



grass valley

A **BELDEN** BRAND

# **KULA**

PRODUCTION SWITCHER

## **User Manual**

Issue 4 Rev 4

2019-06-25

[www.grassvalley.com](http://www.grassvalley.com)

## Related Products

This User Manual covers:

- Kula IP Mainframe and System Menus
- Kula SDI Mainframe and System Menus
- Kula 12G-SDI Mainframe and System Menus

## 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/](http://www.grassvalley.com/patents/)

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Title	<b>Kula User Manual</b>
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## 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.



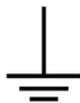
Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.



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](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.



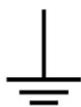
Avertit l'utilisateur, l'opérateur ou le technicien de maintenance que des instructions importantes relatives à l'utilisation et à l'entretien se trouvent dans la documentation accompagnant l'équipement.



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 nettoyeurs liquides ou en aérosol. Utilisez uniquement un chiffon humide.
- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.
- Avant de procéder à toute opération d'entretien ou de dépannage, enlevez tous vos bijoux (notamment vos bagues, votre montre et autres objets métalliques).
- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués sur l'équipement ou dans la documentation qui l'accompagne.
- Ne pas utiliser cet appareil dans une atmosphère explosive.
- Présence possible de courants de fuite. Un raccordement à la masse est indispensable avant la mise sous tension.
- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

## Mises en garde



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

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.
- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.
- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.
- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.
- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire.

Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.

- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.
- 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](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](http://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](mailto: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 (1 mW) 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.

## 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.



## Safety and EMC Standards

This equipment complies with the following standards:

### Safety Standards



#### Information Technology Equipment - Safety Part 1

##### **EN60950-1: 2006**

Safety of Information Technology Equipment Including Electrical Business Equipment.

##### **UL1419 (4<sup>th</sup> 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.

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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.

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## 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  $\Omega$  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.



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### **Contact Us .....435**



# 1

## Product Overview

Thank you for purchasing your new Kula™ Production Switcher. This User Manual relates to the operational side of the Kula system and will describe in detail how to use the Control Surface and the touch screen or mouse driven Graphical User Interface (known as the GUI). Please see the Kula Installation Manual for information about the connectivity of the Mainframe and any Ancillary Panels. This manual covers Kula, Kula 12G-SDI and Kula IP switchers.

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Note: Diagrams are for illustration purposes only

---



**3M/E 24 Xpt** Comprised of:  
1x K1X control surface  
1x K1X control surface  
1x KPX control surface



**2M/E 24 Xpt** Comprised of:  
1x K1X control surface  
1x KPX control surface



**2M/E 16 Xpt** Comprised of:  
1x K1P control surface  
1x KPP control surface



**1M/E (19") K5P** Control Surface

### Kula Mainframe



## Overview

The Kula Production Switcher is brand new addition to the Grass Valley Family of Video Production Switchers.

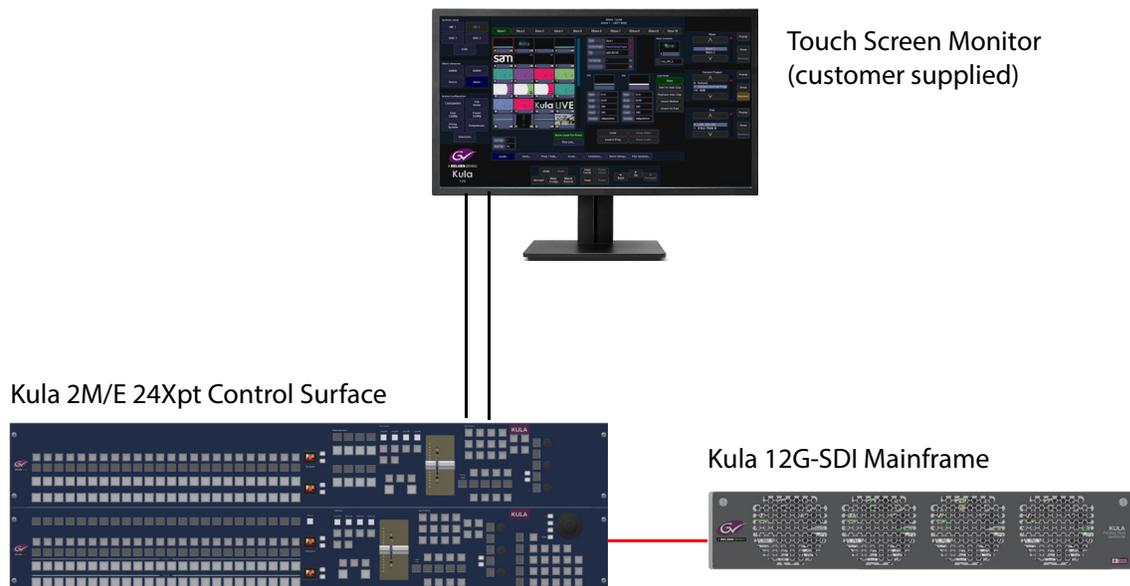
Kula offers a cost effective, flexible production switcher with a vast amount of features to meet today's budgets. The core design allows for a powerful HD/1080p/UHD production and mix in these formats. The Kula switcher is a simple self contained Mainframe and intuitive control surface that can be taken anywhere.

Kula has up to 3 full Mix Effects, each mix effect has A/B Backgrounds, 5 Keyers which include:

- 4 Full Effects Keyers with Lin/Luma
- 2 assignable DVE Engines (will give 4 independent boxes)
- Chroma Key assignable to all Keys (not DSKs)
- Transition Keyer with dedicated ClipStores for Key & Fill
- Mask Generator per Keyer
- Separate Wipe Generator
- Matte Generator
- 2 Util Buses per M/E.

The system also includes 2 Sub M/Es (SMEs) background with 2 Keyers, which can be used on any output or combined with a different M/E for more keying power.

## Example of a Kula System



## Kula Mainframe Introduction and Functionality

### Kula Mainframes:

- A Kula 2RU SDI mainframes can work in HD, SD, single link 1080p or UHD. The 2M/E mainframe has up to 36x Inputs, 12x fully assignable Outputs and 6x Bi-directional Input/Outputs.
- The Kula 12G-SDI 2RU mainframe has up to 40x Inputs (which includes 10x 12Gbps "silver" inputs), 12x fully assignable Outputs (which includes 3x 12Gbps "silver" outputs) and 2x Bi-directional Input/Outputs.
- The Kula IP (2M/E) mainframe has up to 36 inputs and 12 outputs over 2x 50GbE QSFPs. with a further 6x SDI inputs (inputs 37 to 42), and 2x Bi-direction Input/Outputs.

### Features Include:

- Large Internal ClipStore with 10 outputs holding 1 minute of uncompressed HD Video and audio content that is totally routable.
- 4 x Floating Resizing Down Stream Keyers / Mixing Aux outputs without using M/E or Sub M/E's
- Fully flexible internal Multiviewer with 1 to 4 Heads and up to 16 Tiles (multiviewer 1). M/E2 can be re-allocated to become multiviewer 2 with 1 to 4 heads and 12 tiles.
- External Control and connectivity consists of:
  - 66 x GPI/O's (on 3x 25 Way D-type connectors)
  - 2 x RJ45 RS422 Ports
  - 3 x Ethernet ports for Control Panel and TCP/IP protocols
  - 2 x USB 3.0 Ports for User/Clip/System files Import, Export and Back up

Kula has 2 power supplies giving dual redundant capability.

All video input and output connections and timing signals are to the mainframe.

As well as the configuration set-up the actual operation set-up of the panel can be Stored. This includes the selected transition, the Key sources, the still Store contents settings. All these settings are accessed via menus on the GUI and will be explained later in this manual.

### Kula System Components:

- 1 **Switcher Mainframe:** (2RU rack height) in 2M/E (configurable to 3M/E) or 1 M/E configurations
- 2 **Control Surfaces:** (depending on the system purchased) 3M/E Control Surface, 2M/E Control Surface or 1M/E Control Surface and 1M/E (19") Control Surface
- 3 **External Power Supplies:** 2 x PSU for the Control Surface
- 4 **Cables:** For each system purchased, there are 16x RJ45 Comms cables supplied:
  - 4x 0.5 meters ~ 1 foot 7.68 inches

---

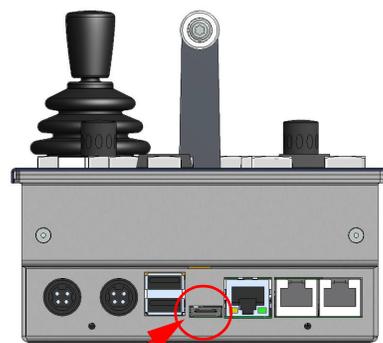
Note: Installation and User Manuals are supplied regardless of system components purchased.

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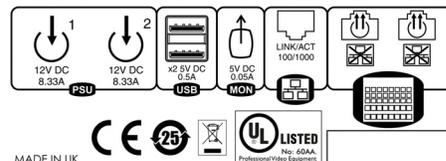
## Connecting the Touch Screen GUI to the Control Surface

Connecting a monitor to the control surface is done via a monitor cable being connected to the monitor port near the USB ports (as shown below). You can connect a touch screen or normal display monitor.

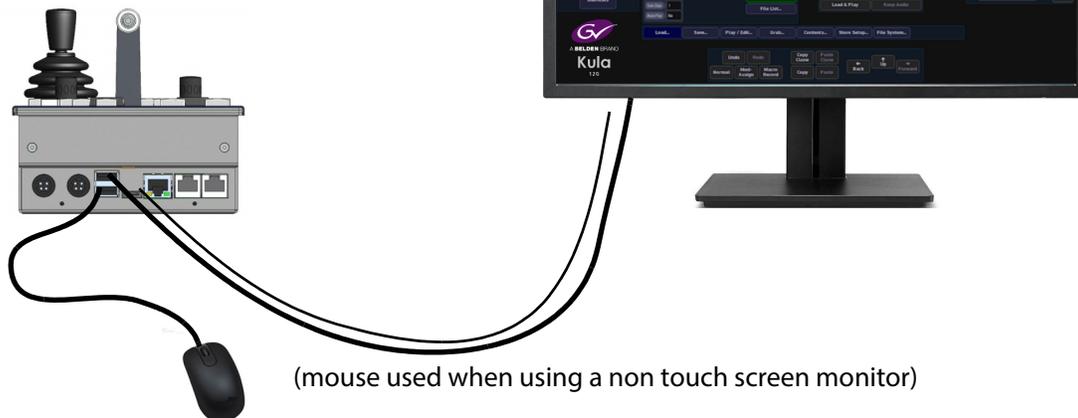
The external monitor must have a 1920 x 1080 display resolution and it is recommended that the monitor be larger than 21 inches.



Monitor Port



MADE IN UK  
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  
Snell Advanced Media, Turnpike Road, Newbury, Berkshire, RG14 2NX, UK.



(mouse used when using a non touch screen monitor)

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

**Non- touch screen monitor** - once the external monitor is connected to the Kula control surface, a USB mouse (shown above) is used to control the Kula menus on the monitor screen.

**Current Compatible Touch Screen Monitors:**

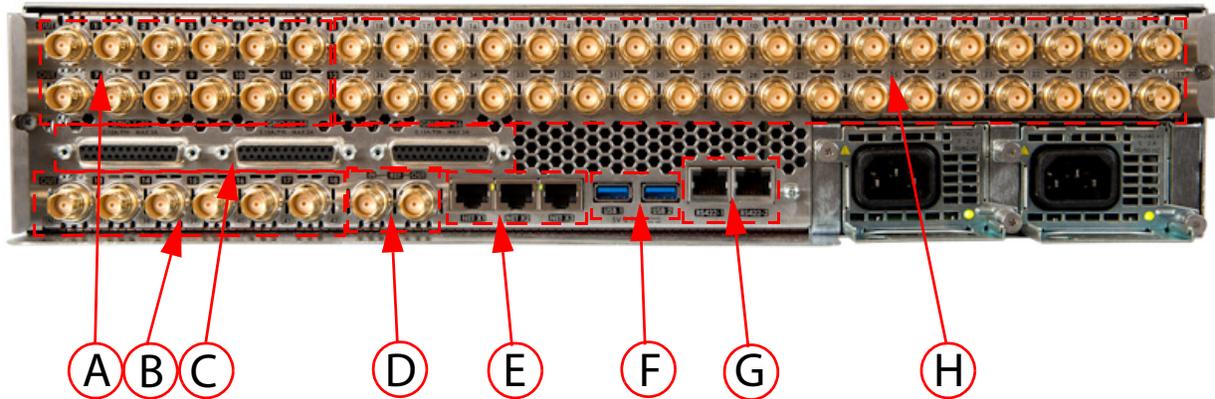
- iiyama T2250-MTS
- iiyama T2236-MSC B1 and B2
- iiyama T2252-MTS
- GeChic On-Lap 1502
- ELO\_1002L\_1502L
- ELO-2002L



# Kula Mainframe Rear Connections



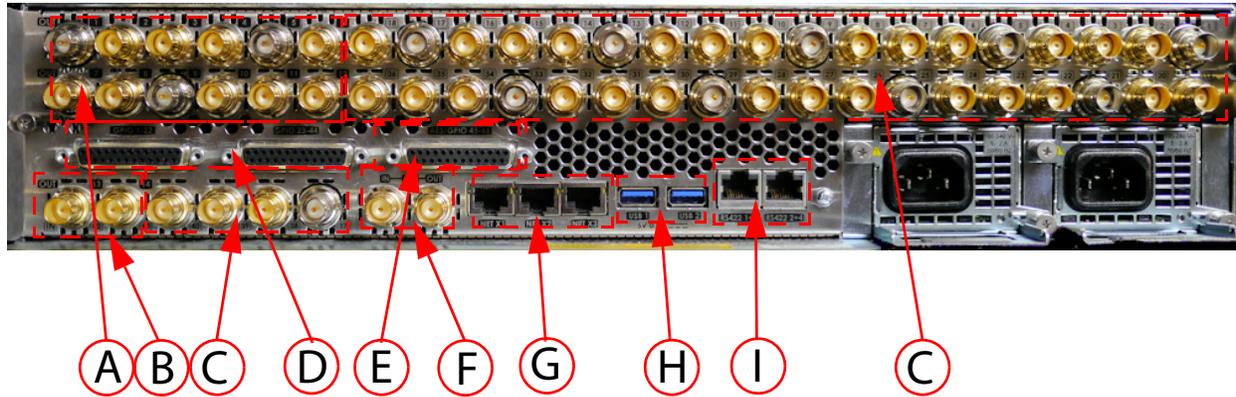
## Mainframe Connections



**Mainframe Connections**

Connectors	Description	Connector Information
<b>A</b>	Output BNCs	12x SDO BNC Outputs total (numbered BNC 1 to 12) (6x SDO BNC Outputs on the 1M/E mainframe)
<b>B</b>	Input/Output Bi-directional BNCs	6x SDI/SDO BNC (numbered 13 to 18 if they are Outputs, and 37 to 42 if they are Inputs)
<b>C</b>	GPIO	3x 25 Way D-type GPIO connectors (1 - 22, 23 - 44, 24 - 46)
<b>D</b>	Reference	1x Ref In and 1x Ref Out
<b>E</b>	Network	3x 10/100/1000 base T
<b>F</b>	USB	2x USB3 - for external memory device or hard drives
<b>G</b>	Serial	2x RJ45, RS422 Ethernet Ports
<b>H</b>	Inputs	36x SDI BNC (numbered BNC 1 to 36) (18x SDI BNC Inputs on the 1M/E mainframe)

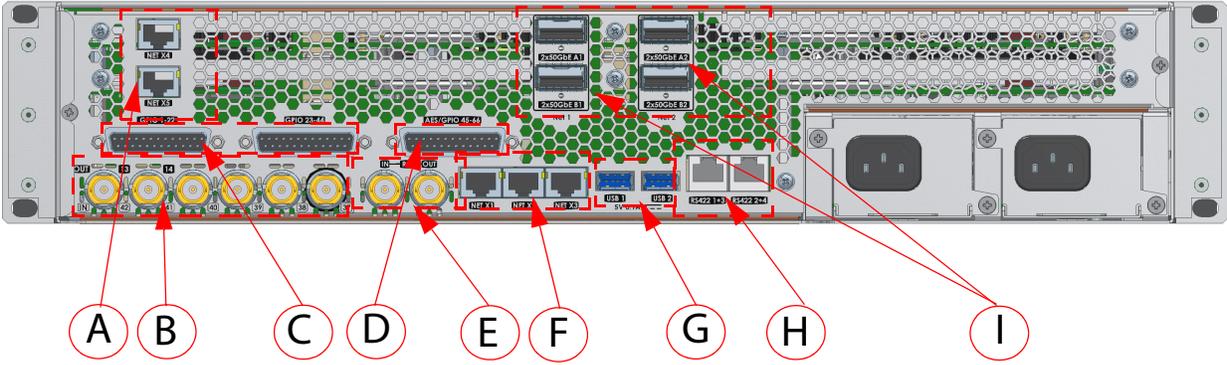
## 12G-SDI Mainframe Rear Connections



**12G-SDI Mainframe Connections**

Connectors	Description	Connector Information
<b>A</b>	Output BNCs	12x HD/SD/1080p (270Mbps / 1.485Gbps / 2.97Gbps) Outputs. Serial digital interface As REC601/ SMPTE/292M / SMPTE424M via BNC connectors. Including 3 x 12G-SDI (SMPTE 2082) single link BNC connectors (silver BNCs)
<b>B</b>	Input/Output Bi-directional BNCs	2x SD/HD/1080p SDI/SDO BNCs
<b>C</b>	Input BNCs	40 x HD/SD/1080p (270Mbps / 1.485Gbps / 2.97Gbps) Inputs. Serial digital interface As REC601/ SMPTE/292M / SMPTE424M via BNC connectors. Including 10 x 12G-SDI (SMPTE 2082) single link BNC connectors (silver BNCs)
<b>D</b>	GPIO 1 to 44	GPI Tally/GPO Outputs Assignable GPI / GPO Isolated contact closures via 2 x 25 way D Type. Assignable as GPI or GPO
<b>E</b>	AES/GPIO 45 to 66	AES/GPI Tally/GPO Outputs Assignable GPI / GPO Isolated contact closures via 1x 25 way D Type. Assignable as GPI or GPO.
<b>F</b>	Reference	1x Ref In and 1x Ref out
<b>G</b>	Network	3x 10/100/1000 base T
<b>H</b>	USB	2x USB3 - for external memory device or hard drives
<b>I</b>	Serial	2X RJ45, 4 x RS422 serial ports

## IP Mainframe Rear Connectors



### IP Mainframe Connectors

Connectors	Description	Connector Information
<b>A</b>	Network ( <b>NOT</b> for connection to Control Surface or LAN/WAN networks)	NET X4 and NET X5 are used for direct connection from a laptop or PC for software updates to the IP Fins via RollCall.
<b>B</b>	Input BNCs For inputs 37 to 42	6x HD/1080p (1.485Gbps / 2.97Gbps) Inputs. Serial digital interface As REC601/ SMPTE/292M / SMPTE424M via BNC connectors.
<b>C</b>	GPIO 1 to 44	GPI Tally/GPO Outputs Assignable GPI / GPO Isolated contact closures via 2 x 25 way D Type. Assignable as GPI or GPO.
<b>D</b>	AES/GPIO 45 to 66	AES/GPI Tally/GPO Outputs Assignable GPI / GPO Isolated contact closures via 1x 25 way D Type. Assignable as GPI or GPO.
<b>E</b>	Reference	1x Ref In and 1x Ref out
<b>F</b>	Network	3x 10/100/1000 base T
<b>G</b>	USB	2x USB3 - for external memory device or hard drives
<b>H</b>	Serial	2X RJ45, 4 x RS422 serial ports
<b>I</b>	IP Inputs and Outputs (secondary Inputs/Outputs are for redundancy)	<b>A1</b> (primary) 50GbE for Inputs 1 to 18 and Outputs 1 to 6 <b>B1</b> (primary) 50GbE for Inputs 19 to 36 and Outputs 7 to 12 <b>A2</b> (secondary) 50GbE for Inputs 1 to 18 and Outputs 1 to 6 <b>B2</b> (secondary) 50GbE for Inputs 19 to 36 and Outputs 7 to 12



# 3 Menu Operation

## Menu Overview

Configuration and setup of a Kula system is driven using the intuitive menu system on the touch screen or mouse pointer driven Graphical User Interface (GUI). The type of GUI monitor used is a customer selected option, but the menu structures will be identical.

The menu structures are clear and allow the user to quickly move from menu to menu when setting up or using a Kula production switcher.

Setup, Effects and System Configuration menu selection is done using the buttons down the left side of the menu. Parameter controllers are on the right side of the menu and consist of on-screen rotary controls and sliders (these can be attached to the physical rotary controls and joystick on the control surface). Navigation, Copy & Paste, Undo/Redo, Macro Record and Modulation Assign buttons are situated at the bottom.

All the menu functions, options and parameters are displayed in the center area of the menu.



- 1 Menu Selection Buttons
- 2 Selected menu functions and options
- 3 On-screen Rotary and Slider Controls and Integer Buttons
- 4 Menu Navigation and Control

## Menu Selection Buttons

The information below highlights the function of each button.

### Switcher Setup:

These buttons allow the user to enter the main user setup menus for the M/Es, SMEs and DSKs.

For the M/Es and SMEs, the menus allow the user to access the Transition, Keyer, MAV Trans and Util bus setup and control menus.

DSK menu is for DSK setup and control

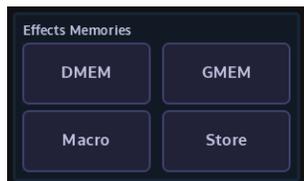


### Effects Memories:

The DMEM and GMEM menus allow the user to quickly select and load effects memory files.

The Macro button enters the main macro setup menu.

The Store button enters the main Store setup menu.



**System Configuration:**

As the name suggests, these are the main system configuration menus. Here the user is able to setup Crosspoints, M/E Outputs, Aux setup, Button Maps, Control Surface and GUI Preferences, GPOs, Store Setup etc.

The Filing System button enters a menu where the filing system information for all Projects, GMEMs, DMEMs, Config files, Snapshots etc. are kept. It contains the Import/Export of files menu where Projects, Stills, Clips and individual files are imported and exported, the menu also contains the Backup, ReStore and Media Management menus.

The Shortcuts menus displays an on-screen number pad for saving and loading GMEMs and DMEMs and an on-screen Transition Control menu.

+++



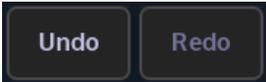
**Normal** - a press and release of this button normalizes all the adjustable values in the current selected menu.

**Mod Assign** - assigns a modulation effect to a chosen parameter.

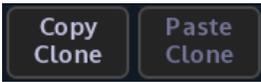
**Macro Record** - will record any button press sequences in "Real Time" to the macro function, which can then be setup within the Macro menus.



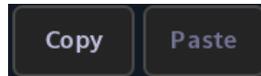
**Undo/Redo** - incrementally undo or redo.



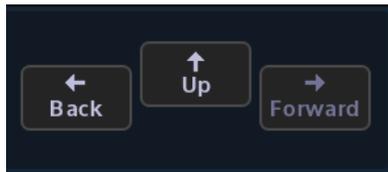
**Copy Clone/Paste Clone** - the Copy Clone and Paste Clone buttons are used to copy button functions from either the Kula menus or from the control surface and allows the user to setup a system to their own operational preference.



**Copy & Paste** - the Copy & Paste function enables the user to quickly and simply transfer values from one parameter to another. This function can be used to record and transfer one or two co-ordinates or even the detail of a whole M/E.



**Back/Up/Forward** - the menu navigation buttons will step through menus in the direction selected. Back will go back to a previously visited menu or menus. Up will either come out of a menu structure to the "Connected" menu or go to the top menu in a menu structure.



**Direct Jump Button** - The direct menu jump facilitates direct access to almost any menu. The implementation is slightly different between the large touch screen GUI and the Kula control surface GUI.



At a basic level (on the Kula control surface GUI), the only level), you can discover/learn the unique numeric menu code (like a phone number) of any menu by navigating to it in the normal way. Once there, the menu number can be seen in one of two places, depending on the GUI in use. For the large touch screen GUI, it is shown on the **{Menu Jump}** button under the 'UP' button. On the Kula control surface GUI, it is shown on the numeric keypad, accessed by touching the "Star" pop-up button.

In order to direct-jump to a menu, all you need to do is to bring up the pop-up keypad, type the number and touch the **{Enter}** button. The details are slightly different, depending on the GUI:

- On the Kula control surface GUI, touch the "Star" button to show the 'Star pop-up'. Use the "Direct Menu Jump" keypad to enter the menu number. The number is shown on the "Enter" button at the top of the keypad. Touch the green "enter" button to jump to the menu. This works for pop-up menus as well. Corrections can be made during number entry by using the "backspace" button. If the entered number does not match any menu, no jump will occur, and the Star pop-up menu will stay open. The "enter" button (still showing the entered number) will go

**red** to indicate the problem. This can be corrected by backspacing, or by just entering a new number afresh (this replaces the previous number).

- On the large touch screen GUI menu, Touch the '**menu number**' button (the one labeled "Menu Jump" or with "Menu" followed by a number - just below the 'UP' button). This shows the 'Direct Menu Jump' pop-up. From the keypad in the center of the pop-up you can type the number for the required menu, and press enter to do the jump. Error handling is very similar, except the enter button flashes just briefly red to indicate a problem.

Jumps will always occur on the GUI they are requested on. There is a strong correlation of menu numbers between the GUIs, though due to menu differences not all numbers are available on both.

The large touch screen GUI menu, has two additional features:

- A 'scrolling' history is shown on the left of the pop-up. Any of the previous ten menus can be jumped to by pressing one of the buttons on the left. Note that a jump to a menu in this recent history will move that entry back to the top of the list, rather than add another instance of it.
- Also available is a '**Favorites**' menu system. This works like the preset buttons on your car FM radio. To use - once you're in a menu that you want to save as a '**Favorite**' - open the 'Direct Menu Jump' pop-up and press and hold one of ten buttons on the right (underneath the 'Favorites' label). After about 2 seconds, the title of the menu will appear in that button. Use is the same as the history buttons. Overwriting favorites is possible. Currently it is not possible to remove favorites.

They are saved in the Panel Config file.

**Disable Tracking** - This is a one button press to disable all the tracking elements set in the "Panel Config-Preferences - Tracking Preferences" menu. When selected, Menu Tracking, Store Tracking, Layout Tracking, Mixer & Bus Tracking, Xpt Button Tracking and Crosspoint Tracking are all disabled.

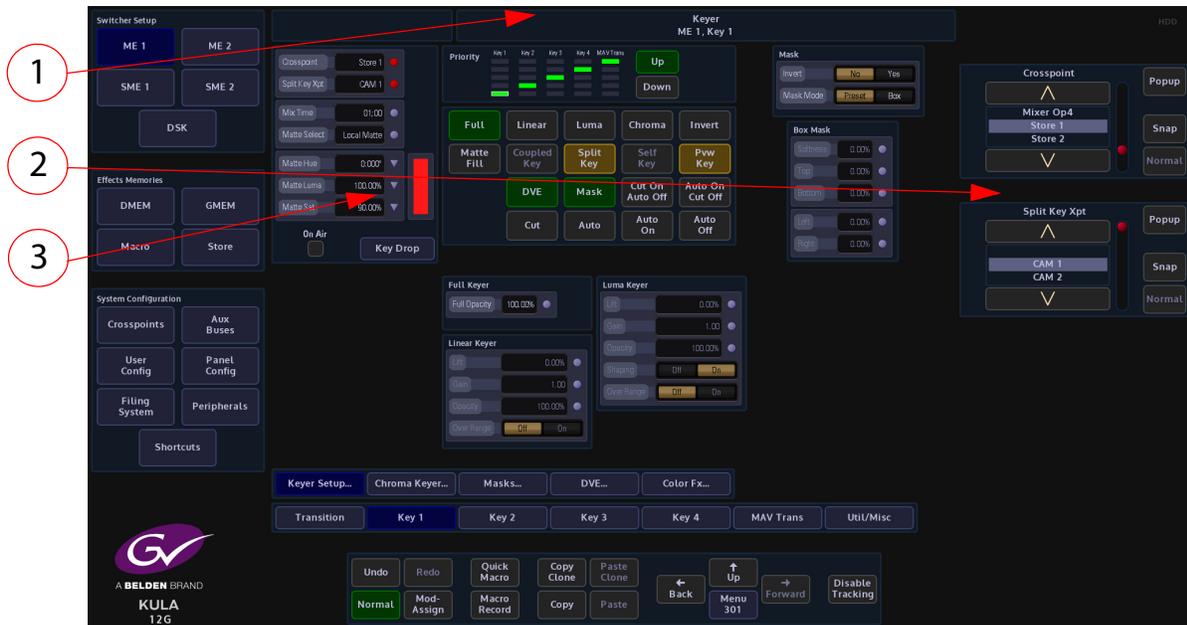


Disable Tracking On



Disable Tracking Off

## Using the GUI Menus



- 1 Title Bar
- 2 On-screen Rotary and Slider Controls and Integer Buttons
- 3 Attachers with Parameters

### Title Bar

All menus have a title bar situated at the top of the menu, the title bar Shows the full title of the current menu. A second line in the title bar will indicate the mainframe the system is connected to, or that it is controlling a particular M/E, SME, Background or Key.

