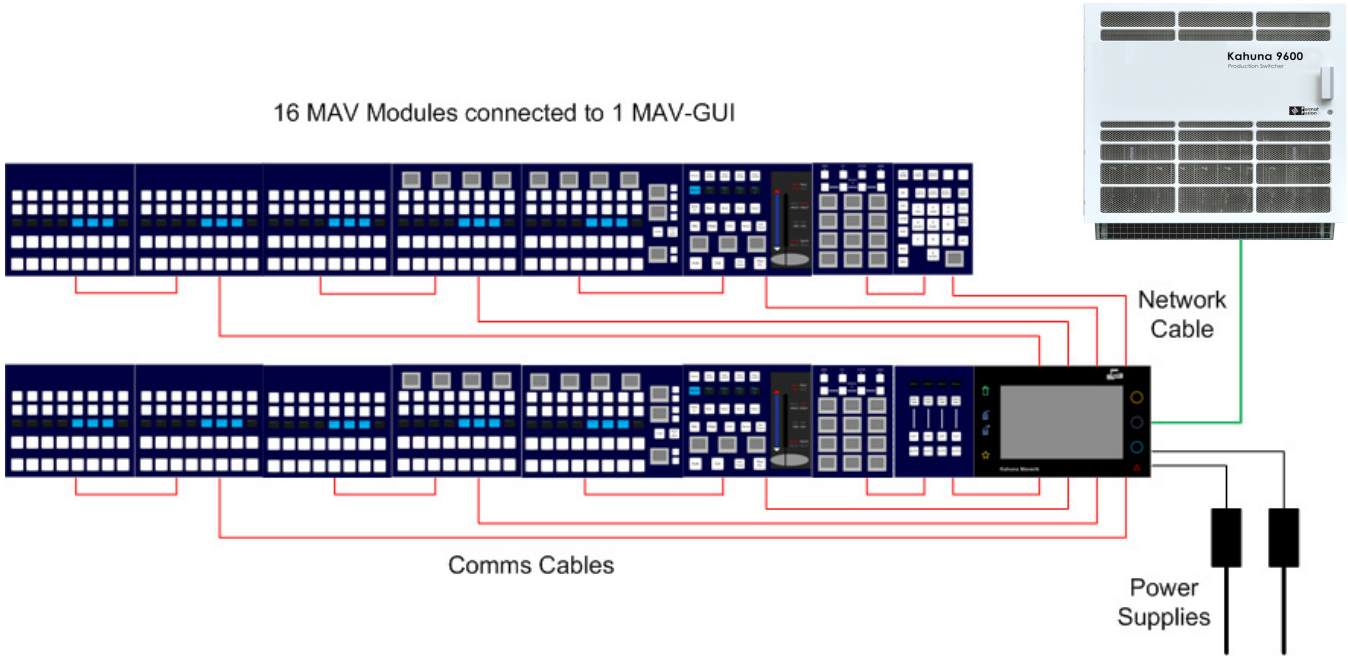


Because a MAV module is able to "loop through" to provide Comms and power to a second MAV module, it is worth noting that to save cable clutter, a MAV-GUI only has to have 4 Comms cable connected to provide Comms and power to 8 MAV modules.

> Note: The MAV-8 Aud Fader is a future MAV module release, when released, it will have a higher individual power requirement than the other MAV modules. It will not support loop-through.

Connection Diagram Example

The diagram below shows an example how a MAV-GUI can connect to 16 individual MAV modules

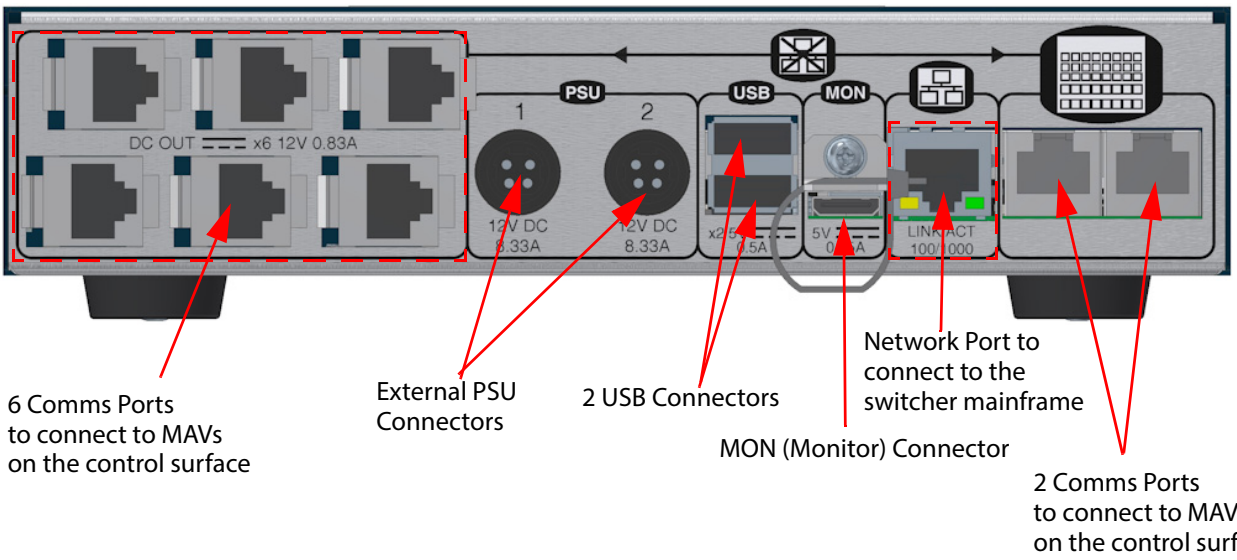


Mav Remote Connections

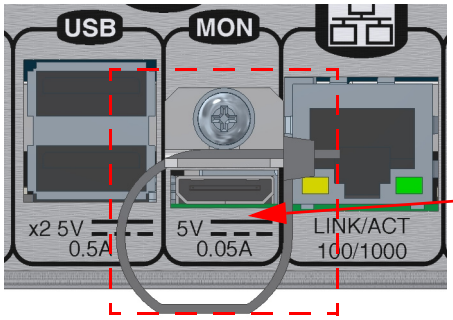
The Mav Remote is a rack mountable/desk top hardware element that provides a means of control to the Grass Valley switcher range.
Essentially the Mav Remote enables control of the video hardware from a remote location away from the main control surface. It allows engineering to remotely control a mainframe, operators to have a smaller means of control when used with MAV modules.

- The Mav Remote has 2 external PSU connectors, one PSU can power the MAV-GUI, the other PSU is for redundancy.
- The Mav Remote has a network port which connect directly to the switcher mainframe.
- The Mav Remote has 8x Comms ports and can have up to 16 individual MAV modules connected to it.

Mav Remote Connections

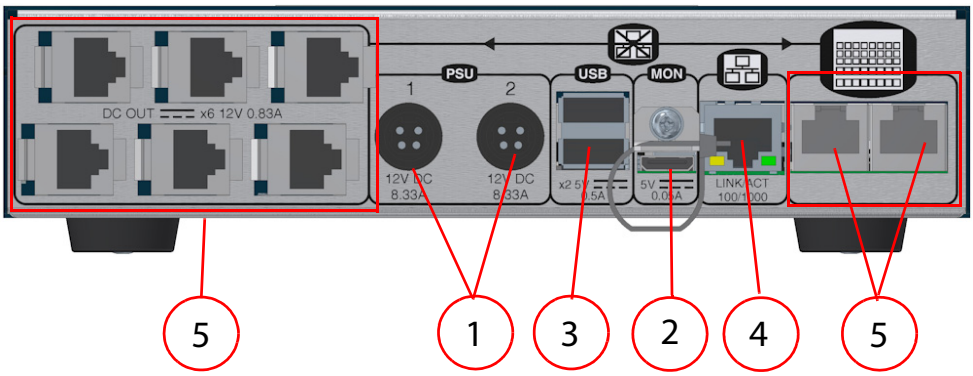


The "**Monitor**" connector takes a mini HDMI lead. To make sure that the lead stays in place, there is a cable tie fitted to secure the body of the HDMI lead to a plate above the connector socket (as shown below).



Mav Remote Connections - continued

Diagram below shows the connector information for the Mav Remote



Mav Remote Connectors	
Connector	Description
1	PSU Connectors - Kycon KPPX 4Pin or Compatible 12V DC 8.33A
2	Monitor Output
3	2x USB 2 Connectors
4	10/100/1000 base T, RJ45 network connectors to the switcher mainframe
5	Connection to other MAV modules NOT Ethernet, connections must be direct to MAV modules. Do Not use network switches or hubs. CAT5 or above cables - crossover cables are **Not** suitable.

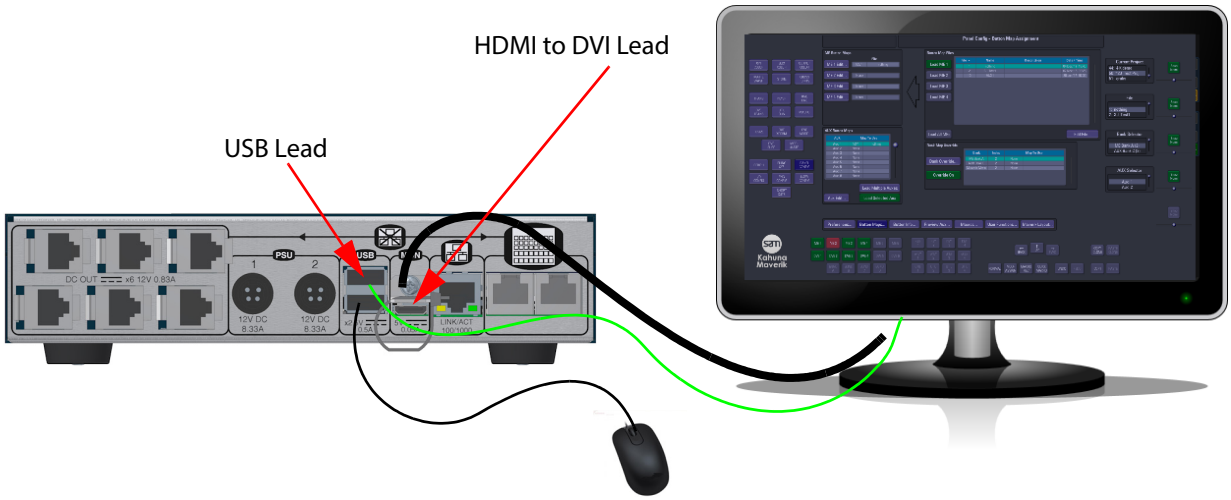
Connecting a Touch Screen Monitor to the Mav Remote

The Mav Remote monitor port can be used to connect to an external “computer” touch screen or normal display monitor. The external monitor will have to have a 1920 x 1080 display resolution and it is recommended that the monitor be larger than 21 inches.

Mav Remote

MON (monitor) output port

USB port
When using a touch screen



*When using a non-touch screen monitor, connect a USB Mouse to control the menus.

*When using a touch screen monitor, connect the USB lead from the monitor to one of the USB ports on the Mav Remote.

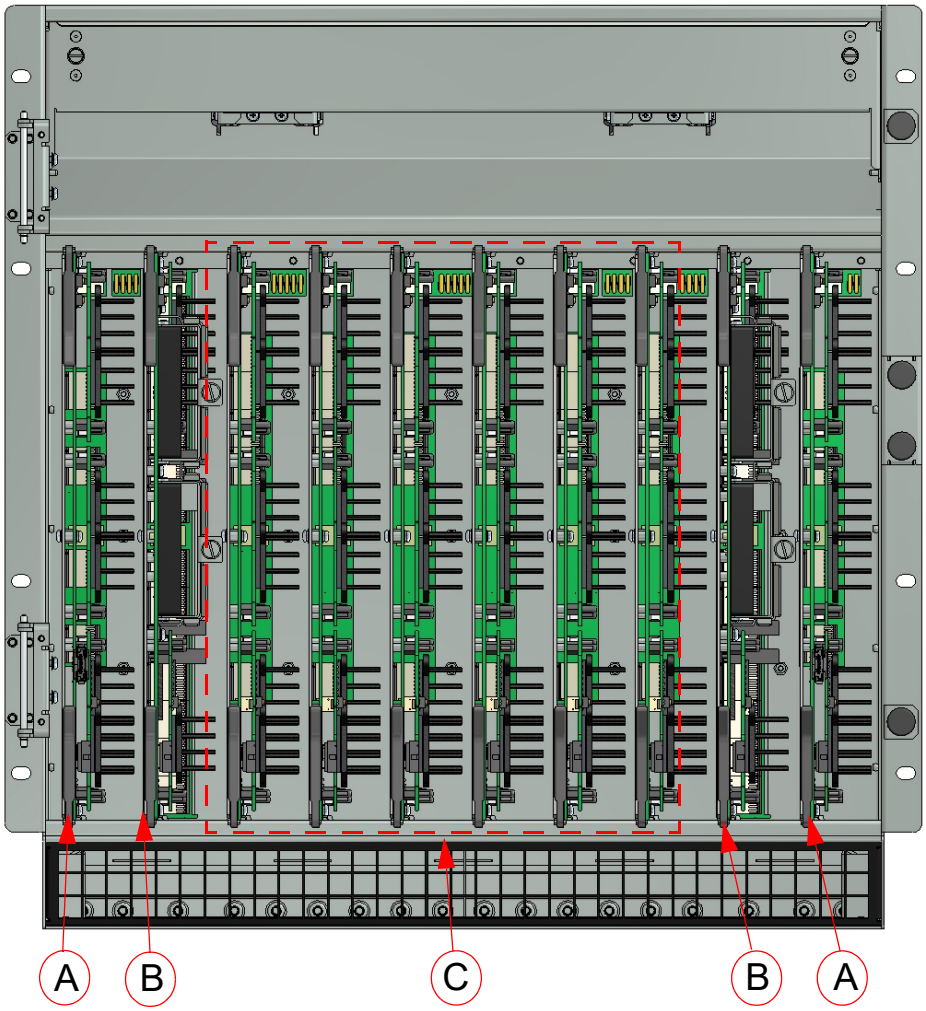
Mainframe Layout and Connections

Mainframe Overview

The Kahuna 9600 mainframe has completely new architecture that provides the building blocks for Inputs, Outputs, Mix Effects and DVE's to build a production switcher to meet any requirement. Kahuna 9600 is designed for flexibility, easy configuration and an easy field upgradable solution.

Inputs and outputs to the mainframe are a new design called ***FIN's.*** Fins make it possible for the mainframe to grow with a customer needs.

11RU Mainframe Front Card Locations



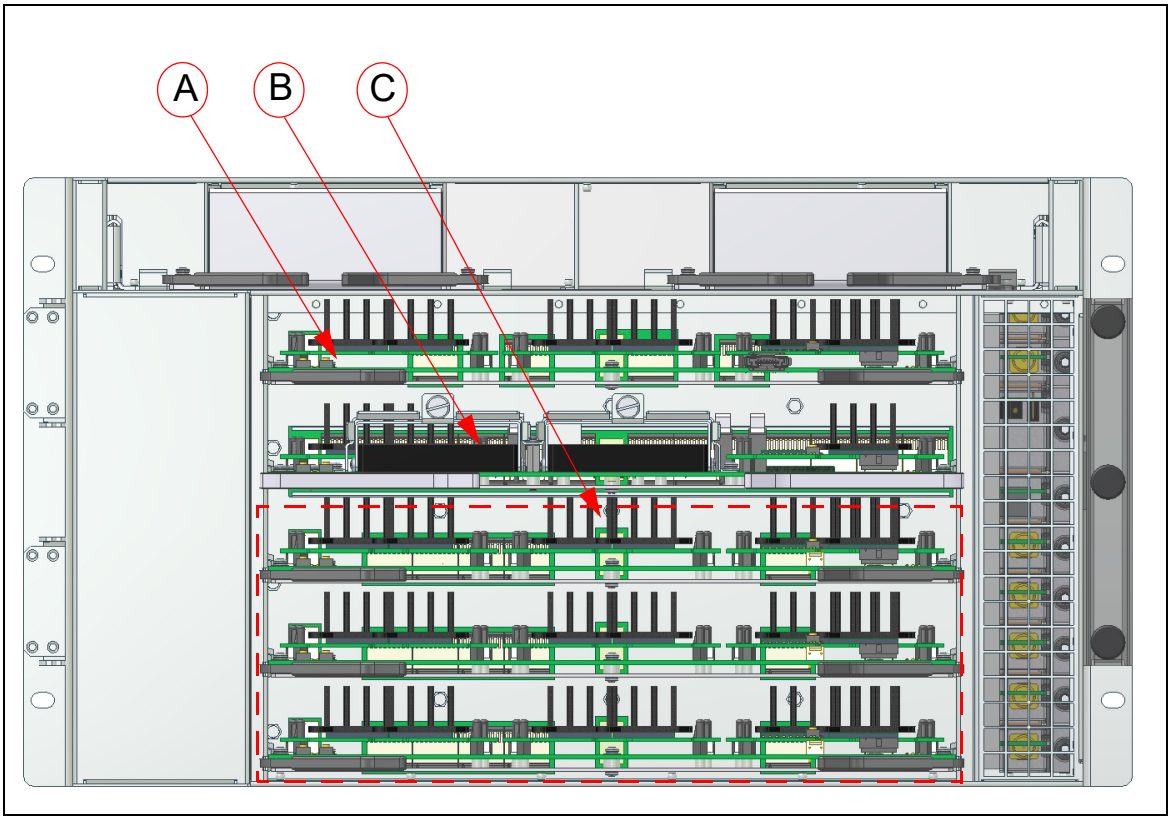
The mainframe must be populated with cards from Right to Left; when looking at the card locations as shown above.

If more than 3 M/E cards are required then a second Router card must be installed.

If more than 32 Outputs are required then a second Output card must be installed.

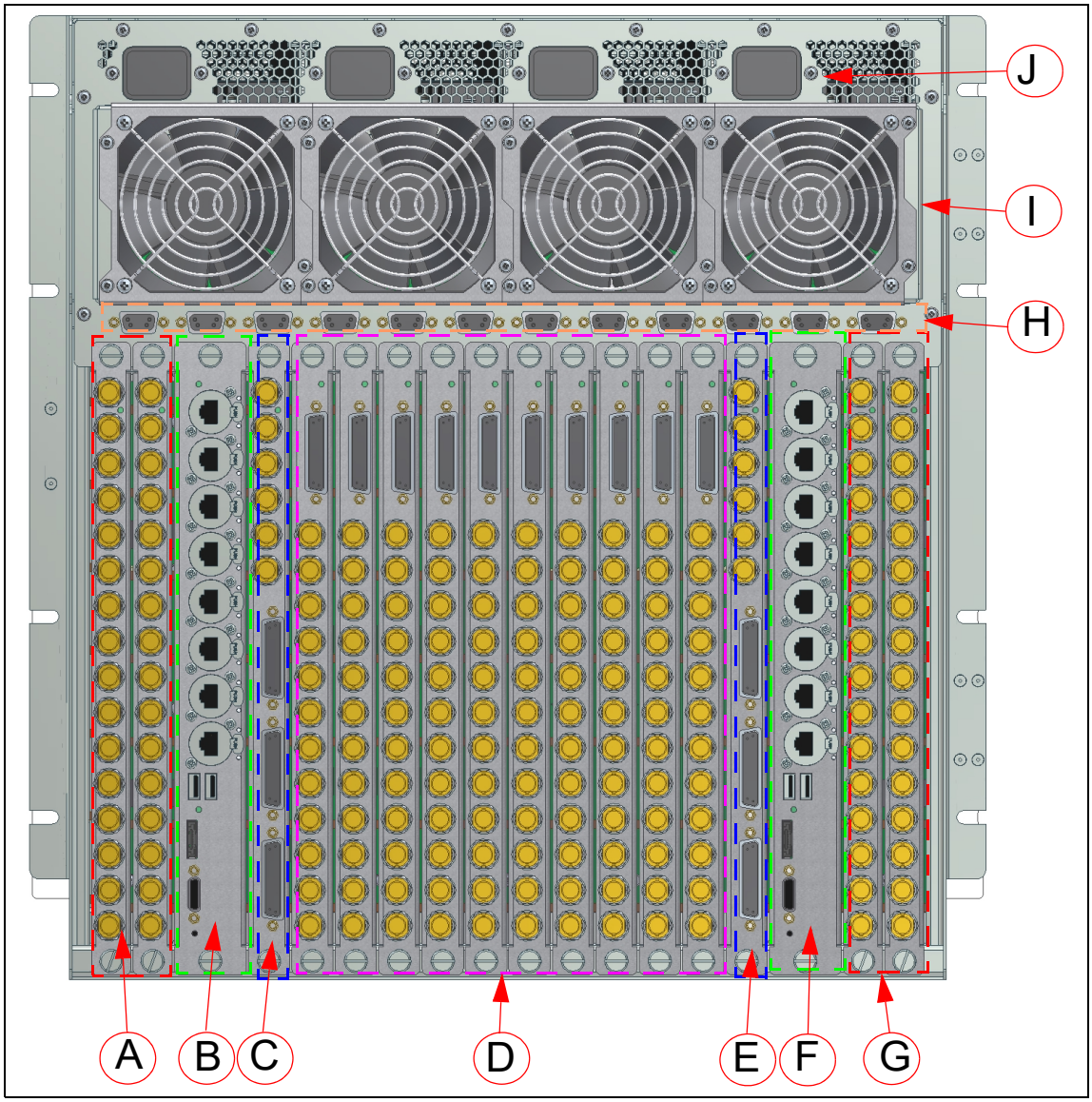
11RU Mainframe Card Locations	
Card Type	Card Function
A	Output Cards
B	Router Cards
C	M/E or DVE Cards

6RU Mainframe Front Card Locations



6RU Mainframe Card Locations	
Card Type	Card Function
A	Output Card
B	Router Card
C	M/E or DVE Cards

11RU Mainframe Rear Fin Locations and Connectors



The table below outlines a fully populated mainframe.

11RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
A Fin O/P A Fin O/P B	Output Fin	 Fin O/P A - 16x SDI BNC (numbered BNC 1 to 16) Fin O/P B - 16x SDI BNC (numbered BNC 1 to 16)
B Fin NET A	Network Fin	8x Neutrik 10/100/1000 base T 2x USB2 - for external memory device or hard drive 1x eSATA - for external hard drives
C Fin REF A	Reference Fin	6x Reference and Sync inputs/outputs 2x 25 Way D-type GPI connectors (1 - 24, 25 - 48) 1x 25 Way D-type GPO connector (1 - 12)

11RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
D Fin IN A to Fin IN J	Input Fins	12 0x SDI BNC Inputs total, on 10 Fins, each Fin has 12 SDI inputs, (numbered BNC 1 to 12) 1x 25 Way D-type GPO Tally connector.
D Fin IN A to Fin IN J	***Optional*** FDI Fiber Input Fins (Supplied empty with SFP options)	The FDI Fiber Input Fins are able to take the following SFP Modules (not supplied): Input Fiber Optic SFP Module - Single Mode Dual Rx Module (wideband 1260nM - 1620nM) Input Coax SFP Module - Dual Rx Coax, Mini BNC Module. ***Each Input Fin has*** 6x SFP Cages (12 Inputs) ***Each Input Fin has*** 1x 25 Way D-type GPO Tally connector. SFP's can be purchased as an options from Grass Valley.
D Fin IN A to Fin IN J	***Optional*** 40GbE IPI40 (IP Input) Fin (supplied empty with SFP options)	Signals supported over RTP stream per input Fin Module. 2 x 40GbE QSFP Cages. **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Source **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 6 x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows inputs per Fin
D Fin IN A to Fin IN J	***Optional*** 50GbE IPI50 (IP Input) Fin (supplied empty with SFP options)	Signals supported over RTP stream per input Fin Module. 2 x 50GbE QSFP Cages. **SMPTE 2110-20** 3x 12Gbps Format Sources (ST2110-20/30/40) **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Source **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 6 x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows inputs per Fin

11RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
D Fin IN A to Fin IN J	***Optional*** UHDI - 12Gbps Input Fin (supplied empty with SFP options)	A single UHDI 12Gbps Fin has 3x Inputs and a single 25 Way Tally GPO connector. Inputs are selectable between SDI and SFP via a user menu. SFP Option: 12G/6G-SDI UHD video SFP optical, single receiver, medium haul, non-MSA, reclocked" and "12G/6G-SDI video SFP (emSFP) optical, transceiver, medium haul, MSA, 1310nm" to the UHDI SFP list A single Fin has 3x SDI inputs, or 3x Fiber SFP inputs. SFP's can be purchased as an options from Grass Valley.
E Fin REF B	Reference Fin	6x Reference and Sync inputs/outputs 2x 25 Way D-type GPI connectors (1 - 24, 25 - 48) 1x 25 Way D-type GPO connector (1 - 12)
F Fin NET B	Network Fin	8x Neutrik 10/100/1000 base T 2x USB2 - for external memory device or hard drive 1x eSATA - for external hard drives
G Fin O/P C Fin O/P D	Output Fin	 Fin O/P A - 16x SDI BNC (numbered BNC 1 to 16) Fin O/P B - 16x SDI BNC (numbered BNC 1 to 16)
A and G Fin O/P A/B Fin O/P C/D	***Optional*** FDO Fiber Output Fins (Supplied empty with SFP options)	The FDO Fiber Output Fins are able to take the following SFP Modules (not supplied): Output Fiber Optic SFP Module - Single Mode Dual Tx Module (1310nM). Output Coax SFP Module - Dual Tx Coax, Mini BNC Module. Before purchasing any SFP Modules, please read the SFP Module specifications at the rear of this manual. ***Each Output Fin has*** 3x SFP Cages (6 Outputs) ***Each Output Fin has*** 10x HD-SDI BNC's (10 Outputs) SFP's can be purchased as an options from Grass Valley.
A and G Fin O/P A/B Fin O/P C/D	***Optional*** 40GbE IPO40 (IP Output) Fin (supplied empty with SFP options)	Signals supported over RTP stream per output Fin Module with 2 x 40GbE QSFP Cages. **SMPTE 2022-6** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2042 (VC-2)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 6 x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows outputs per Fin

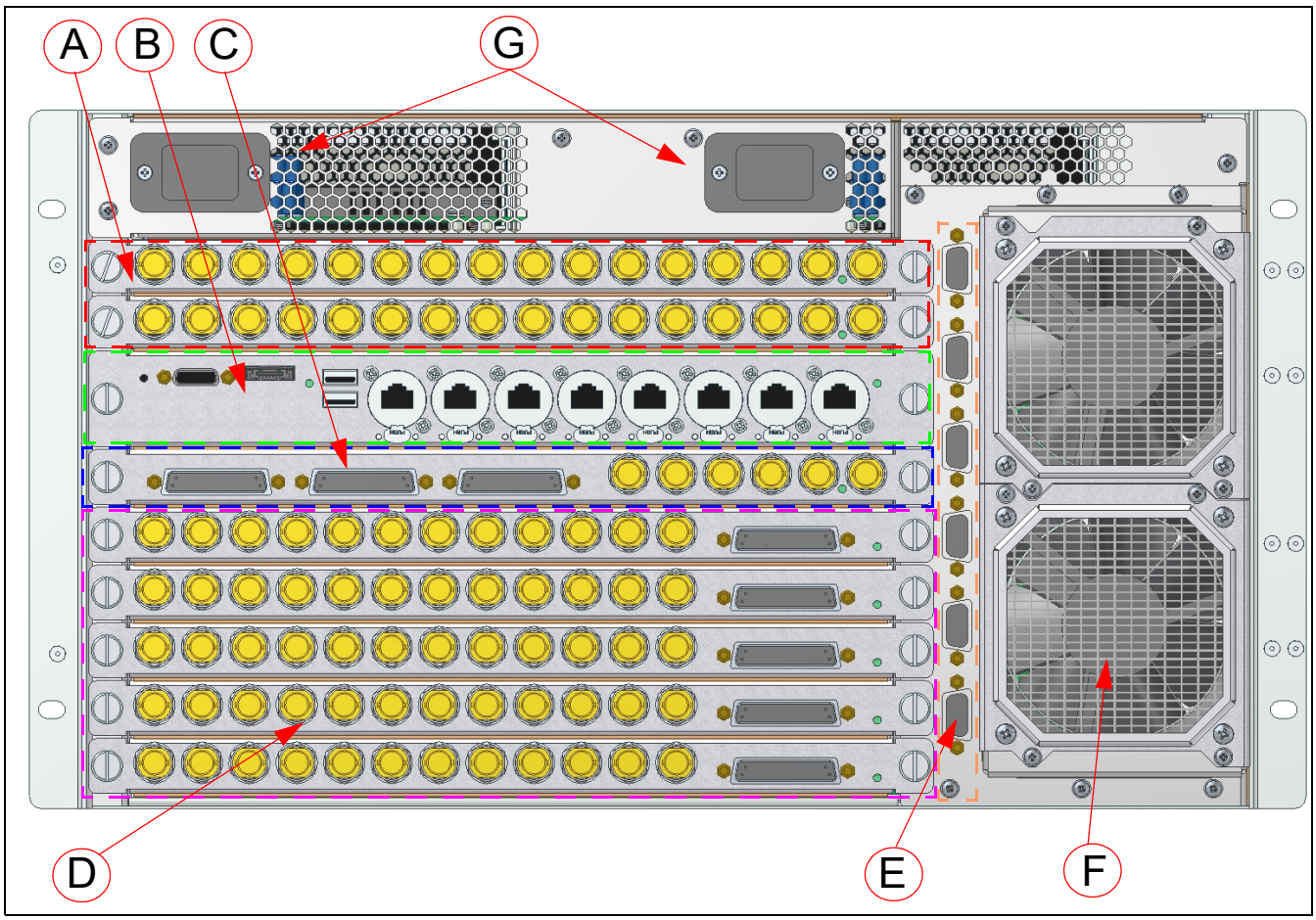
11RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
A and G Fin O/P A/B Fin O/P C/D	***Optional*** 50GbE IPO50 (IP Output) Fin (supplied empty with SFP options)	Signals supported over RTP stream per output Fin Module with 2 x 50GbE QSFP Cages. **SMPTE 2110-20** Outputs - 4x 12Gbps Format Sources (ST2110-20/30/40) **SMPTE 2022-6** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2042 (VC-2)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 6 x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows outputs per Fin
A and G Fin O/P A/B Fin O/P C/D	***Optional*** UHDO - 12Gbps Output Fin (supplied empty with SFP options)	A single UHDO 12Gbps Fin has 4x Outputs. The user has a choice of either using SDI or SFP outputs. SFP Option: 12G/6G-SDI video SFP (emSFP) optical, transceiver, medium haul, MSA, 1310nm" to the UHDO SFP list. A single Fin has 4x SDISDI outputs, or 4x Fiber SFP outputs. SFP's can be purchased as an options from Grass Valley.
H RS422-R1-1 to RS422-R1-12	RS422 Control Ports	12x 9 Pin D-type connector
I	Exhaust Fans	4x Exhaust fans, drawing air through the mainframe
J	Mains Inputs	4x 16A IEC mains inputs to the Power Supplies

The mainframe is populated with Fins from Left to Right when looking at the rear of the mainframe.

If a second Network Fin is required then a second Router Card must be installed in the front of the mainframe.

If Output Fins C and D re required for an extra 32 outputs then a second Output Card must be installed in the front of the mainframe.

6RU Mainframe Rear Fin Locations and Connectors



The table below outlines a fully populated mainframe.

6RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
A Fin O/P A Fin O/P B	Output Fin	Fin O/P A - 16x SDI BNC (numbered BNC 1 to 16) Fin O/P B - 16x SDI BNC (numbered BNC 1 to 16)
A Fin O/P A Fin O/P B	***Optional*** FDO Fiber Output Fins (Supplied with Empty SFP Cages)	The FDO Fiber Output Fins are able to take the following SFP Modules (not supplied): Output Fiber Optic SFP Module - Single Mode Dual Tx Module (1310nM). Output Coax SFP Module - Dual Tx Coax, Mini BNC Module. Before purchasing any SFP Modules, please read the SFP Module specifications at the rear of this manual. ***Each Output Fin has*** 3x SFP Cages (6 Outputs) ***Each Output Fin has*** 10x HD-SDI BNC's (10 Outputs)

6RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
A Fin O/P A Fin O/P B	***Optional*** 40GbE IPO40 (IP Output) Fin (supplied empty with SFP options)	Signals supported over RTP stream per input Fin Module. 2 x 40GbE QSFP Cages. **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Source **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 8 x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows inputs per Fin
A Fin O/P A Fin O/P B	***Optional*** 50GbE IPO50 (IP Output) Fin (supplied empty with QSFP options)	Signals supported over RTP stream per input Fin Module. 2 x 50GbE QSFP Cages. **SMPTE 2110-20** 4x 12Gbps Format Sources (ST2110-20/30/40) **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Source **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 8x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows inputs per Fin
A Fin O/P A Fin O/P B	***Optional*** UHDO - 12Gbps Output Fin (supplied empty with SFP options)	A single UHDO 12Gbps Fin has 4x Outputs. The user has a choice of either using SDI or SFP outputs. SFP Option: 12G/6G-SDI video SFP (emSFP) optical, transceiver, medium haul, MSA, 1310nm" to the UHDO SFP list A single Fin has 4x SDI outputs, or 4x Fiber SFP outputs. SFP's can be purchased as an option from Grass Valley.
B Fin NET	Network Fin	8x Neutrik 10/100/1000 base T 2x USB2 - for external memory device or hard drive 1x eSATA - for external hard drives
C Fin REF	Reference Fin	6x Reference and Sync inputs/outputs 2x 25 Way D-type GPI connectors (1 - 24, 25 - 48) 1x 25 Way D-type GPO connector (1 - 12)
D Fin IN A to Fin IN E	Input Fins	60x SDI BNC Inputs total, on 5 Fins, each Fin has 12 SDI inputs, (numbered BNC 1 to 12) 1x 25 Way D-type GPO Tally connector (on each Fin).

6RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
D Fin IN A to Fin IN E	***Optional*** FDI Fiber Input Fins (Supplied with Empty SFP Cages)	The FDI Fiber Input Fins are able to take the following SFP Modules (not supplied): Input Fiber Optic SFP Module - Single Mode Dual Rx Module (wideband 1260nM - 1620nM) Input Coax SFP Module - Dual Rx Coax, Mini BNC Module. Before purchasing any SFP Modules, please read the SFP Module specifications at the rear of this manual. ***Each Input Fin has*** 6x SFP Cages (12 Inputs) ***Each Input Fin has*** 1x 25 Way D-type GPO Tally connector.
D Fin IN A to Fin IN E	***Optional*** 40GbE IPI40 (IP Input) Fin (supplied empty with SFP options)	Signals supported over RTP stream per input Fin Module. 2 x 40GbE QSFP Cages. **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Source **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows inputs per Fin
D Fin IN A to Fin IN E	***Optional*** 50GbE IPI50 (IP Input) Fin (supplied empty with QSFP options)	Signals supported over RTP stream per input Fin Module. 2 x 50GbE QSFP Cages. **SMPTE 2110-20** 3x 12Gbps Format Sources (ST2110-20/30/40) **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Source **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 8 x 2.970Gpbs 1080p Format Sources ***Note:*** The above information shows inputs per Fin

6RU Mainframe Fins and Connectors		
Fin/Connector	**Description**	**Connector Information**
D Fin IN A to Fin IN E	***Optional*** UHDI - 12Gbps Input Fin (supplied empty with SFP options)	A single UHDI 12Gbps Fin has 3x Inputs and a single 25 Way Tally GPO connector. Inputs are selectable between SDI and SFP via a user menu. SFP Option: 12G/6G-SDI UHD video SFP optical, single receiver, medium haul, non-MSA, reclocked" and "12G/6G-SDI video SFP (emSFP) optical, transceiver, medium haul, MSA, 1310nm" to the UHDI SFP list.. A single Fin has 3x SDI inputs, or 3x Fiber SFP inputs. SFP's can be purchased as an option from Grass Valley.
E RS422-1 to RS422- 6	RS422 Control Ports	6x 9 Pin D-type connector
F	Exhaust Fans	2x Exhaust fans, drawing air through the mainframe
G	Mains Inputs	2x 16A IEC mains inputs to the Power Supplies

Mainframe Connections

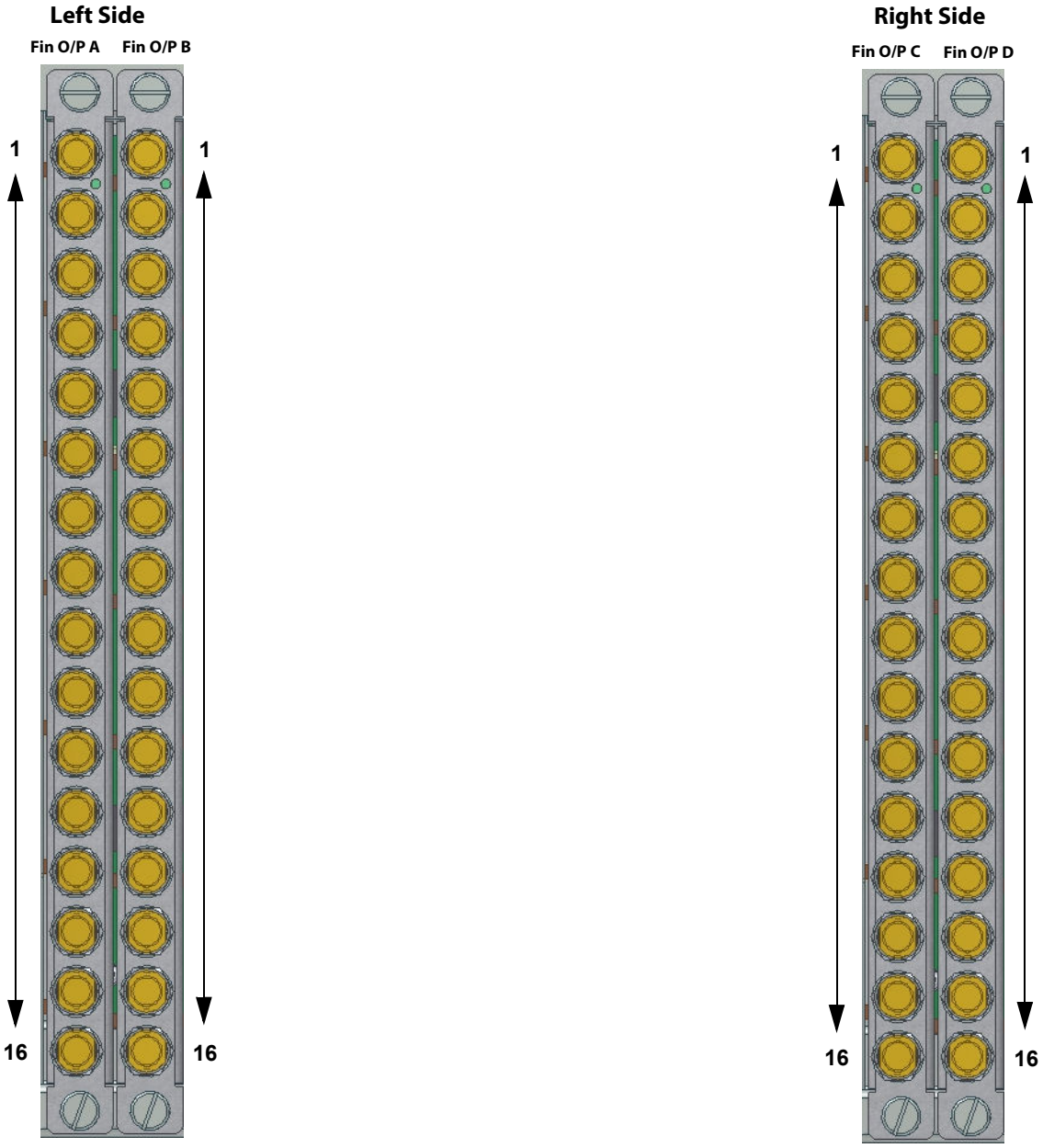
The Kahuna 9600 Mainframes have Ethernet, Serial, Tally & GPI I/O ports.

The Ethernet ports are used for connection between the mainframe and the GUI, to connect to a network.

> Note: The following pages that describe the mainframe Fins are for the 11RU Mainframe (unless indicated otherwise). The 6RU mainframe Fins are identical, taking into account that there is no second REF Fin, NET Fin or second pair of Output Fins.

Output Fins

There are 16x SDO outputs on each Output Fin (64 Outputs in total (11RU Mainframe), 32 Outputs in total (6RU Mainframe) with all Output Fins installed), the diagram below shows the 4 output fins as would be seen looking at the rear of the 11RU mainframe.



Optional - FDO Fiber Output Fin

Each FDO Fiber Output Fin has 16x outputs, which comprise of:

- 3x SFP Cages, each cage has 2x outputs
- 10x HD-SDI BNC outputs

The maximum number of outputs are, 64 Outputs in total (11RU Mainframe), 32 Outputs in total (6RU Mainframe) with all Output Fins installed. The diagram below shows an FDO Fiber Output Fin as would be seen looking at the rear of the 11RU mainframe.

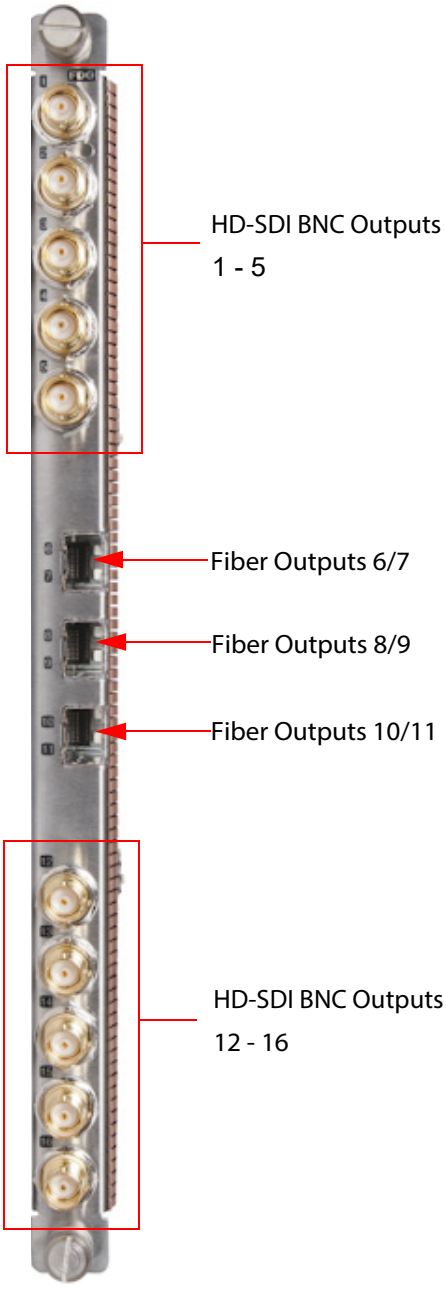
The Fiber SFP Cages are able to take similar SFP Modules to the ones shown below:

Output Fiber Optic SFP Module - Single Mode Dual Tx Module (1310nM).

Fiber SFP Module

Output Coax SFP Module - Dual Tx Coax, Mini BNC Module.

Coax SFP Module



Optional - 40GbE IPO40 (IP Output) Fin

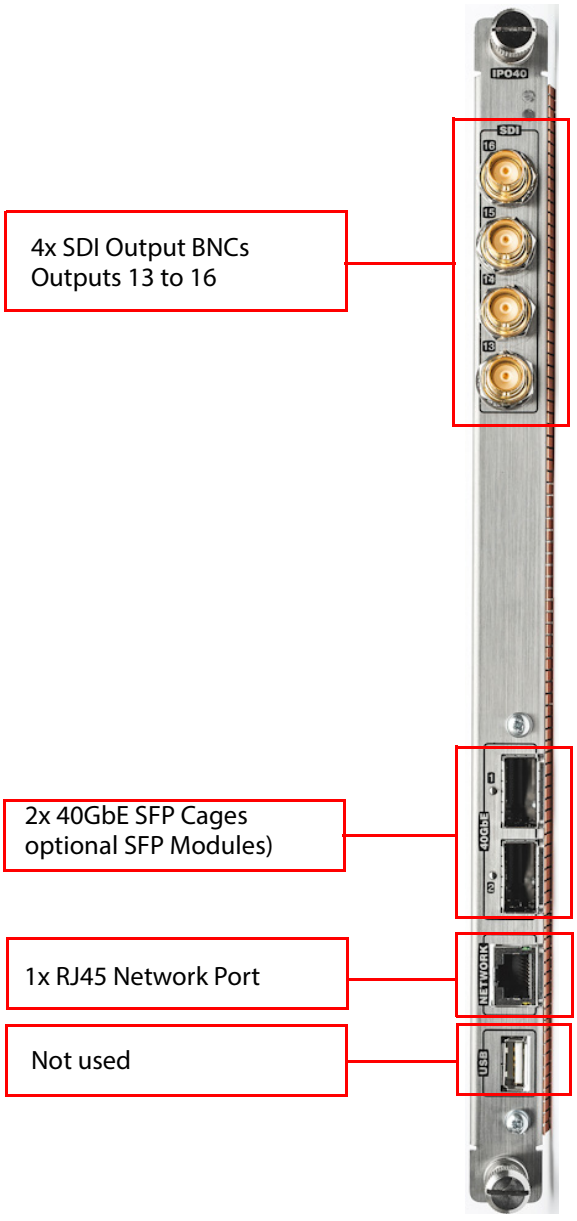
Signals supported over RTP stream per output Fin Module with 2 x 40GbE QSFP Cages.