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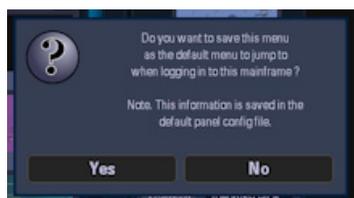
Note: Touching the Title Bar at the top of the page will allow the user to return to the menu page's original state, as would be the case if leaving the menu and then re-entered it. Adjustments to attacher parameters remain unchanged; it just acts as a shortcut to the original combination of attacher boxes.

---

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Note: Touching and holding the title bar will display a dialog box asking if the user wishes to save the menu as the default logging in menu.

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## On Screen Control

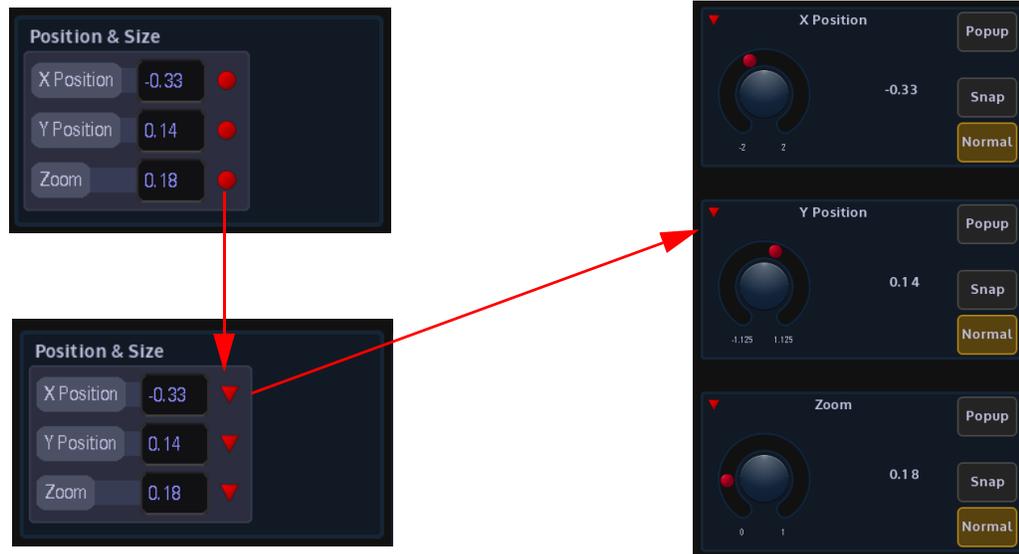
On the right hand side of the menu are the rotary and slider controls, these are linked to parameters within a selected attacher. The parameters can be adjusted using the on-screen rotary/slider controls, the physical rotary controls on the control surface, or the joystick on the control surface. If the parameter control is a Red triangle, this indicates that the adjustment can be made using the Joystick.

When active the parameter indicators will turn RED as shown below:

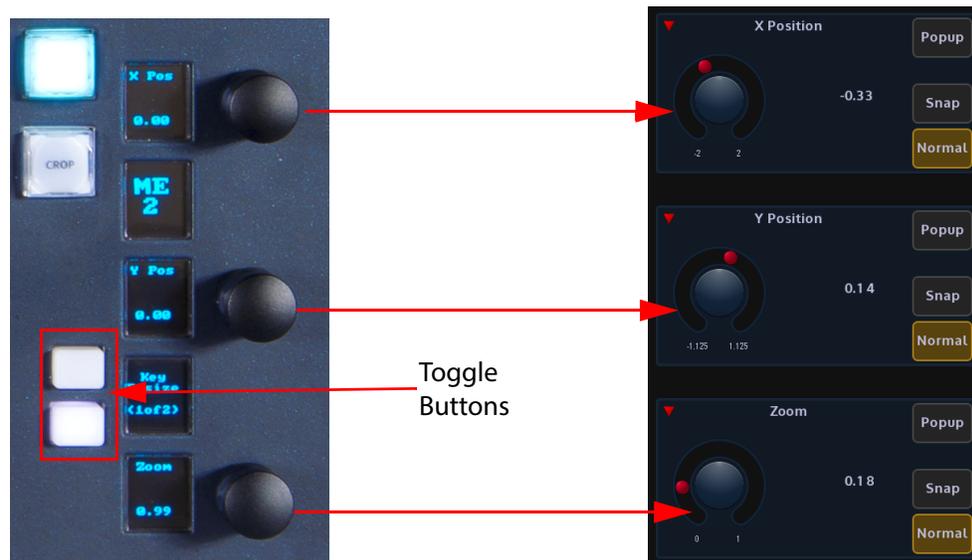


### Controlling Parameters using a Joystick or Rotary Controls

The diagram below displays an example of an attacher with parameters that can be controlled using the joystick. The controls changes from round to a triangle, showing that a joystick can be used.



The rotary controls on the Kula controls surface can also be used to control parameters, not only rotary parameters but scrolling list parameters and slider controlled parameters.



To attach the physical rotary controls to parameters in a menu, press the 2 toggle buttons next to the rotary controls at the same time, notice that the parameter control information is displayed in the mnemonic displays next to the rotary controls. As the controls are turned the parameters will also adjust in the menu.

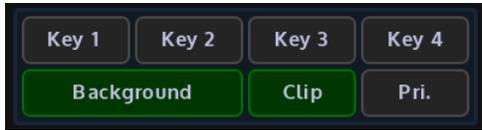
## Other Menu Functions

### Menu Link Buttons



Menu Link buttons allow the user to enter a sub-menu, mainly shown at the bottom of menu's.

### Action Buttons



When pressed the Action buttons apply the selected action to a menu. The buttons go Green when active.

### Pop-up List Selector & Snap/Norm Buttons



**Popup** - Touching this button will display an “options dialog box”. This allows the user quick access to all options available in the selected parameter, without having to use the rotary control to scroll through all the options.

**Snap & Normal** - The Snap button when pressed will jump a parameter to an incremental value.

The Normal button has two states, when it is illuminated Green this indicates that the currently selected parameter is in its default state. When the rotary control is turned, the button will turn Orange, denoting that the currently selected parameter's value has been changed, Press the button and the parameter will revert back to its original default state, the button will once again turn Green.

## Time and Timecode Adjustments

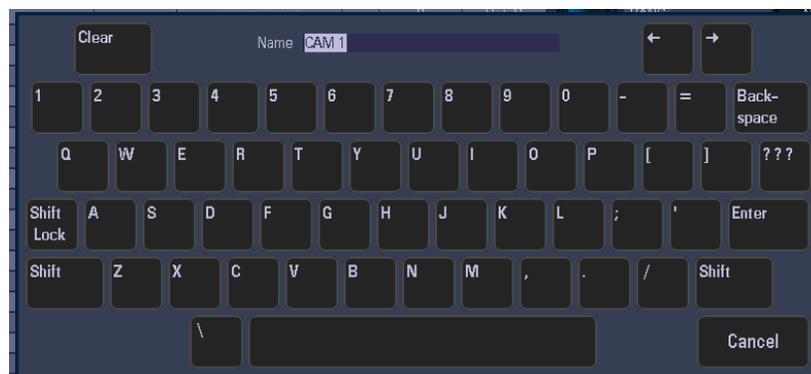


It is worth mentioning that some menus described in this manual will have the option of adjusting the duration of Hours, Minutes, Seconds and Hundredths, as shown in the diagram the adjustment can be made using either the parameter controls or using the numeric keypad (by touching the popup button).

This Example: - Transition Time: 01:03

This Shows the duration as, 01(second):3 (frames)

## On-Screen QWERTY Keyboard



Some menus have name attachers, touching the red oblong twice will display an on-screen QWERTY keyboard that can be used to enter text.

Enter the chosen name (text entry is displayed at the top of the keyboard dialog box), then press "Enter". To return to the original menu screen if no changes are made to a parameter, press the "Cancel" button on the keyboard.

Text can also be typed into name attachers using a USB keyboard connected to the mainframe.

# Control Surface Overview

## Control Surface Overview

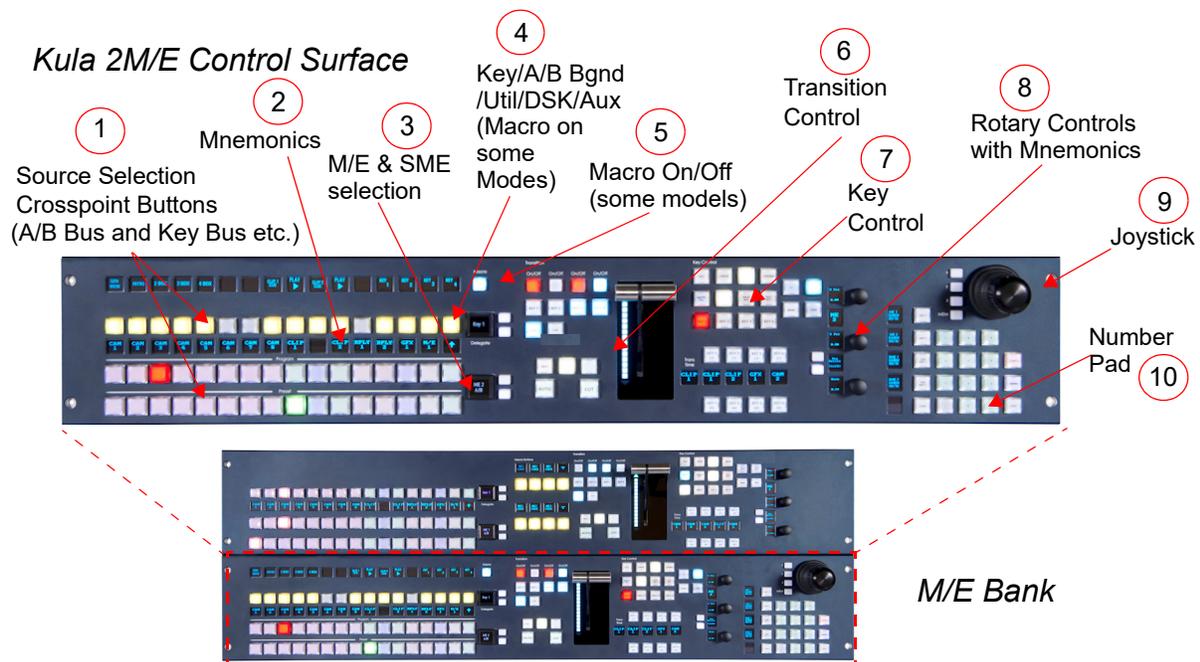
Note: This section of the manual is an overview of the control surface, further details related to button interaction and functionality will be explained with the more advanced functions of Kula. Control Surface button layouts will vary depending on the type of control surface purchased.

### The Control Surface

Kula Control Surfaces all have a similar look and feel throughout the range, the layout is best explained by breaking down the control surface into sections, once one Mix Effect (M/E) bank has been explained the information can be applied to other control surfaces.

The example diagram above is of the larger 2M/E Control Surface, this example is shown because it has all the possible combinations of button layouts available on a current control surface.

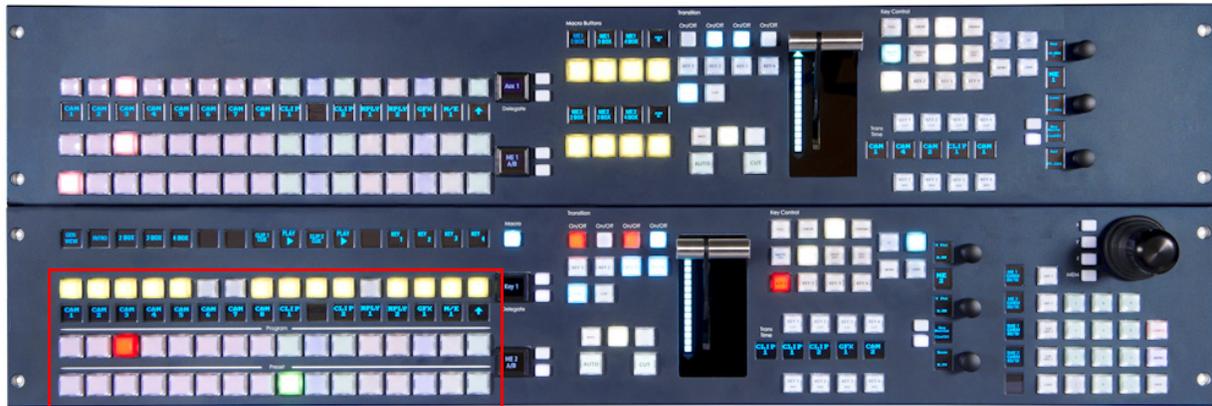
Moving around the control surface in the diagram above, each numbered item will be explained in this section of the manual.



## Source Selection Crosspoint Buttons and Colored Mnemonics

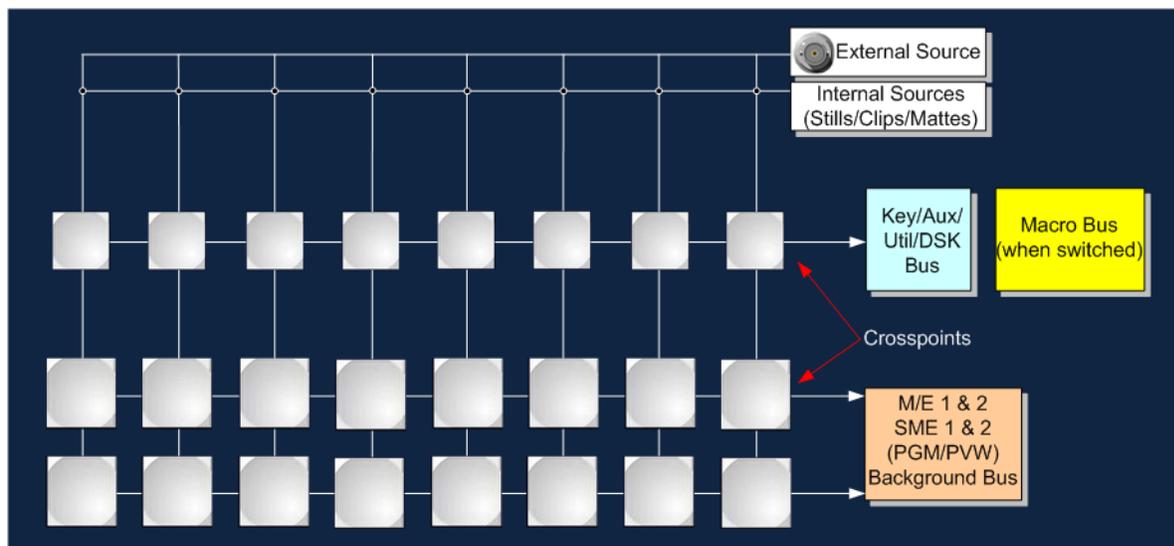
Kula Control Surfaces have the option of 1, 2 or 3 banks of M/E source selection buttons and each M/E has the same number of crosspoint selection buttons (16 or 24 depending on model purchased). With the exception of some features such as Macro selection, Joystick and Number pad each M/E will work in the same way, an example is shown below.

*Example of M/E Source Selection Buttons*



There are three rows of source selection buttons, the lower two being for the M/E background source selection **A/B** (PGM/PVW on output M/E) and the upper one for the **Key, A/B Bgnd, Util Bus, DSK and Aux** selections.

The source selection buttons for each function (A/B, C/D Background, Key/Util) form a crosspoint bus which is fundamentally a switching matrix with the incoming signals forming the vertical parts of the matrix and the bus outputs the horizontal parts.



A Bus button (crosspoint button) when pressed creates a matrix crosspoint, once setup correctly, the circuit tells the mainframe to route the source to an output.

Kula allows any physical input source, any Store or Matte to be mapped to any crosspoint button for a specific M/E, i.e. one M/E may be mapped differently to the other. Using a combination of crosspoint and button map, mapping specific signal sources that can be shared across M/E's or restricted to one particular M/E.

## Mnemonics

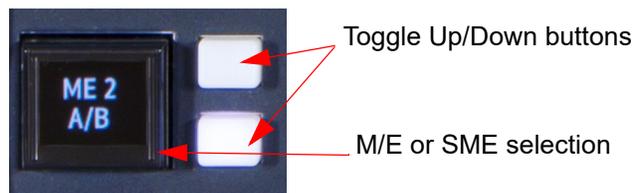
There is a row of Mnemonics between the key bus and program/preset (A/B)bus buttons. This will display information relevant to the source allocated to each button. The mnemonics provide a display of 64 pixels wide by 48 pixels high for each column of buttons.

Mnemonics on Kula can also be set to have a basic image instead of text, this is done in the Crosspoint menu and will be explained in the Crosspoint section of this manual.



## M/E & SME Selection

Kula M/E selection delegate button, allows the user to select which M/E or SME they wish to use on that M/E bank. This is done by using the toggle buttons to step through the M/E or SME options on the OLED button, then press the OLED button to select the required option. When a Kula system has a 2M/E control surface, any M/E or SME can be selected to work on any M/E bank.



### Key, A/B Bgnd, Util Bus DSK and Aux Selection Buttons (also Macro selection on some control surfaces)



Like the M/E selection buttons above, use the toggle buttons to step through the bus options and then press the OLED button to select the option. Here the user has the option to select Keys 1 - 4, Bgnd A/B, Util 1/2, DSK 1 - 4 and Aux Buses 1 to 64.

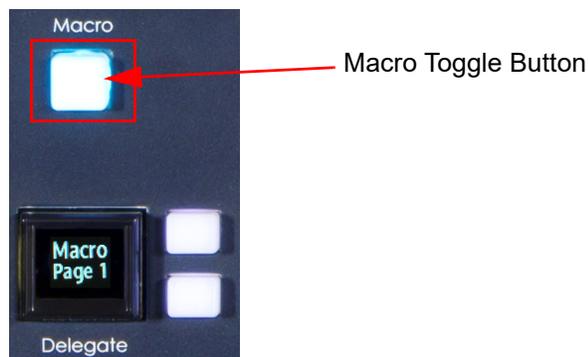
### Macro Selection

On the KPP control surface, a Macro button will change the Key Delegate OLED button into a Macro bus selection button. Pressing the macro toggle button will cause the OLED button to display "Macro Page 1", press the toggle button again allows the user to step through macro pages 1 to 3.

---

Note: How Macros are setup and attached to buttons will be explained in full in the "Macro" section of the "Effects Memories" chapter of this manual.

---



The mnemonic display next to the macro toggle button will display all the "loaded" macros for each macro page.

The K1P control surface has a cluster of 8 fixed macro buttons (as shown below), the mnemonics display the macro that is attached to the button.



### Transition Control

Transition control area with Key, Background, Clip (MAV Trans) Wipe, Mix and Key 1 to 4 transition selection. The transition controls are used to control Background, Key and Clip (MAV Trans) transitions.



#### ON/OFF (Key 1 to Key 4)

The four On/Off buttons are used to cut a Key Layer on or off, the affected Key Layers are 1 to 4 from left to right. The lamps within the buttons have three states; Off, White or Red, these indicate the following situations:

- **Off** - The Key Layer is off.
- **White** - The Key Layer is on but not contributing to the program or M/E output.
- **Red** - The Key Layer is on and contributing to the program or M/E output.

By pressing one of these buttons the following will happen:

- Press once and the Key Layer is on but will only contribute to the programme or M/E output if set to contribute.
- Press once again and the Key Layer is turned off.
- If part way through a transition, pressing one of buttons removes the layer from the transition process.

#### **BGND, KEY 1 to 4 Transitions**

Sets the BGND to be On/Off, when selecting Key Layers 1 - 4 to be on-screen. It also selects the Key Layer(s) for the next transition. Any number may be active at any one time. Pressing any one of these buttons will clear all others. Holding one button down and then pressing any others will make all of those selected active.

Any or all of these buttons can be selected as required. The transition for the selected layer(s) is started by pressing the **[AUTO]** button. This facility allows one or more of the Key Layers to be transitioned, using a different transition for each layer, at the same time as the background transition.

#### **Transition Buttons**

##### **CLIP**

Allows the key transition to be associated with a selected clip from an internal source. The clip position is determined by the Transition Time.

##### **MIX**

Selects Mix as the main transition. When using this function, the type of mix used in a transition is setup in the Transition menu

##### **WIPE**

Selects *Wipe* as the main transition.

##### **CUT**

An immediate "Cut" between the Background or Key sources causing bus swap.

##### **PVW TRANS**

Allows the next transition to be previewed on the preview monitor without affecting the program output.

##### **AUTO**

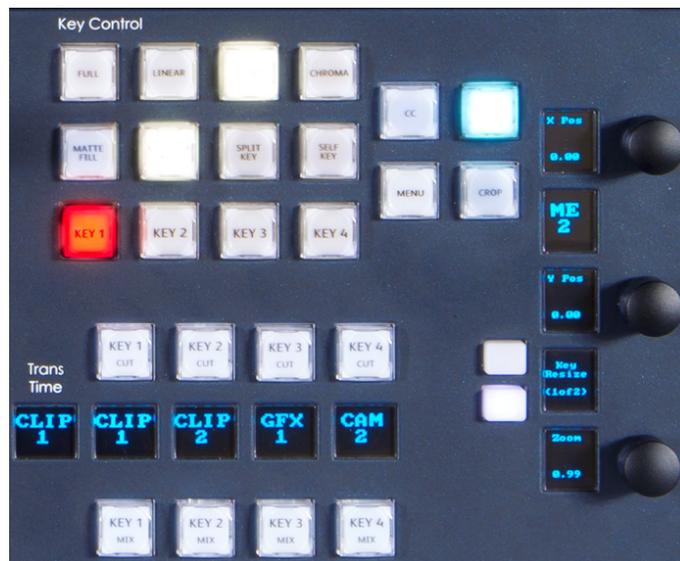
Starts an automatic pre-timed transition, using whatever transition types and times have been selected for the layers included in the transition. The transition time for each layer can be different as can any time offsets.

##### **T-Bar**

Performs a manual transition using whatever transition types have been selected.

## Key Control

The Key Control buttons are used to set parameters for the Key Layers on an M/E. The function of each button is described below.



### Key Control Function Buttons:

#### LED Bars

These bar displays indicate the priority levels of the Key channels, where the top bar is highest priority downstream.

#### FULL

The fill is a full layer over the background hiding it completely.

#### LIN

Linear Key (a pre-cut key)

#### LUMA

Luminance Key (no pre-keying has been applied to the fill)

#### CHROMA

Selects the Chroma Keyer menu on the GUI

#### INV

Inverts the keying signal

#### MATTE FILL

Sets Matte for the selected Key Layer as that layers fill

#### COUPLED KEY

Sets the Key source as that selected on the bus crosspoint

#### SPLIT KEY

Allows the fill and cut signals to be separated. The fill signal is selected as normal. To split the cut signal, press and hold this button and select the cut signal on the Key crosspoint bus. With this button pressed the bus displays the cut source and with it released the fill source is displayed.

**SELF KEY**

Uses its self to cut and fill.

**CC (color correction)**

Selects the Bus color effects facility

**2D**

Selects the re-size options X/Y and zoom position of the selected Key.

**CROP**

Selects the Key Mask facility

**KEY1 to 4**

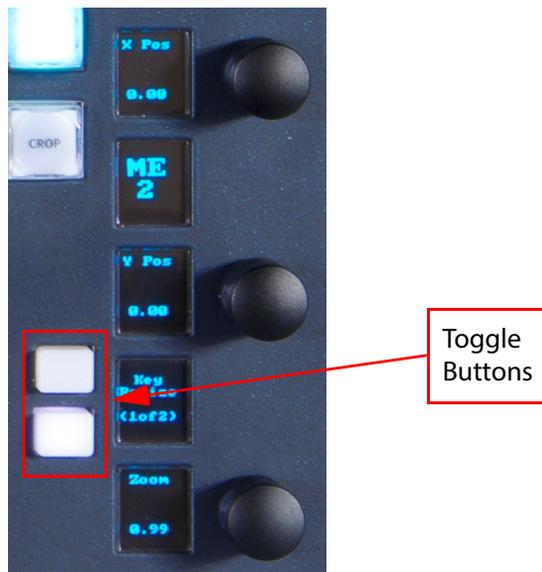
Selects the Key Layer that will be affected by the Key Control buttons

**T-Bar**

Performs a manual transition using whatever transition types have been selected.

**Rotary Controls with Mnemonics**

The rotary controls (or sometimes called “Shaft Encoders”) have a dual purpose, they can either be used to adjust “Local” parameters in the Key Control area of the control surface such as “Matte Fill” or “Color Correction”.



If the two toggle buttons are pressed together, then the rotary controls will latched to the selected parameter controls on the GUI. In the picture above, the mnemonics show that the rotary controls will adjust a Key Layer X Pos, Y Pos and Zoom. Pressing just the top toggle button will also step through and select the parameters in the current menus on the touch screen GUI.

### Number Pad

The number pad on the Kula control surface (shown below), is used for the direct loading and saving of DMEM's and GMEM's. The mnemonic display next to the M/E and SME buttons defaults to showing the last DMEM/GMEM loaded.

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Note: Using the number pad to load DMEMs and GMEMs is explained in full in the "How to Save Files" chapter of this manual

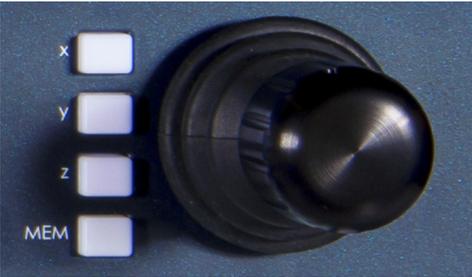
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### Joystick

Any parameter set that has an X-Y or zoom adjustment can be attached to the joystick as well as the rotary parameter controls.

Where a parameter set is attached to a rotary control or the joystick, the parameter set symbol will be a red circle and the parameter will show a red triangle.



**MEM button** - when the MEM button is Off (unlit) the device will be connected to the current parameters, indicated by red triangles, when ON the device will revert to the saved parameters). When in SNAP mode these buttons will perform as before:

- **Single Press** = SNAP
- **Double Press** = Normalize
- **Press and Hold** = attach to number pad

When a parameter set is attached to the joystick it may be independently locked to either one of the parameters by using the **[MEM]** button. When either one is so locked to a parameter, any further attachment is only to the non locked device and rotary control/button pair.

To lock a parameter set to the Joystick, press and hold the **[MEM]** button. When locked a short press on the **[MEM]** button will toggle control between the locked memory set and that of the current menu.