SMPTE 2022-6
Outputs - 12 x 1.485Gpbs Format Sources
Outputs - 12 x 2.970Gpbs 1080p Format Sources

VSF TR-03 (SMPTE 2110)
Outputs - 12 x 1.485Gpbs Format Sources
Outputs - 12 x 2.970Gpbs 1080p Format Sources

SMPTE 2022-7
Outputs - 12 x 1.485Gpbs Format Sources
Outputs - 12 x 2.970Gpbs 1080p Format Sources

SMPTE 2042 (VC-2)
Outputs - 12 x 1.485Gpbs Format Sources
Outputs - 8 x 2.970Gpbs 1080p Format Sources



Output Configuration	
Kahuna Output	**IPO Spigot**
A1	Spigot 1
A2	Spigot 2
A3	Spigot 3
A4	Spigot 4
A5	Spigot 5
A6	Spigot 6
A7	Spigot 7
A8	Spigot 8
A9	Spigot 9
A10	Spigot 10
A11	Spigot 11
A12	Spigot 12
A13	BNC 13
A14	BNC 14
A15	BNC 15
A16	BNC 16

50GbE IPO50 Output Fin

Signals supported over RTP stream per output Fin Module with 2 x 50GbE QSFP Cages.

SMPTE 2110-20
4x 12Gbps Format Sources (ST2110-20/30/40)

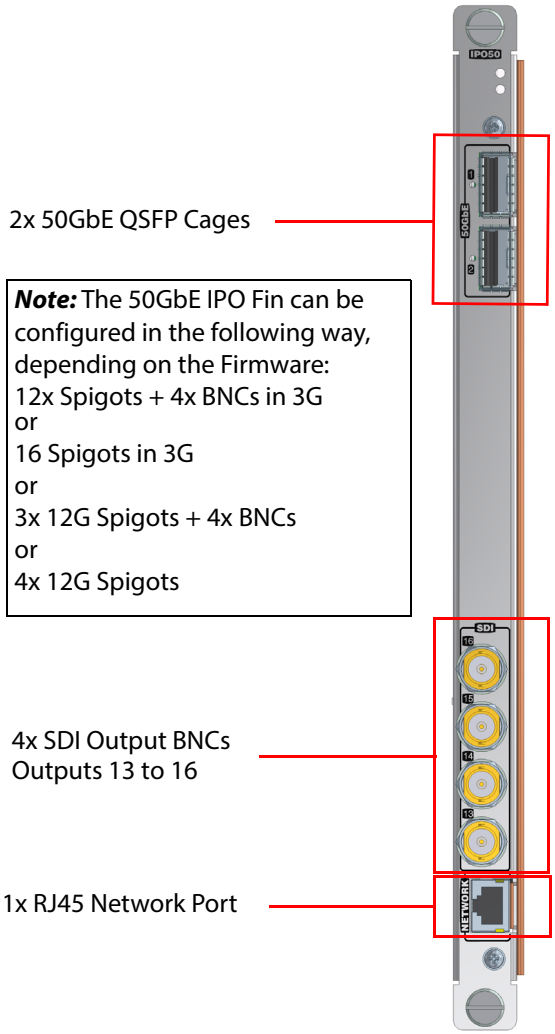
SMPTE 2022-6
Outputs - 12x 1.485Gpbs Format Sources
Outputs - 12x 2.970Gpbs 1080p Format Sources

VSF TR-03 (SMPTE 2110)
Outputs - 12x 1.485Gpbs Format Sources
Outputs - 12x 2.970Gpbs 1080p Format Sources

SMPTE 2022-7
Outputs - 12x 1.485Gpbs Format Sources
Outputs - 12x 2.970Gpbs 1080p Format Sources

SMPTE 2042 (VC-2)
Outputs - 12x 1.485Gpbs Format Sources
Outputs - 8x 2.970Gpbs 1080p Format Sources

Ethernet Signals
QSFP + Optical 2x 50G Ethernet
Conforms to IEEE 802.3ba – 50Gigabit over fiber.
QSFP + connected Cable 2x 50Gigabit Ethernet over twin axial cables.



Note: The 50GbE IPO Fin can be configured in the following way, depending on the Firmware:
12x Spigots + 4x BNCs in 3G
or
16 Spigots in 3G
or
3x 12G Spigots + 4x BNCs
or
4x 12G Spigots

Output Configuration		
Kahuna Output	**IPO Spigot**	**UHD Single Link**
A1	Spigot 1	UHD Spigot 1
A2	Spigot 2	
A3	Spigot 3	
A4	Spigot 4	
A5	Spigot 5	UHD Spigot 2
A6	Spigot 6	
A7	Spigot 7	
A8	Spigot 8	
A9	Spigot 9	UHD Spigot 3
A10	Spigot 10	
A11	Spigot 11	
A12	Spigot 12	
A13	BNC 13	UHD Spigot 4
A14	BNC 14	
A15	BNC 15	
A16	BNC 16	

Optional - UHDO (12Gbps Output) Fin

Each UHDO Fin has 4x BNC and 4x SFP cages for outputs. Only the SDI or the SFP can be used for a single output, i.e O/P1, not both.

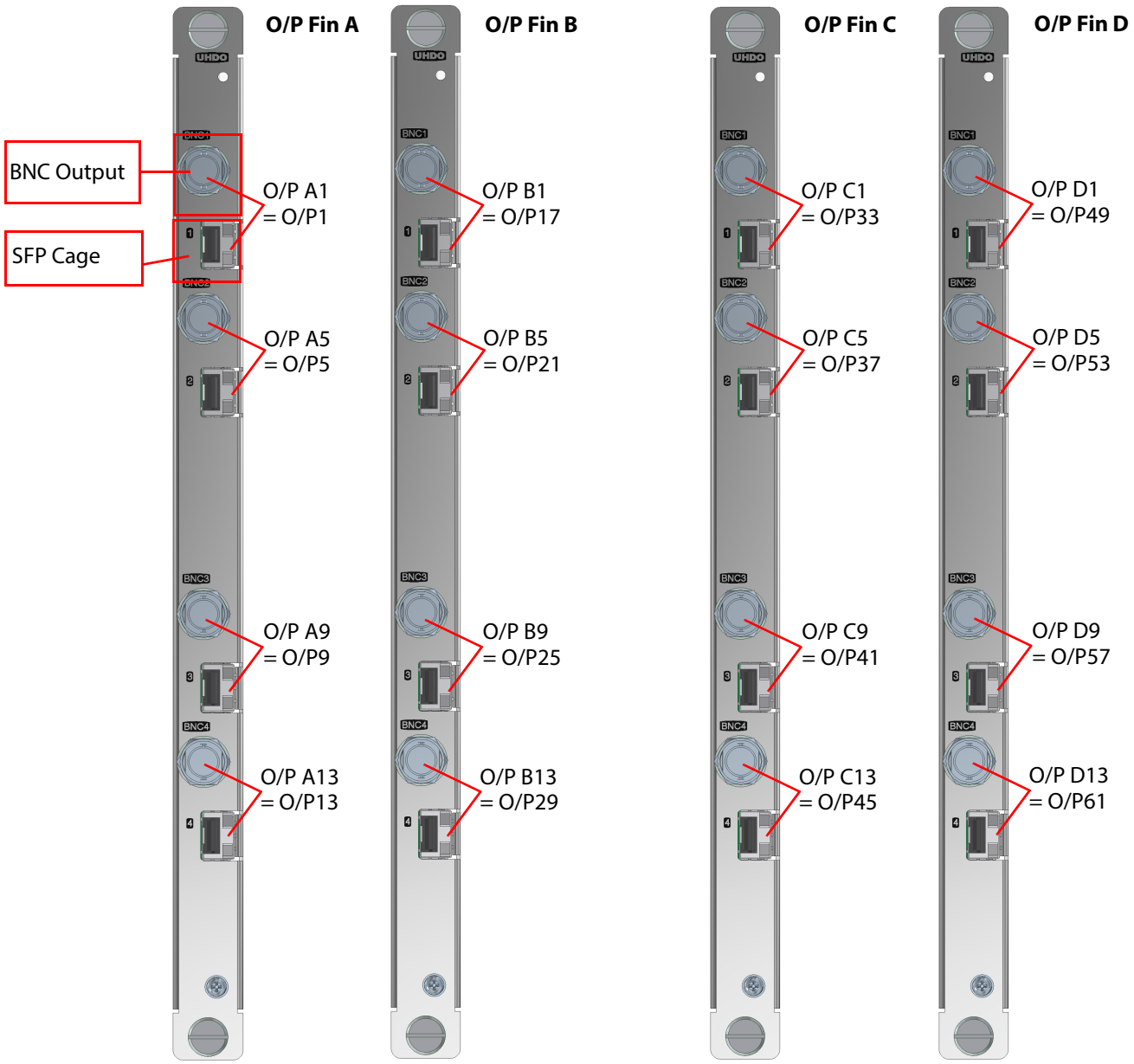
The maximum number of outputs for **Kahuna 9600** are:

- 16x Outputs total on 4x Fins

The maximum number of outputs for **Kahuna 6400** are:

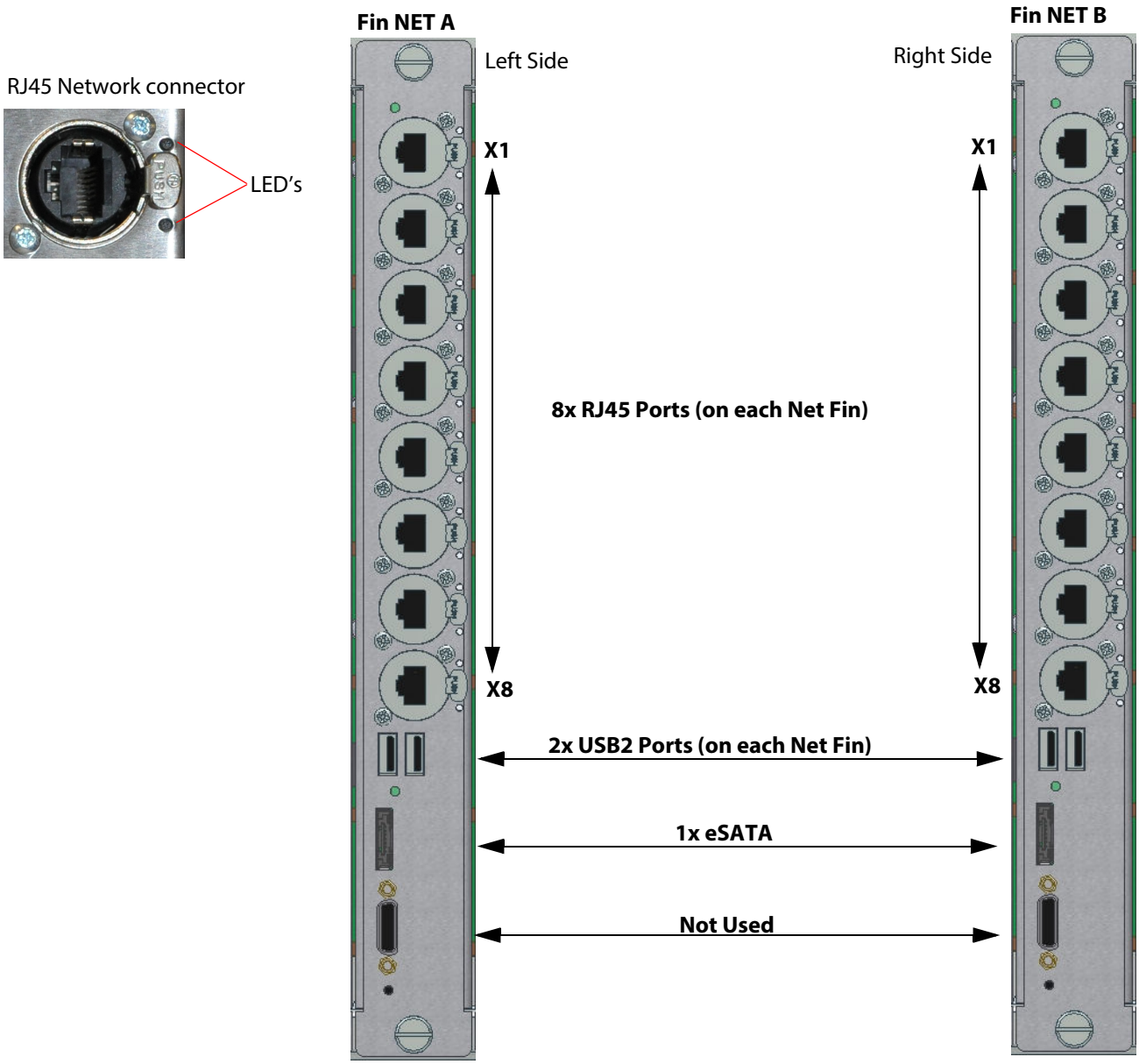
- 8x Outputs total on 2x Fins

Example of 12Gbps Outputs on a Kahuna 9600



Network Fin

Kahuna 9600 has 8 Neutrik RJ45 10/100/1000 base T network connectors on a single Network Fin, another 8 are available if a second (optional) Network Fin is fitted.



There are 2 LED's attached to each connector, the LED's have different functions depending on the type communication they are receiving, the list below describes the functions.
Connectors with XLR shells can be used to connect with these network connectors.
In each case LED - Lit = link, Flashing = traffic.

Top LED Bottom LED

1G bit (1000 base T):GREEN GREEN

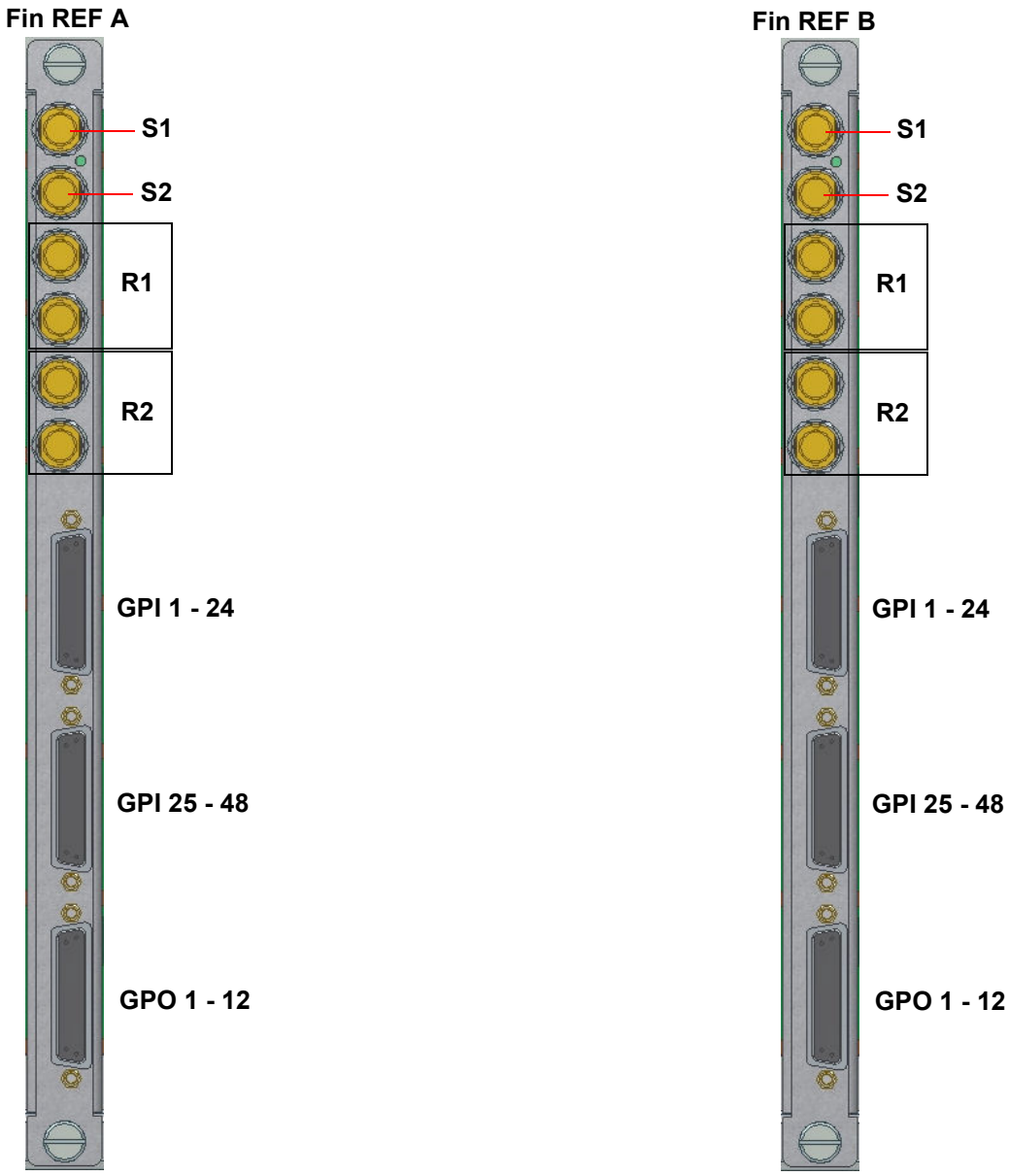
100Mbit (100baseT):OFFGREEN

10Mbit (10baseT):YELLOWGREEN

No link:OFF OFF

> Note: USB ports and eSATA ports can be used to connect external hard drives or memory devices.

Reference Fin



Reference Fin - Sync and Reference Input/Outputs

The information below references the Sync and Reference inputs/outputs:

S1 - this is Sync output 1: analogue sync output. Compatible with any video standard with the current frame rate.

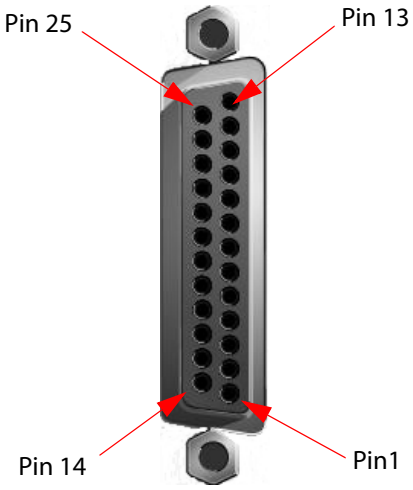
S2 - this is Sync output 2: as above, and is an independent output.

R1 - Reference input 1, this has 2 BNCs, and is a Loop through analogue reference input

R2 - Reference input 2, this has 2 BNCs, and is a Loop through analogue reference input

Reference Fin - General Purpose Inputs (GPI) via 25 way D-Type

The Reference Fin has 48 general-purpose inputs (there are another 48 GPI's if a second Reference Fin is fitted) The action of each of these inputs may be allocated by the user from a range of functions. The allocation is performed in the GPI menus. GPI's are TTL compatible, GPI's can be activated by contact closure to GND. Any externally applied voltage must not exceed ± 20V.



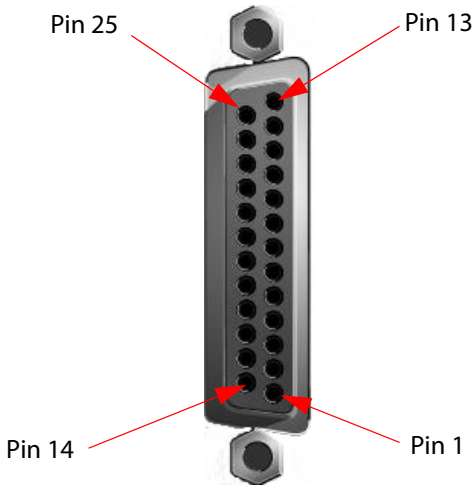
GPI 1 to 24 and GPI 25 to 48			
GPI 1 - 24		GPI 25 - 48	
Pin	Signal	Pin	Signal
1	GPI 1	1	GPI 25
2	GPI 3	2	GPI 27
3	GPI 5	3	GPI 29
4	GPI 7	4	GPI 31
5	GPI 9	5	GPI 33
6	GPI 11	6	GPI 35
7	GPI 13	7	GPI 37
8	GPI 15	8	GPI 39
9	GPI 17	9	GPI 41
10	GPI 19	10	GPI 43
11	GPI 21	11	GPI 45
12	GPI 23	12	GPI 47
13	GND	13	GND
14	GPI 2	14	GPI 26
15	GPI 4	15	GPI 28
16	GPI 6	16	GPI 30
17	GPI 8	17	GPI 32
18	GPI 10	18	GPI 34
19	GPI 12	19	GPI 36
20	GPI 14	20	GPI 38
21	GPI 16	21	GPI 40
22	GPI 18	22	GPI 42
23	GPI 20	23	GPI 44
24	GPI 22	24	GPI 46
25	GPI 24	25	GPI 48

Reference Fin - GPO/TALLY via 25 way D-Type

The Reference Fin has up to 24 GPO/Tally outputs.

Each pair of GPO pins (for example Pin 1 & Pin 14) are connected to contacts of a solid-state relay rated at 60V DC or AC Peak, current rating 0.8A continuous DC or AC. There is no particular polarity requirement.

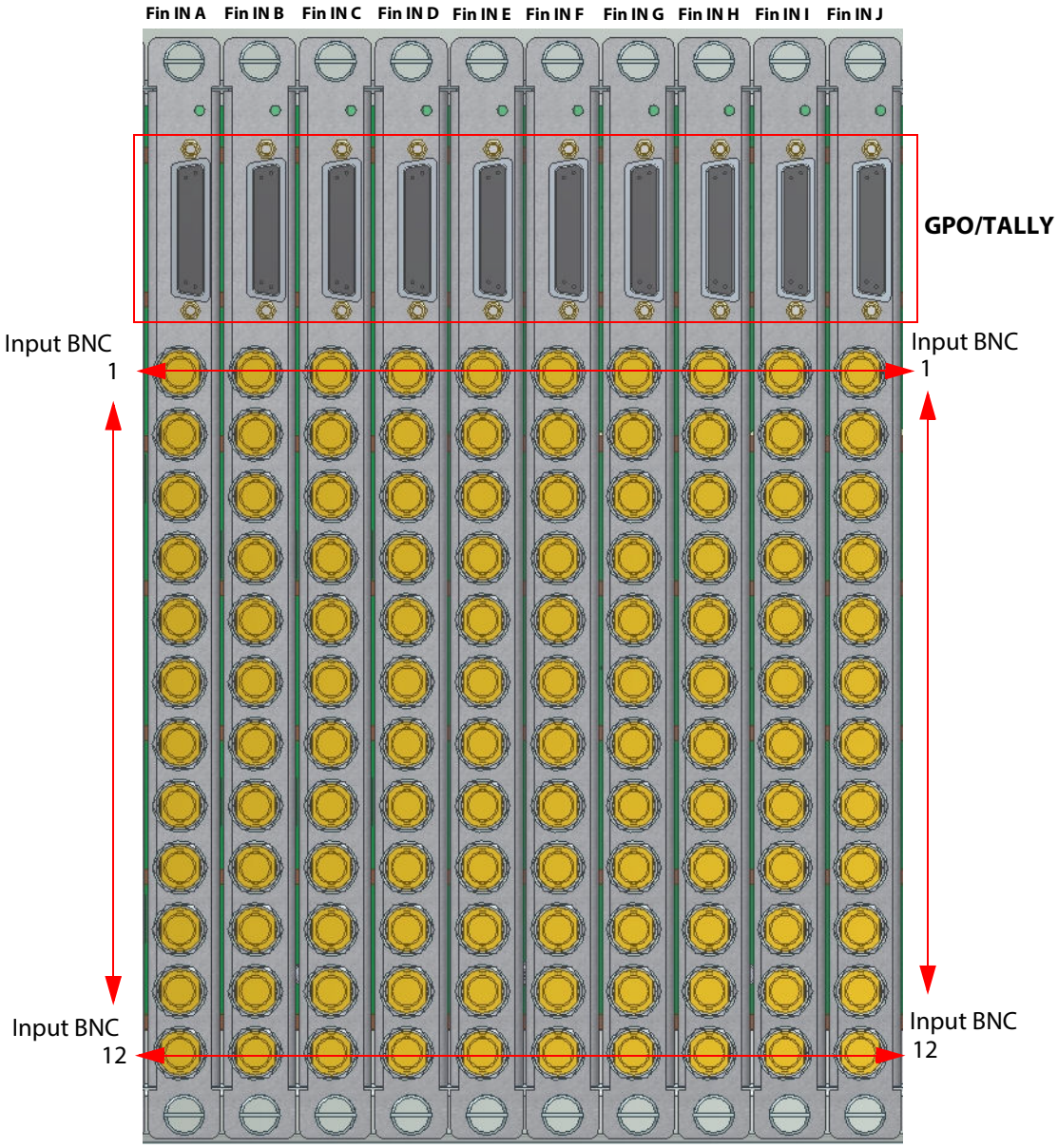
Please refer to the User Instruction Manual for setup procedures.



GPO Tally 1 to 12 A/B	
Pin	**Signal**
1	TALLY 1_A
2	TALLY 2_A
3	TALLY 3_A
4	TALLY 4_A
5	TALLY 5_A
6	TALLY 6_A
7	TALLY 7_A
8	TALLY 8_A
9	TALLY 9_A
10	TALLY 10_A
11	TALLY 11_A
12	TALLY 12_A
13	TEST Only
14	TALLY 1_B
15	TALLY 2_B
16	TALLY 3_B
17	TALLY 4_B
18	TALLY 5_B
19	TALLY 6_B
20	TALLY 7_B
21	TALLY 8_B
22	TALLY 9_B
23	TALLY 10_B
24	TALLY 11_B
25	TALLY 12_B

Input Fins

There are up to 120 inputs to the mainframe spread over 10 Input Fins.



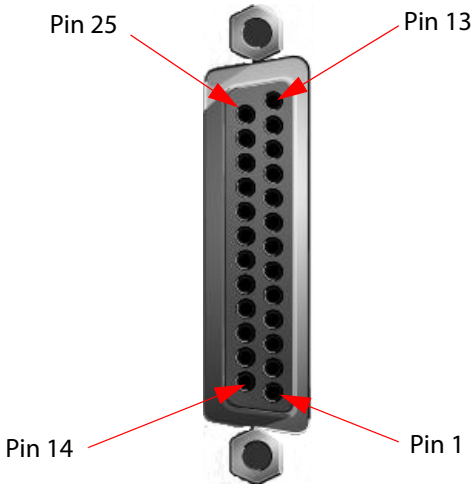
Input BNC's are numbered 1 to 12 on each Input Fin, the way they are referenced is done via the GUI menu system.

Input Fin - GPO/TALLY via 25 way D-Type

The are 24 GPO/Tally outputs per Input Fin.

Each pair of GPO pins (for example Pin 1 & Pin 14) are connected to contacts of a solid-state relay rated at 60V DC or AC Peak, current rating 0.8A continuous DC or AC. There is no particular polarity requirement.

Please refer to the User Instruction Manual for setup procedures.



GPO Tally 1 to 12 A/B	
Pin	**Signal**
1	TALLY 1_A
2	TALLY 2_A
3	TALLY 3_A
4	TALLY 4_A
5	TALLY 5_A
6	TALLY 6_A
7	TALLY 7_A
8	TALLY 8_A
9	TALLY 9_A
10	TALLY 10_A
11	TALLY 11_A
12	TALLY 12_A
13	TEST Only
14	TALLY 1_B
15	TALLY 2_B
16	TALLY 3_B
17	TALLY 4_B
18	TALLY 5_B
19	TALLY 6_B
20	TALLY 7_B
21	TALLY 8_B
22	TALLY 9_B
23	TALLY 10_B
24	TALLY 11_B
25	TALLY 12_B

Optional - FDI Fiber Input Fin

Each Input FDI Fiber Input Fin has 12x inputs, which comprise of:

- 6x SFP Cages, each cage has 2x Inputs
- 1x 25 Way D-Type GOP/Tally connector

The maximum number of inputs are, 120 Inputs in total (11RU Mainframe), 60 Inputs in total (6RU Mainframe) with all input Fins installed. The diagram below shows an FDI Fiber Input Fin as would be seen looking at the rear of the 11RU mainframe.

Note: FDI Fiber Input Fins are supplied with empty SFP Cages.

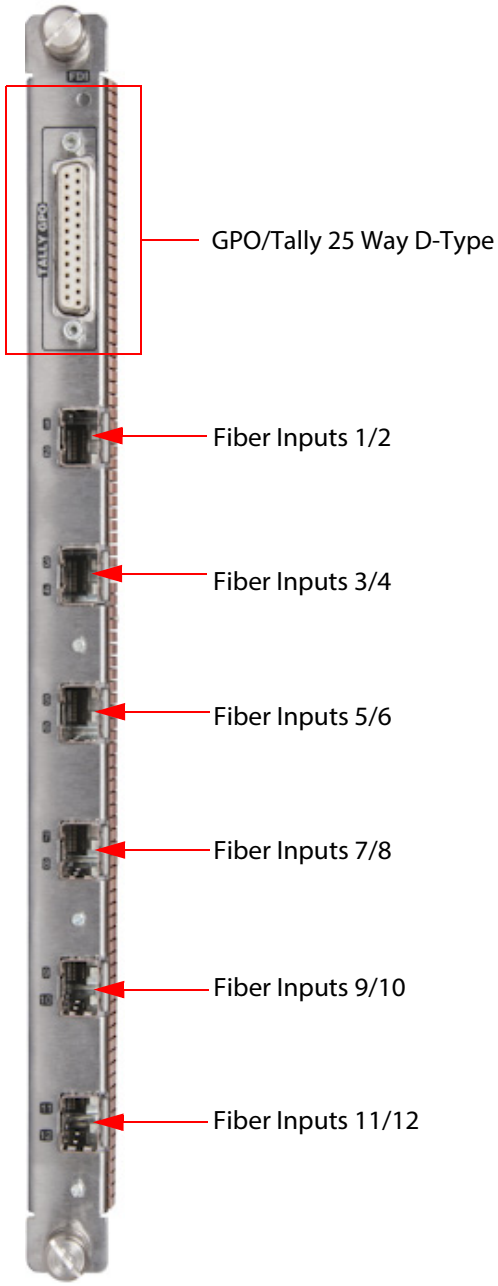
The Fiber SFP Cages are able to take similar SFP Modules to the ones shown below:

Input Fiber Optic SFP Module - Single Mode Dual Rx Module (wideband 1260nM - 1620nM)

Fiber SFP Module

Input Coax SFP Module - Dual Rx Coax, Mini BNC Module.

Coax SFP Module



Optional - 40GbE IPI40 (IP Input) Fin

Signals supported over RTP stream per input Fin Module. 2 x 40GbE QSFP Cages.

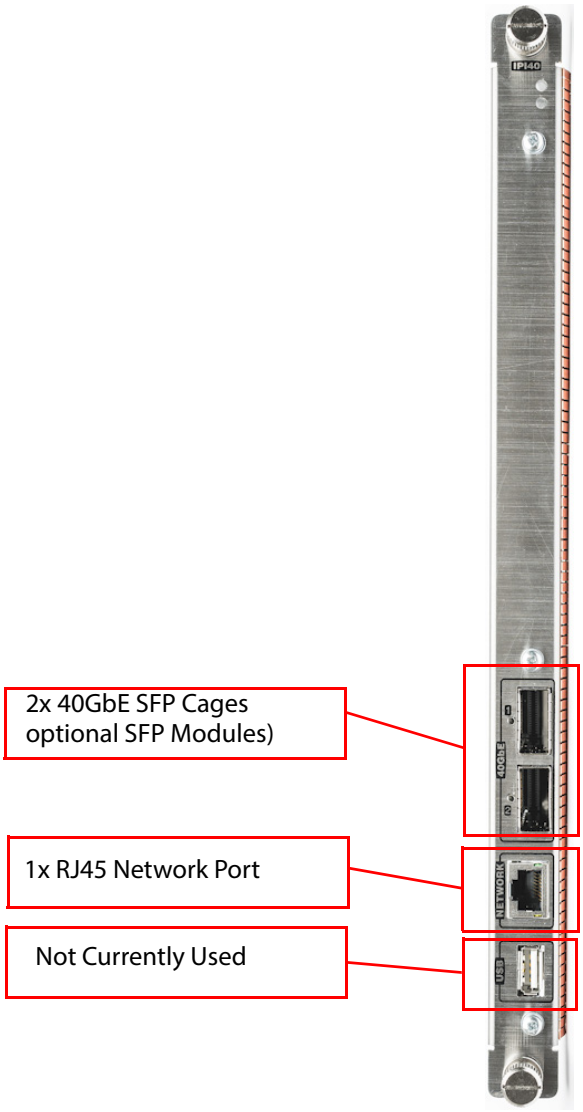
SMPTE 2022-6
12 x 1.485Gpbs Format Sources
12 x 2.970Gpbs 1080p Format Sources

VSF TR-03 (SMPTE 2110)
12 x 1.485Gpbs Format Sources
12 x 2.970Gpbs 1080p Format Sources

SMPTE 2022-7
12 x 1.485Gpbs Format Sources
12 x 2.970Gpbs 1080p Format Sources

SMPTE 2042 (VC-2)
12 x 1.485Gpbs Format Sources
8 x 2.970Gpbs 1080p Format Sources

Ethernet Signals
SFP + Optical 2 x 40G Ethernet
Conforms to IEEE 802.3ba – 40Gigabit over fiber.
SFP + connected Cable 2 x 40Gigabit Ethernet over twin axial cables.



Input Configuration	
Kahuna Input	IPI40 Spigot
A1	Spigot 1
A2	Spigot 2
A3	Spigot 3
A4	Spigot 4
A5	Spigot 5
A6	Spigot 6
A7	Spigot 7
A8	Spigot 8
A9	Spigot 9
A10	Spigot 10
A11	Spigot 11
A12	Spigot 12

50GbE IPI50 Input Fin

Signals supported over RTP stream per input Fin Module. 2 x 50GbE QSFP Cages.

SMPTE 2110-20
3x 12Gbps Format Sources (ST2110-20/30/40)

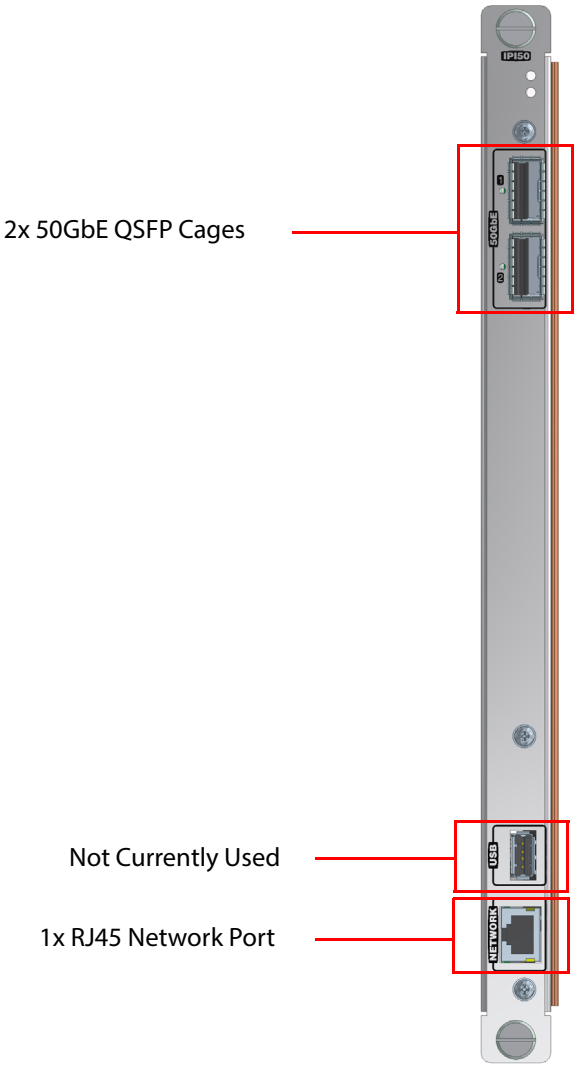
SMPTE 2022-6
12x 1.485Gpbs Format Sources
12x 2.970Gpbs 1080p Format Sources

VSF TR-03 (SMPTE 2110)
12x 1.485Gpbs Format Sources
12x 2.970Gpbs 1080p Format Sources

SMPTE 2022-7
12x 1.485Gpbs Format Sources
12x 2.970Gpbs 1080p Format Sources

SMPTE 2042 (VC-2)
12x 1.485Gpbs Format Sources
8x 2.970Gpbs 1080p Format Sources

Ethernet Signals
QSFP + Optical 2x 50G Ethernet
Conforms to IEEE 802.3ba – 50Gigabit over fiber.
QSFP + connected Cable 2x 50Gigabit Ethernet over twin axial cables.



Input Configuration		
Kahuna Input	**IPI50 Spigot**	**UHD Single Link**
A1	Spigot 1	UHD Spigot 1
A2	Spigot 2	
A3	Spigot 3	
A4	Spigot 4	
A5	Spigot 5	UHD Spigot 2
A6	Spigot 6	
A7	Spigot 7	
A8	Spigot 8	
A9	Spigot 9	UHD Spigot 3
A10	Spigot 10	
A11	Spigot 11	
A12	Spigot 12	

Optional - UHDI (12Gbps Input) Fin

A single UHDI 12Gbps Fin has 3x Inputs and a single 25 Way Tally GPO connector. Inputs are selectable between SDI and SFP via a user menu.

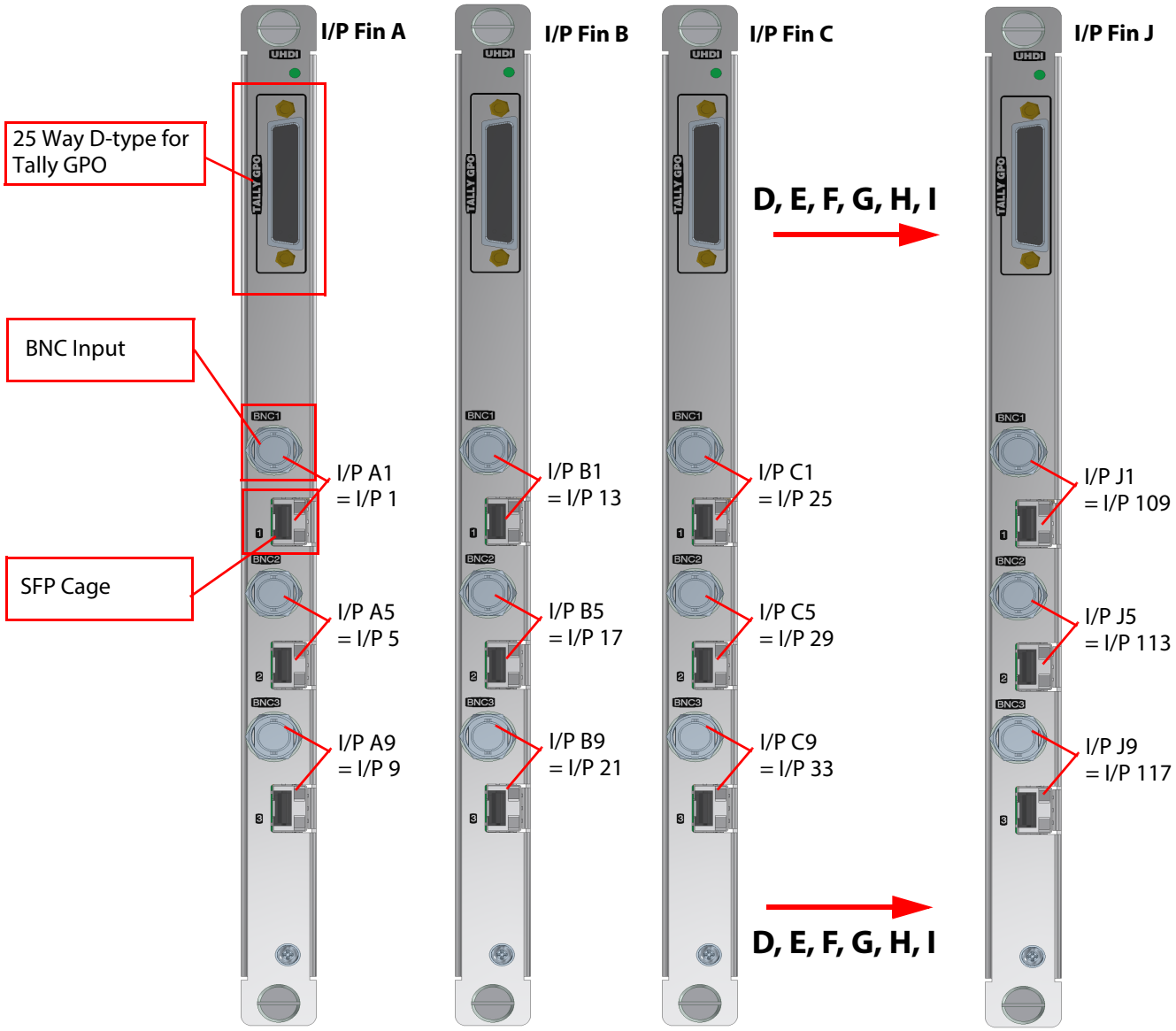
The maximum number of Inputs for **Kahuna 9600** are:

- 30x Inputs total on 10x Fins

The maximum number of Inputs for **Kahuna 6400** are:

- 15x Inputs total on 5x Fins

Example of 12Gbps Inputs to Kahuna 9600



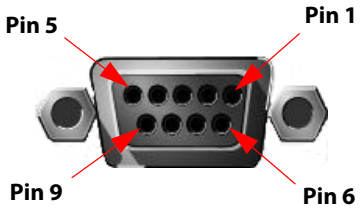
RS422 Port Configuration

There are twelve 9-way D-type connectors (11RU mainframe, 6 RS422 ports on a 6RU mainframe) which provide RS422 control.

Serial Ports are RS422 ports and can be assigned with communications protocols to communicate with number of external devices. For most applications a standard 9-way pin-to-pin cable will be sufficient to connect for example to a VTR, Server, Editor, Robotic Camera Head control or other devices.

The RS422 ports are 9 Way D-type female configuration, shown below is the industry standard wiring for a controlled device.

The ports automatically switch between controlling and controlled device according to the protocol in use, a pin to pin cable is normally required. If the port should ever be configured as a controlling device, simply exchange the words "Transmit" and "Receive" to achieve the correct wiring.



RS422 Port Configuration	
Pin Number	**Function**
1	Frame ground
2	RxA
3	TxB
4	GND
5	(No Connection)
6	GND
7	RxB
8	TxA
9	Frame ground

5 Positioning the MAV and Blank Modules

MAV Modules

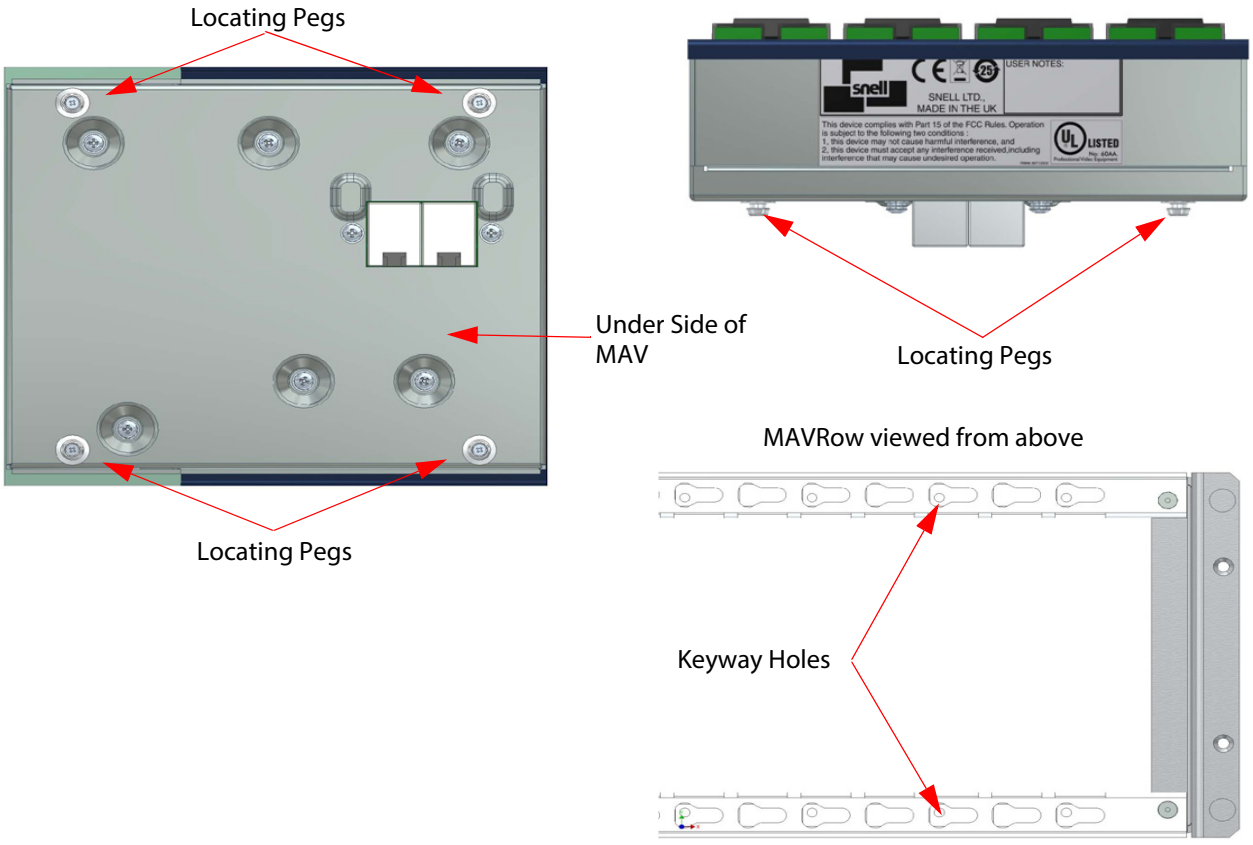
Kahuna Maverik is a completely modular control surface, this means that the user is able to change the layout of the control surface to suit any user preference or production environment. The MAV modules can be easily lifted out of the MAVRow frame and be placed in any configuration the user wishes.