# 5 Projects

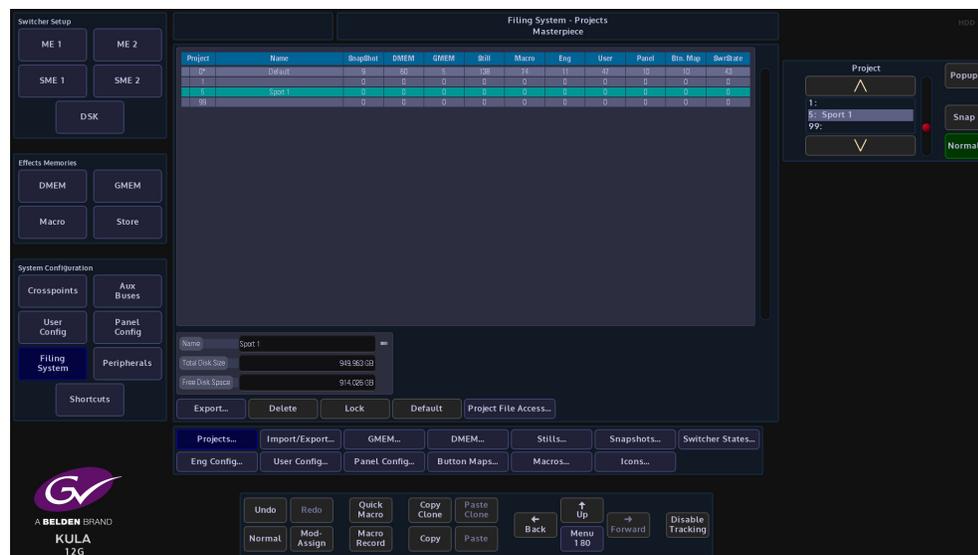
## Introduction to Projects

Kula is a Projects driven system where the user is able to create 98 individual Projects to Store and save their work and the user-defined setup of the system. It is worth noting that even though there are 100 Projects available, that Project 0 and Project 99 are not used because they are reserved as a **Default** Project (0) and a **SnapShot** Project (99).

Projects Store all the saved files from the Engineering, User and Panel Configs, Stores, Macros and most importantly the saved GMEM and DMEM files. Basically, everything is saved into Projects.

## Using Projects

As stated earlier Kula is a Project based system where all DMEM's, GMEM's, Panel Configs, Stills, Macros and other files are Stored into individual user-defined Projects. To get to the Projects menu touch the **{Filing System}** button on the GUI and the first menu that will appear will be the Projects menu.

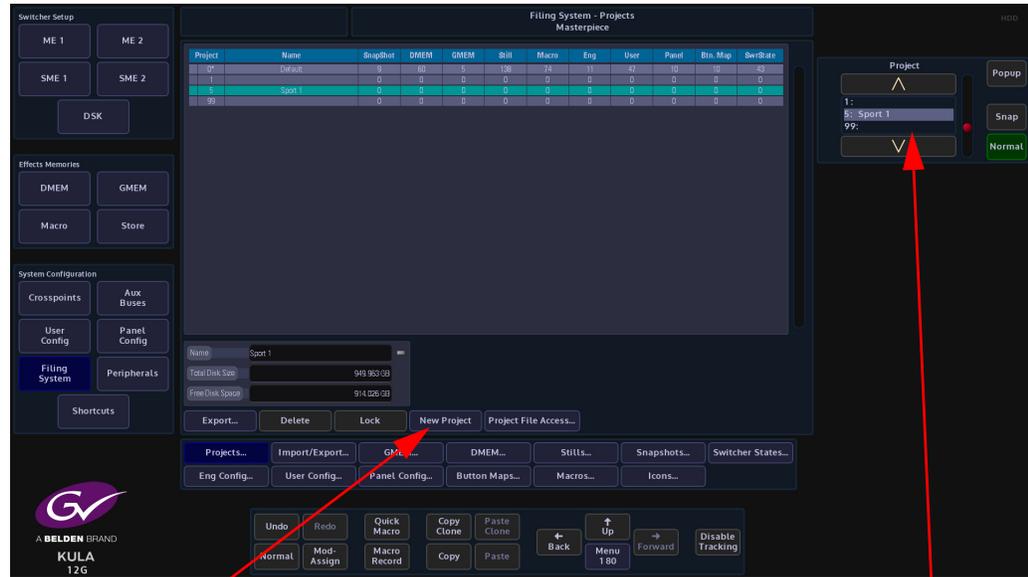


As you can see from the diagram above, Projects are in number order in the table, it also allows the user to see what number can be chosen for a new Project i.e. any number that is not in the table.

The columns depict the user-defined name given to the Project and the number of DMEM's, GMEM's, Panel Configs, Stills, Macros and other files saved within that Project.

## How to create a new Project

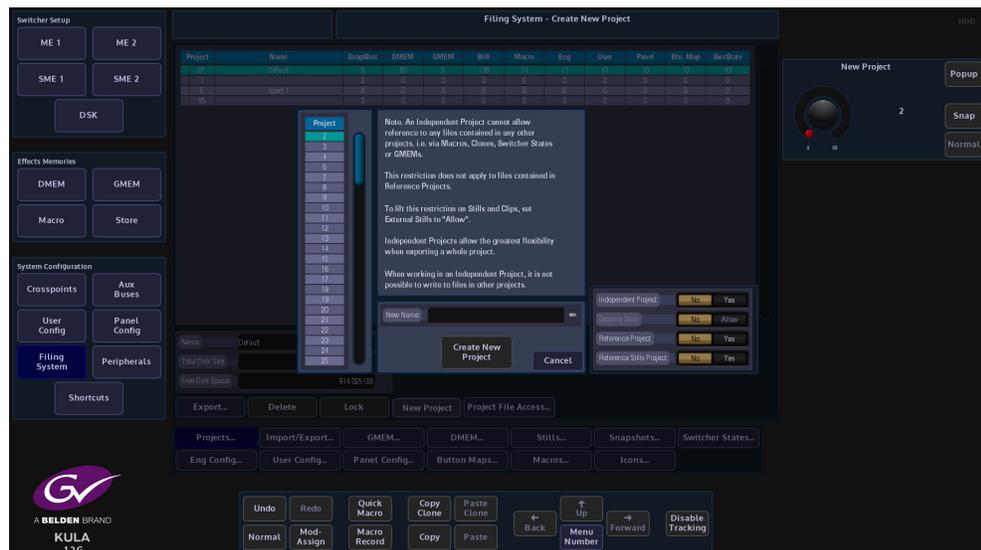
To create a new Project, use the **New Project** parameter to select an unused Project number and then press the **{New Project...}** button.



New Project button

New Project Parameter

A dialog box will be displayed, with a scroll bar that allows the user to select a project number from the number list.



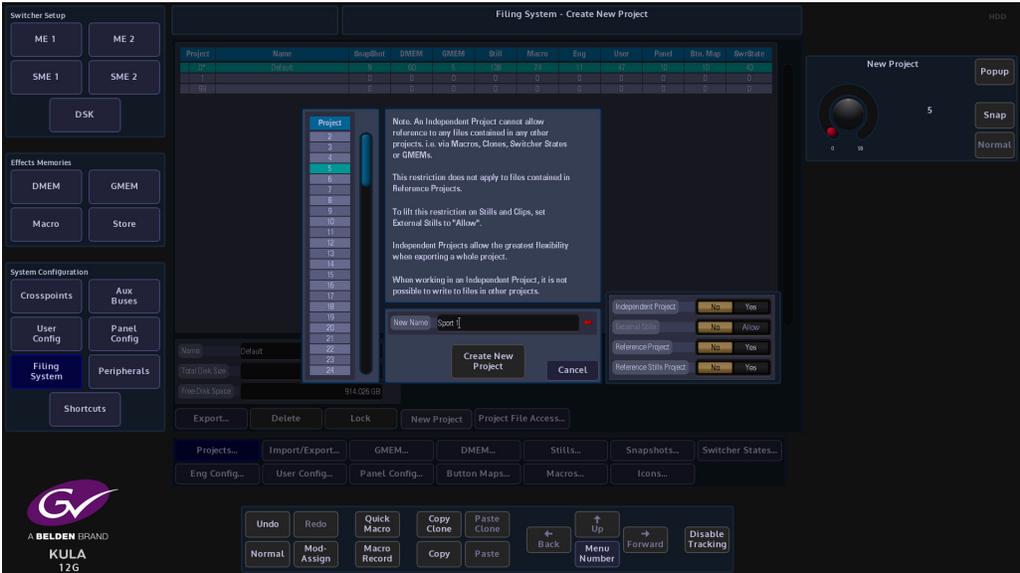
The new Project can now be used.

Note: Projects will be described in detail in the "Filing System" chapter of this manual.

A name can be given to the new Project by touching the Red name attacher button twice, and then entering the name using the on-screen keyboard. Touch the {Enter} button to clear the keyboard from the menu.



The user now has a few options before finally creating a new project. The new Independent Projects feature allows the user to create projects that can only have files from Macros, Stills, DMEMs etc. saved within that project.



There is a column of parameter buttons on the right; Independent Project, External Stills, Reference Project and Reference Stills Project. The "Independent Projects" do not allow reference to any files contained in any other projects.

## Projects

### How to create a new Project

---

"The restriction does not apply to files contained in "Reference Projects".

"When working in an Independent Project, it is not possible to write to files in other projects.

When working in an Independent Project, the highlighted parameter controls will also allow you to reference Stills/Clips, Reference Project and Reference Stills Projects.

# 6

## How to Save Files

### Saving Files Overview

Kula is a very flexible system and gives you a number of options to Save. There are Switcher States, Rolling Switcher States, Effects Memory Recalls (DMEMs, GMEMs and Snapshots), Shows and individual Configuration Files. This sounds like a lot of options, but how they are applied will depend on what you want to do with the system.

All of the above ways to save are saved into a Project. Once a Project has been created, the user is able to save files in several different ways. The user can save individual "Config" files while working in the User, Panel or Engineering Config menus, or they can save DMEMs and GMEMs.

DMEM's and GMEM's Store user-defined setup states of an individual M/E or the overall setup of a Kula Control Surface and form a comprehensive "**Advanced Effects Memory Recall Systems**". This means that the user has the flexibility to save or recall setup's instantly. The Switcher States and Rolling Switcher States are an instantaneous save of the current setup state of the system.

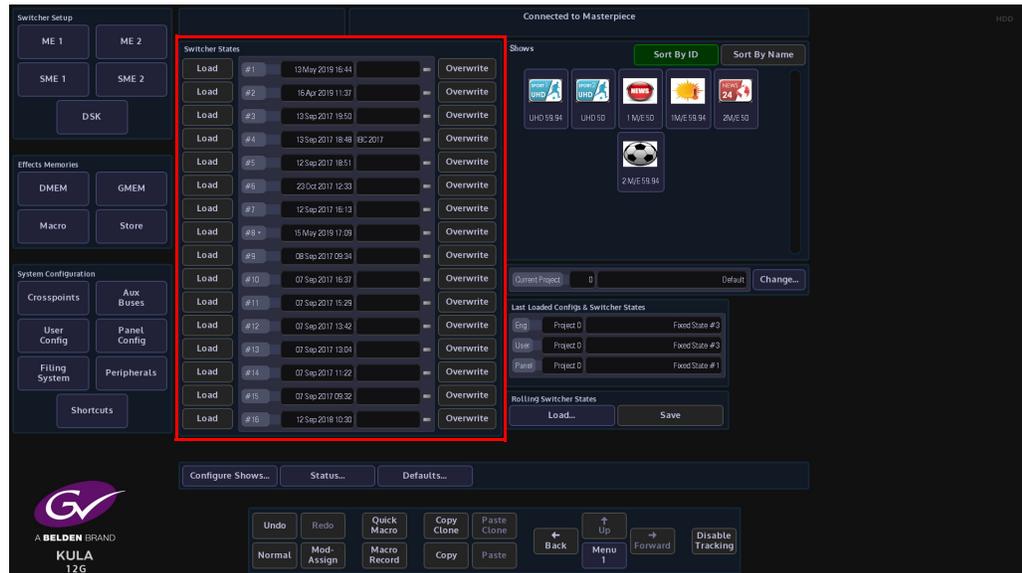
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Note: How to setup and use "Shows" will be explained in full in the "Initial Setup Menus" chapter of this manual.

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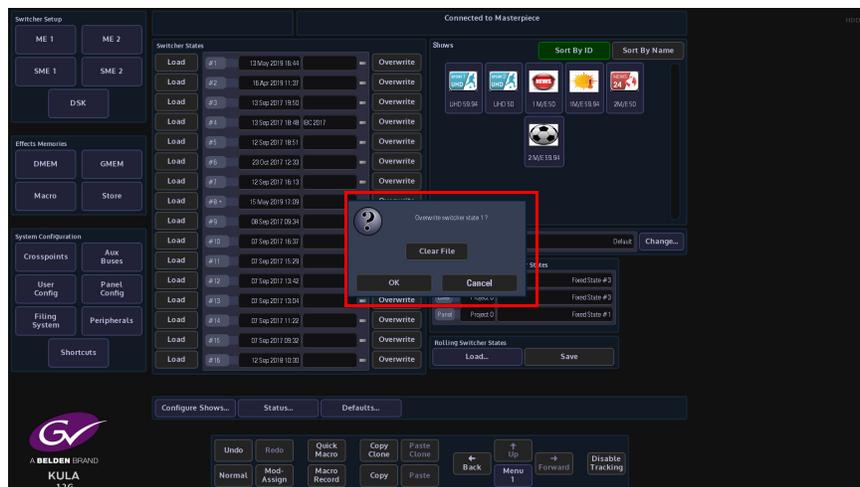
## Switcher States

The fastest way to save the current system setup state is done by using the “**Switcher States**” {**Overwrite**} option. Touch the “**Up**” button to get to the “**Connected to...**” menu and the Switcher States table is displayed in the center of the menu.



The table of 16 fixed Switcher States are used as a one button press “**Save and Load Everything**” function that can be written to an unlimited number of times. Switcher State - Overwrite allows the user to save the current “**Switcher State**” at different points in time. This is very useful as you may want to keep the current original saved state, but may also want to add a newly created DMEMs or add Stores etc, which can be saved in one of the Switcher State slots.

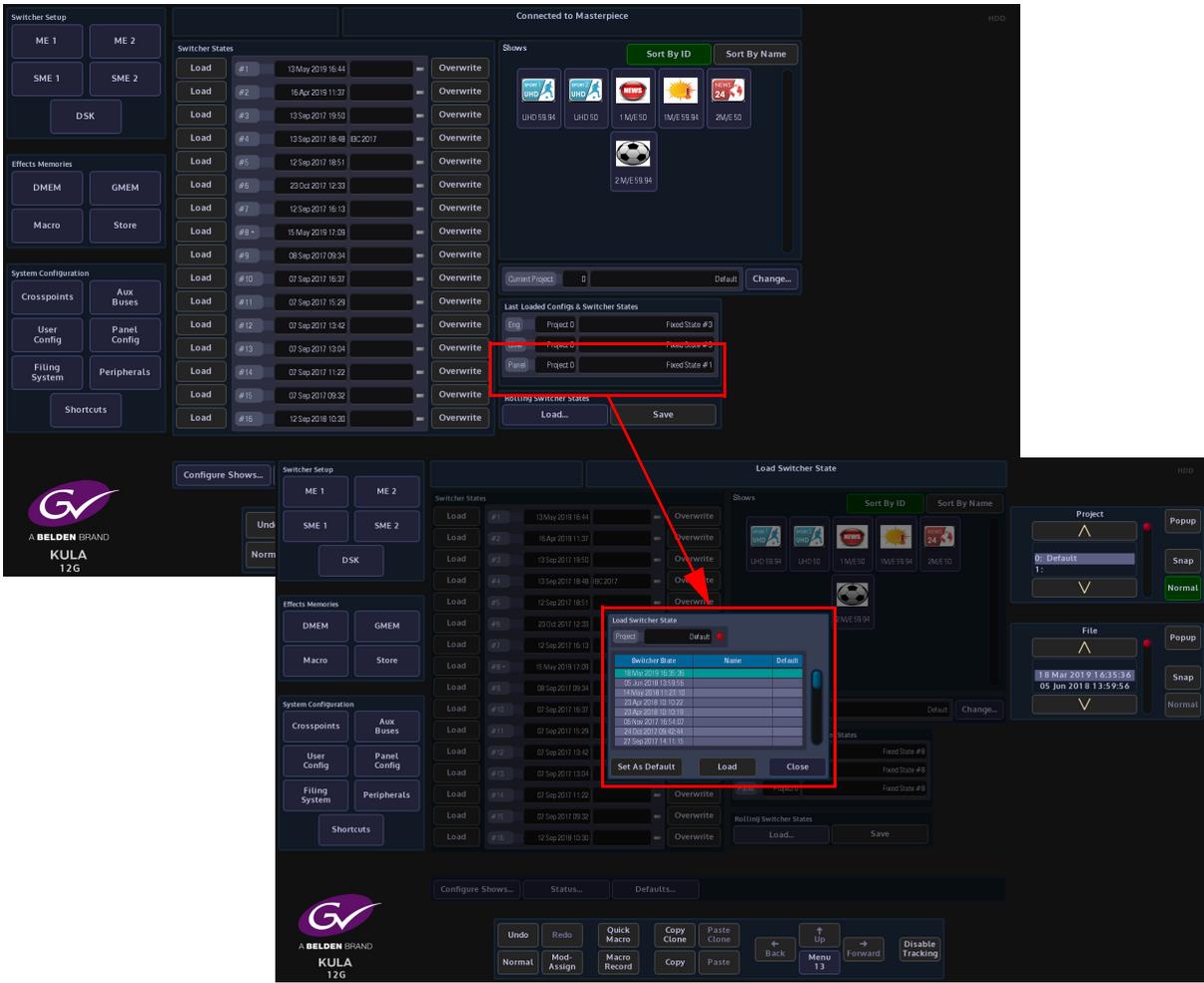
This is done by pressing the {**Overwrite**} button. The date and time that the Switcher State was saved (overwritten) is displayed in the list. By touching the boxed area next to the time and date, a name can be given to the Switcher State using an on-screen keyboard. Touch {**Load**} button to load the saved Switcher State.



When overwriting an already saved switcher state, a dialog box will be displayed, touch "OK" to proceed. **Caution!** - If you press the {Clear File} button, the switcher state will be erased.

### Rolling Switcher States

Rolling Switcher States is the method of quickly saving the overall state of the system. This allows the user to save up to 100 Switcher States in to a "Rolling List" of saved states, which will keep rolling over after 100 states have been saved. The "Rolling Switcher State" function is different to the Switcher State Overwrite mentioned above, because when the user touches the "Load" button, the menu will change to display a list of saved states and the option to change or select a Project. You can also set any one of the switcher states as the default startup state.



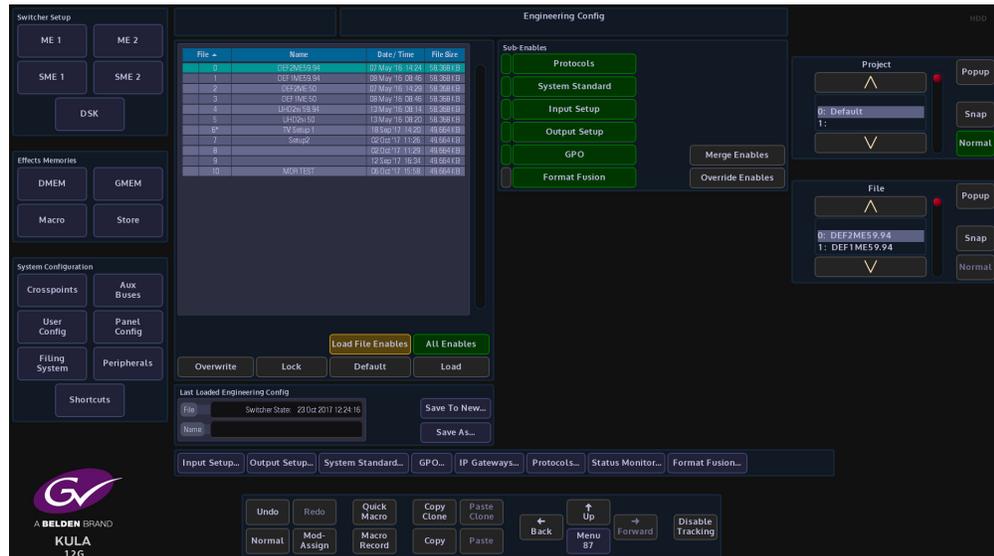
Each time the {Save} button is pressed a switcher state is saved into the rolling list.

## Config Files - Saving and Loading

The User, Panel and Engineering Config files are very important when setting up a system and should be saved regularly so that your configuration state is not lost. User, Panel and Engineering Configs can have up to 1000 different config setup states each. When the config setups are saved, they are listed as files in a table in the menu, so that the user can easily see the time/date that a config was saved, allowing the file to be instantly loaded.

Note: This example will show how to save and Engineering Config File. Saving or loading a User Config or Panel config File is done in exactly the same way.

The Configuration files are used to determine the startup state of the system and it is important to know what state the "Sub-Enables" within the config file are in, i.e. what is enabled/disabled when saving the config files, when creating DMEMs and Macros. The "**Sub Enables**" list of buttons, to the right of the config files table, allows you to select or de-select functions that will be saved within a file. If the tab next to the enables button is green, this means that the enabled function is included in the original saved file. If the tab is gray, the function is not included. If the enabled function is selected (green) when the config is saved, the function will be included in the saved config.



### Saving a Config File

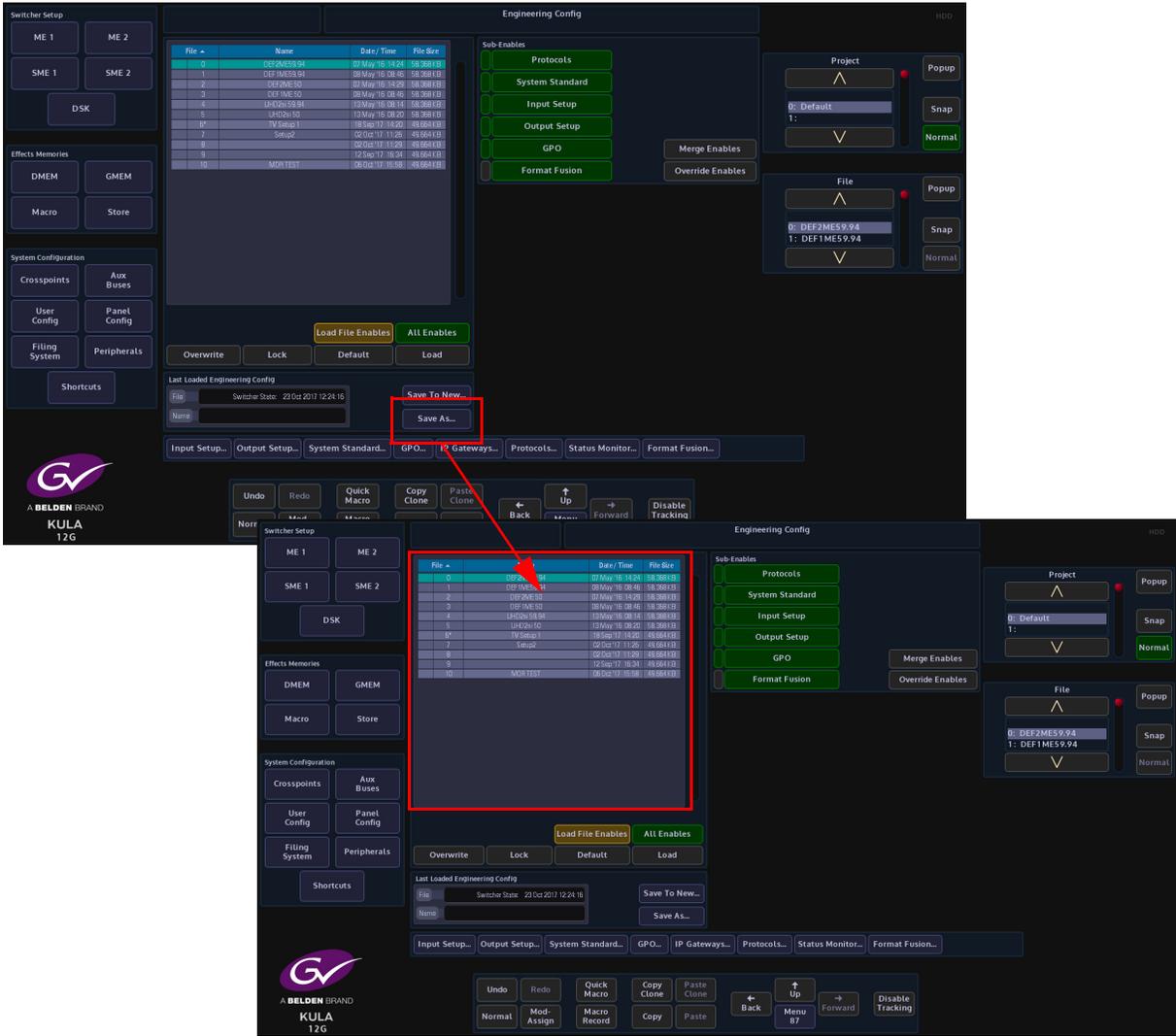
To save a configuration file, touch the **{Save As...}** button and a new menu will appear. The **"Engineering Config - Save As"** menu allows you to select a new slot in the table and save an Eng Config file. Use the **"Name"** attacher box to give the config file a name, touch the red oblong at the end of the **"Name"** attacher and an on-screen keyboard will be displayed. Type a name for the file, then when finished touch the **{Save}** button. There are 1000 slots available to save to.

If you touch the **{Save As...}** button when an existing saved config file is selected, a dialog will be displayed asking the you if you want to proceed to save the file.

### Loading a Config File

To load a config file, simply select a file by touching it in the config file table and then touch the **{Load}** button.

You can choose to enable or disable any of the **"Sub-Enables"** before touching the Load button.

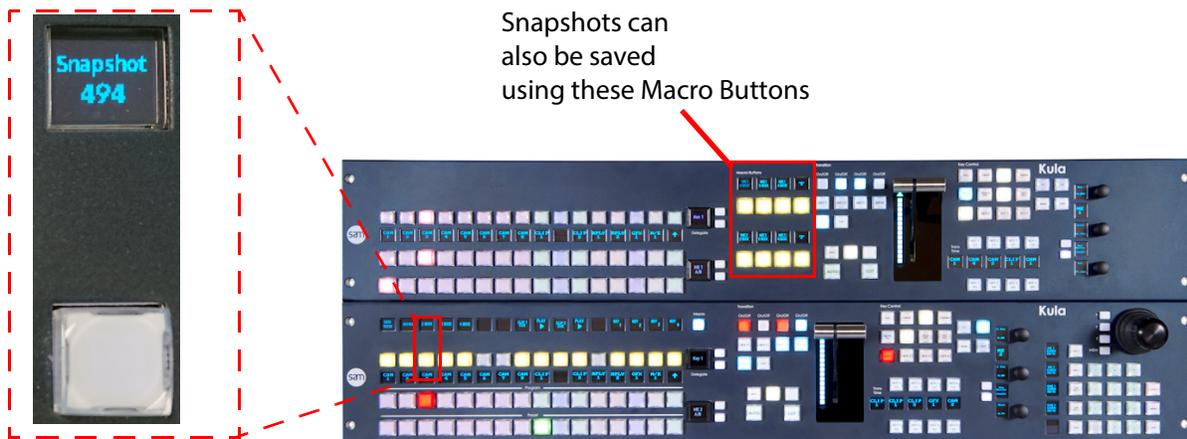


## Snapshots

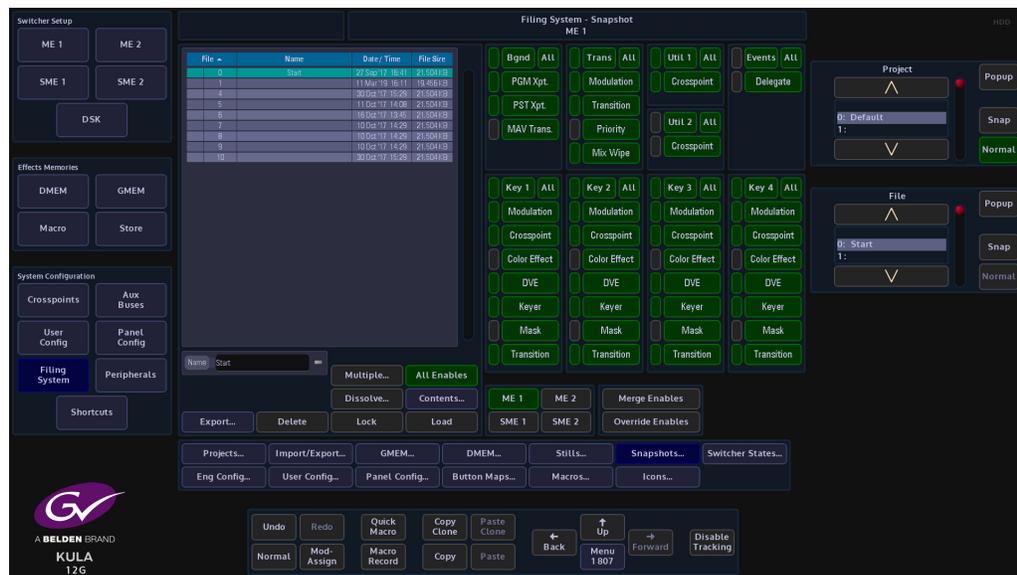
Snapshots as the name suggests will take a snapshot save of the current system setup. They are applied to one of the “Macro Assignment” buttons on the control surface and once they are saved, they are an instant recall of the saved system setup.