> Note: Care should be taken when handling MAV modules not to damage the surface edges. Do Not apply any force to the control knobs on the GUI-MAV or buttons on MAV modules.

With the MAVRows and Comms cables now fitted into the MAVRow frame, the next step is to fit the MAV modules into the MAVRow.

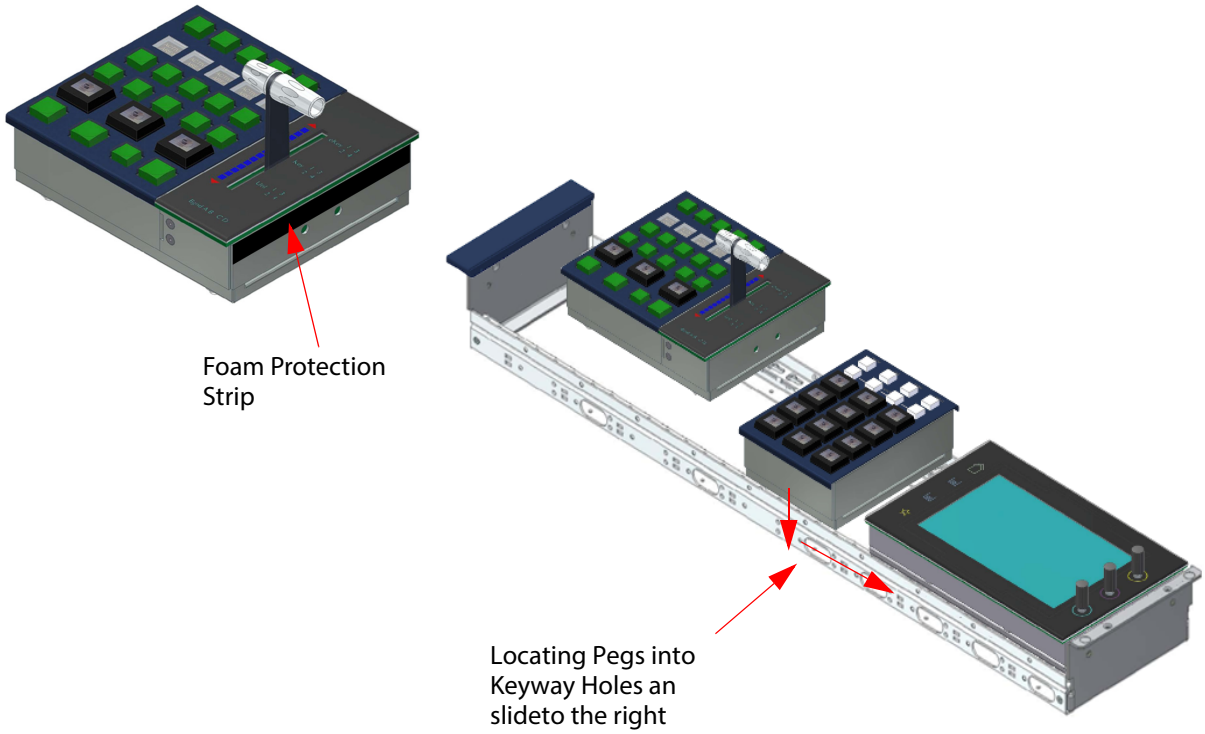
Fitting the MAV modules into the MAVRow is a simple process, there are four locating pegs on the underside of each MAV, the pegs slot into keyway holes on horizontal rails in the MAVRow.

> Note: Connecting the Comms cables, Network cables and the external PSU's to the MAVs/MAV-GUI is covered in the previous section of this manual.



Connect the comms cables to the MAV modules, then carefully place the MAV Locating Pegs (on the underside of the MAV) into the keyway holes and slide the MAV to the right until it is in the locked position. Each MAV module will butt up tight against the next MAV or Blanking module to its immediate right (as shown in the diagram below).

Note: On the right hand side of every MAV module and Blanking module is a black foam protection strip. When fitting the modules, one foam strip should not touch another foam strip. This can be a mistake made when fitting Blanking modules.

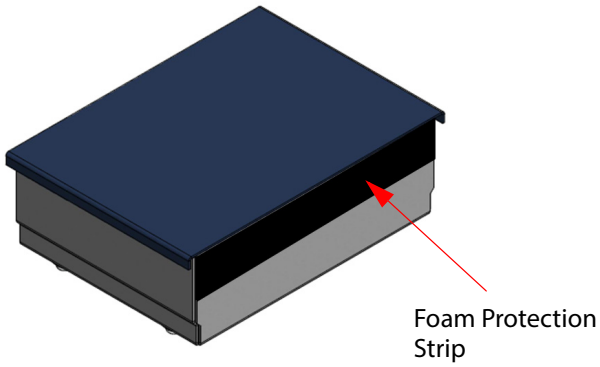


Blanking Modules

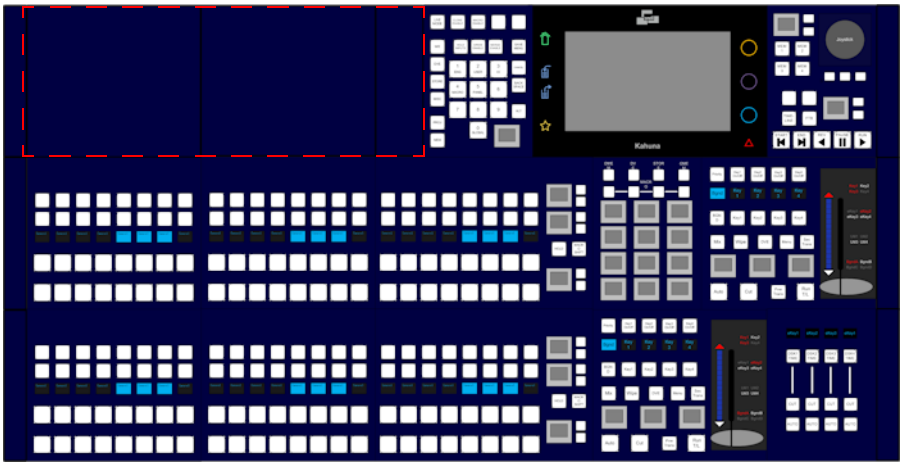
Blanking Modules are designed to fill in the empty spaces in a MAVRow where MAV modules are not required, they fit into the MAVRow frame in exactly the same way as fitting a MAV module (as mentioned on the previous page).
The blanking modules have locating pegs which fit into the keyway holes and slide into a locked position.
The widths of the blanking modules are in 20 mm (0.78 inch) increments, the smallest is 20mm (0.78 inch) up to 220 mm (8.66 inches).

> Note: On the right hand side of every MAV module and Blanking module is a black foam protection strip. When fitting the modules, one foam strip should not touch another foam strip. This can be a mistake made when fitting Blanking modules.

Example of a Blanking Module



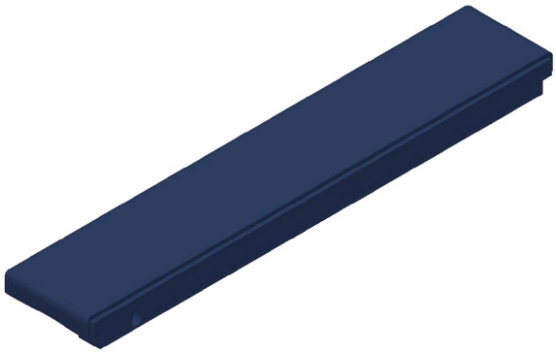
Example of a 2M/E Kahuna Maverik Control Surface
Blanking Modules highlighted by red dotted line



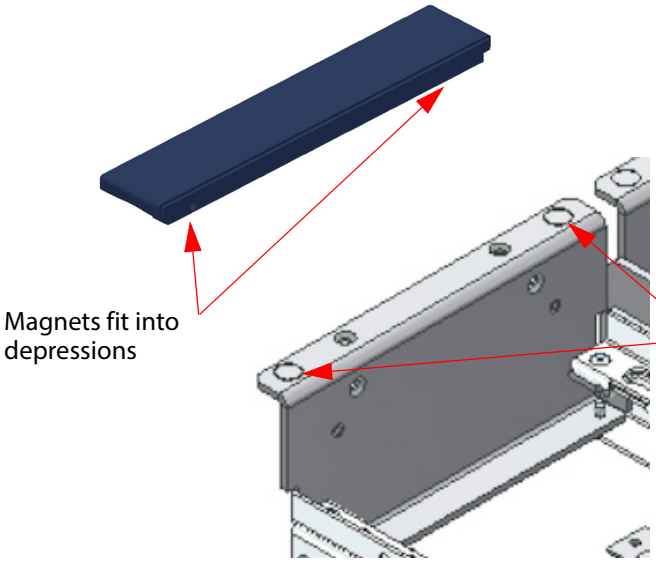
MAVRow Ears

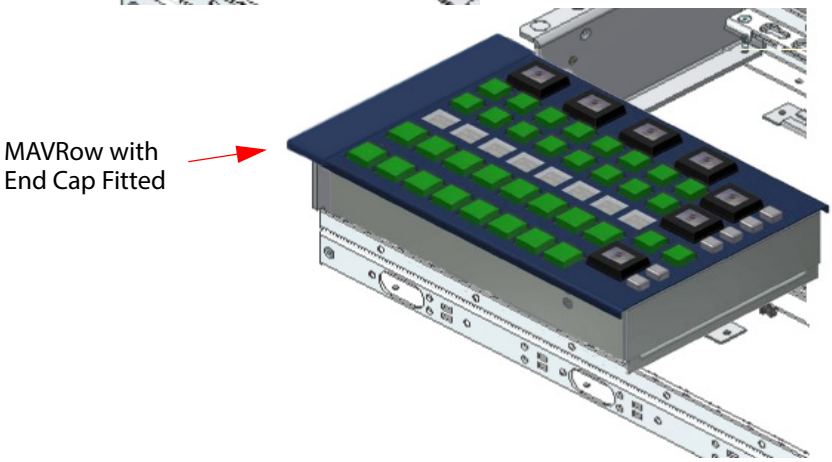
There are two MAVRow Ears are supplied with every MAVRow, they are aesthetic and designed to cover the bare ends of the MAVRow frame.

> Note: Before fitting the MAVRow Ears, please read the safety information on "Use of Magnets with Maverik" in the Warnings and Precautions section at the start of this manual.



The end caps are simply attached to the MAVRow with magnets, that fit into the depressions on the MAVRow frame metalwork.



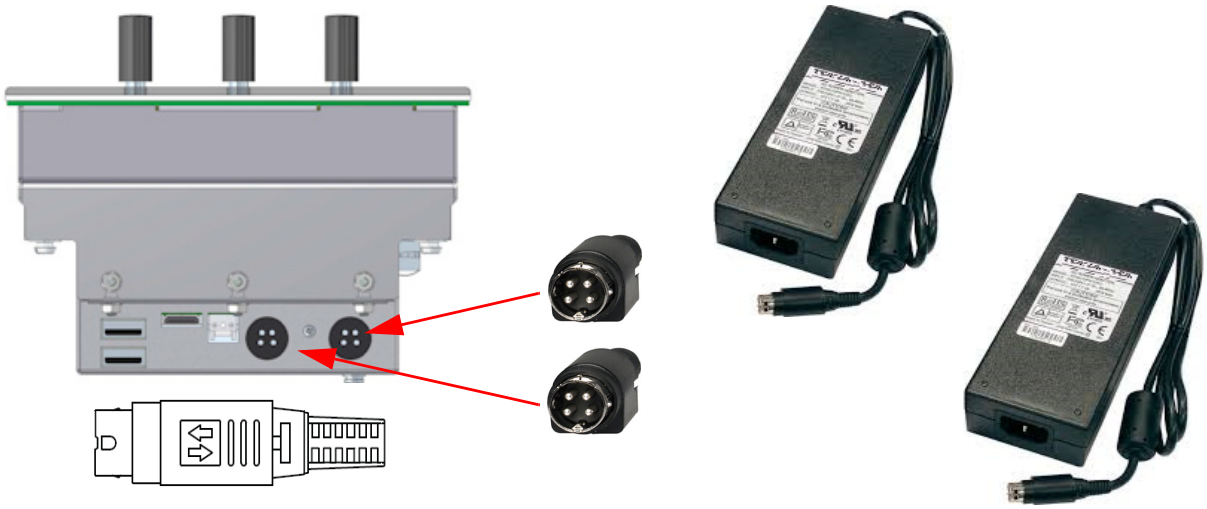


6 Power Supplies

MAV-GUI External Power Supplies

Each MAV-GUI that is purchased is supplied with 2 external 12V power supplies. One of the power supplies powers the MAV-GUI, the other is for redundancy.

The Power Supplies have NO user serviceable parts inside and are welded shut.
Do not attempt to open the power supply cases.



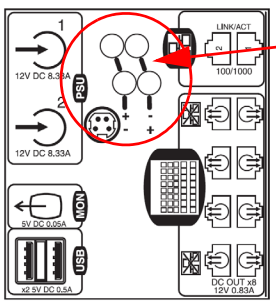
Snap and Lock type connector

Note: Make sure that the mains power is turned **Off** before connecting the PSU to the MAV-GUI.

The power supply connector plug that connects to the MAV-GUI is a 4 pin “Snap and Lock” type, care should be taken when connecting and un-connecting from the MAV-GUI.

Note: Do not allow the power supplies to hang freely from the MAV-GUI. Make sure that the cables are not under any stress.

Diagram shows the connector information for the MAV-GUI



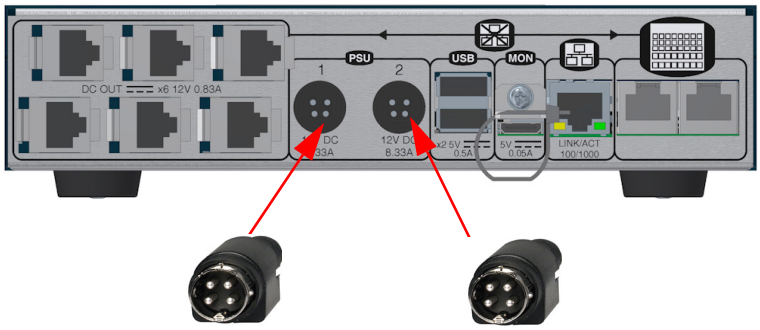
PSU Polarity Adjustment

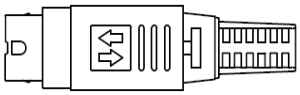
Note: On the under side of the MAV-GUI is a PSU polarity setting screw. This is factory set to the supplied Grass Valley PSU polarity.
There should be no attempt made to change the polarity by the customer.
For further information please contact your Grass Valley Partner or Grass Valley Customer Support.

Mav Remote External Power Supplies

The MAV Remote is supplied with 2 external 12V power supplies. One of the power supplies powers the Mav Remote, the other is for redundancy.

The Power Supplies have NO user serviceable parts inside and are welded shut.
Do not attempt to open the power supply cases.





Snap and Lock type connector

Note: Make sure that the mains power is turned **Off** before connecting the PSU to the Mav Remote.

The power supply connector plug that connects to the Mav Remote is a 4 pin “Snap and Lock” type, care should be taken when connecting and un-connecting from the Mav Remote.

Note: Do not allow the power supplies to hang freely from the Mav Remote. Make sure that the cables are not under any stress.

Mainframe Power Supplies

The information below gives an overview of all the power supplies used in the Kahuna 9600 and Kahuna 6400 mainframes.

Caution 

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

System Components Using Internal Power Supplies

Mainframes

The **Kahuna 9600 11RU** Mainframe is supplied as standard with two power supplies, the two power supplies are able to run a fully populated mainframe.
A further two power supplies can be fitted to provide dual redundancy if required.

Note: To ensure full dual redundancy, two of the four power supplies must be powered from independent power sources.

The **Kahuna 6400 6RU** Mainframe is supplied as standard with two power supplies. A single power supply is able to run a fully populated mainframe.
The second power supply is fitted as standard to provide redundancy.

Note: To ensure redundancy, both power supplies must be powered from independent power sources.

Powering Up the Mainframes

Kahuna 9600 11RU Mainframe

This symbol indicates that hazardous voltages are present inside. ***No User Serviceable Parts*** inside the power supplies. This unit should only be serviced by trained personnel.

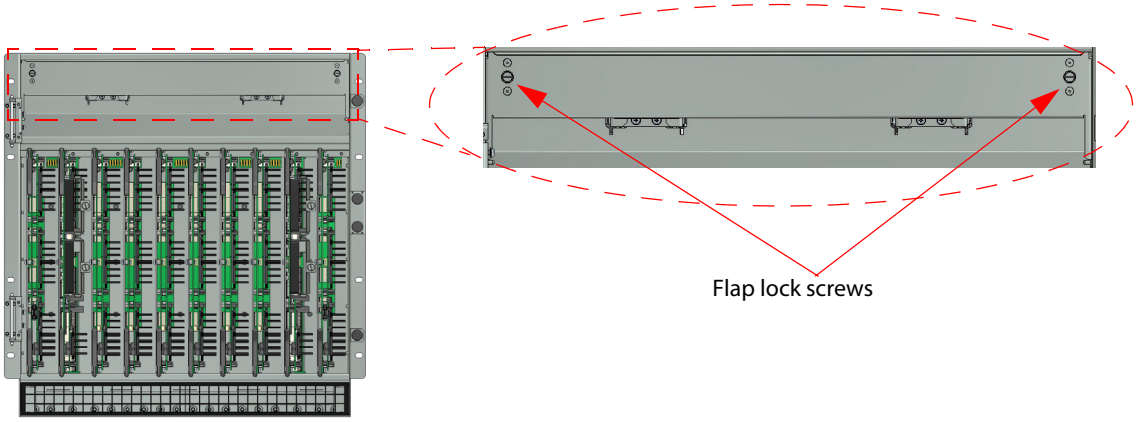
The power supplies for the Kahuna 9600 11RU mainframe are retained within the mainframe body, there are no On/Off switches for the power supplies. The mainframe will power up as soon as the AC Power Cables are plugged into the 16A IEC connectors and turned **On** at the AC mains supply.

Checking the Kahuna 9600 11RU Power Supplies

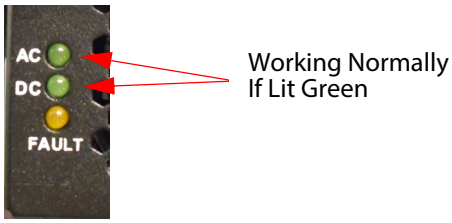
Kahuna 9600 power supplies are hot-swapable. Replacing power supplies should only be attempted by qualified personnel. Do not attempt to run the mainframe with only 1 power supply!

To see that the power supplies are working correctly, the user will have to gain access to the inside of the mainframe.

1. Open the mainframe front door by unscrewing the door lock screw counter-clockwise, and carefully pull on the door.
2. With the door open, be very careful when placing hands inside the mainframe, the power supplies reside in the top quarter of the mainframe above the cards, behind a metal flap.

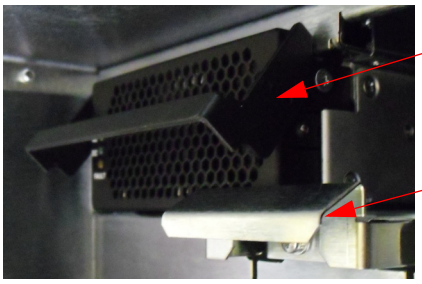


3. Unscrew the lock screws counter-clockwise, the flap lock screws are captive.
4. Lower the flap and the power supplies are clearly visible.
5. At switch on, the “AC” and “DC” LED’s on the front of the power supply will be lit Green indicating that the power supplies are working normally.
6. In the un-likely event that there is a fault with a power supply the “Fault” LED will be lit.



Removing the Mainframe Power Supplies

1. The power supplies are held in place with a locking handle, which is in turn held in place by a sprung lever.

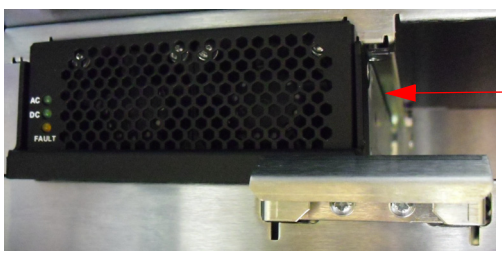


2. To remove a power supply from the mainframe chassis, press down on the sprung lever, and whilst holding it down, lift the locking handle on the power supply to the horizontal position (a little pressure will be needed), while still holding down the sprung lever.
3. As the locking handle lifts to the horizontal position, a pivot releases the power supply from the slot and allows the power supply to be withdrawn out of the slot.
4. Before the power supply can be withdrawn completely from the mainframe chassis, the locking handle has to be placed into the vertical position or closed position to allow it to pass the front lip of the mainframe.

Note: The power supplies are heavy so both hands will be needed to remove the power supply from the mainframe. DO NOT hold the PSU by the front handle, place a hand underneath the PSU assembly to support it.

Replacing the Power Supply

1. With the locking handle in the closed position, carefully maneuver the power supply towards the slot in the mainframe.
2. Hold down the sprung lever to allow the power supply to pass over it and slide into the slot in the mainframe.
3. Lift the locking handle to the horizontal position and whilst holding the sprung lever slide the power supply into the slot until it stops (the power supply should be in position as shown in the diagram above).
4. Whilst still holding down the sprung lever, push down on the locking handle and the power supply will lock into position (see diagram below), release the sprung lever.



Kahuna 6400 6RU Mainframe

Hazardous voltages are present inside. ***No User Serviceable Parts*** inside the power supplies. This unit should only be serviced by trained personnel.
The power supplies for the Kahuna 6400 6RU mainframe are retained within the mainframe body, there are no On/Off switches for the power supplies. The mainframe will power up as soon as the AC Power Cables are plugged into the 16A IEC connectors and turned **On** at the AC mains supply

Checking the Power Supplies are working

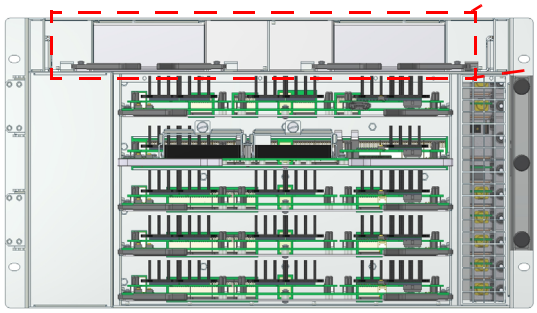
1. At switch on, the "AC" and "DC" LED's on the front of the power supply will be lit Green indicating that the power supplies are working normally (you will have to look around the front of the PSU sled to see the LED's)
2. In the un-likely event that there is a fault with a power supply the "Fault" LED will be lit.

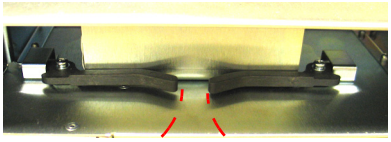
Working Normally
If Lit Green

Removing the Mainframe Power Supplies

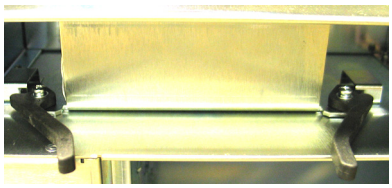
1. The power supplies are held in place with a 2 locking handles, (similar to the ones used for securing the cards into the mainframe).

Power Supplies in the Mainframe





Carefully pull the handles outwards as shown above



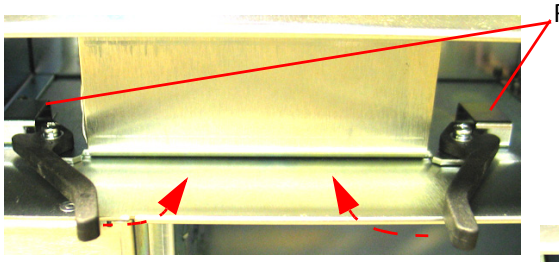
Handles in un-locked position. The PSU can now be withdrawn from the mainframe chassis

2. To remove a power supply from the mainframe chassis, carefully pull the locking handles outwards as shown above and the power supplies will be disconnected from their connectors.
3. The power supply is attached to a sled and as it is withdrawn, a hand will need to be placed under the sled assembly to take the weight.

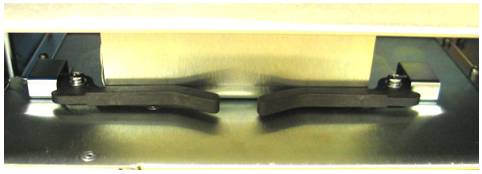
Note: The power supplies are heavy so both hands will be needed to remove the power supply from the mainframe. **DO NOT** hold the power supplies by the locking handles, the metal front of the sled or the handle at the front of the power supply module.

Replacing the Power Supply

1. With the locking handles in the open position, carefully slide the power supply sled along the rails until the sled stops. Do not force the sled, the locking handles will fully locate the PSU.
2. Once in position locate the hooks of the locking handles into the raised metal lugs (shown below) and carefully push both locking handles at the same time inwards towards the PSU sled.
3. The power supply connectors will locate into the mainframe connectors once the locking handles are in the closed position (shown below).



Push locking handles inwards



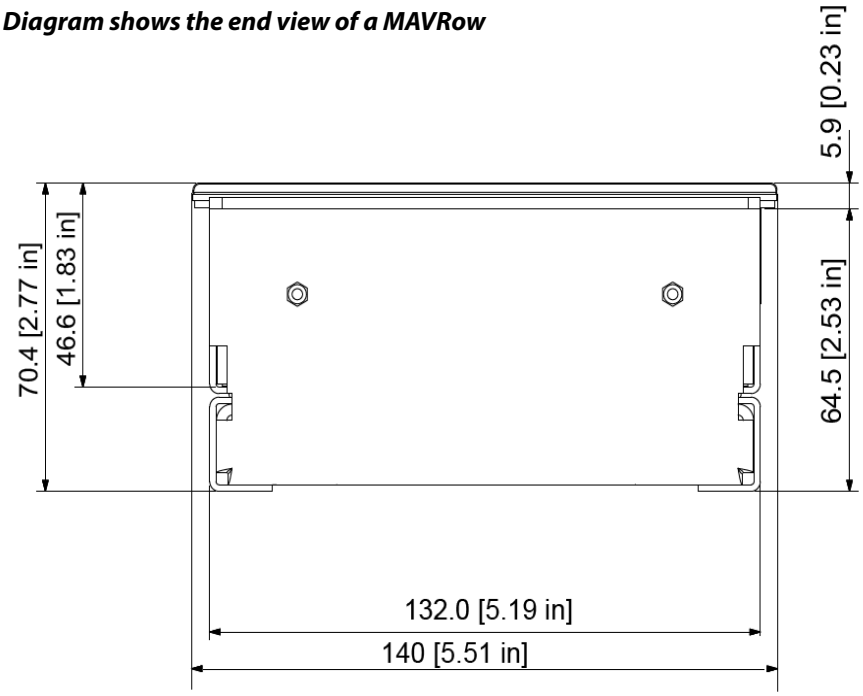
Closed position

Note: There are vent holes next to the Mains input sockets on both the 11RU mainframe and the 6RU mainframe, when the mainframes are powered up, LED's (which are part of the power supply modules) can be seen through the vent holes.
If the mainframes are powered up, the LED's should be lit Green, indicating that the power supplies are working correctly. If the LED's on any power supplies are Red then the power supply is faulty and have to be replaced.

7 Dimensions

MAVRow

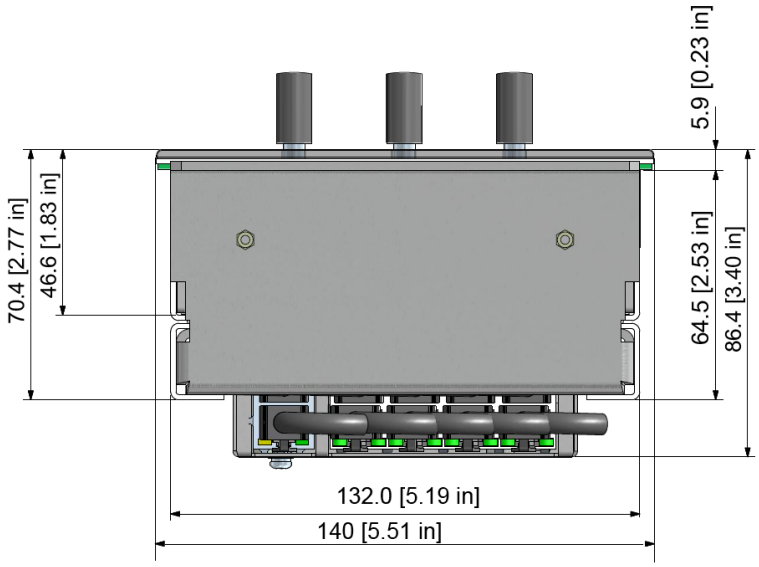
Diagram shows the end view of a MAVRow



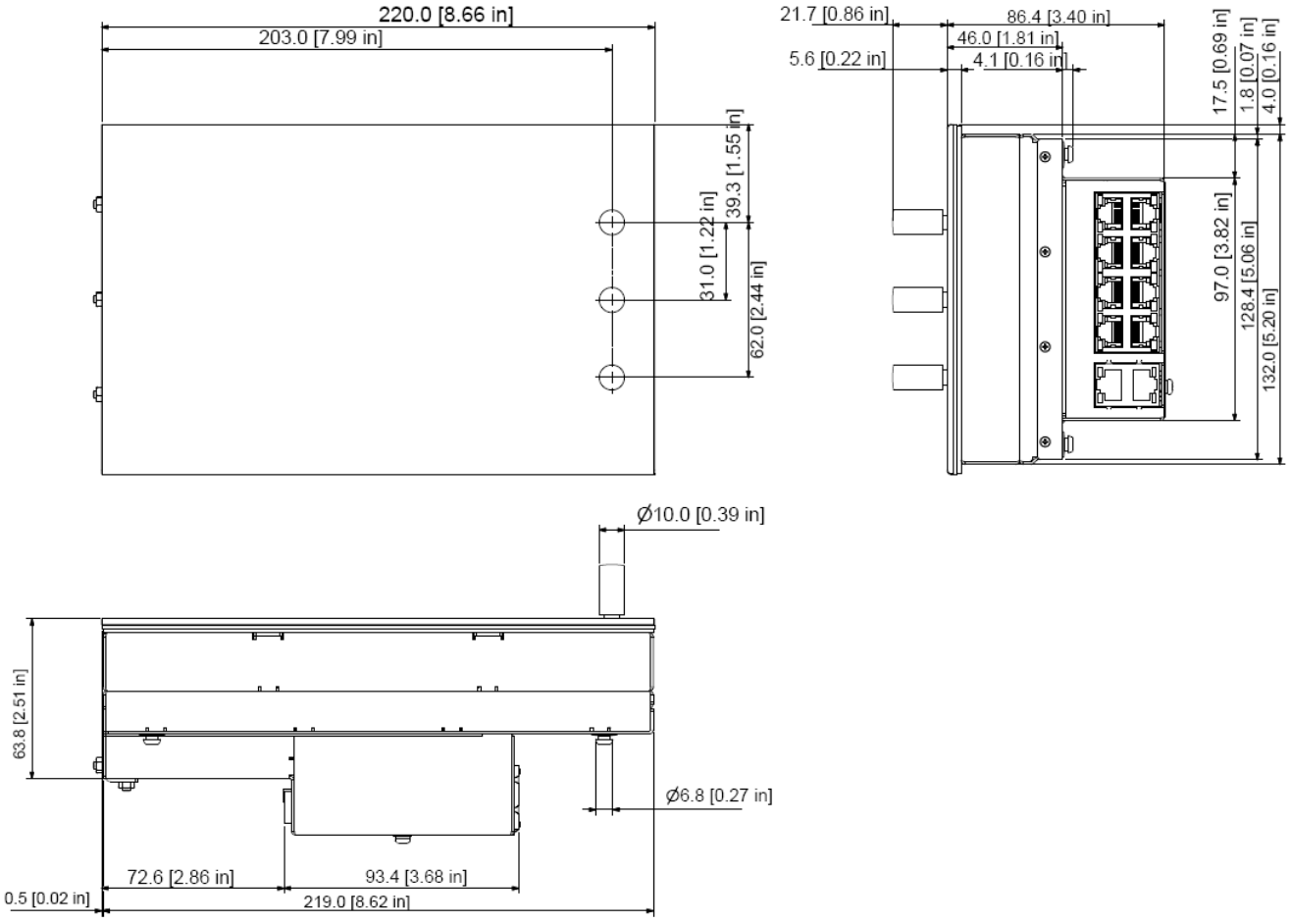
MAVRow	
Depth Height	140 mm ~ 5.51 Inches 70.4 mm ~ 2.77 Inches (surface of MAV-GUI to the bottom of the body)
Weight	Approx - TBC

Diagram showing a MAVRow end with a MAV-GUI fitted into the MAVRow

IMPORTANT!
When mounting a MAVRow frame into a desk, the cutout has to be a minimum of 110mm (4.3 inches) into the desk to allow clearance for cables and airflow underneath the MAVRow

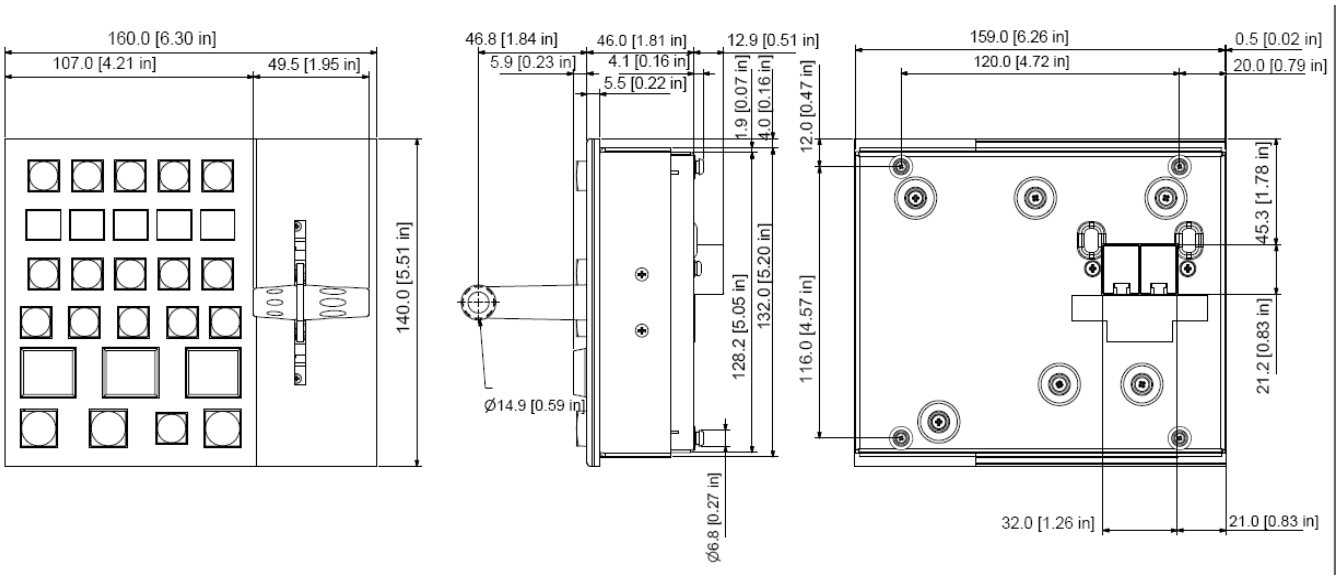


MAV-GUI



MAV-GUI	
Width Depth Height	220 mm ~ 8.66 Inches 140 mm ~ 5.51 Inches 89.4 mm ~ 3.51 Inches (surface of MAV-GUI to the bottom of the body) (Top of the Rotary Knob to the bottom of the body = 111.1 mm ~ 4.37 Inches)
Weight	Approx - 1.6kg ~ 3.52lb
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

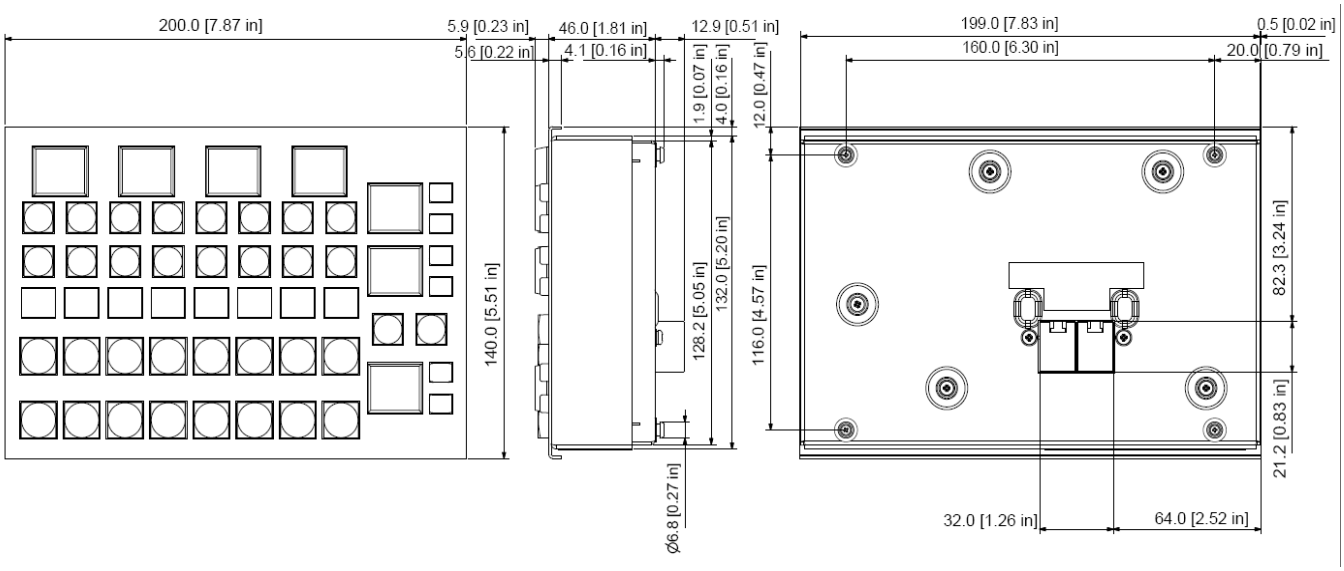
MAV-Trans



MAV-Trans	
Width Depth Height	160 mm ~ 8.66 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-Trans to the bottom of the body) (Top of TBar to the bottom of the body = 104.3 mm ~ 4.10 Inches)
Weight	Approx - 746g ~ 1.64lb
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-8Xpt-Del-OB and MAV-8Xpt-Del-FS

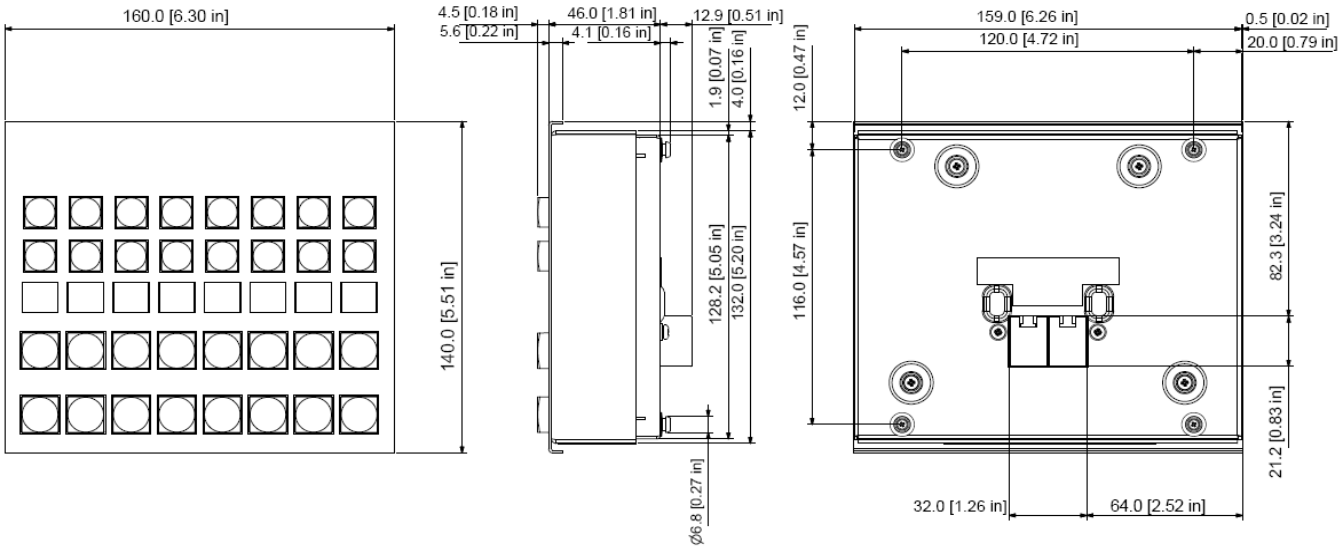
The diagram below shows the "MAV-8Xpt-Del-OB" module only, the dimensions of the "MAV-8Xpt-Del-FS" module are exactly the same, please use the dimensions listed below for this MAV module.



MAV-8Xpt-Del-OB and MAV-8Xpt-Del-FS	
Width Depth Height	200 mm ~ 7.87 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV to the bottom of the body)
Weight	Approx - 736g ~ 1.62lb
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

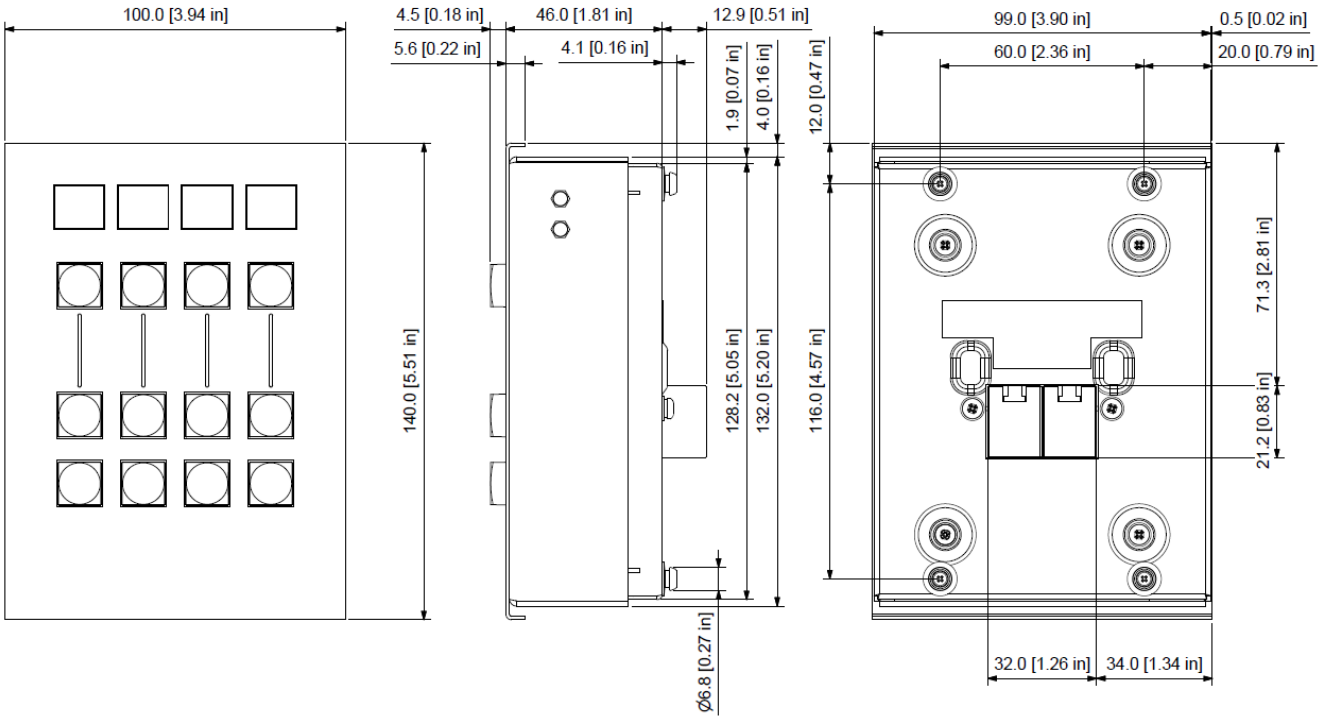
MAV-8Xpt-FS and MAV-8Xpt-OB

The diagram below shows the "MAV-8Xpt-FS" module only, the dimensions of the "MAV-8Xpt-OB" module are exactly the same, please use the dimensions listed below for this MAV module.