### Saving a Snapshot

Snapshots are very easy to use, with the buttons delegated as “Macro” buttons, just press and hold one of the buttons until “Snapshot and the snapshot number is displayed in the mnemonic display. Up to 1000 snapshots can be saved.



In the Filing System menu, touch the **{Snapshots...}** button to open the Snapshots filing system menu. The menu displays a table with all the snapshots taken. To the right of the table, the enables associated to the snapshot are displayed.

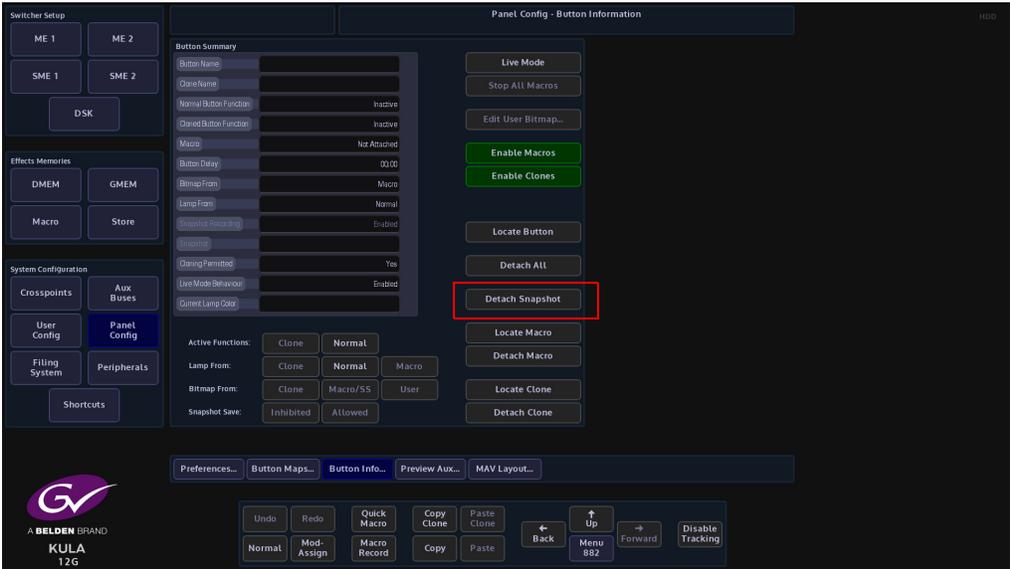


In this menu, Effects Dissolve can be added to an existing snapshot allowing you to make creative effects.

Note: How “Effects Dissolve” works with Snapshots will be explained in the “Operator Information” chapter in this manual.

### Detaching Snapshots

Snapshots are attached to the OLED buttons when saved, you can detach a snapshot from an OLED button, so that a new snapshot can be saved. This is done in the “**Panel Config - Button Info**” menu.



To detach a snapshot touch the **{Detach Snapshot}** button and the button will turn red, then touch the snapshot button and it will be detached.

Detaching a snapshot does not delete the snapshot from the system memory, the snapshot can be re-loaded by selecting the snapshot in the table in the “**Filing System - Snapshots**” menu, then touching the **{Load}** button.

## DMEM's

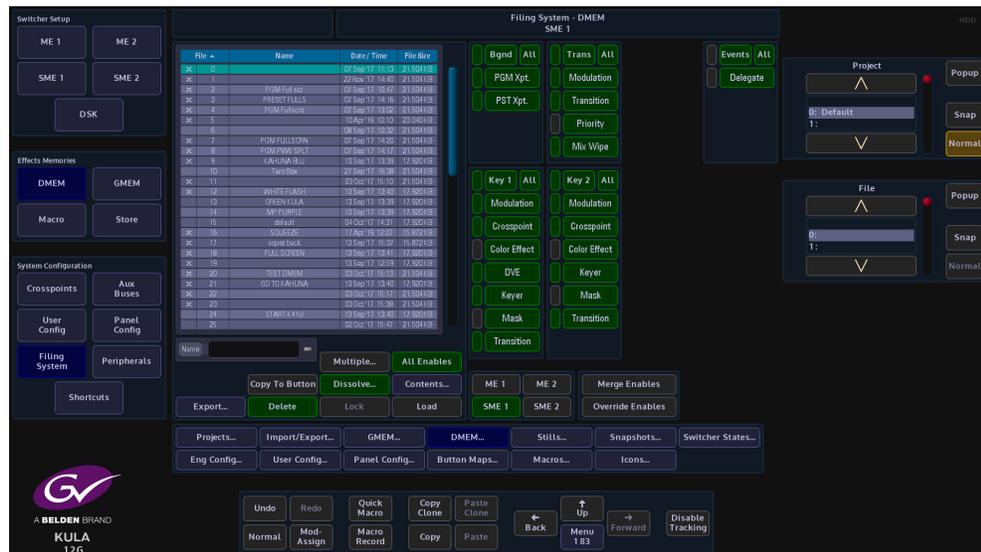
### What is a DMEM

A DMEM or Dynamic Memory, saves set-up information related to a single M/E, which may contain information such as:

- Bus set-up (Crosspoints, Keyers, Wipes, Transitions)
- Color Effects
- Key Layer Priorities
- Masks, Crops, Borders

DMEM's are Stored within a user-defined Project, the user can save up to 1000 DMEM's within a single Project.

With the defined Project selected, the **Filing System** menu allows the user to enter the DMEM filing system where the user is able to Load or Delete selected DMEM's, Export DMEM's to external memory devices or view detailed contents within the DMEM.



### Creating a DMEM

All DMEM's are saved into and recalled from Projects, to create a DMEM, follow the steps below.

**Step 3**  
Select an M/E or  
SME

**Step 2**  
Enter DMEM  
number e.g.  
78

**Step 1**  
Enter a Project  
number e.g.  
12. (dot)



**Step 4**  
Press  
**SAVE**

**Step 1** - Enter in the Project Number e.g. 12 followed by a [.] (dot), the dot signifies that a DMEM number will be entered next.

The top mnemonic display will show **"PROJ #12"**

**Step 2** - Enter the DMEM memory position number e.g. 78.

The top mnemonic display will show **"PROJ #12"**, the next mnemonic display down will show **"GMEM #78"** (GMEM will be changed to DMEM in the next step).

---

Note: If you are already working in the project that you are going to save the DMEM into, you can skip entering the "Project Number [.] Effect Number". Just enter the "Effect Number" and then "Save".

---

**Step 3** - Select which M/E you want to save the setup state from, e.g. pressing ME1 will save data from M/E1 (the selected button will turn white).

By selecting the M/E, the mnemonic display changes to show **"DMEM #78"**. To de-select an M/E, press that M/E button again.

---

Note: Pressing the [CANCEL] button at any point before saving will cancel the entire operation.

---

**Step 4** - Finally, press the [SAVE] button.

If the DMEM already exists, the bottom mnemonic display will show **"File Exists Overwrite?"** Press [SAVE] again to save the DMEM.

## Recalling a DMEM

To recall a DMEM follow the steps below.



**Step 1** - Enter the Project number (e.g. 12) followed by a dot [.]  
The top mnemonic display will show "**PROJ #12**" the next mnemonic display down will show the last GMEM saved "**GMEM #78**"

**Step 2** - Enter the DMEM memory number (e.g. 45).  
The mnemonic display will show "**GMEM #45**" (GMEM will be changed to DMEM in the step 3).

---

Note: When operating in the Current Project that you will be recalling the DMEMs from, you can skip entering "Project Number [.] Effect Number" and instead just enter the Effect Number and [**LOAD**]

---

**Step 3** - Select the M/E or SME with the DMEM you want to load. The mnemonic display changes to show "**DMEM #45**".

**Step 3** - Press [**LOAD**]

# GMEM's

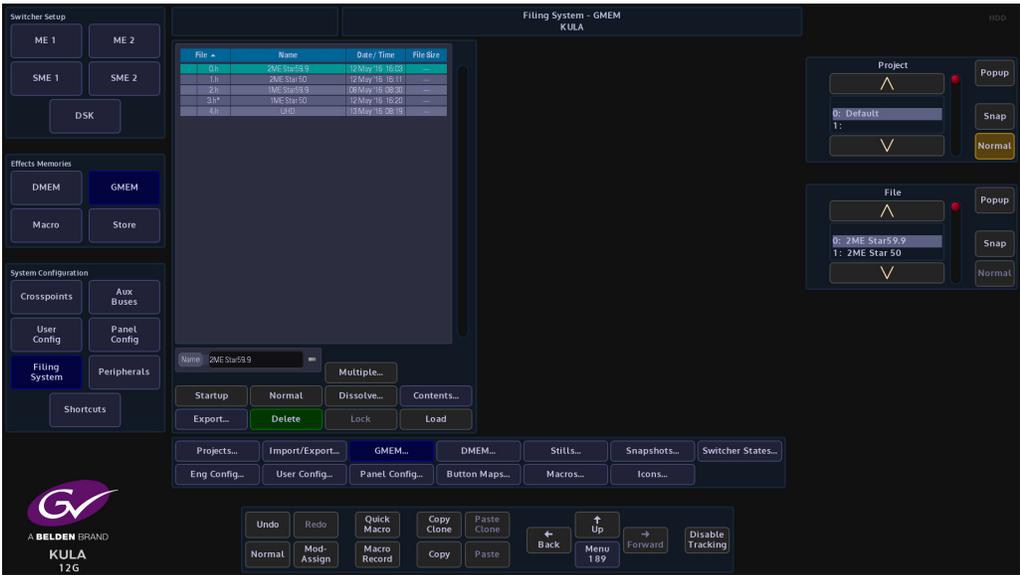
## What is a GMEM

A GMEM or Global Memory will save set-up information relating to multiple M/E's. A GMEM saves all the same information as DMEM's with the added ability to save Stores and Configurations:

- Bus set-up (Crosspoints, Keyers, Wipes, Transitions)
- Color Effects
- Key Layer Priorities
- Masks, Crops, Borders
- Stores
- User Config

A GMEM can save all of the above as a complete snapshot of the entire system setup.

GMEM's are saved within a user-defined Project, which can be viewed in the **Filing System** menu allowing the user to enter the GMEM filing system where the user is able to Load or Delete selected GMEM's, Export GMEM's to external memory devices or view detailed contents within the GMEM.



## Creating a GMEM

Creating a GMEM is very similar to creating a DMEM.



**Step 1.** Enter a (existing) Project number followed by a [.] "dot"  
The top mnemonic display will show "**PROJ #12**"

**Step 2.** Enter a number that is used to recall a GMEM.  
The top mnemonic display will show "**PROJ #12**", the next mnemonic display down will show "**GMEM #78**"

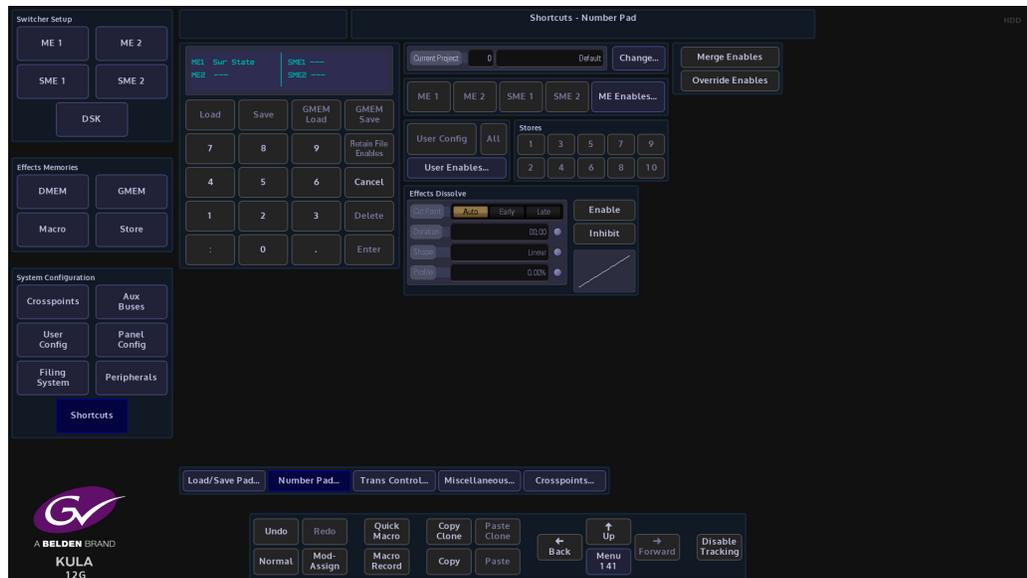
---

Note: When operating in the Current Project that you will be saving the GMEMs into, then you can skip entering "Project Number [.] Effect Number" and instead just enter the Effect Number and SAVE.

---

**Step 3.** At this point the user now has the choice to select multiple M/E's, Stores, configurations and Enables that will be saved within the GMEM.  
To individually select M/E's press the ME number required e.g. ME1, ME2, SME1 and SME2, the selected buttons will go white.

To add other features press **[MENU]** button on the control surface (in the number pad area), and the **DMEM/GMEM** enables menu will appear, this is where the User Config files are saved within the GMEM, including M/E's and Stores.



The menu above is the first menu shown when you press the **[MENU]** button. Select the function options required and when the GMEM is saved they will be included within the GMEM.

**Step 4.** Press **[SAVE]**. The GMEM can be saved using the number pad or using the menu above.

The option to save as a **Hard** or **Soft** GMEM will now be displayed in the bottom two mnemonic displays, press button number **[1]** so save as a Soft GMEM and button **[2]** to save as a Hard GMEM.,

**Hard GMEM** - will save all the Stores and M/E data in a single file, or a "Complete Snapshot".  
**Soft GMEM** - will save "pointers" to the DMEM files and Stores.

**Hard GMEM Definition** - a Hard GMEM saves whatever is created on the panel and included in the memory as a set state.

**Soft GMEM Definition** - a Soft GMEM will save whatever is currently loaded and shown on the number pad screen, so for example; the user can setup the panel in a specific configuration and then save as a soft GMEM, but the system will not remember what was created on the control surface, instead the system will take the information that was last physically loaded and shown on the number pad screen, then save those settings. The user can still update a DMEM and the Soft GMEM will remember the latest version of that DMEM as long as that DMEM was loaded on the number screen when you saved the Soft GMEM.

To save the GMEM press **[SAVE]**.

If the file already exists you will be prompted to overwrite it - if **[SAVE]** is pressed a second time, the existing file will be overwritten.

The save process may take a few seconds depending on the amount of information that is being Stored within the GMEM.

## Recalling a GMEM



Again recalling a GMEM is very simple and similar to recalling a DMEM.

**Step 1** - Enter the Project number, followed by a dot [.]  
The top mnemonic display will show "**PROJ #12**"

**Step 2** - Enter the GMEM memory number  
The top mnemonic display will show "**PROJ #12**", the next mnemonic display down will show "**GMEM #78**"

---

Note: When operating in the Current Project that you will be recalling the GMEMs from, then you can skip entering "Project Number [.] Effect Number" and instead just enter the Effect Number and LOAD

---

**Step 3** - Finally press [**LOAD**].

The GMEM may take a few seconds to load depending on the amount of information that was Stored within the GMEM.

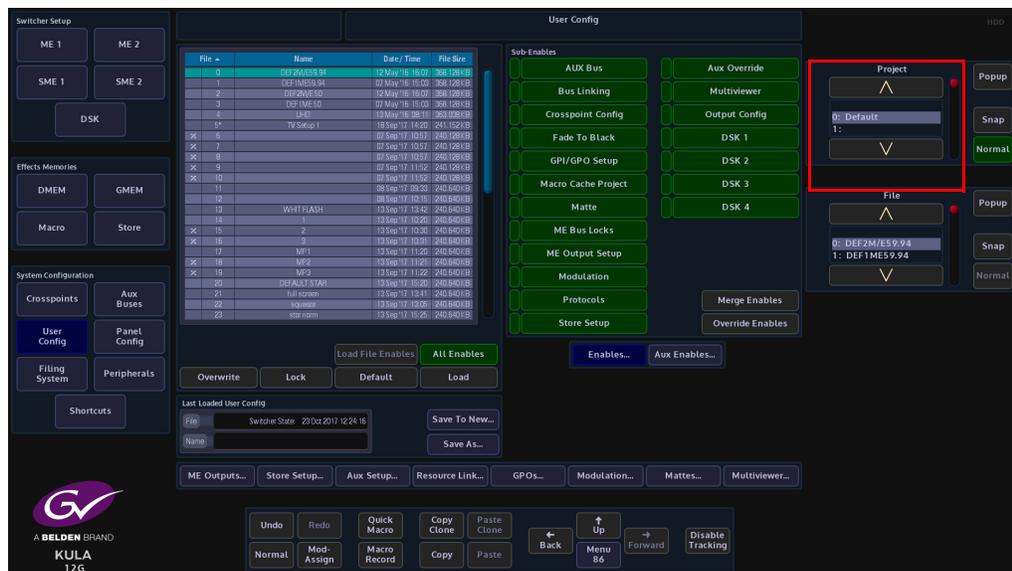
# 7 Configuration

## Configuration Files

Before describing the Configuration menus, it is a good idea to explain how to save a config file. All config files are saved into a Project.

### Saving a Config File

The Engineering, User and Panel Config files are used to save up to 1000 different config setup states into Projects. They are very important and while setting up a system, should be saved regularly so that no configuration state is lost. When the config setups are saved, they are listed as files in a table (as shown in the menu below), so that the user can easily see the time/date that a config was saved, allowing the file to be instantly loaded.



---

Note: This example will show how to save a User Config file. Saving an Engineering Config or Panel Config file is done in exactly the same way.

---

---

Note: Before saving a file, look at the "Current Project" parameter and make sure that the Project being displayed is the correct one to save to.

---

## Sub Enables

The “**Sub Enables**” list of buttons, to the right of the config files table, allows the user to select or de-select functions that can be saved with a file.

If the tab next to the enables button is green, this means that the function was included when the file was originally saved. If the tab is gray, the function is not included when the file was originally saved. If an enabled function is selected (green), when the config is saved, the function will be included in the saved config (shown below).



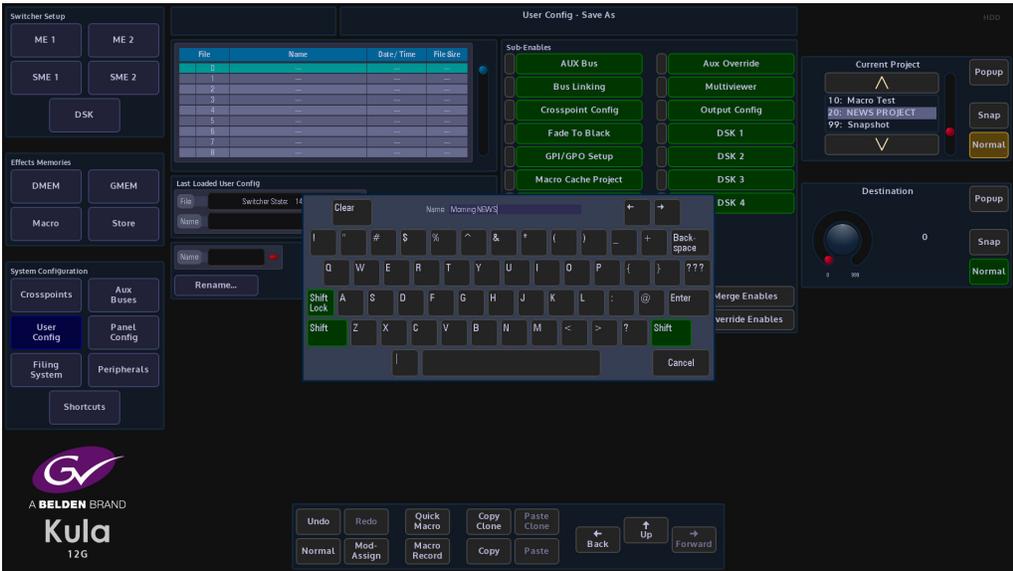
Enables and Sub Enables buttons are found in the in the Engineering, User and Panel Config menus as well as the Filing System menus.

**Override Enables** - will override any enables that have been de-selected and turn the enable On.

**Merge Enables** - this merges enables currently set in the switcher with the enables saved in the file being loaded (a "logical OR" of the enables).

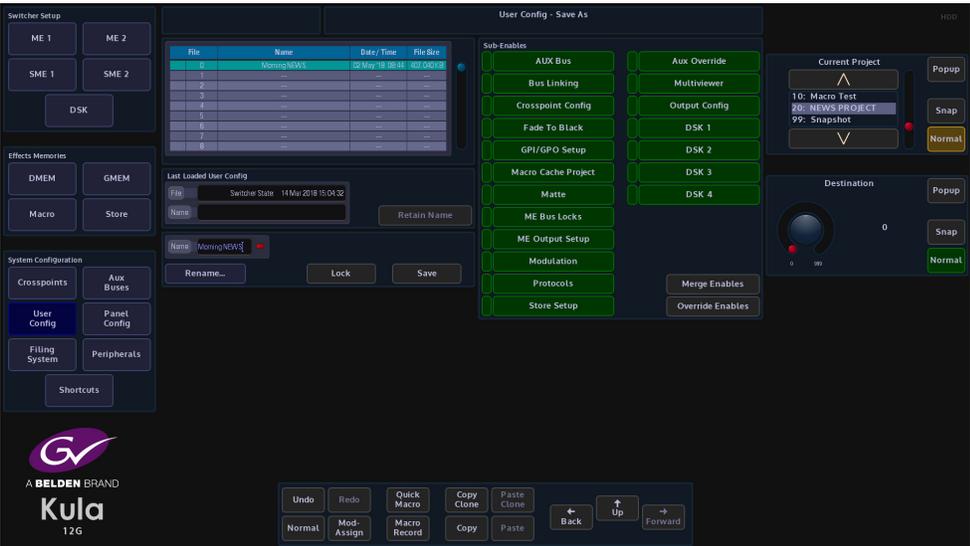
## How to save a Config

In the menu, press the **{Save As}** button and a new config file table will be displayed. In the table, select a slot where the file will be saved using the “Destination” parameter, or just touch the slot in the table. There are 1000 slots to choose from. When selected the row will be highlighted, then double touch the red oblong in the “Name” attacher and an on-screen keyboard will be displayed.



Type out a name for the config file and press **{Enter}**.

Finally, press the **{Save}** button and the new config file is saved into the table.

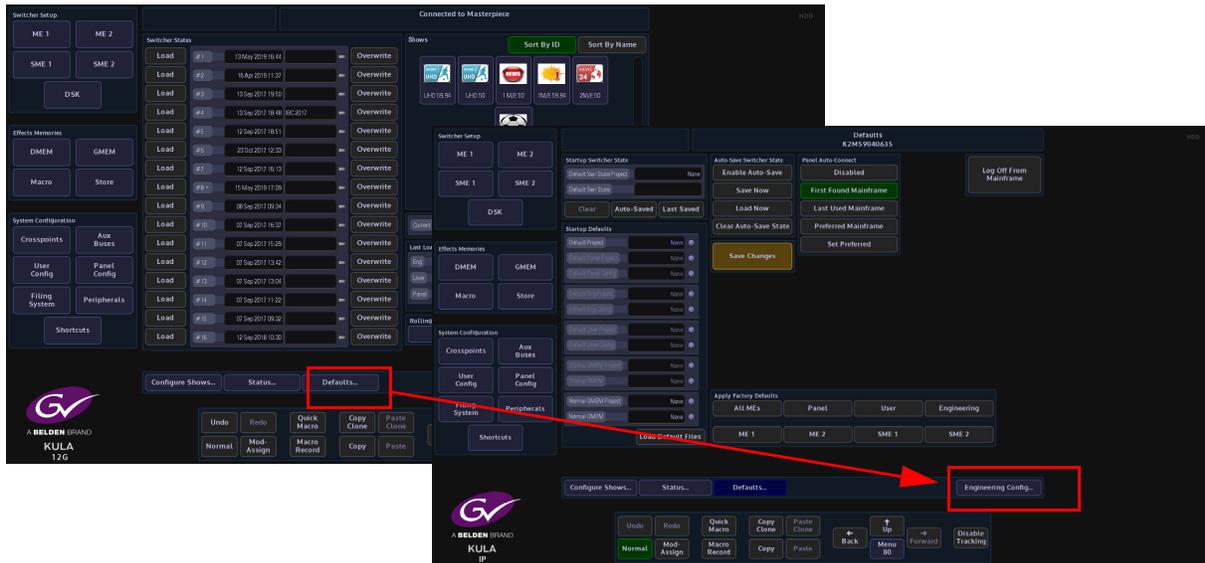


Each file can be overwritten, locked so that they cannot be saved to, or deleted from the table.

Note: Remember: Any changes that need to be kept..... Save the Config File

## Engineering Configuration

To get to the Engineering Config menus, press the **{Up}** button until the **“Connected to”** menu is reached. In this menu, touch the **{Defaults}** menu link button, then in the Defaults menu, touch the **{Engineering Config...}** menu link button (shown below).



## Input Setup

The Input Setup menu has several main configuration functions integrated into one to allow the user to quickly configure an input to the mainframe. The user can give a name to the input source and apply a video standard.



At the top of the menu is a single row table showing the currently selected Input and BNC number, the description of the input (if it has been given one) and the crosspoint that the input source is assigned to.

The **BNC Input** parameter is used to select an input. The user can also touch the “Pop-up Selector” which will show all the available inputs.

The **Router Overwrite** parameter when set to {Yes} will allow an externally connected router to rename a source.

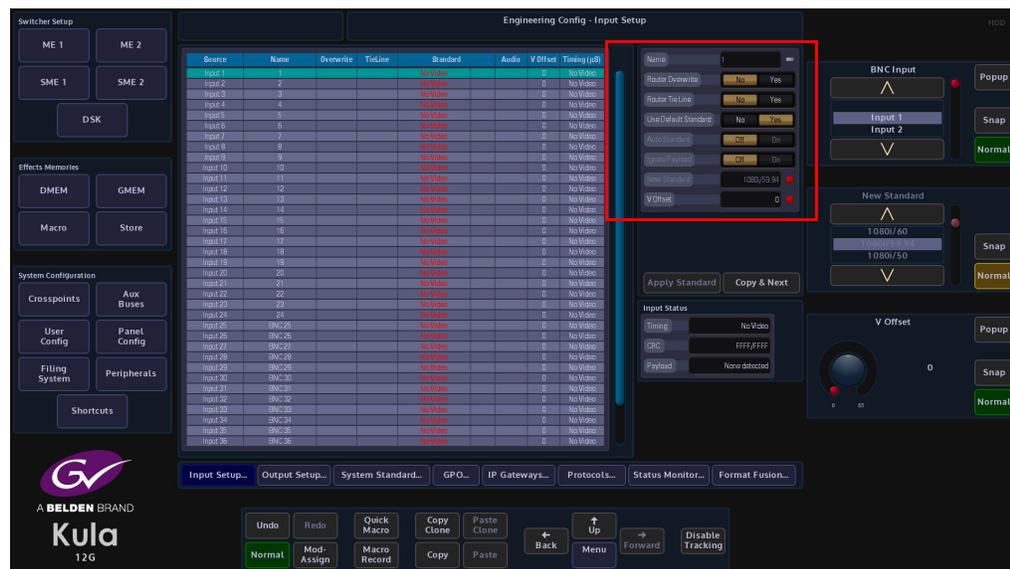
The **Use Default Std** parameter will force the input source to use the default mainframe video standard which is set in the **Eng Config - System Standard** menu. The Default Standard can be changed using the **New Standard** parameter. Use the Up/Down scroll buttons to select the required standard, then touch the {Apply} button.

If a new default standard is selected press the {Apply Standard} button for the new video standard to be set.

The **Name** attacher allows the user to give the selected input a name and a description; using the on-screen keyboard.

The attacher also displays if **Router Overwrite** has been selected.