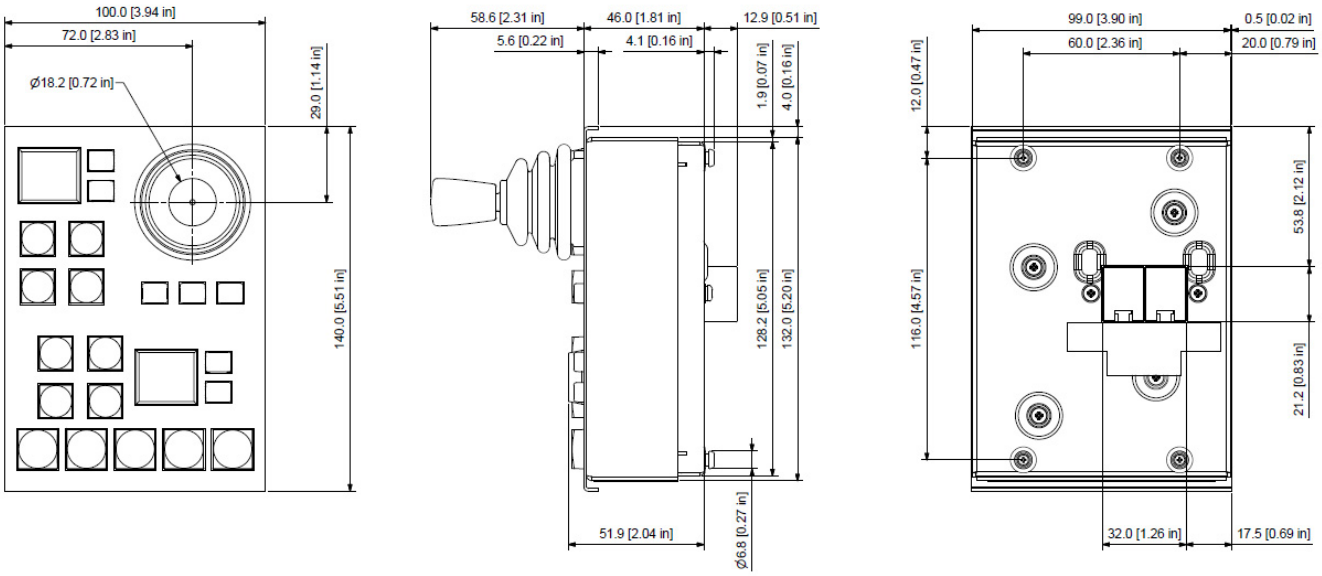
MAV-8Xpt-FS and MAV-8Xpt-OB	
Width Depth Height	160 mm ~ 8.66 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV to the bottom of the body)
Weight	Approx - 600g ~ 1.32lb
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-DSK



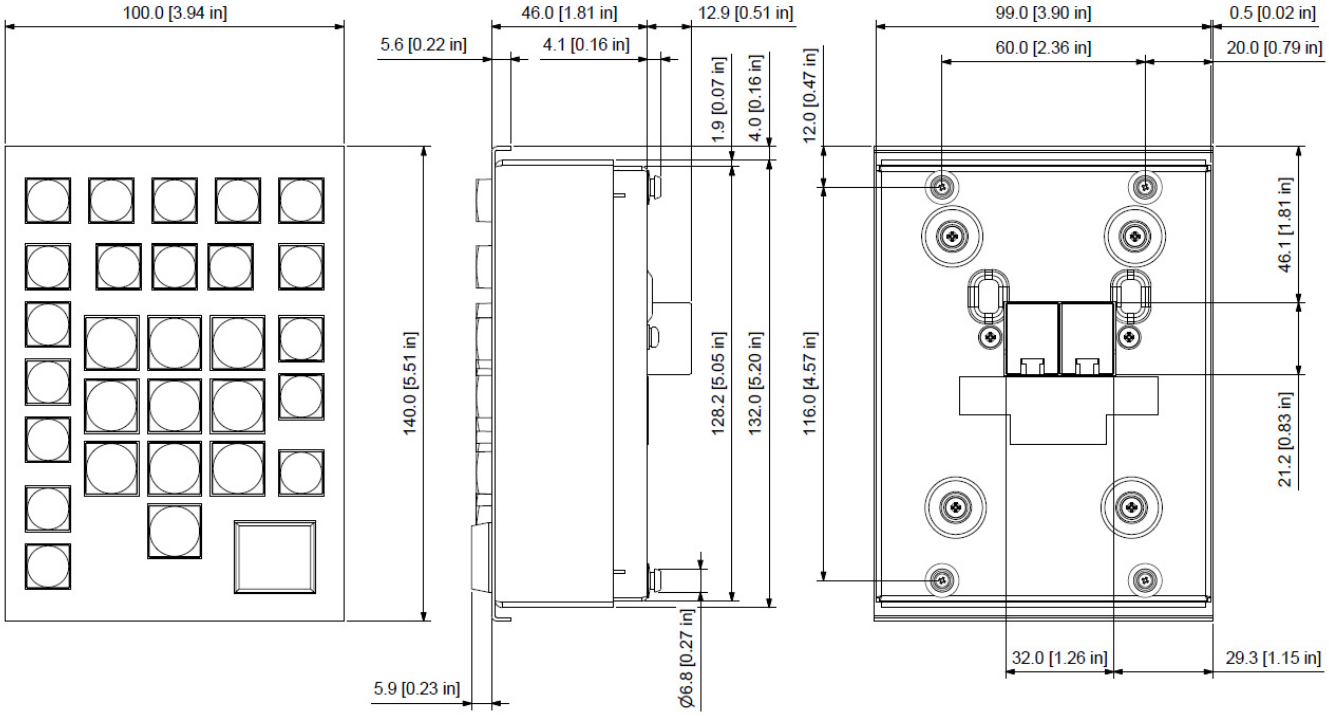
MAV-DSK	
Width Depth Height	100 mm ~ 3.93 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-DSK to the bottom of the body)
Weight	Approx - 360g ~ 12.69oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-JOY



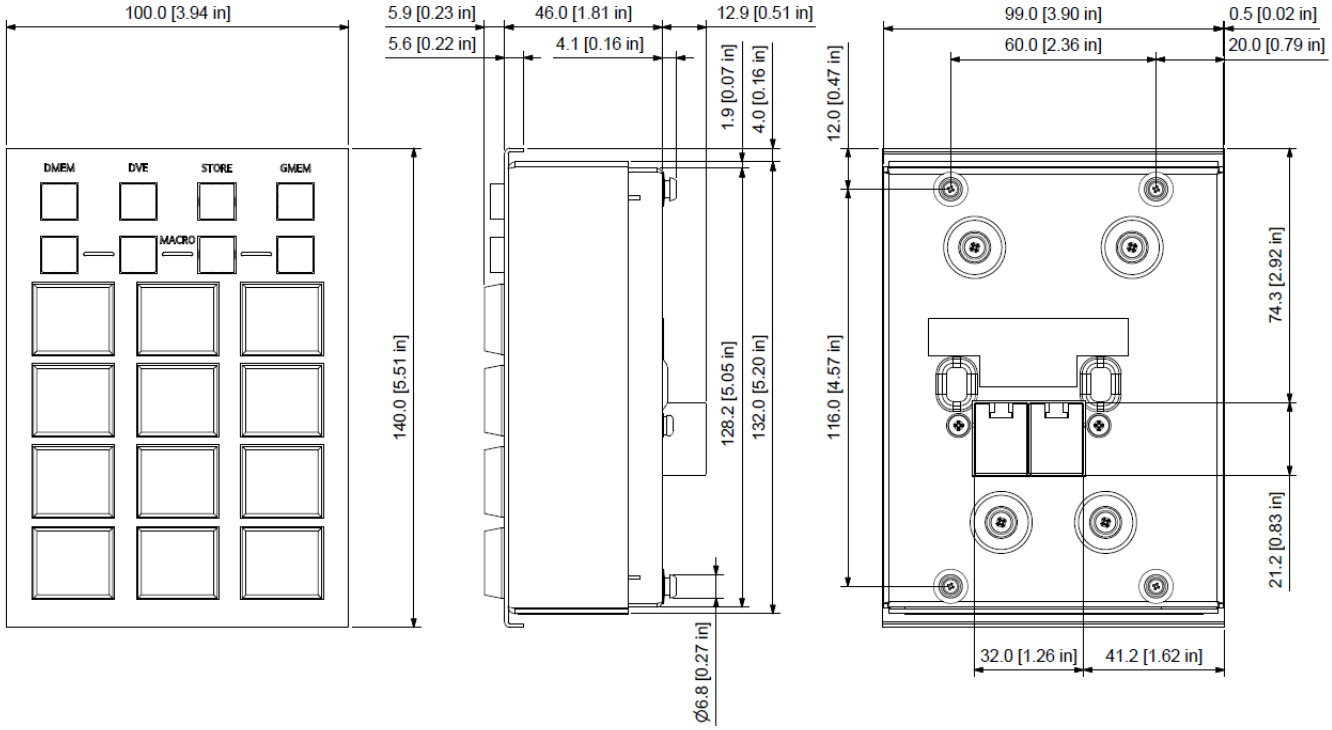
MAV-JOY	
Width Depth Height	100 mm ~ 3.93 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-DSK to the bottom of the body)
Weight	Approx - 500g ~ 1.10lb
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-KEYPAD



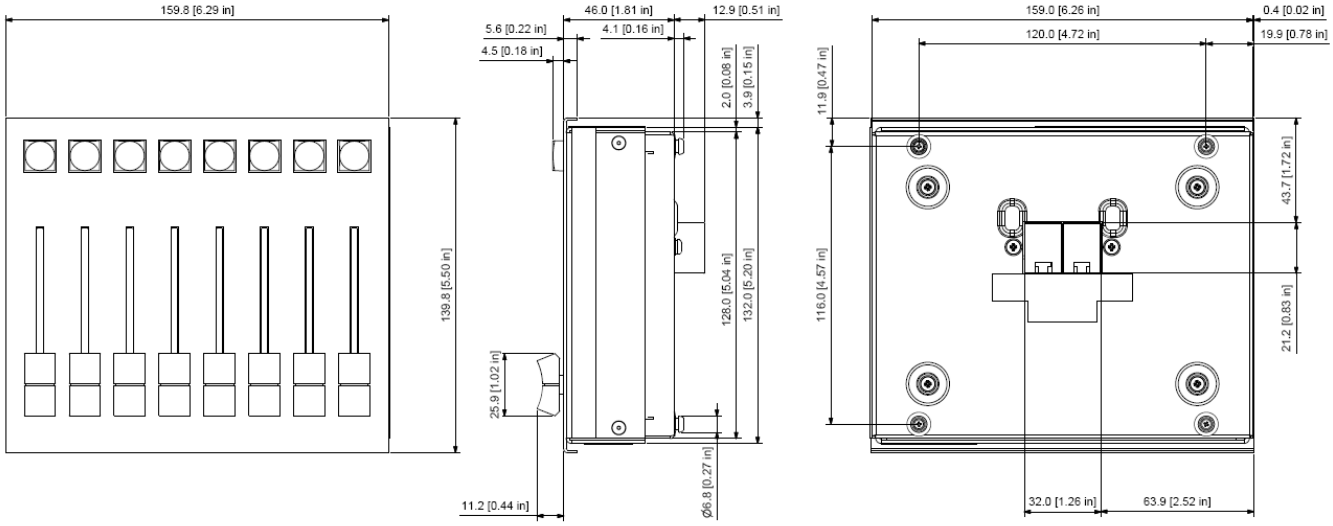
MAV-KEYPAD	
Width Depth Height	100 mm ~ 3.93 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-KEYPAD to the bottom of the body)
Weight	Approx - 396g ~ 13.96oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-UFBPAD



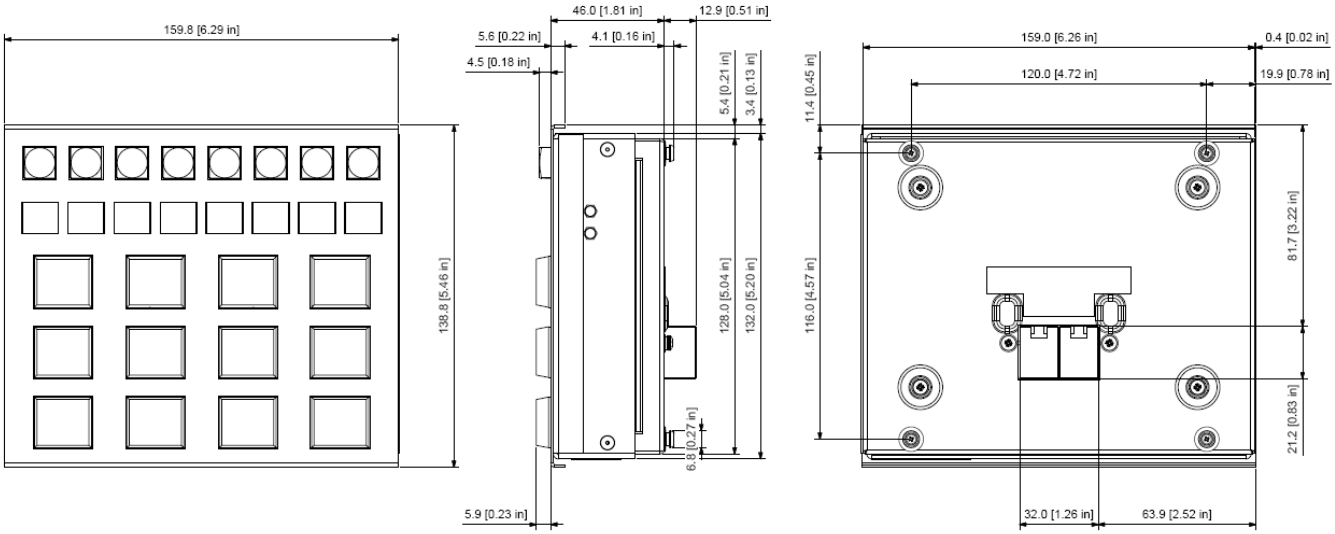
MAV-UFBPAD	
Width Depth Height	100 mm ~ 3.93 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-UFBPAD to the bottom of the body)
Weight	Approx - 386g ~ 13.61oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-AUD-FADER



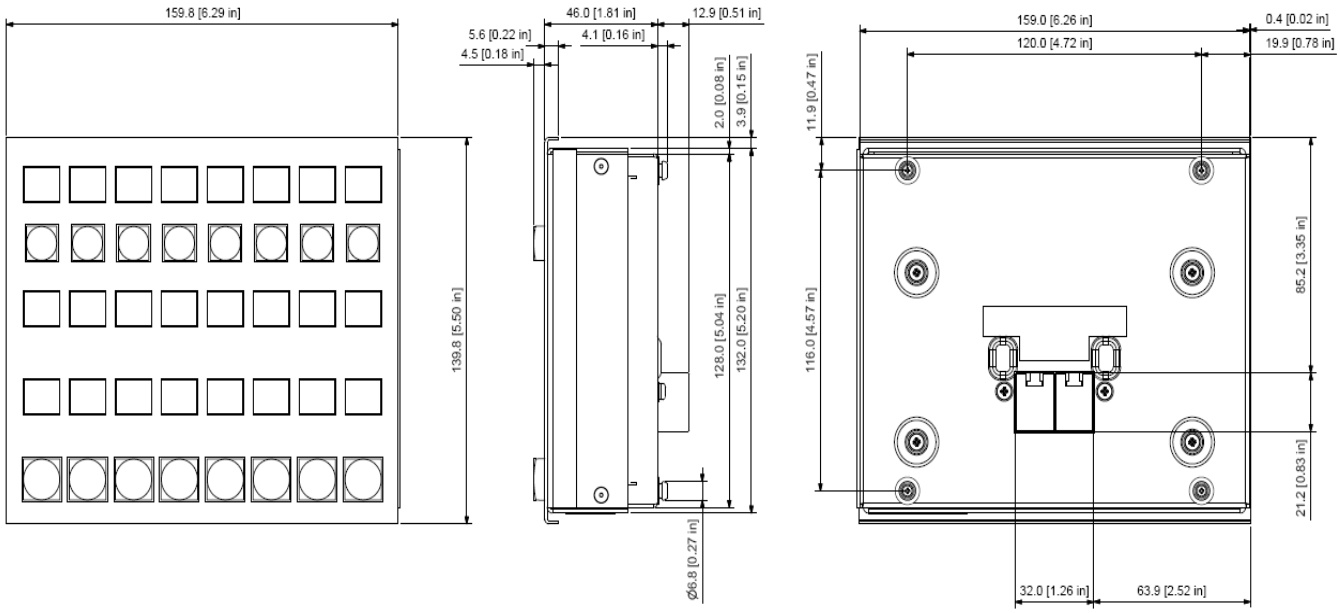
MAV-AUD-FADER	
Width Depth Height	160 mm ~ 6.29 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-AUD-FADER to the bottom of the body)
Weight	Approx - 900g ~ 31.74oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-AUTO



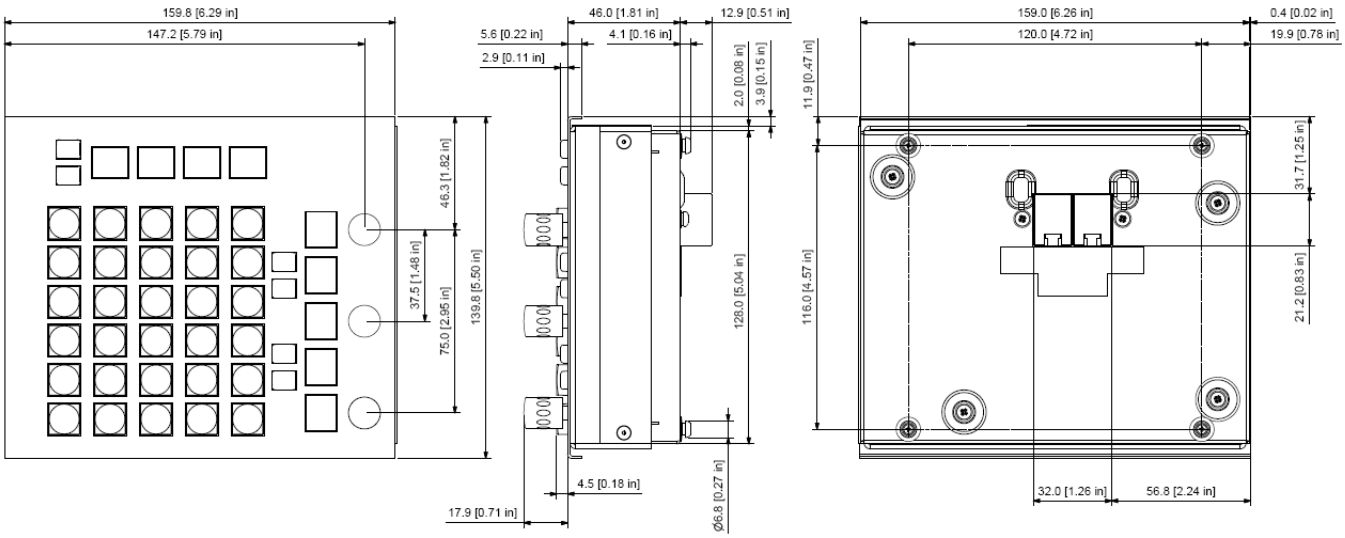
MAV-AUTO	
Width Depth Height	160 mm ~ 6.29 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-AUTO to the bottom of the body)
Weight	Approx - 640g ~ 22.57oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-AUX



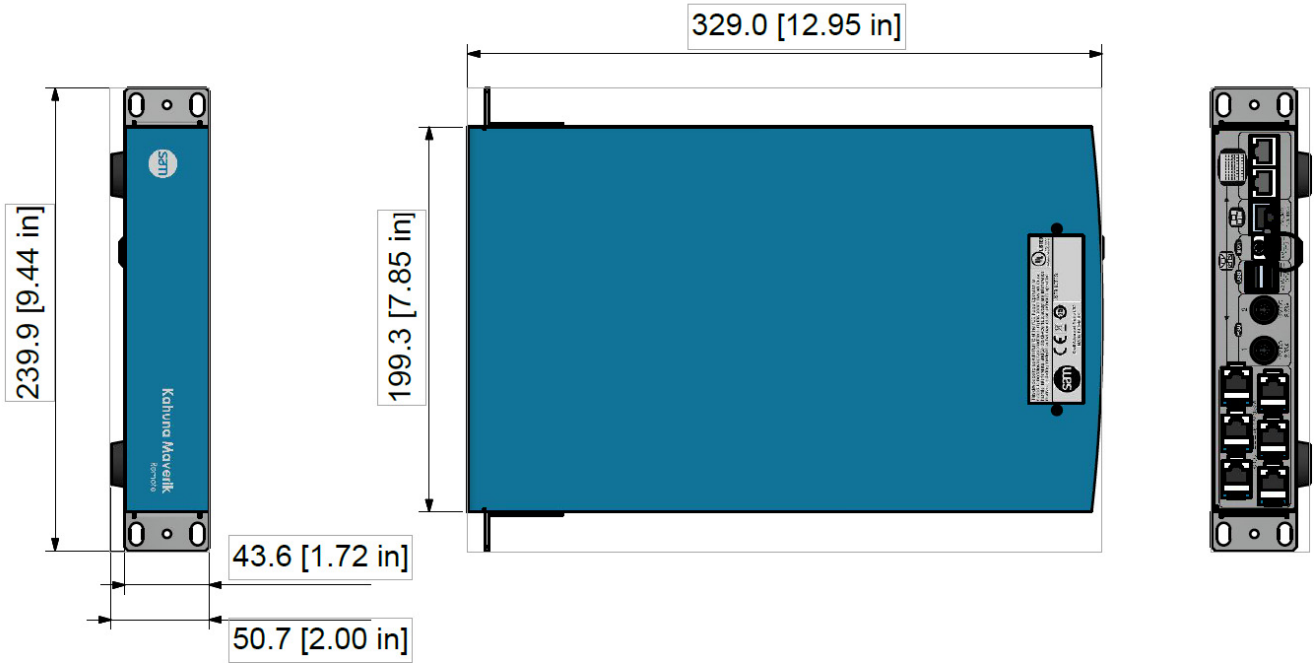
MAV-AUX	
Width Depth Height	160 mm ~ 6.29 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-AUX to the bottom of the body)
Weight	Approx - 640g ~ 22.57oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