The {Copy & Next} button is a quick shortcut function forcing the switcher to take the name from the current Source, and then jumps on to the next Source in the list - this makes naming all of the sources much easier and quicker.



This menu displays the video standard for the selected BNC. The video standard for the incoming source can be set to the default mainframe video standard, changed to a new standard or using the {Auto Standard} button which will allow the system to “auto detect” the incoming source video standard and will keep the original video standard of the incoming source.

**New Standard** parameter, use the Up/Down scroll buttons to select the required standard, then touch the {Apply} button.

The **V Offset F1/F2** parameters are used to adjust to the point where active video reaches the bottom line on both fields.



The Timing Parameter indicates the Offset in Micro seconds (or Milli Seconds) between the Reference input and the selected source. To Clean switch or avoid a Line offset (e.g. a vertical shift) the Timing has to be within +/- half a line of the current standard. e.g. for 1920x1080i59.94 +/-14uS).

Note: All Sources have to be within this window. Any sources outside this window can be corrected by using FormatFusion.

To Adjust this timing window go to the Eng Config/System Standard menu and adjust the Genlock phase. NB adjustment of the Gen Lock Phase will also adjust the Video Outputs to have a Phase offset from the incoming reference. The Output Offset is +2 Lines from the Reference + Genlock Phase.

The CRC (Cyclic Redundancy Check) field shows the CRC for the current Frame. e.g. In general this will be a changing number for a moving picture and a static number for a still.

The **{Copy & Next}** button is a quick shortcut function forcing the switcher to take the name from the incoming Source, and then jumps on to the next Source in the list - this makes naming all of the incoming sources much easier and quicker.

## Input Frame Synchronization

Sometimes sources will arrive at the switcher, which are not synchronized. Using frame synchronizers in Kula we can ensure all sources cut cleanly. With Kula we also have a 10µs timing window, so if the source is within this, a frame synchronizer is not required.

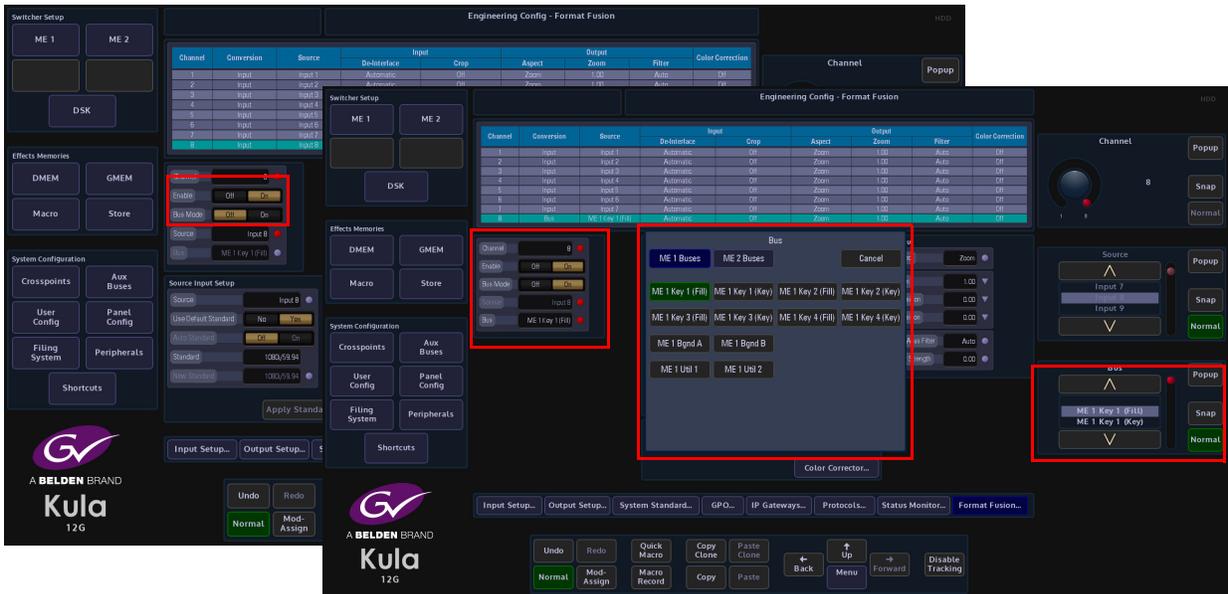
### Frame Synchronization using FormatFusion3

FormatFusion3 on Kula allows frame synchronization and also format conversion on all inputs. We have up to 4 FormatFusion3 channels in the 1M/E Kula and up to 8 FormatFusion3 channels in the 2M/E Kula. Each of these FormatFusion3 channels can be assigned to any inputs, any outputs and any Buses. This gives us the ability to frame synchronize on every input without losing any of the DVE power from the M/Es, in HD and 3G.

### If more than 4 or 8 sources are need to be Synchronized

Broadcast facilities normally only need to synchronize cameras or outside sources that are not locked or have been temporarily added into an existing production work flow. Typically as 1 M/E and 2 M/E productions don't require a huge amount of cameras or outside sources, so, 8 synchronizers is more than enough. With Kula software version 3.1r1 and greater, FormatFusion3 can now be assigned to any of the internal Buses, including M/E Buses. This means all sources selected on the M/E will be synchronized. This gives the ability to synchronize all incoming sources.

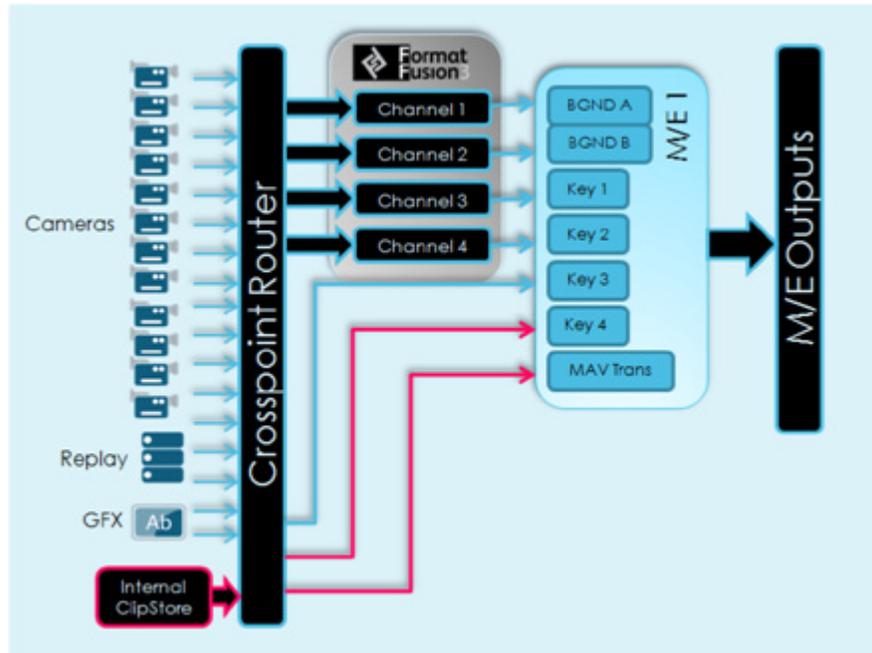
In the **Engineering Config - Format Fusion** menu, set the **"Bus Mode"** parameter to **"On"**.



The **"Bus"** parameter controls will turn on allowing the user to touch the **"PopUp"** button to open the popup menu. The user can now select between **M/E Key**, **M/E Bgnd** and **M/E Util** Buses for the selected M/E. This can be done on a channel by channel basis. As mentioned earlier, if the user selects for example **"ME 1 Bgnd A"** all sources selected on that Bus will now be synchronized.

Note: See the FormatFusion3 section at the end of the Engineering Config section of this manual.

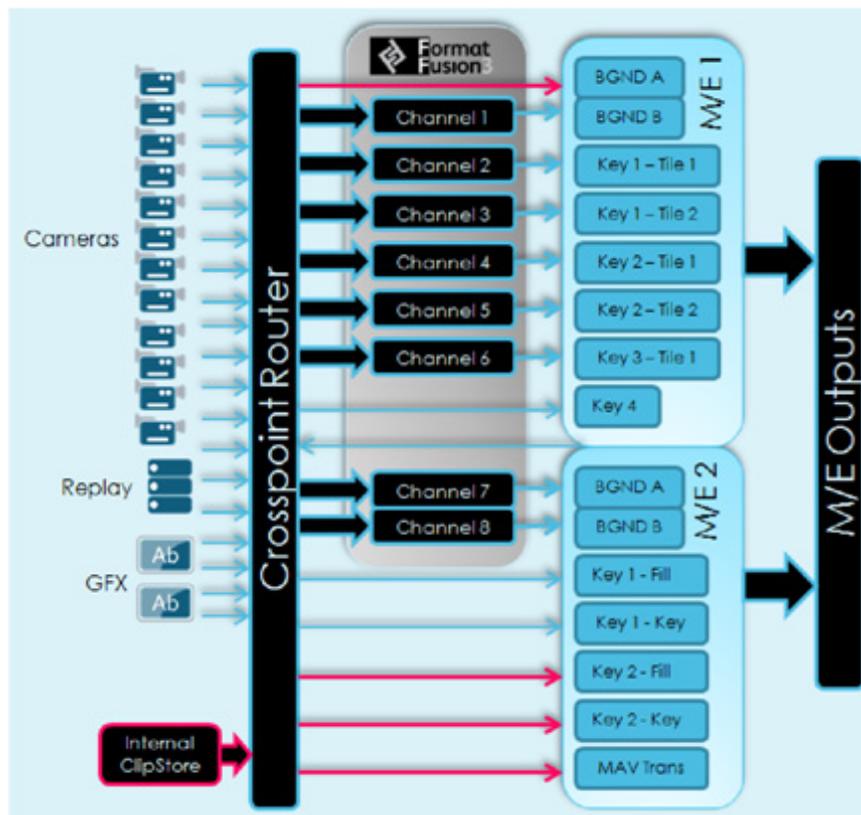
The example below shows how the FormatFusion3 can be applied in a 1M/E system.



With this configuration we are able to produce an output like this:



Now, look at a typical more complex example that may be used with 2 M/Es.



The user can now create a 5 way box on M/E 1 (all possible with non sync sources) with a store or any other background, plus graphics using Key 4 for the location of each of the boxes.



This can then be taken as a source on M/E 2, with lower third GFX, bugs and logos added. Plus animated MAVTrans can still be done on both M/Es using the internal clip store.

## **Summary**

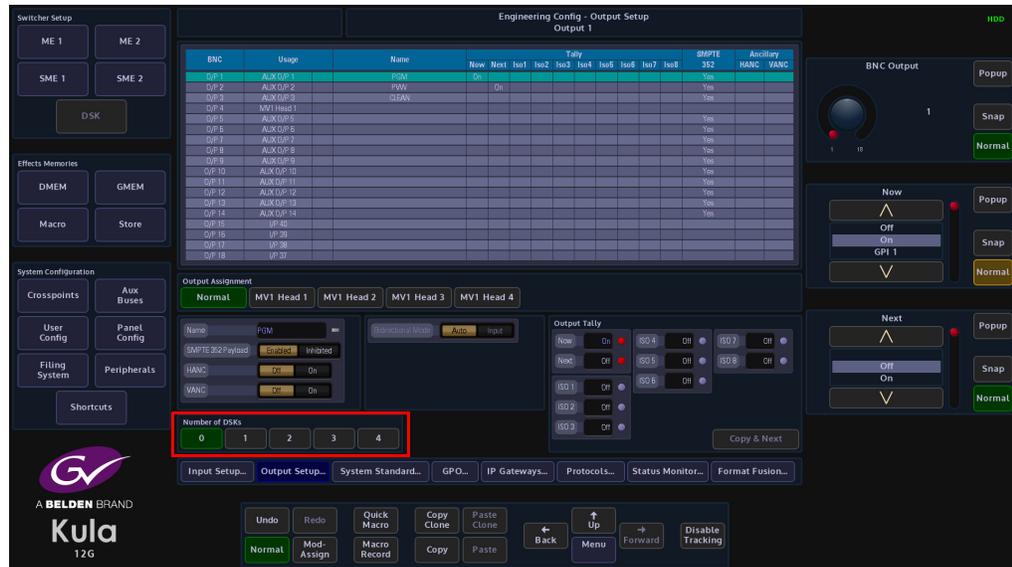
Synchronizers are not normally required for all sources, as in house standard cameras, servers, GFX are normally locked to in house reference. External or non standard equipment normally requires synchronization.

This document shows the flexible nature of Kula and FormatFusion3 to be able to synchronize all inputs and still create complex effects with multiple DVEs, both in HD and 3G with no loss of M/E or DVE functionality.

## Output Setup

This menu is where each BNC output from the Kula mainframe is setup, within these menus the user is able to:

- Name and give a Description to each BNC output
- Setup ISO Tally's for each BNC output
- Assign DSKs
- Assign the Bi-directional Inputs and Outputs



The default setting for all outputs is as an Aux output, this can be user-defined by changing any of the outputs to become one of the 4 Multiviewer Heads.

Note: All multiviewer outputs are set to 1080p video standard irrespective of the system standard, but the frame rate is set by the system standard. For example, if the system standard is 1080i/59.94, then the multiviewer output is 1080p/59.94. Please make sure that any HD-SDI to HDMI or DVI converters being used are capable of receiving 1080p and the monitor being used is also capable of receiving 1080p.

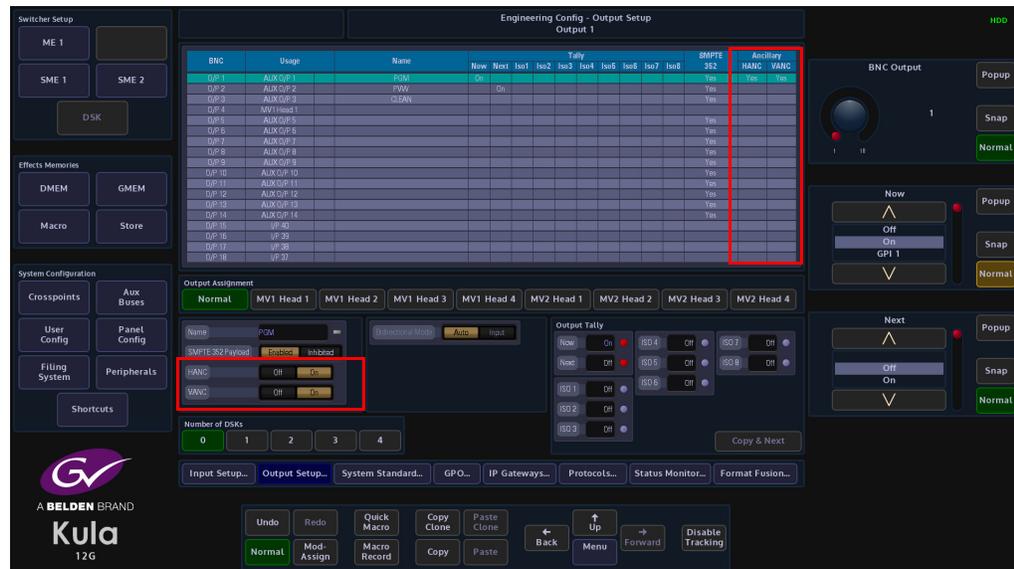
Outputs 13 to 18 are the “Bi-directional” Inputs/Outputs. By default, they are outputs but when using the DSK selection buttons, the following happens:

- **Selecting 2 DSKs** - Makes O/P 17/18 into Inputs (2M/E mainframe I/P 37 and I/P 38) (1M/E mainframe I/P 19 and I/P 20).
- **Selecting 3 DSKs** - Makes O/P 15, 16, 17 and 18 into Inputs (2M/E mainframe I/P 37, 38, 39 and 40) (1M/E mainframe I/P 19, 20, 21 and 22).
- **Selecting 4 DSKs** - Makes O/P 13, 14, 15, 16, 17 and 18 into Inputs (2M/E mainframe I/P 37, 38, 39, 40, 41 and 42) (1M/E mainframe I/P 19, 20, 21, 22, 23 and 24).

## Parameter Controls

**Name** - A user-defined name can be given to each output for reference.

**SMPTE 352 Payload** - This parameter specifies a “payload packet” which can be included in a serial stream as ancillary data. This indicates such things as the video standard, picture rate, aspect ratio etc. of the video signal that stream carries. The button turns it on and off on each output.



**HANC/VANC** - Ancillary Data can be output from any BNC output on the mainframe. These buttons are used to either pass or block the ancillary data on each individual output.

The Kula is able to receive Ancillary Data and pass the ancillary data out from any BNC outputs from the mainframe.

The ancillary data is part of the horizontal and vertical blanking portion of the video signal and is known as **HANC (Horizontal Ancillary Data)** and **VANC (Vertical Ancillary Data)**. The portion of the ancillary data we are interested in is **Embedded Audio**.

The embedded audio will usually be in the **HANC** portion of the video signal, and is the most likely way that embedded audio data is received. There can also be other forms of information embedded in the HANC data; such as, SMPTE 352 Payload identifier or SMPTE 2051 two-frame marker.

**VANC** is also able to carry embedded audio in the form of Dolby E™, VANC also carries other ancillary data; such as video standard, aspect ratio, content name etc.

### Where Embedded Audio can be used:

The embedded audio can pass directly from input BNC to output BNC, or video containing the embedded audio can be grabbed from a crosspoint into a Store. The software allows just the audio to be grabbed separately from the video. This is setup using the **Grab Crosspoint** parameter in the **Store Grab** menu, where the audio has been setup on a crosspoint and then using the **Grab Crosspoint** parameter on a selected M/E, use the **“Grab Audio”** button to grab the required embedded audio.

The other method of importing video with embedded audio into a ClipStore is using K-Watch application software, in the Filing System Import Export menu.

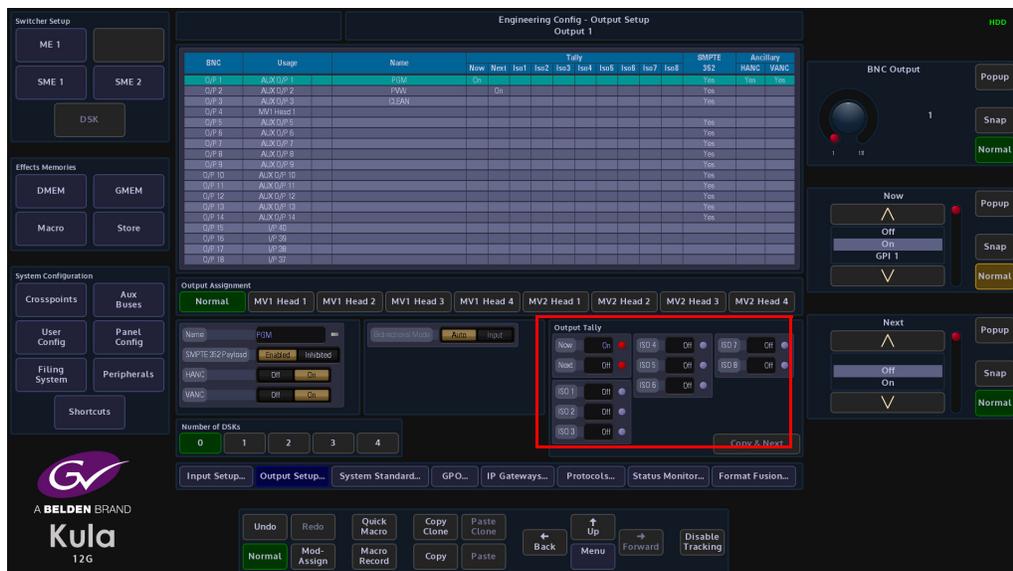
**Output Assignment** - This allows the user to change an output to become a Multiviewer Head.

**Number of DSKs** - As mentioned above, selecting DSKs will change the bi-directional input/outputs into inputs.

**Bi-directional Mode** - This allows the user to individually change Outputs 13 to 18 into Inputs.

### Output Tally

The GPO Tallies can be set to provide up to 8 further output Tallies ISO1 to ISO8. These can be used to Tally outputs that are being used as ISO (isolation) Feeds.



ISO Tally's can be used for example in a studio situation where studio cameras are recording live and/or live to disk or tape. The ISO tally can be used to signal if a camera is live, or recording.

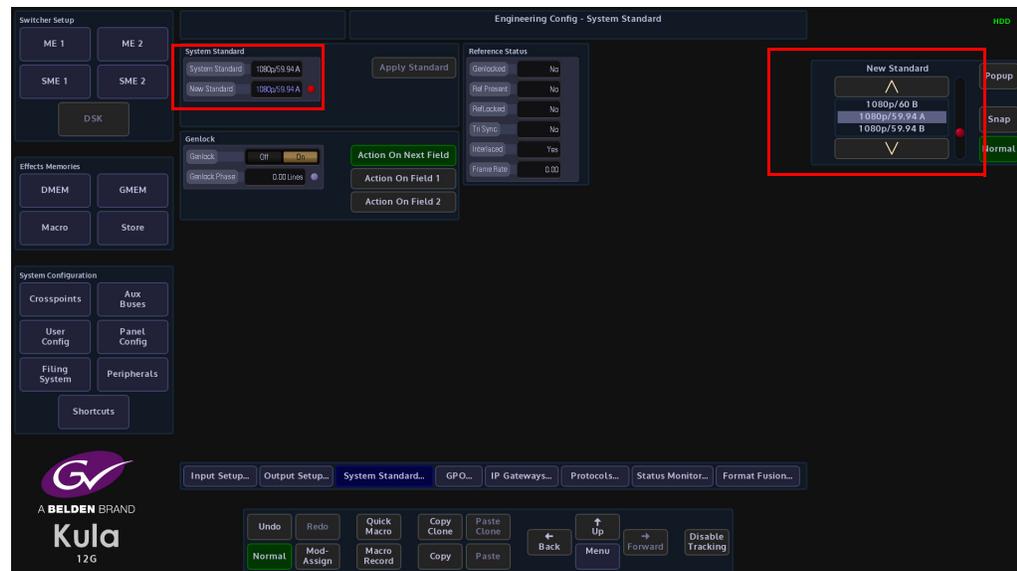
**Tally Now** sets the tally for the on-air Sources. Set this for the PGM output.

**Tally Next** - This sets the Tally for the next on-air source. Set this for the PVW Output.

## System Standard

The system standard menu; as the name suggests, is where the default video standard is set for the Kula system.

Note: The Kula mainframe must have a Reference signal applied to the "Ref In" BNC on the mainframe.



When the "System Standard" is set, this becomes the default standard for the whole system. To change the standard use the "New Standard" parameter to scroll up/down through the list of video standards. When the required standard is reached, notice the **{Apply Standard}** button has turned orange, press the "Apply Standard" button and a new system standard is set.

**Genlock** - Switch Genlock On, if the standard set for the selected Reference Input is not compatible with the system standard.

**Genlock Phase** sets the timing of the input router cut point relative to the genlock reference.

Reference Status - The information refers to the analogue Ref input.+

- **Genlocked** - Yes = genlocked
- **Tri Sync** - Yes = horizontal/vertical sync detected
- **Interlaced** - Yes = interlaced, No = Progressive.
- **Frame Rate** = frame rate in Hz

The mainframe will not genlock if the standard of the reference is incompatible with the system standard. (Compatible means same 1/2 or 2x).

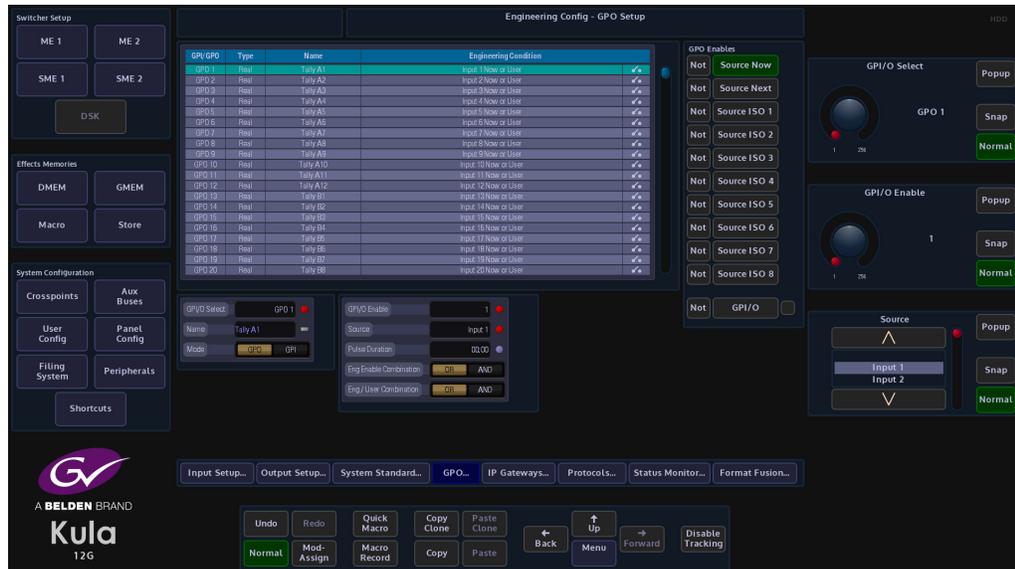
**Action On Next Field:** all actions on next TV field.

**Action On Field 1:** sources cut on field 1 only, all other actions on next field.

**Action On Field 2:** sources cut on field 2 only, all other actions on next field.

## GPO

This is a “source” based GPO setup menu, meaning that it is used to tally on sources coming into the Kula mainframe.



**GPI/O Select** is used to scroll down the table through the individual GPI/O/Tally's, the **Name** parameter allows the user to re-name the tally if required. The default table is a one-to-one connection; Tally to Input.

**Source** - parameter is used to assign a tally to another input as required

### GPO Enables

**Source Now** - This sets the GPO to be a tally for On Air Sources.

**Source Next** - This sets the GPO to be a Tally for the next on air source. Source next is determined by which sources are just one transition away, including any M/E re-entry. E.g. If M/E2 is set to look at M/E1 the next configuration will indicate the next sources, including Keys, in the M/E2 transitions, as well as the next sources in the M/E1 transition.

**Source ISO/ISO8** - This sets the GPO to be an ISO (Isolated) tally for On Air Sources.

**Red Indicator** - If GPO 1 is set to look at a Source and its State is Closed the light for GPO 1 will be Red.

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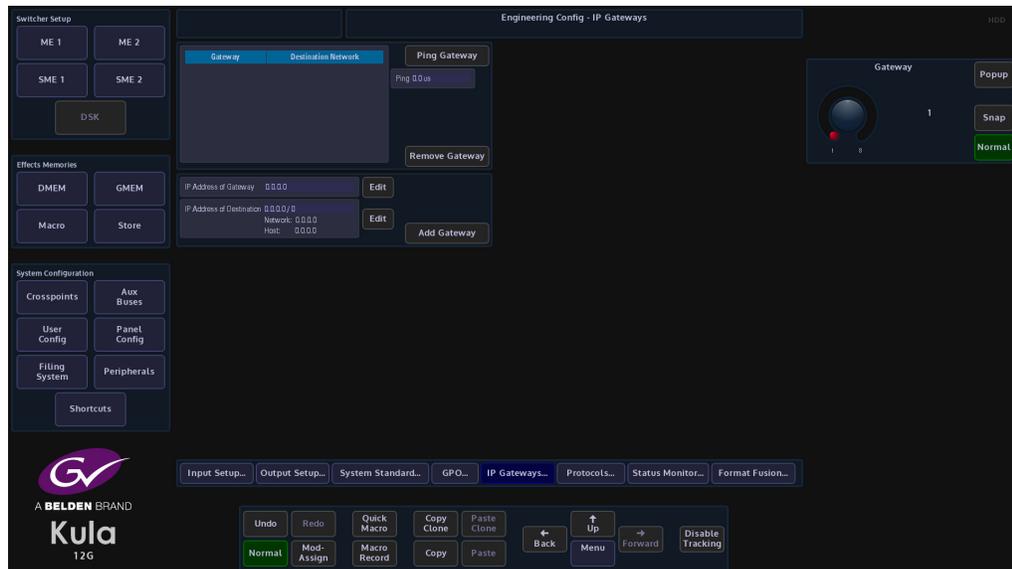
Note: The GPO Enables have to be set for each GPO for the parameter to be actually used.

---

**Eng Enable and Eng/User Combine OR/AND** - Performs a logical 'ANDing' or 'ORing' of the GPO Enables. This defines the combined event, which will trigger a GPO and GPI.

## IP Gateways

The **Engineering Config - IP Gateway** menu allows the user to add a route to a destination network through a local IP Gateway.



Touch the **IP Address of Gateway** attacher and set the four **New Gateway** parts of the address (A) (e.g. 172.28.1.6). Note. The network part of this address must exactly match the network part of the panel's IP address.

Next press the **IP address of Destination Network** attacher and set the four parts of the destination network address (e.g. 172.23.0.0) and set the number of bits of the netmask for the destination network.

Finally, press **Add Gateway** to add the new gateway to the list at the top of the menu. This has now told the panel how to send a message onto network 2, but not where it should go when it gets there.

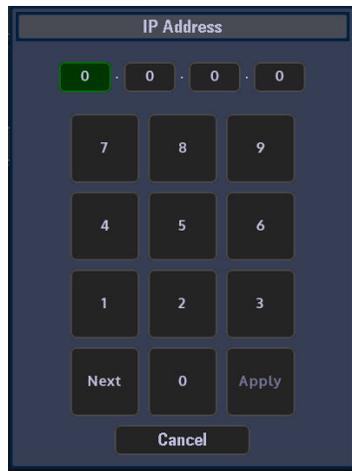
To check that the gateway is attached to the network and is responding, press the **{Ping Gateway}** action button. The box below the button should show the ping round-trip time for a few seconds followed by:

**"Good"** **"Fair"** may give occasional **"Lumpy"** controls

**"Poor"** may have excessive lumpy controls and cause a loss of comms, **"Failed"** no link at all.

Press **{Remove Gateway}** then make the required changes to the five parameters, then press **{Add Gateway}** to put the modified entry back into the list.

Pressing either of the **{Edit}** buttons for the Gateway or destination IP addresses will display a number entry pad. Enter the required IP address and then touch the **{Apply}** button.



## Protocols

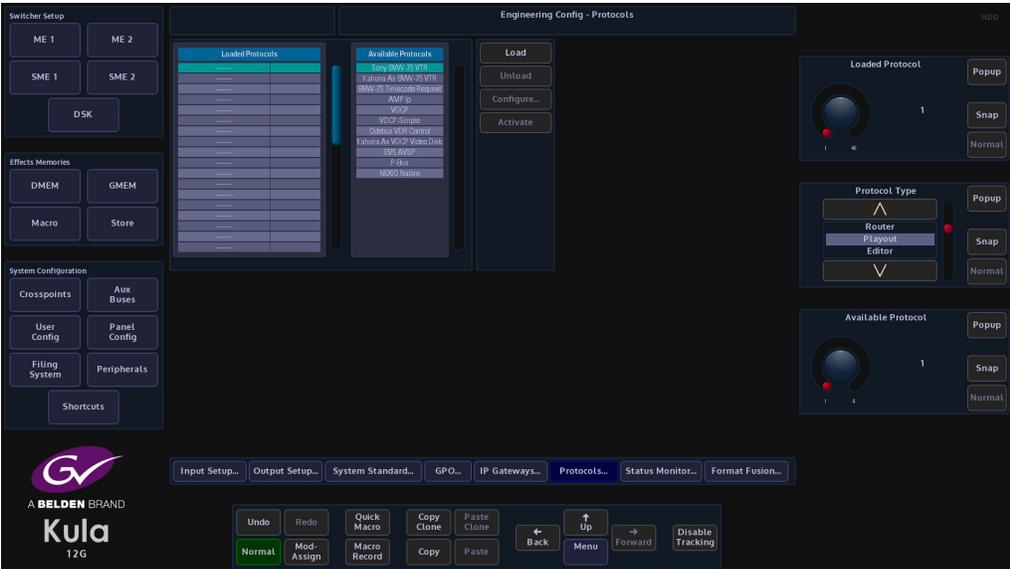
The Protocols menu is used to set parameters for bi-directional communication with external devices either by one of the RJ45 RS422 ports or selecting one of the IP protocol connections.

Protocols have to be setup in this menu before the Peripherals functions can be used.

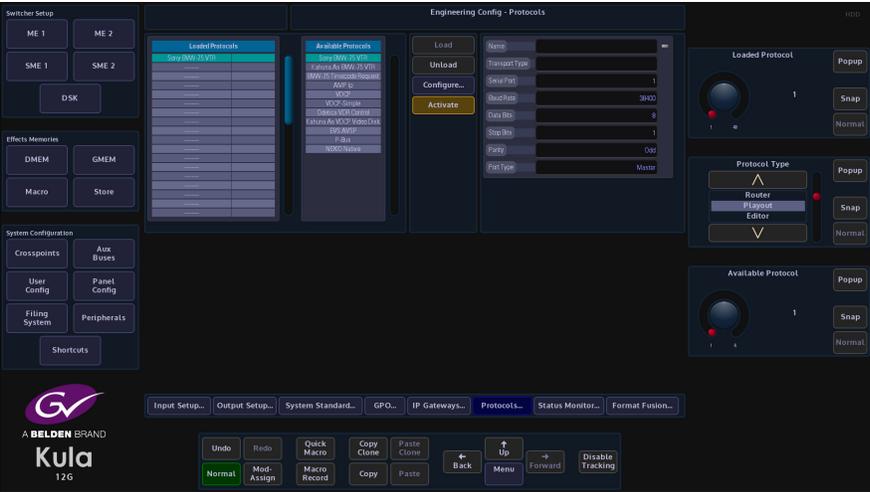
There are 5 Protocol Types to choose from; Tally & UMD, Router, Playout, Editor and Miscellaneous. Each protocol type has a number of available sub-protocols to choose from, that allows the users to connect to a large number of different types of external equipment.

### Selecting and setting up a Protocol

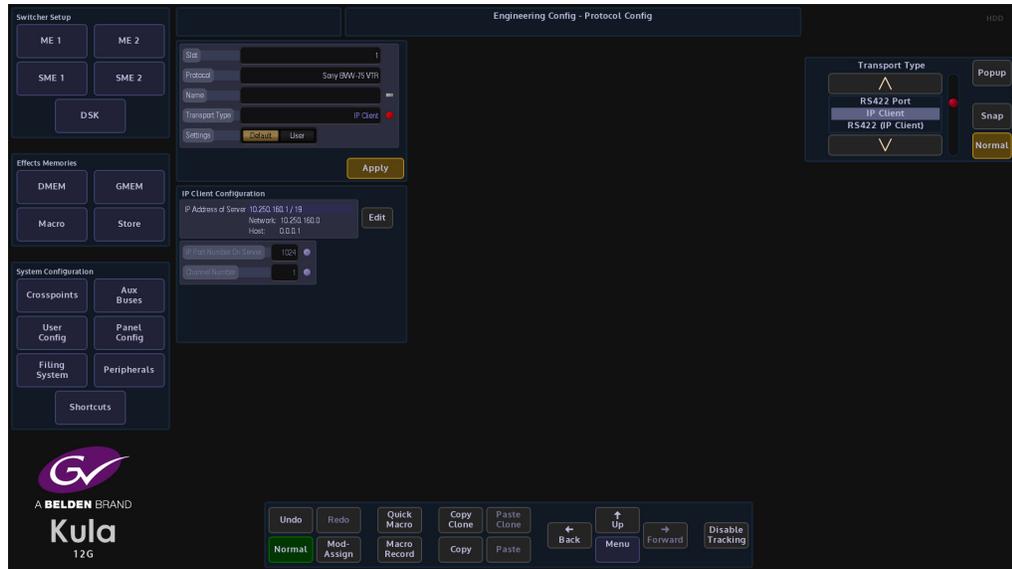
Using the Loaded Protocol parameter, select a free row in the Loaded Protocols table, then use the **Protocol Type** parameter is used to scroll through the protocol sets.



Once the required Protocol Type has been selected, use the **Available Protocol** parameter to scroll to the required protocol and then touch the **{Load}** button.



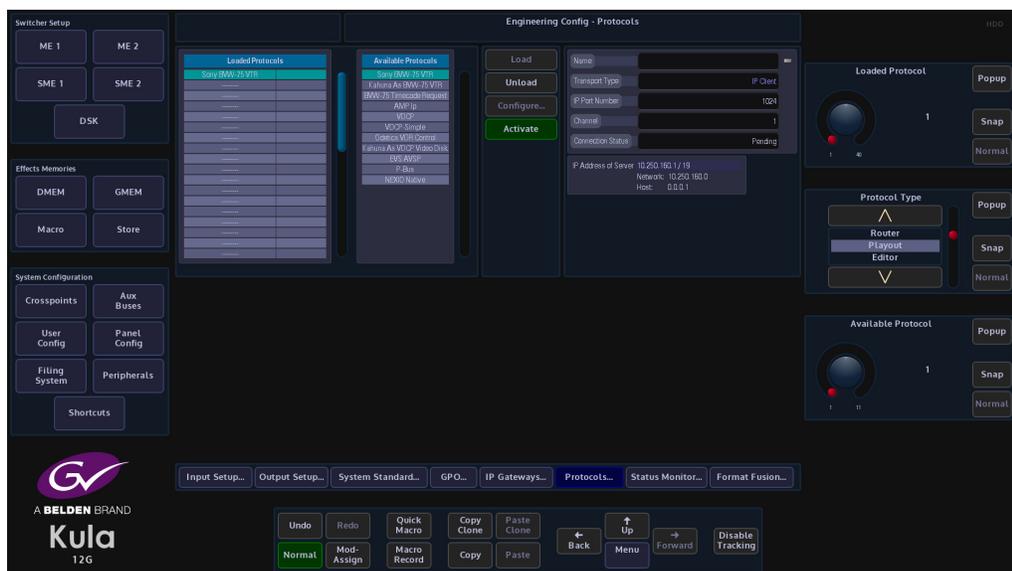
After the Load button was touched, the selected protocol is placed in the **Loaded** Protocols table, touch the **{Configure}** button to enter the **Protocol Config** menu.



The user is able to select the type of connection that is required “**Transport Type**” i.e Serial or IP, and also set user-defined parameters for the protocol.

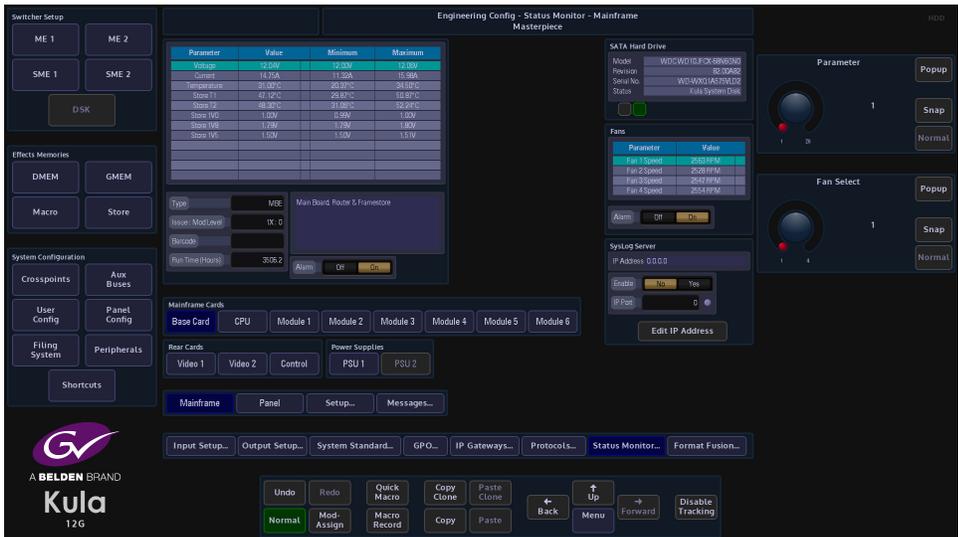
The **Settings - Default** as the name suggests is the default setup to communicate with an external device (normally this would default to “RS422 Port”). If a specific setup is needed, press the **{User}** button in the **Settings** parameter, the user is now able to setup the protocol as required. When the parameters have been set correctly press the **{Apply}** button. The menu will now return to the main Protocols menu.

The **{Activate}** button will be yellow, if happy with the setup, touch the **{Activate}** button. The protocol setup information is displayed on the right side of the menu.



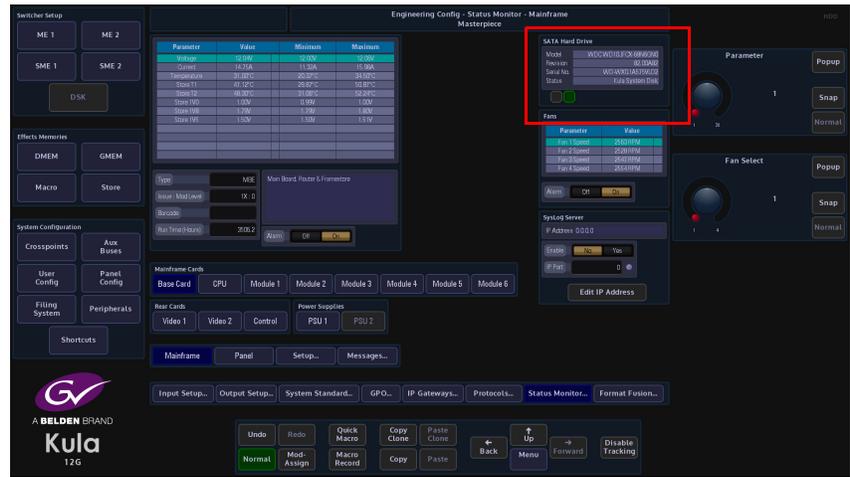
### Status Monitor

The Status Monitor function monitors the overall health of the mainframe allowing the user to easily see any problems in the unlikely event that the Kula mainframe should have a fault.



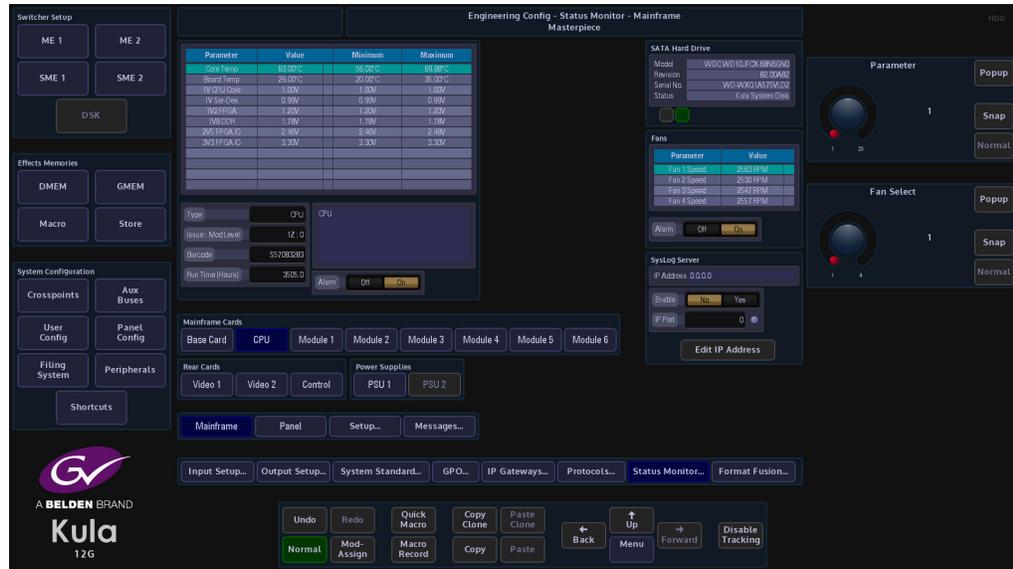
The main status monitor menu displays all the internal cards in the mainframe, the power supplies, fans and Rear Cards.

The **Mainframe Cards - Base Card** menu displays the voltage and current on the card, the table displays the operating voltage and current at the present time, and the max/min values that have been reached during the boards working life. The **Alarm** is set to On so that if the voltage or current goes over a value specified by the factory then the alarm will go off and the warning box at the top left of the menu will have a warning note. The warning will be displayed in all menus while using the system until something is done to sort the problem out.



Top right of the menu, information related to the SATA hard drive is also displayed, and below, the fan speed of the 4 fans at the front of the mainframe.

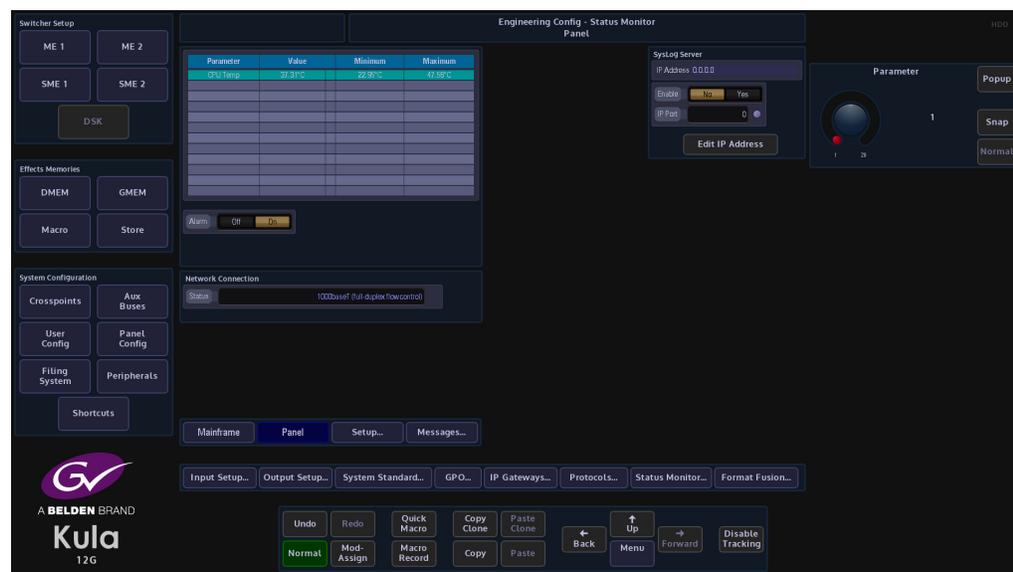
Pressing the **{CPU}** button in the menu will display the current operating temperature of the CPU, the board temperature and all the voltages related to the CPU.



The other monitor menus within status monitor all work in a similar way all giving similar information to the user.

## Panel

The Status Monitor - Panel menu allows the user to monitor the CPU temperature in the KPP and KPX control surfaces.



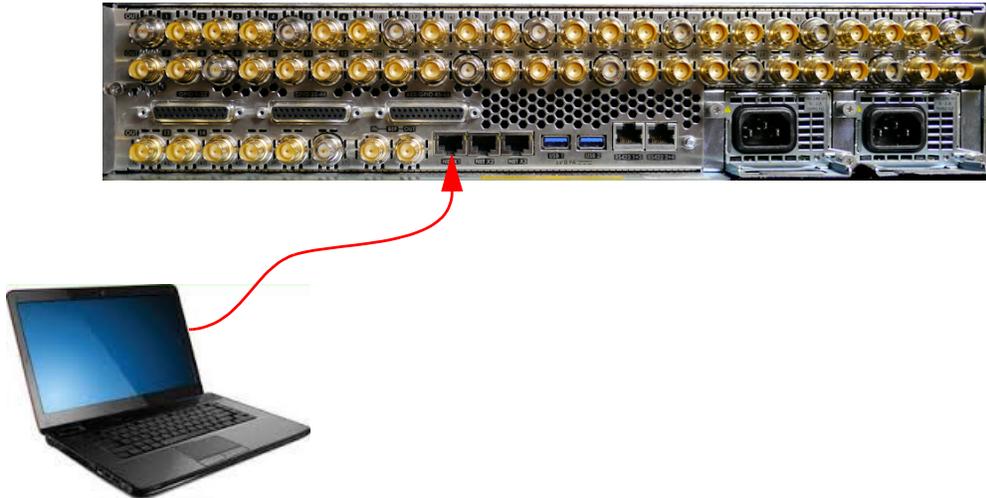
The user is also able to setup the SysLog Server IP address so that an external PC running SysLog Server software can monitor Kula. (please read the next section of this manual).

### Status Monitor Panel - SysLog Server

The Kula Production Switcher mainframes and control panels are now capable of using an external Syslog server to save its diagnostic output. In the unlikely event of there being a problem with a Kula system, Syslog can be used to display error log files.

### Connection

To use Syslog, a computer needs to be connected to the Kula mainframe via one of the network ports (as shown below).



### IP address

The next thing to find out is the IP address of the computer being used. If the IP address is not static, then open a Command Prompt.

If using a Windows™ operating system for example, in the command prompt window type:  
>Ipconfig /all

In the message list look for:

"Ethernet adapter Local Area Connection"

Then look for "IPv4 Address" It will show (for example) 192.28.7.7

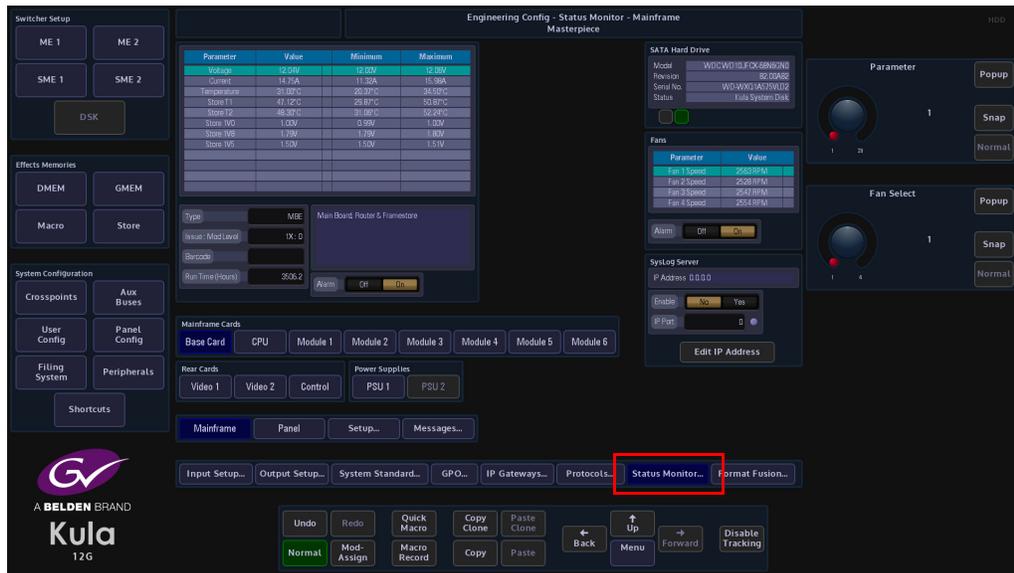
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Note: Make a note of this address.

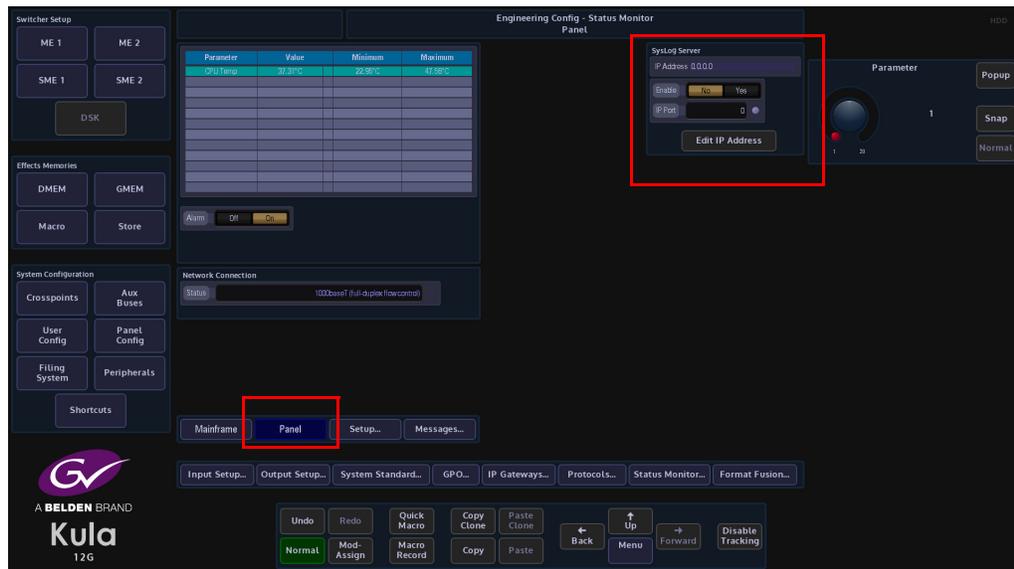
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## Kula Setup

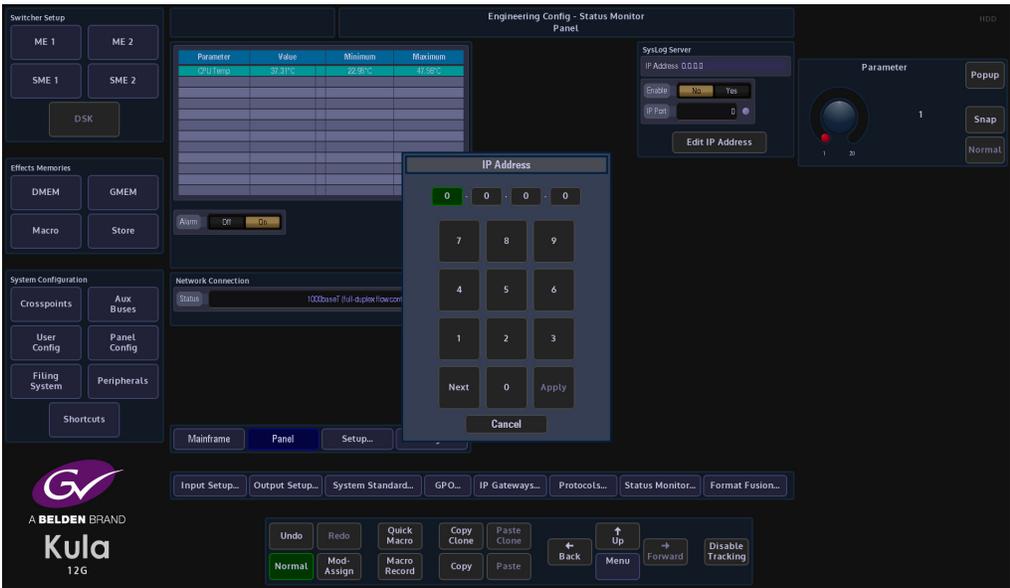
The next, setup the connection between the computer and the Kula mainframe.  
Touch the **{ENG CONFIG}** menu link button, then touch the **{Status Monitor...}** menu link button.



Then in the "Status Monitor" main menu touch **{Panel}** menu link button where the **SysLog Server** parameter controls are displayed.



Touch the **{Edit IP Address}**, then enter the IP address of the computer.

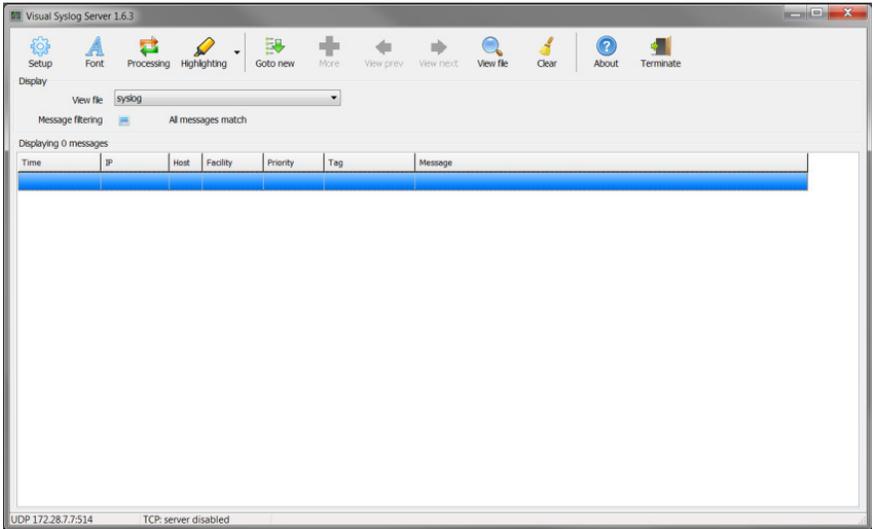


In the menu, use the **"IP Port"** parameter to set the port number. It is set to **"514"** as a default, but it can be changed to a user defined number. Set the **"Enable"** parameter to **"Yes"**.