MAV-KEYER



MAV-KEYER	
Width Depth Height	160 mm ~ 6.29 Inches 140 mm ~ 5.51 Inches 58.9 mm ~ 2.31 Inches (surface of MAV-KEYER to the bottom of the body)
Weight	Approx - 760g ~ 26.80oz
Environmental	41 to 104°F ~ 5 to 40°C non-condensing

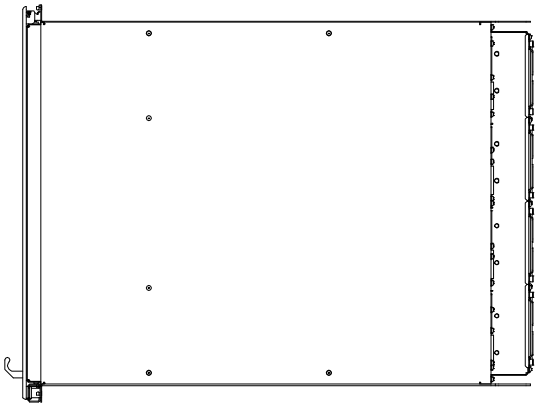
Mav Remote Dimensions

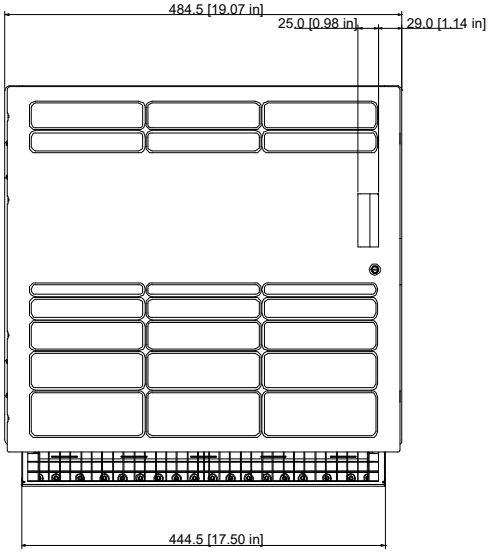


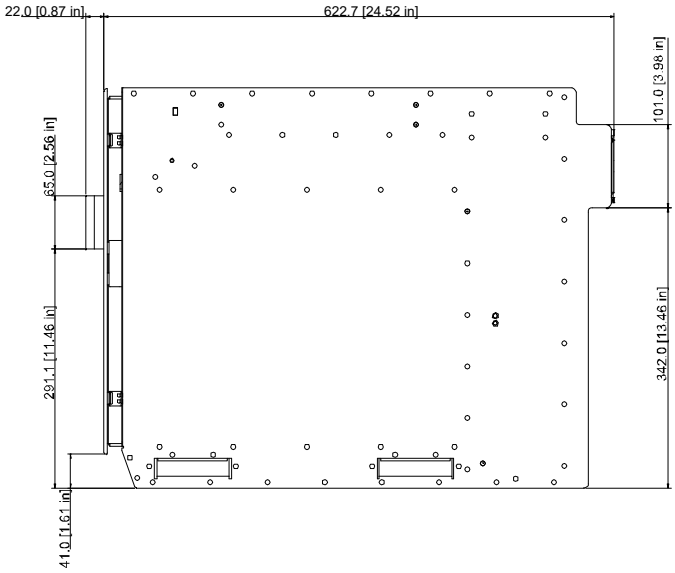
Mav Remote Dimensions		
Width Depth Height	9.44 inches 12.95 inches 2.00 inches	~ 239.9 mm ~ 329 mm ~ 50.7 mm (including feet)
Weight	TBC lbs	~ TBCkg
Environmental	41 to 104°F	~ 5 to 40°C non-condensing

Kahuna 9600 11RU Mainframe Dimensions

11RU Mainframe Dimensions		
Width	19.07 inches	~ 484.5 mm including brackets
Depth	19.21 inches	~ 488 mm
Height	25.39 inches	~ 644.7 mm including connectors, PSU fans and door handle
Weight	154.3 lbs	~ 70 kg
Environmental	41 to 104°F	~ 5 to 40°C non-condensing

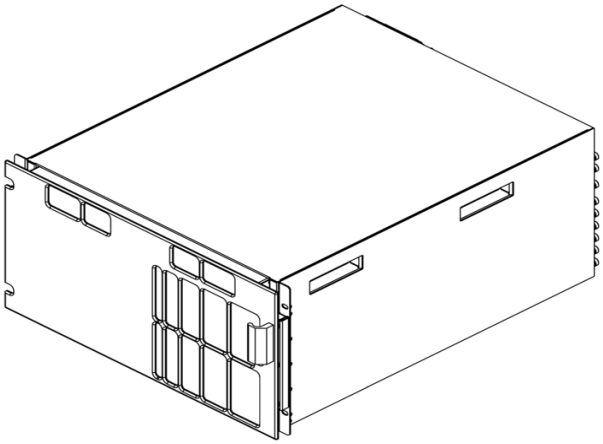


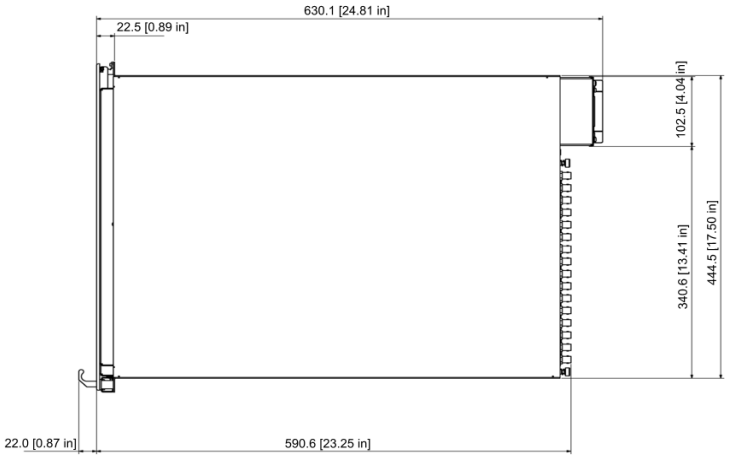


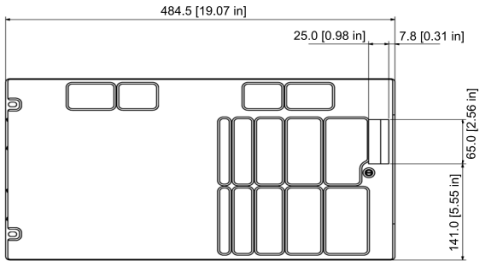


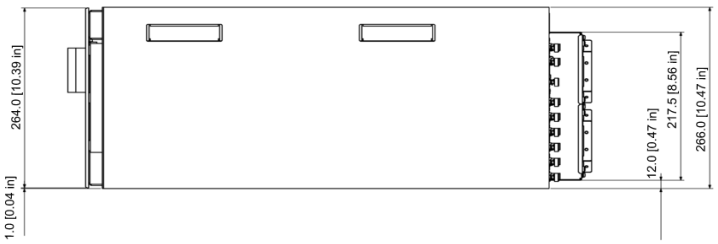
Kahuna 6400 6RU Mainframe Dimensions

6RU Mainframe Dimensions		
Width	19.07 inches	~ 484.5 mm including brackets
Depth	10.47 inches	~ 266 mm
Height	24.81 inches	~ 630.1 mm including connectors, PSU fans and door handle
Weight	88.1 lbs	~ 40 kg
Environmental	41 to 104°F	~ 5 to 40°C non-condensing

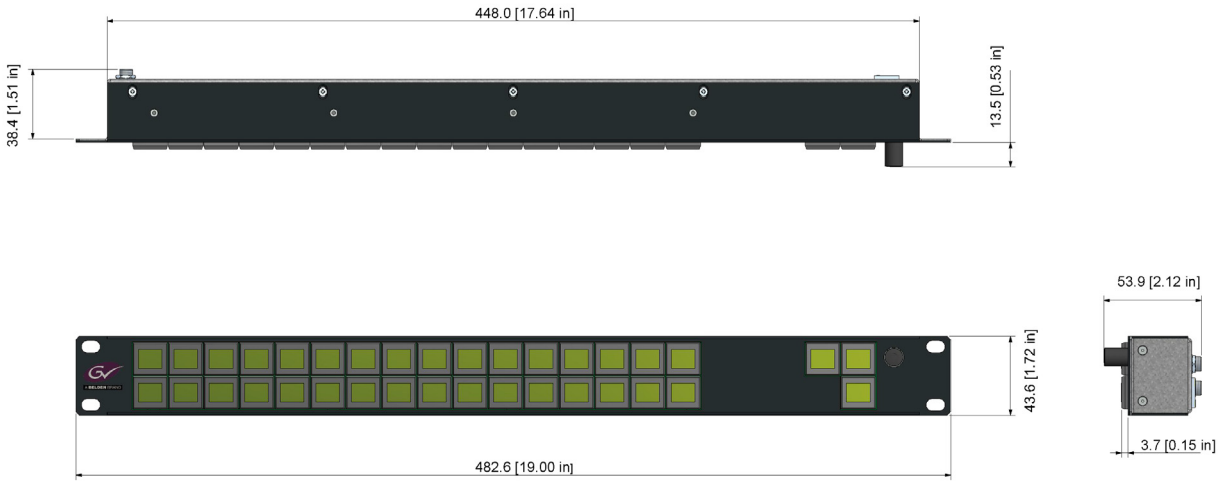








LCD and LED Aux Panel Dimensions



LCD and LED Aux Panel Dimensions		
Width Depth Height	19 inches 1.51 inches 1.72 inches	~ 482.6mm ~ 38.4mm ~ 43.6 mm
Weight	2.2 lbs	~ 1kg
Environmental	41 to 104°F	~ 5 to 40°C non-condensing

Note: The diagram above displays the LCD Aux Panel dimensions. The LED Aux Panel has exactly the same dimensions

8 Specifications

Kahuna Maverik Specifications

MAV-GUI	
Connector	Description
Power Supply	2x PSU Connectors - Kycon KPPX 4 Pin or Compatible 12V DC 8.33A
Video Output	1x Monitor Output
USB	2x USB 2 Connectors
Network	1x 10/100/1000 base T, Auto - MDX/MDXI on RJ45 connectors
Connections to MAV modules	8x RJ45 connectors for Comms and 2x +12V 0.42A power supply Connection to other MAV modules NOT Ethernet, connections must be direct to MAV modules. **Do Not** use network switches or hubs. CAT5 or above cables - crossover cables are **Not** suitable.

MAV Modules	
Power and Comms	Description
MAV-GUI MAV-Trans MAV-8Xpt-Del-OB MAV-8Xpt-Del-FS MAV-8Xpt-OB MAV-8Xpt-FS MAV-8Xpt AUX MAV-DSK MAV-JOY MAV-KEYPAD MAV-UFBPAD MAV-8 Aud Fader	Each MAV has 2x RJ45 connectors (one for Input and one for Output) for Comms and 12V 0.83A in and +12V 0.42A out NOT Ethernet. CAT5 or above cables - crossover cables are **Not** suitable.

Power Supplies	
Power Supply	Description
To the MAV-GUI	2x Fully independent external PSU modules with separate mains power feeds via 2x 10A IEC leads. Output from each PSU = 12V DC 100W via Kycon KPPX 4 Pin or Compatible connectors to the MAV-GUI. 2 supplied as standard per MAV-GUI, One PSU provides Dual Redundancy.

MAV-GUI External Mains Power Supply Requirements	
Voltage	100V - 240V 50/60Hz
Power	Less than 120 Watts (per MAV-GUI)

Kahuna 9600, Kahuna 6400 Mainframe Specifications

Television Standards	
Television Standards	**2.97Gbps Video Standards (1080p)** 1080p 59.94Hz SMPTE-424M/Level A 1080p 59.94Hz SMPTE-424M/Level B 1080p 60Hz SMPTE-424M/Level A 1080p 60Hz SMPTE-424M/Level B 1080p 50Hz SMPTE-424M/Level A 1080p 50Hz SMPTE-424M/Level B **1.485 Gbps HD Video Standards** 1080i 60Hz (ANSI/SMPTE-274M(4) - 292M(D)) 1080i 59.94Hz (ANSI/SMPTE-274M(5) - 292M(E)) 1080i 50Hz (ANSI/SMPTE-274M(6) - 292M(F)) 1035i 60Hz (ANSI/SMPTE-260M - 292M(A)) 1035i 59.94Hz (ANSI/SMPTE-260M - 292M(B)) 1080p 30Hz sF (ANSI/SMPTE - 274M(12) as per RP211) 1080p 29.97Hz sF (ANSI/SMPTE - 274M(13) as per RP211) 1080p 25Hz sF (ANSI/SMPTE - 274M(14) as per RP211) 1080p 24Hz sF (ANSI/SMPTE - 274M(15) as per RP211) 1080p 23.976Hz sF (ANSI/SMPTE - 274M(16) as per RP211) 1080p 30Hz (ANSI/SMPTE-274M(7) - 292M(G)) 1080p 29.97Hz (ANSI/SMPTE-274M(8) - 292M(H)) 1080p 25Hz (ANSI/SMPTE-274M(9) - 292M(I)) 1080p 24Hz (ANSI/SMPTE-274M(10) - 292M(J)) 1080p 23.976Hz (ANSI/SMPTE-274M(11) - 292M(K)) 720p 60Hz(ANSI/SMPTE-296M(1) - 292M(L)) 720p 59.94Hz(ANSI/SMPTE-296M(2) - 292M(M)) 720p 50Hz(ANSI/SMPTE-296M(2) - 292M(M)) **SD Video Standards** 525 60Hz/59.94Hz 4:3/16:9 (ITU-R BT.601-5 ANSI/SMPTE - 259M(2) 625 50Hz 4:3/16:9 (ITU-R BT.601-5ANSI/SMPTE - 259M(2)

Mainframe Internal Processing	
Luma & Key Input/Output Rates	HD – 74.25 MHz or (74.25/1.001)MHz SD – 13.5MHz
Pb & Pr Input/Output Rates	HD – 37.125 MHz or (37.125/1.001)MHz (4:2:2) SD – 6.75MHz
Resolution	12 bits minimum, with Dynamic Rounding™ where appropriate. (Dynamic Rounding™ is licensed from Quantel Ltd.)
Synchronisation	Input synchronisers on all paths. Full frame synchronisation of inputs. Asynchronous sources must be transitioned on and off

Mainframe Output Fins	
Outputs	
11RU Mainframe	64 x 1080p-SDI/HD-SDI/SD-SDI Grouped in 16 off. SD/HD/1080p (270Mbps / 1.485Gbps / 2.97Gbps)
6RU Mainframe	32x 1080p-SDI/HD-SDI/SD-SDI Grouped in 16 off. SD/HD/1080p (270Mbps / 1.485Gbps / 2.97Gbps)
(Optional) FDO Fiber Fin	16 outputs over 3x SFP Cages and 10x HD-SDI BNC's
(Optional) 40GbE IPO40 IP Output Fin	Signals supported over RTP stream per output Fin Module with 2 x 40GbE QSFP Cages. **SMPTE 2022-6** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2042 (VC-2)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 8 x 2.970Gpbs 1080p Format Sources
(Optional) 50GbE IPO50 IP Output Fin	Signals supported over RTP stream per output Fin Module with 2 x 50GbE QSFP Cages. **SMPTE 2110-20** 4x 12Gbps Format Sources (ST2110-20/30/40) **SMPTE 2022-6** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2042 (VC-2)** Outputs - 12 x 1.485Gpbs Format Sources Outputs - 8x 2.970Gpbs 1080p Format Sources

Mainframe Output Fin Formats & Levels	
(Optional) UHDO 12Gbps Output Fin	4x UHD BNCs SMPTE ST 2082-10 4x SFP + complaint cages 11.88Gbps Video Standards (UHD)
SDI Output Format	Tri Standard 3Gbps-SDI/HD-SDI/SD-SDI Grouped in 16 off. SD/HD/1080p (270Mbps / 1.485Gbps / 2.97Gbps)
Analogue Sync	±300mV tri-level HD sync or 300mV SD sync according to system standard
Output Impedance:	75 ohms
FDO Fiber Fin Module Requirements	Output Fiber Optic SFP Module - Single Mode Dual Tx Module (1310nM) ***Wavelength*** = 1310nM (+/- 30nM) ***Power*** = -2dBm typical, -5dBm min, 0dBm max ***Note:*** All single mode TX modules are Class 1 laser products. They comply with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. Output Coax SFP Module - Dual Tx Coax, Mini BNC Module
40GbE IPO40 (IP Output)	Signals supported over RTP stream per output Fin Module with 2 x 40GbE QSFP Cages. SFP + Optical 2 x 40G Ethernet Conforms to IEEE 802.3ba – 40Gigabit over fiber. SFP + connected Cable 2 x 40Gigabit Ethernet over twin axial cables
50GbE IPO50 (IP Output)	Signals supported over RTP stream per output Fin Module with 2 x 50GbE QSFP Cages. SFP + Optical 2 x 50G Ethernet Conforms to IEEE 802.3ba – 50Gigabit over fiber. SFP + connected Cable 2 x 50Gigabit Ethernet over twin axial cables
UHDO 12Gbps Output Fin	11.88Gbps Video Standards (UHD) 3840 x 2160p 50Hz, 3840 x 2160p 59.94Hz, 3840 x 2160p 60Hz, 11.88Gbps Video Signals (UHD) >= 70m of Belden 1694A cable

Mainframe Network Fin (per Fin)	
Network	8 ports 10/100/1000 base T, Auto – MDX/MDXI on RJ45 connector.
Serial Control	12 x RS-422 on 9-way D-type.
USB	2x USB2 - for external memory device or hard drive
eSATA	1x eSATA - for external hard drives

Mainframe Reference Fin (per Fin)	
Sync Output	2x Tri-Level depending on output standard
Reference Inputs Mainframe	On-line Switchable between analogue 3Gbps, HD Tri-level Sync and analogue SD sync 2 x BNC loop-through.
GPO (Tally) outputs Mainframe	1 x 25 Way D-type GPO Tally on each Input Fin with isolated contact closures.
GPI inputs Mainframe	48 TTL-level/contact-closure inputs on 2 x 25-way D-types

Mainframe Input Fins	
Number of Video Inputs	
11RU Mainframe	120 x Tri standard, SD-SDI/HD-SDI/3Gbps-SDI (depending on options) each on 1x BNC
6RU Mainframe	60 x Tri standard, SD-SDI/HD-SDI/3Gbps-SDI (depending on options) each on 1x BNC (If all Input Fins are fitted) 12x Inputs over 6x SFP Cages
(Optional) 40GbE IPI IP Input Fin	Signals supported over RTP stream per input Fin Module. 2 x 40GbE QSFP Cages. **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 8 x 2.970Gpbs 1080p Format Sources
(Optional) 50GbE IPI50 Input Fin	Signals supported over RTP stream per input Fin Module. 2 x 50GbE QSFP Cages. **SMPTE 2110-20** 3x 12Gbps Format Sources (ST2110-20/30/40) **SMPTE 2022-6** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **VSF TR-03 (SMPTE 2110)** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2022-7** 12 x 1.485Gpbs Format Sources 12 x 2.970Gpbs 1080p Format Sources **SMPTE 2042 (VC-2)** 12 x 1.485Gpbs Format Sources 8 x 2.970Gpbs 1080p Format Sources

Mainframe Input Fin Formats & Levels	
(Optional) UHDI 12Gbps Input Fin	3x UHD BNCs SMPTE ST 2082-10 3x SFP + complaint cages 11.88Gbps Video Standards (UHD)
GPO (Tally) outputs Mainframe	1 x 25 Way D-type GPO Tally on each Input Fin with isolated contact closures. (10 x 25 Way D-type GPO Tally connectors if all Input Fins are fitted)
SDI Input Format	Tri Standard 1080p 2.97Gbps/HD 1.485 Gbits/second and SD 270Mbits/second serial digital interface as per ANSI/SMPTE-259/292M
Analogue HD Reference	±300mV tri-level sync ±6dB
Analogue SD Reference	300mV sync with optional 300mV pk-pk burst ±6dB
Impedance:	75 ohms (except reference input).
FDI Fiber Fin Module Requirements	Input Fiber Optic SFP Module - Single Mode Dual Rx Module (wideband 1260nM - 1620nM) ***Receiver(s)*** = PIN + TIA ***Wavelength*** = 1260nM - 1620nM ***Sensitivity*** = -25dBm typical, -21dBm max Input Coax SFP Module - Dual Rx Coax, Mini BNC Module
40GbE IPI40 (IP Input)	Signals supported over RTP stream per input Fin Module. 2 x 40GbE QSFP Cages. SFP + Optical 2 x 40G Ethernet Conforms to IEEE 802.3ba – 40Gigabit over fiber. SFP + connected Cable 2 x 40Gigabit Ethernet over twin axial cables.
50GbE IPI50 (IP Input)	Signals supported over RTP stream per input Fin Module. 2 x 50GbE QSFP Cages. SFP + Optical 2 x 50G Ethernet Conforms to IEEE 802.3ba – 50Gigabit over fiber. SFP + connected Cable 2 x 50Gigabit Ethernet over twin axial cables.
UHDI 12Gbps Input Fin	11.88Gbps Video Standards (UHD) 3840 x 2160p 50Hz, 3840 x 2160p 59.94Hz, 3840 x 2160p 60Hz, 11.88Gbps Video Signals (UHD) >= 70m of Belden 1694A cable

Mainframe Power Supplies	
Mainframes	
11RU Mainframe	Two fully independent hot-swappable PSU modules, with separate mains power feeds via 2 x 16A IEC-C20 socket. Dual Redundant requires two more fully independent PSU modules; with separate mains power feeds via 2 x 16A IEC socket.
6RU Mainframe	Two fully independent hot-swappable PSU modules, with separate mains power feeds via 2 x 16A IEC-C20 socket. Redundancy provided by the second PSU.

Mav Remote Specifications

Mav Remote	
Connector	Description
Video Output	1x Monitor Output
USB	2x USB 2 Connectors
Network	2x 10/100/1000 base T, Auto - MDX/MDXI on RJ45 connectors
Connections to MAV modules	8x RJ45 connectors for Comms and 2x +12V 0.42A power supply Connection to other MAV modules These are **NOT** Ethernet, connections must be direct to MAV modules. **Do Not** use network switches or hubs. CAT5 or above cables - crossover cables are **Not** suitable.

Mav Remote Power Supplies	
Power Supply	Description
To the Mav Remote	2x Fully independent external PSU modules with separate mains power feeds via 2x 10A IEC leads. Output from each PSU = 12V DC 100W via Kycon KPPX 4 Pin or Compatible connectors to the Mav Remote. 2 supplied as standard per Mav Remote, One PSU provides Dual Redundancy.

Mav Remote External Mains Power Supply Requirements	
Voltage	100V - 240V 50/60Hz
Power	Less than 100Watts (per MAV-GU Remote)

Contact Us

Grass Valley Technical Support

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

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

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

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