Syslog Application

There are many Syslog servers available on the Internet, they are suitable for a variety of platforms (Windows, Linux, OS etc).

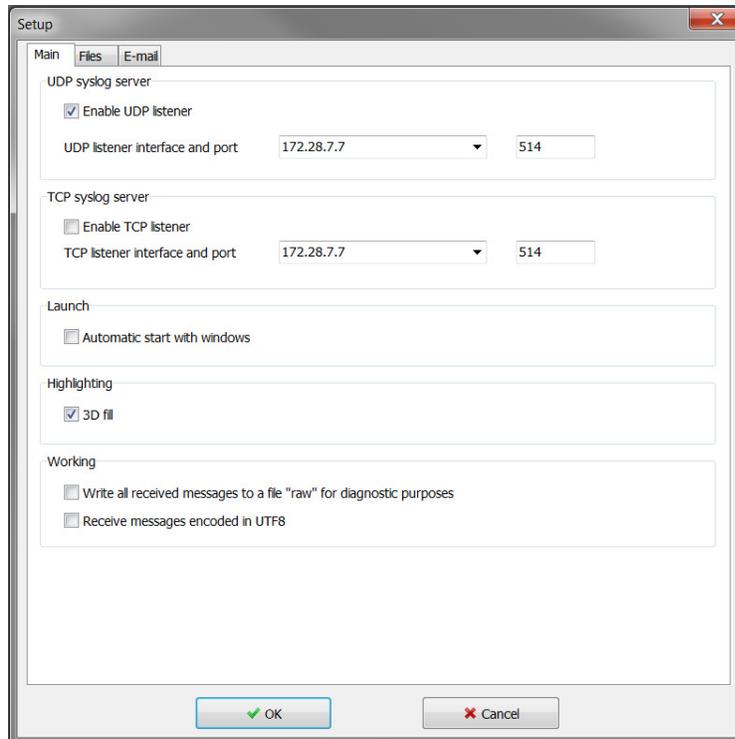
This example uses a generic Syslog Server application. Once installed open the Syslog application.



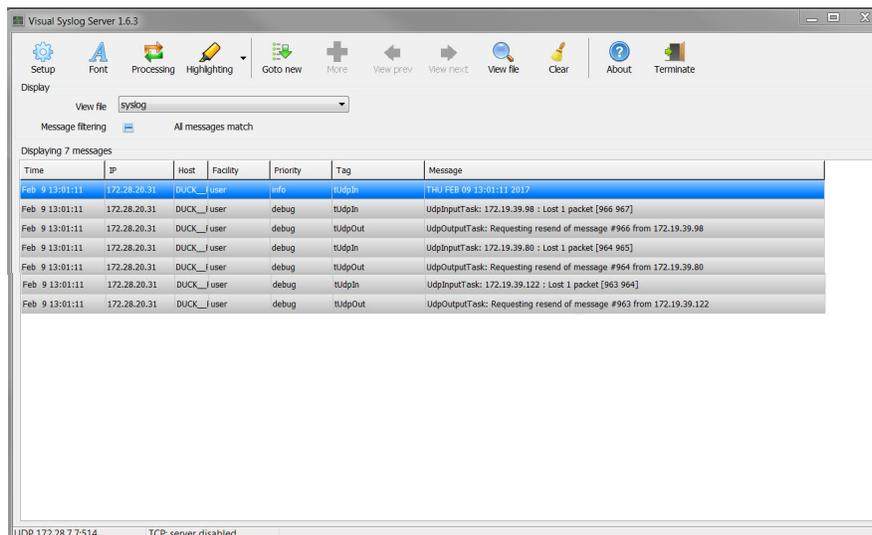
Select setup.

Enable UDP Listener, then set the IP Address to be that of the computer. Set the port number to be 514 (or what ever it was set to on Kula).

Note: Usually, Syslog servers will use UDP port #514, although they will offer the ability to change this port, allowing the same machine to run multiple Syslog servers simultaneously.



Click on **{OK}** and the Syslog software should now start receiving messages from Kula.



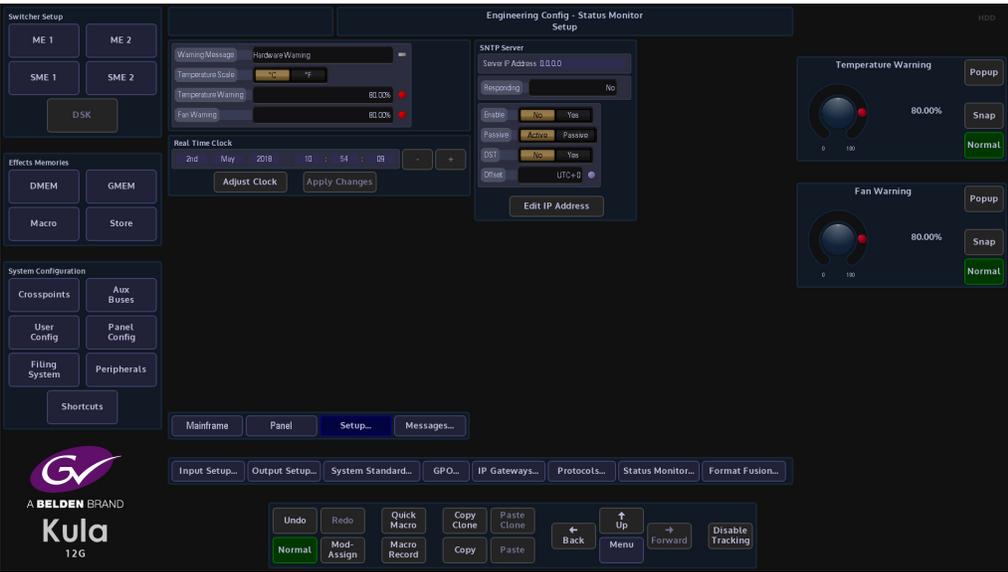
The job of a Syslog server is to open up a network port and log all Syslog format messages that are received at the port; in this example from Kula. Usually, messages are recorded continuously into a file or files on the disk.

The log file may be restricted to a maximum size and can either be used as a circular-buffer or a new file can be started when the maximum size is exceeded or when a time duration has passed (e.g. start new file each week or if the file exceeds 10Mbytes).

Logged messages can be color-coded by severity. They can also be filtered and sorted by who sent them, their severity, time stamp etc.

### Setup Menu

The **Status Monitor - Setup** menu allows the user to set the maximum values for temperature, voltage and fan warnings before the alarm status is reached.



The default setting for all the alarms is set to 80% of the factory maximum limit. The warning message can be changed to what ever is needed; the temperature scale can be changed and the real time clock set.

## Messages

The Status Monitor - Message History menu will display a history of any significant events or hardware warnings with the time and date against them.

In the unlikely event of a problem, this menu can be used as a high level review of any possible failures. For more detailed information please use the **Export Status Log Files** option in the **Mainframe Configuration** menu.

The screenshot displays the 'Engineering Config - Status Monitor Message History' window. The central pane shows a table of messages:

Time	Messages
18:02:04	Logged in to: Masterpiece (Masterpiece)
18:05:01	Connecting
18:46:56	Logged in to: Masterpiece (Masterpiece)
18:46:52	Connecting
18:06:11	Logged in to: Masterpiece (Masterpiece)
18:46:09	Connecting
18:30:07	Logged in to: Masterpiece (Masterpiece)
18:30:06	Connecting
8:04:07	Logged in to: Masterpiece (Masterpiece)
8:04:05	Connecting
8:44:02	Saving...
22 Apr 18:10	Saving...
22 Apr 18:10	Saving...
22 Apr 18:10	Saving...
23 Apr 8:16	Loading...
23 Apr 8:14	Logged in to: Masterpiece (Masterpiece)
23 Apr 8:14	Connecting
23 Apr 8:14	Panel Powered Up

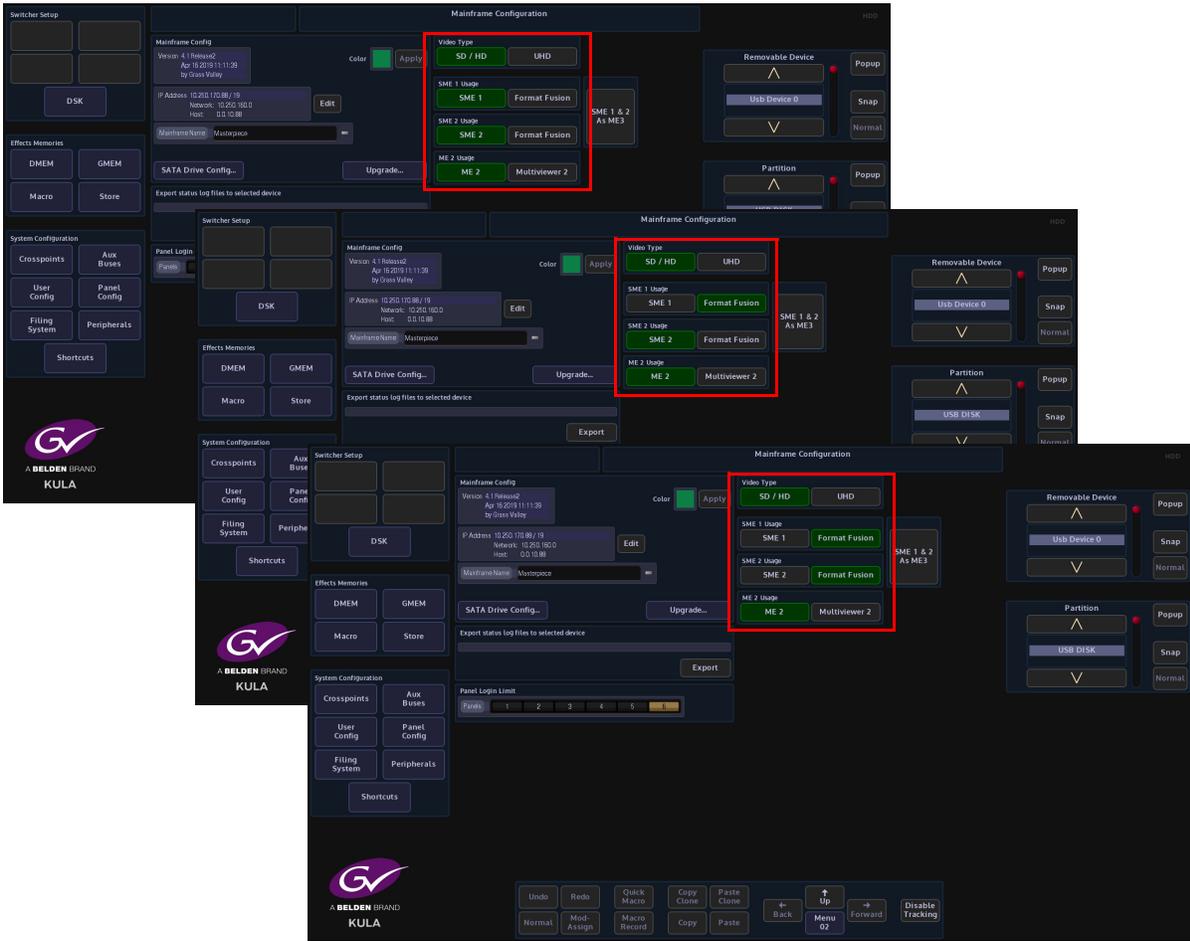
Below the table, the 'Current Time' is shown as '2nd May 2018 10:54:23'. The interface includes various configuration menus on the left (Switcher Setup, Effects Memories, System Configuration) and a bottom navigation bar with buttons for 'Mainframe', 'Panel', 'Setup...', and 'Messages...'. A 'Selector' knob is located on the right side of the window.

## FormatFusion3™

The FormatFusion3™ controls allow the user to change the aspect of an input source, this would be used for example if a portion of an HD source needs to be cropped and stretched to fit a 16:9 format or an SD 4:3 source aspect has to change to fit a 16:9 output.

### FormatFusion3 Initial Setup

The initial setup of FormatFusion3 is done in the logged off state in the “Mainframe Config” menu. The user can select 4 or 8 channels of FormatFusion3 by selecting FormatFusion3 instead of SME1 (4 channels) and FormatFusion3 instead of SME2 (8 channels) as shown below.

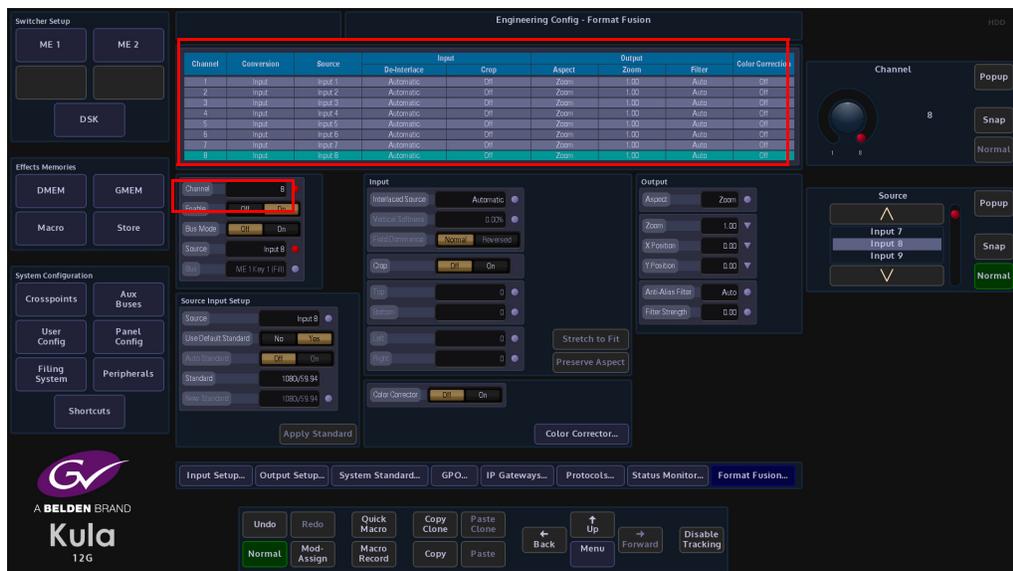


## Input FormatFusion3 Inputs and Channels

To use FormatFusion3, touch the **{Input Setup...}** button, then in the menu, select an input by touching an input row or use the **"BNC Input"** parameter. Once selected, set the **"User Default Standard"** parameter to **"No"** and set the **"Auto Standard"** parameter to **"On"**. This must be done for each input that requires FormatFusion3.



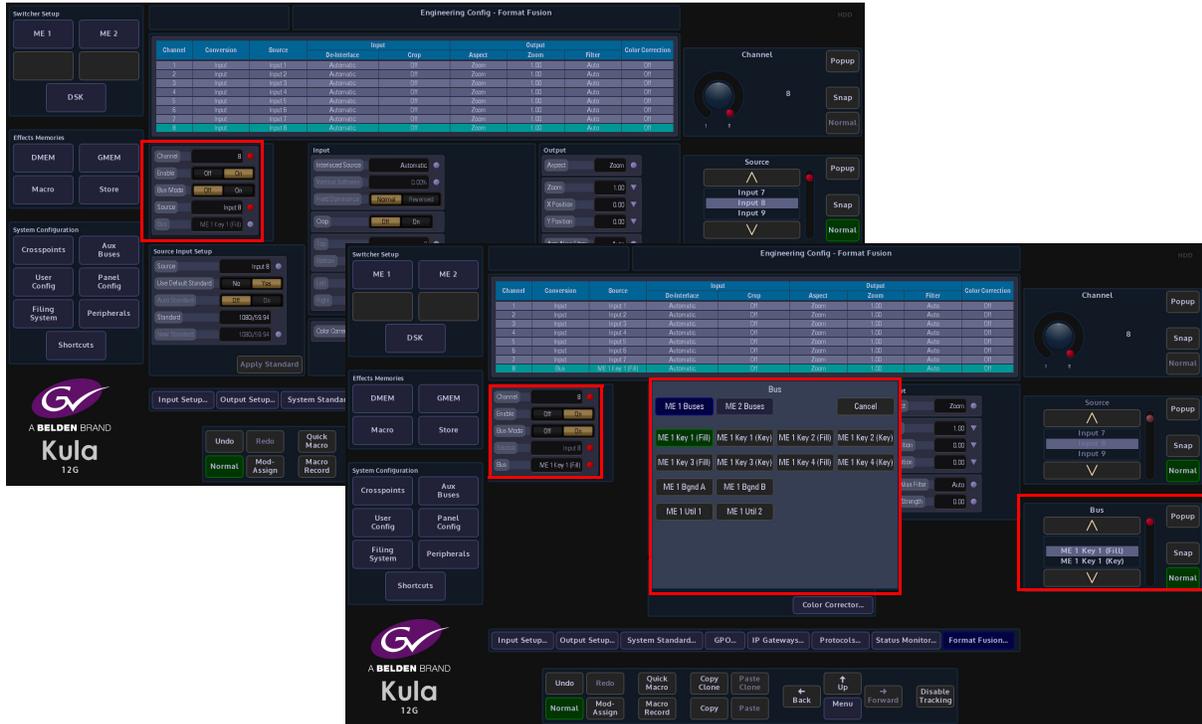
In the Engineering Config menu, touch the **{FormatFusion3...}** button to open the menu. The table at the top of the menu displays the available channels of FormatFusion3. There are 4 Channels when SME1 has been de-selected in the Mainframe Config menu and 8 Channels when both SME1/SME2 have been de-selected.



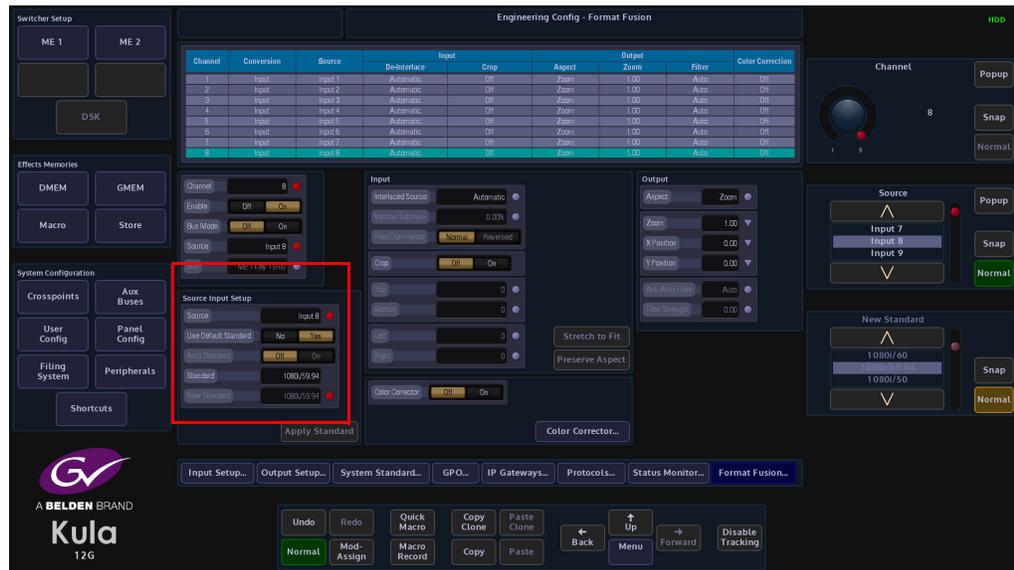
Each of the channels of FormatFusion3 in the table are individually enabled by setting the **"Enable"** parameter to **"On"**.

FormatFusion3 can now be assigned to any of the internal Buses, including M/E Buses. This means all sources selected on the M/E will be synchronized. This gives the ability to synchronize all incoming sources.

In the **Engineering Config - Format Fusion** menu, set the **"Bus Mode"** parameter to **"On"**.



The **"Bus"** parameter controls will turn on allowing the user to touch the **"PopUp"** button to open the popup menu. The user can now select between **M/E Key**, **M/E Bgnd** and **M/E Util** Buses for the selected M/E. This can be done on a channel by channel basis. As mentioned earlier, if the user selects for example **"ME 1 Bgnd A"** all sources selected on that Bus will now be synchronized.

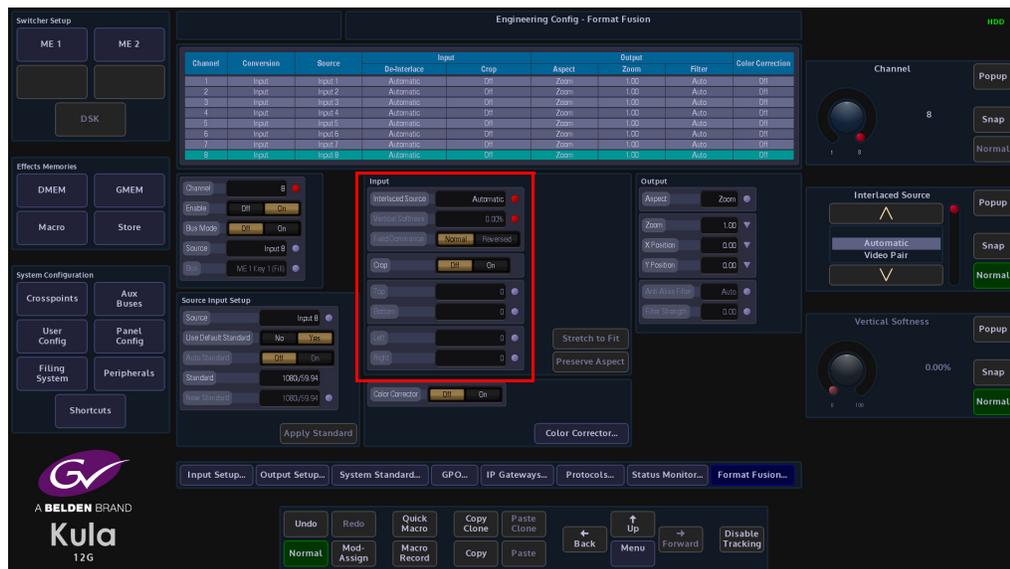


### Source Input Setup

**Source** - This selects the BNC Input.

**Use Default Standard** - This parameter will force the input source to use the default mainframe video standard which is set in the Eng Config - System Standard menu. The Default Standard can be changed using the New Standard parameter, use the Up/Down scroll buttons to select the required standard, then touch the **{Apply}** button.

**Auto Standard** - The video standard for the incoming source can be set to the default mainframe video standard or changed to a new standard using the **{Auto Standard}** button which will allow the system to “auto detect” the incoming source video standard and will keep the original video standard of the incoming source.



## Input

**Interlaced Source** - This has 4 parameter settings, these settings are listed below:

**Automatic** is the default setting for Interlaced Source it is the most suitable mode for live programme making. When creating the current field/frame, the automatic setting will use the current input field and a percentage of both the previous and next input fields. Typically used when the output of a camera is fed to the switcher as a continuous stream of footage.

**Video Pair** is used when creating the current field/frame, will use the current input field and a percentage of either the previous or next field to maintain 1-2 or 2-1 pairing. This could be used for pre-prepared material with cuts on known field boundaries to prevent possible subtle artifacts appearing at cut points.

**Film Pair** is used when creating the current field/frame, will directly combine the current input field and either the previous or next field. This mode should only be used if the fields are temporarily matched, e.g. PAL film based sources or some animation.

**Single Field** is used when creating the current field/frame, will only use the current input field.

The **Field Dominance** control selects which field comes first. The **Normal** setting is the default field setting for the input standard, the **Reversed** setting should only be used to correct sources that have incorrect field order (swapped fields). Swapped fields will manifest as very jittery motion.

The **Vertical Softness** control, this feature allows the user to visually "soften" the source on the selected input. Generally, this control is not required and should be set to 0% for the best de-interlacing quality. It is de-activated in Automatic mode, the function will work in Video Pair, Film Pair and Single Field modes.

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Note: Field Dominance and Vertical Softness can only be used with selected Interlaced Source settings.

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The **Crop** adjustments allow the user to crop areas of the image that may need to be hidden from view. Adjustments can be made to the **Top, Bottom, Left** and **Right** of the image.

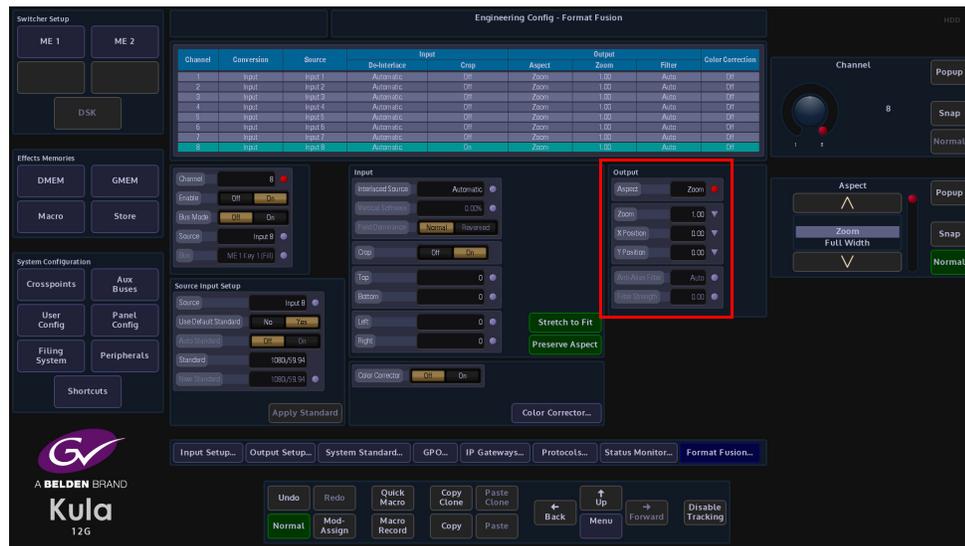
When the **Stretch To Fit** parameter is enabled the cropped picture content will be stretched to fill the 16:9 area.

With the **Preserve Aspect** parameter enabled, this will maintain the aspect ratio of the image e.g. If you crop left and right the image will zoom vertically to compensate. If a source has become very distorted or stretched, this function will adjust the source outwards from the center in all directions creating a 'zoom in' effect.

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Note: This may cause a very small amount of the source material around the edge of the source to be lost.

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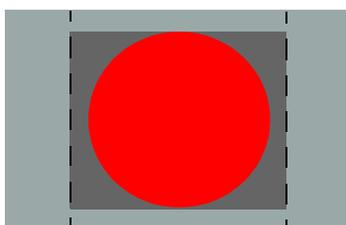
## Output

**Aspect Mode** has 3 settings: **Zoom**, **Full Width** and **Full Height**. The **Zoom** parameter allows the source to be zoomed out to fill the 16:9 aspect, when the source is zoomed to 16:9; it will appear slightly larger. The zoom function will not work if the aspect is set to Full Width or Full Height.

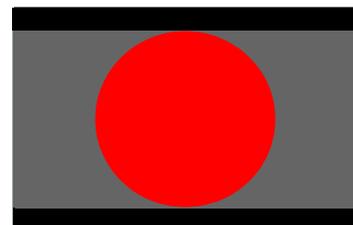
The **Full Width** parameter changes the aspect so that the full width of the 16:9 aspect is filled, in this setting a letter box effect is seen where there are bars at the top and bottom of the image.

The **Full Height** parameter will change the aspect so that the full height of the 16:9 aspect ratio is filled, leaving bars either side of the image.

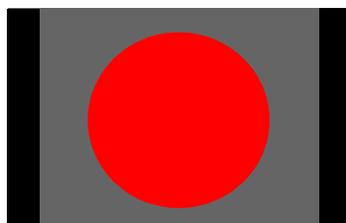
**Zoom, X and Y Position** - Will allow the source to be re-positioned within the 16:9 space.



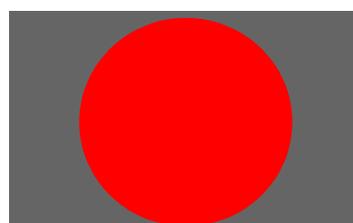
Original 4:3 Source on a 16:9 background



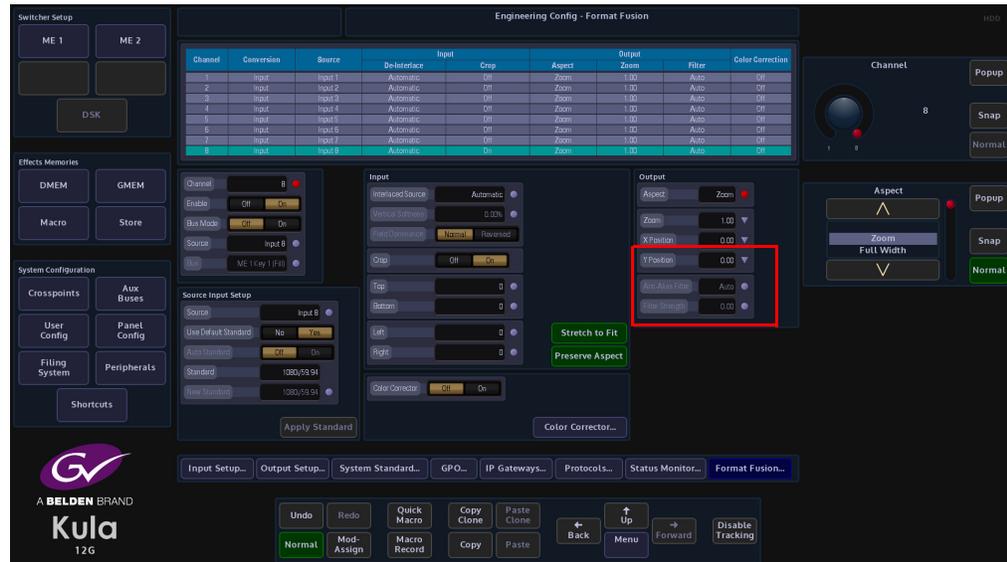
With Full Width Applied



With Full Height Applied



With Zoom Applied to fill 16:9 Aspect



**Anti-Alias Filter** - is used to vertically soften interlaced outputs. This will reduce line 'twitter' and 'jaggies', replicating the vertical filtering that would normally happen in an interlaced camera. This is particularly useful on SD outputs.

- **Off** - will never apply the filter.
- **Auto** - will apply the filter when the output is interlaced and not the same standard as the input.
- **On** - will always apply the filter.

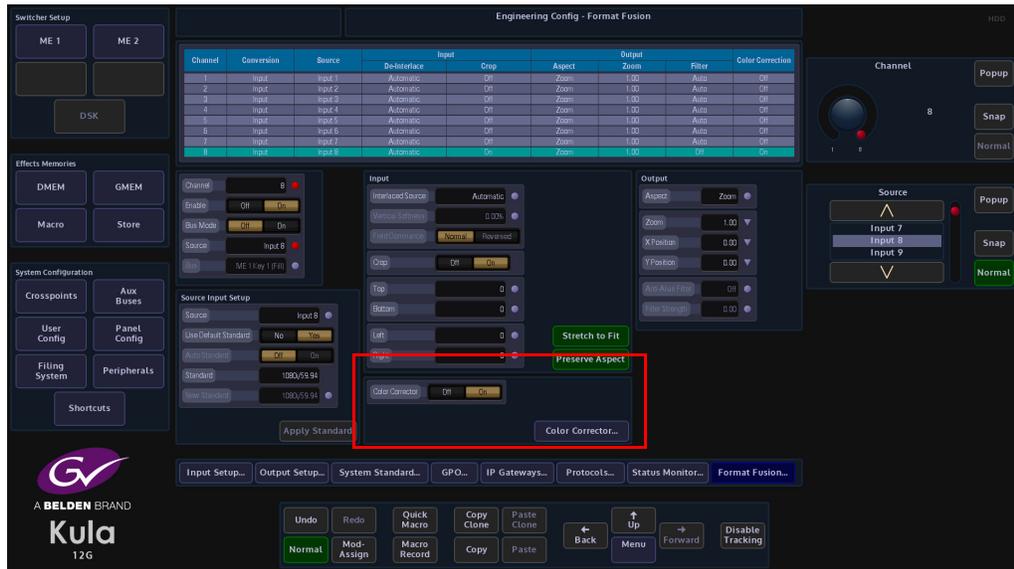
**Filter Strength** - 0.0 is the normal amount of filtering but the user can choose a bit more or a bit less than this if required.

**4:3 Letterbox** - This function is only available when the video standard is changed to an SD standard. It changes the aspect ratio of the picture to a letterbox format. If the video standard is changed to a HD/1080p, this function will automatically turn off.

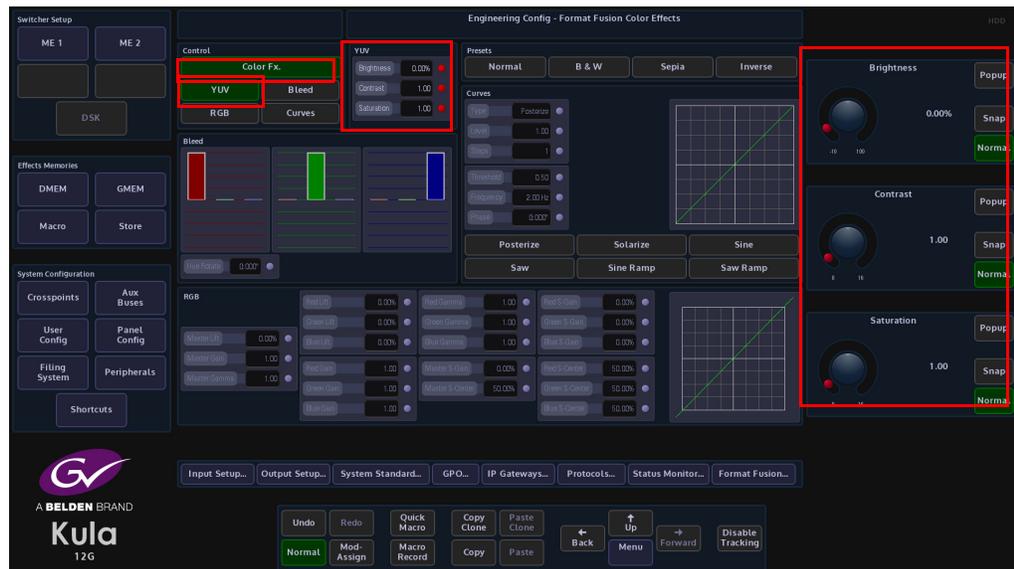
## Color Correction

Input FormatFusion3 color correction allows the user to color correct a selected Channel/Input.

To use Color Correction, turn **“On”** the Color Correction parameter and touch the **{Color Correction...}** menu link button.



In the Color Effects menu, make sure that the **“Color Fx”** button is selected, from here the user can select the type of color correction required.

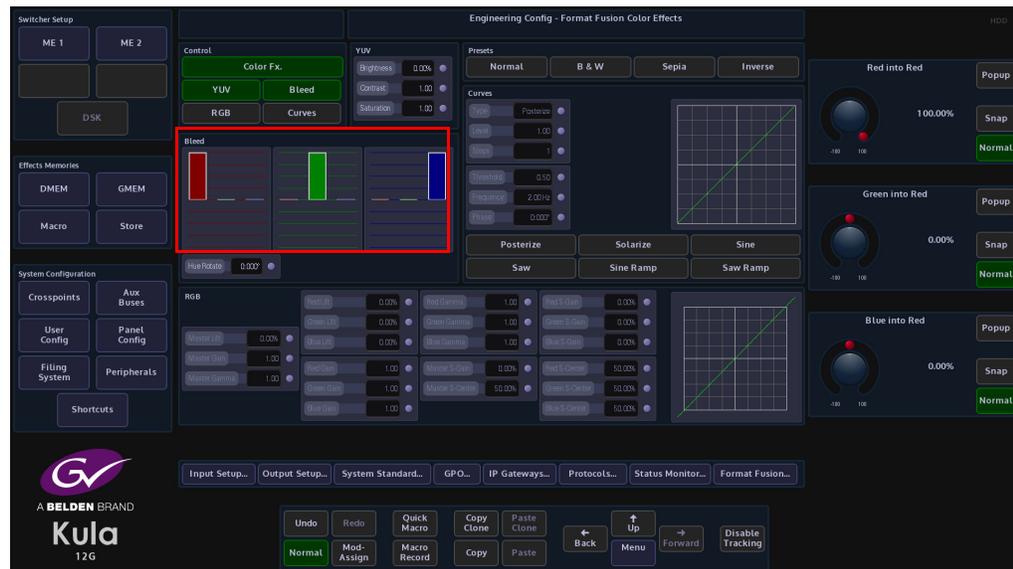


## YUV

Touch the **{YUV}** button to enable the parameter controls. Touch the **YUV Control** attacher and by changing the parameters, the Brightness, Contrast and Saturation of the channel can be adjusted.

- Brightness default value is 0.00%, and the range is from -10% to 100%
- Contrast default value is 1.00%, and the range is from -0% to 16%
- Saturation default value is 1.00%, and the range is from -0% to 16%

As each of the above are adjusted notice that the percentage of adjustment is shown in the YUV attacher.



## Bleed

Color bleed is a situation where a single color will over power the other colors in the RGB signal. By using the bleed function the stronger color can be softened to make the color output more natural, or adjusted to suit a specific need.

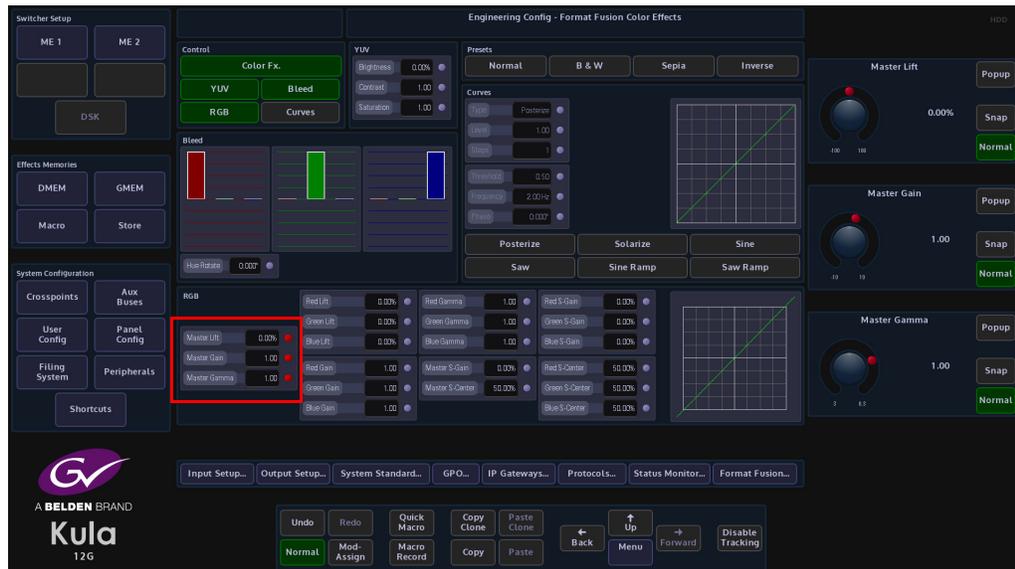
The initial menu has a default state where a single adjustment for each parameter menu is active; this will allow the adjustment of the main RGB bleed parameters:

- Red into Red
- Green into Green
- Blue into Blue

Touch one of the Bleed color blocks to enable all the options for that color. This will allow a detailed adjustment for each of the R, G and B bleed settings. The adjustments are measured on a -100% to a +100% scale. Each parameter menu will adjust a single color, i.e. red into red, green into red and blue into red. These changes are also reflected graphically in the RGB bar graphs above the parameter sets.

## RGB

Touch the “RGB” button to enable the parameter controls. The initial menu is set to a default condition, which Shows the Master adjustment parameters. This will give an adjustment of Master Lift, Gain and Gamma. Each of these adjustments will alter all three elements of the RGB signal at the same time.



When one of the master parameters is altered, notice that the RGB curve profile changes in the graph situated center of the menu.

Touching one of the attachers allows a more accurate adjustment to the RGB components where the:

**RGB Lift** - parameters adjust the images Black Level, working on Black or shadow areas.

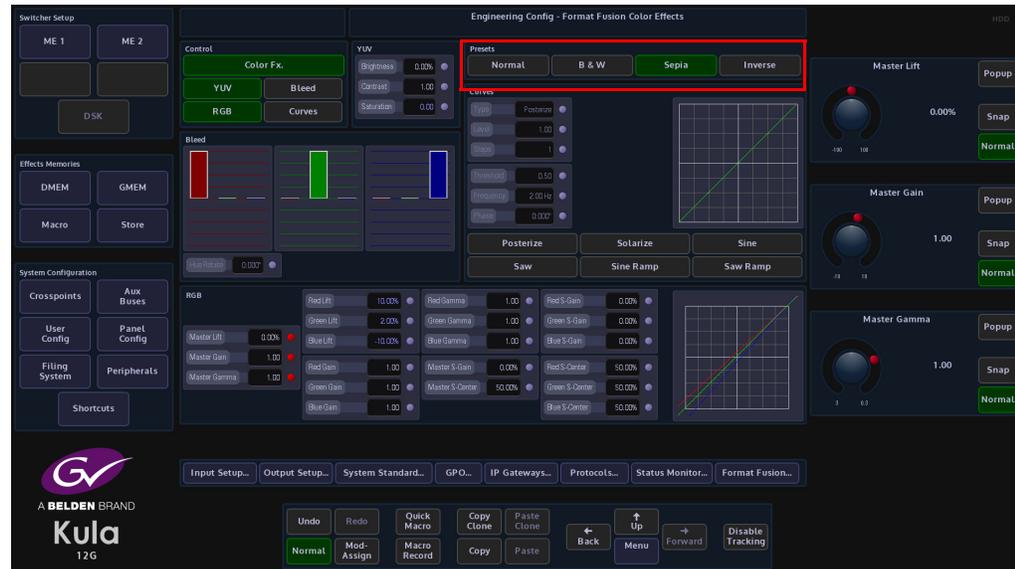
**RGB Gamma** - parameters adjust the levels between dark/shadow and the mid tones, where the mid tones become brighter or darker; depending on the adjustment made.

**RGB Gain** - parameters control the White level or highlights, where brighter colors become brighter or darker; depending on the adjustment made.

**RGB S Gain and S Center** - the parameters adjust the gain mid tone levels of the S curve and the center point levels of the s curve.

## Presets

Presets allow the user to quickly select commonly used preset color options for the crosspoint source, or quickly revert back to the original input source color levels.



**Normal** - Is the original color levels of the input source; without any color correction adjustments.

**B & W** - Sets the chroma saturation to zero removing the chroma content, making the signal black and white.

**Sepia** - Sets the chroma saturation to zero removing the chroma content, then adds positive portions of Red and Green and a negative portion of Blue to make-up a sepia appearance.

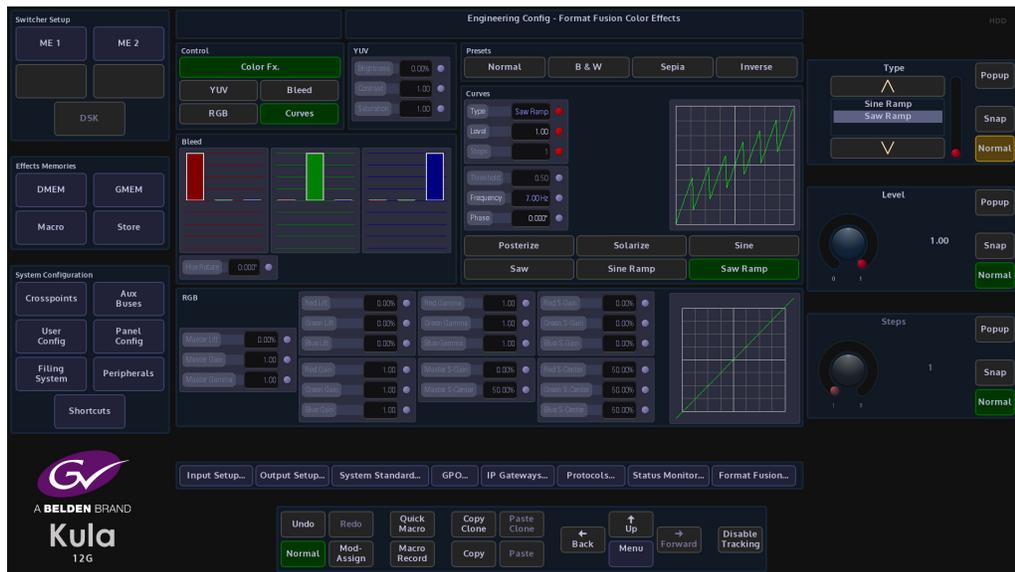
**Inverse** - Inverts the video signal making the picture a negative of its correct colors.

If the **Normal** preset option is selected, then all color correction controls are Grayed out preventing any adjustments. This is to make sure that the original crosspoint source can be recalled.

If **B&W**, **Sepia** and **Inverse** are selected, the preset levels can all be color corrected.

## Curves

The Curves function is used to artistic type effect to the selected FormatFusion3 channel. The user can select preset effects such as Solarize and Posterize, and then adjust them to give a user-defined effect.



The user can select from 6 Preset Curve options by touching the button or use the **Type** parameter to select from a list of options.

Touch the top attacher, the **Level** parameter changes the level of effect on the selected channel, from a normal looking source to an extreme manipulation effect with full effect.

The **Type** parameter as mentioned above selects the type of Curve effect.

When the **Steps** parameter is adjusted, the more steps there are in an effect, the less extreme the effect will appear.

In the bottom attacher there are 3 parameters that can be used to modify a selected preset curve, not all of the parameters work with all of the preset curves.

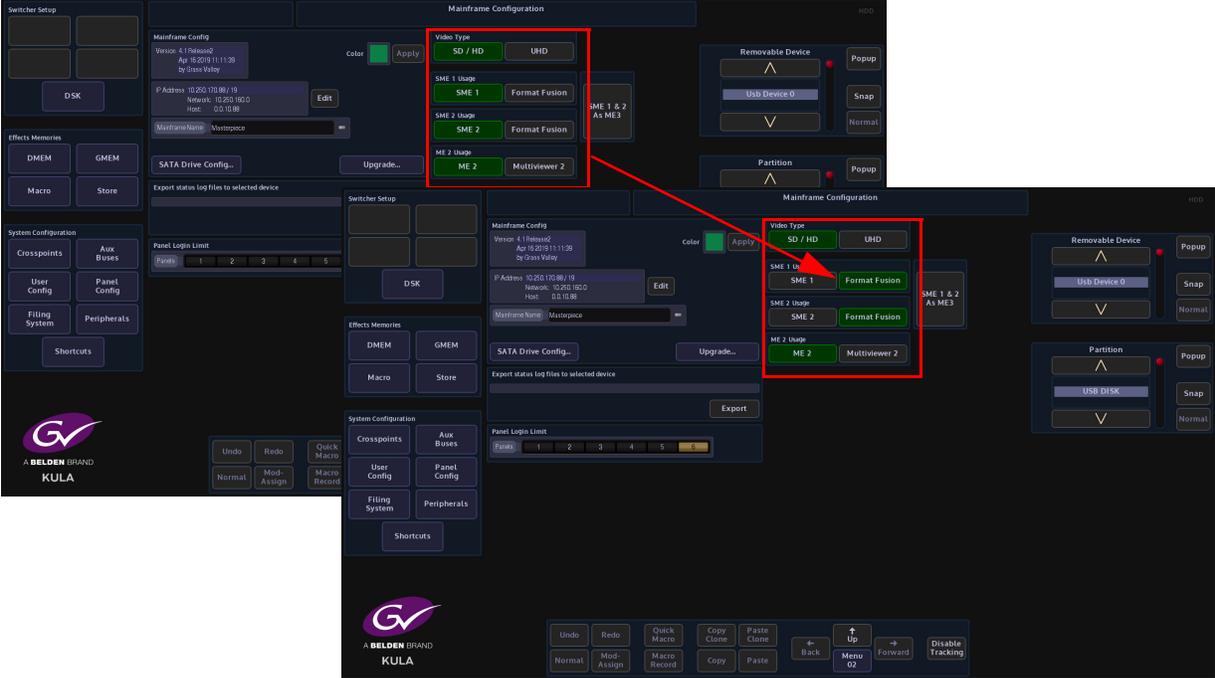
**Threshold** is used to change the shadow and highlight values of the selected preset curve,

**Frequency** determines the number repeated occurrences are applied to the effect. The

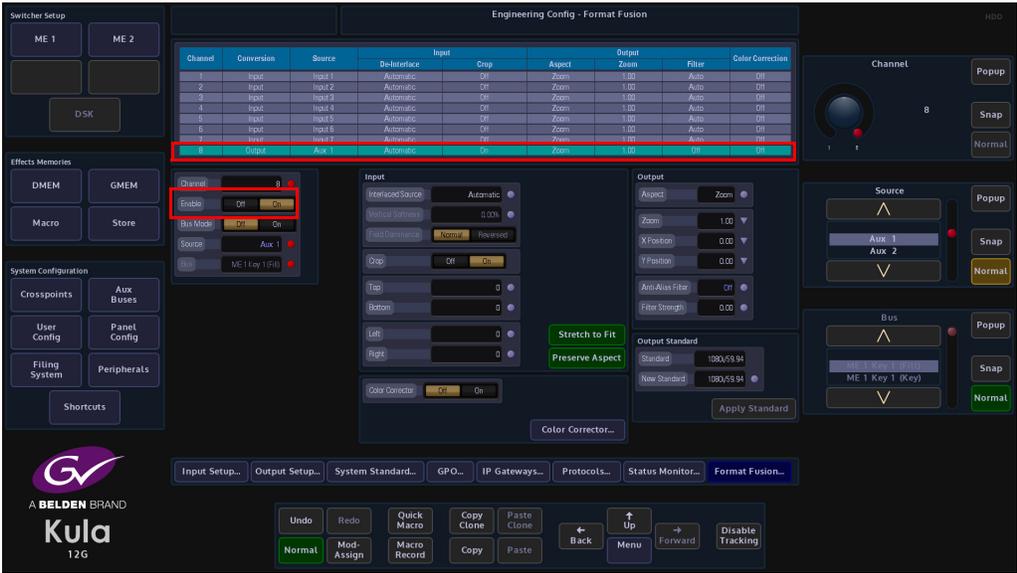
final parameter is **Phase**, this adjusts the effect starting point within the Step cycle.

### Output FormatFusion3

Any output from the mainframe can be assigned to have Output FormatFusion3 by utilizing the 8 available FormatFusion3 channels. By default the 8 FormatFusion3 channels are set as "Input FormatFusion3", when FormatFusion3 is enabled in the Mainframe Config menu (in the logged out state).

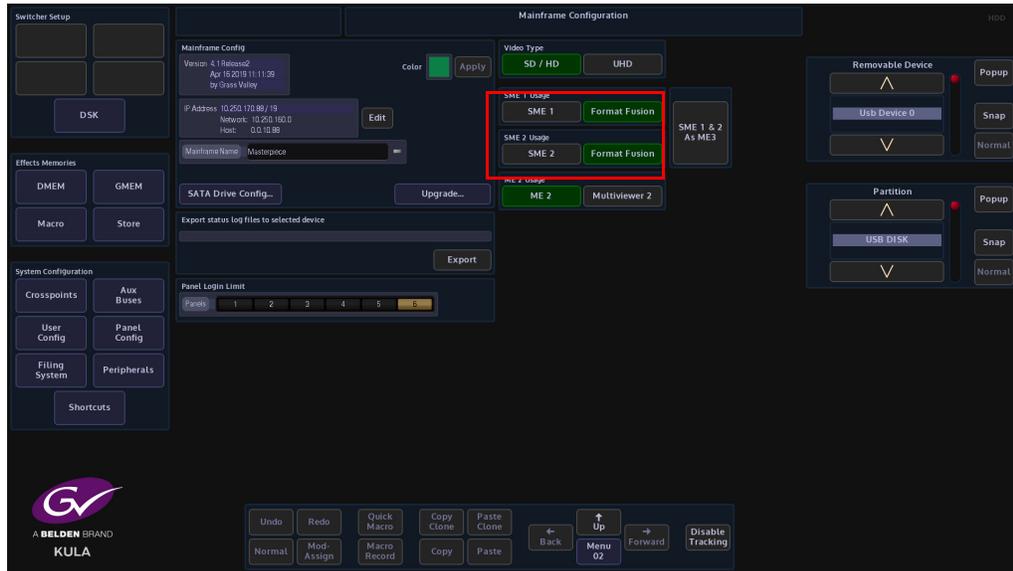


When FormatFusion3 is enabled, go to the **Engineering Config - FormatFusion3** menu. The user can now assign the "Source" parameter from being an "Input BNC" to being an "Aux", the selected channel will now become an output with FormatFusion3.

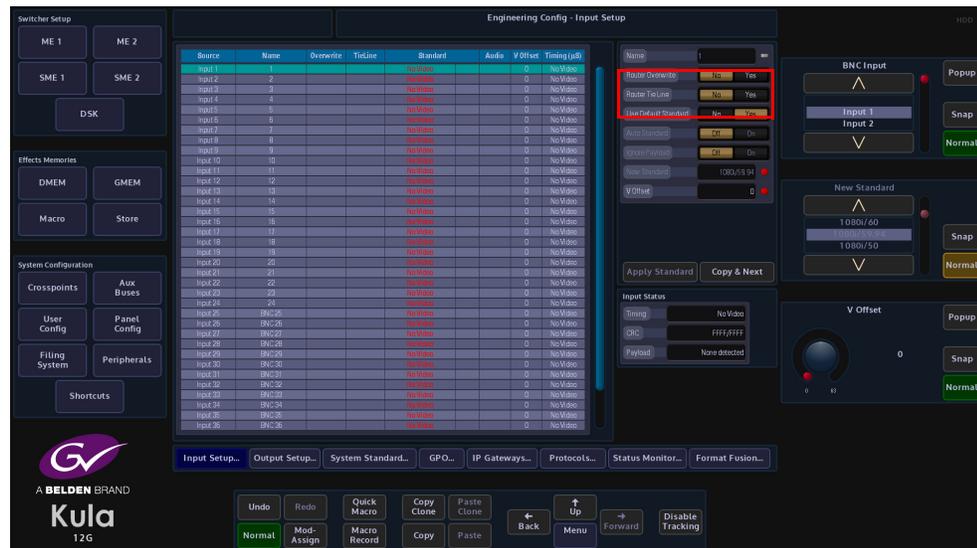


## Output FormatFusion3 Setup

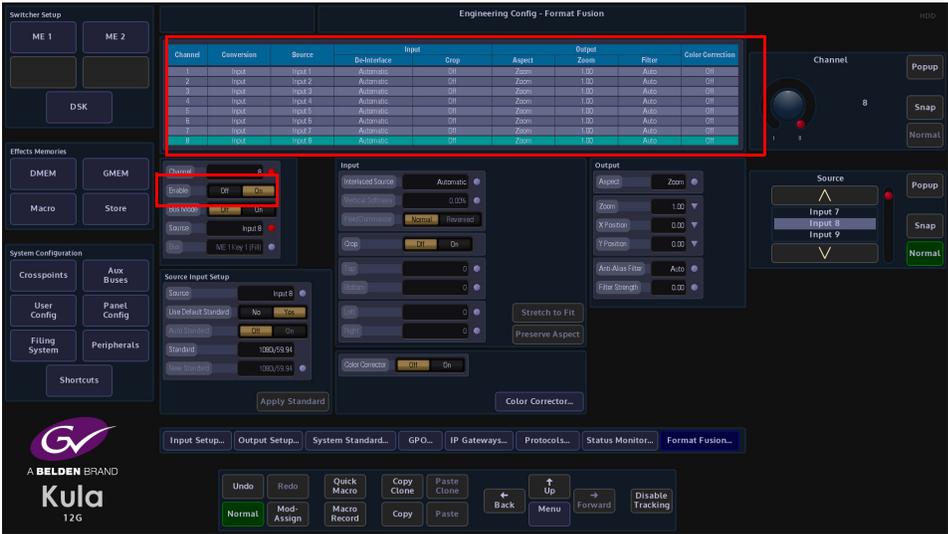
As shown earlier, turn on FormatFusion3 in the Mainframe Config menu (in the logged out state). There are two FormatFusion3 buttons, enabling 1 will give 4 channels of FormatFusion3 enabling both of them will give 8 channels.



To use FormatFusion3, touch the **{Input Setup...}** button, then in the menu, select an input by touching an input row or use the **"BNC Input"** parameter. Once selected, set the **"User Default Standard"** parameter to **"No"** and set the **"Auto Standard"** parameter to **"On"**. This must be done for each input that requires FormatFusion3.

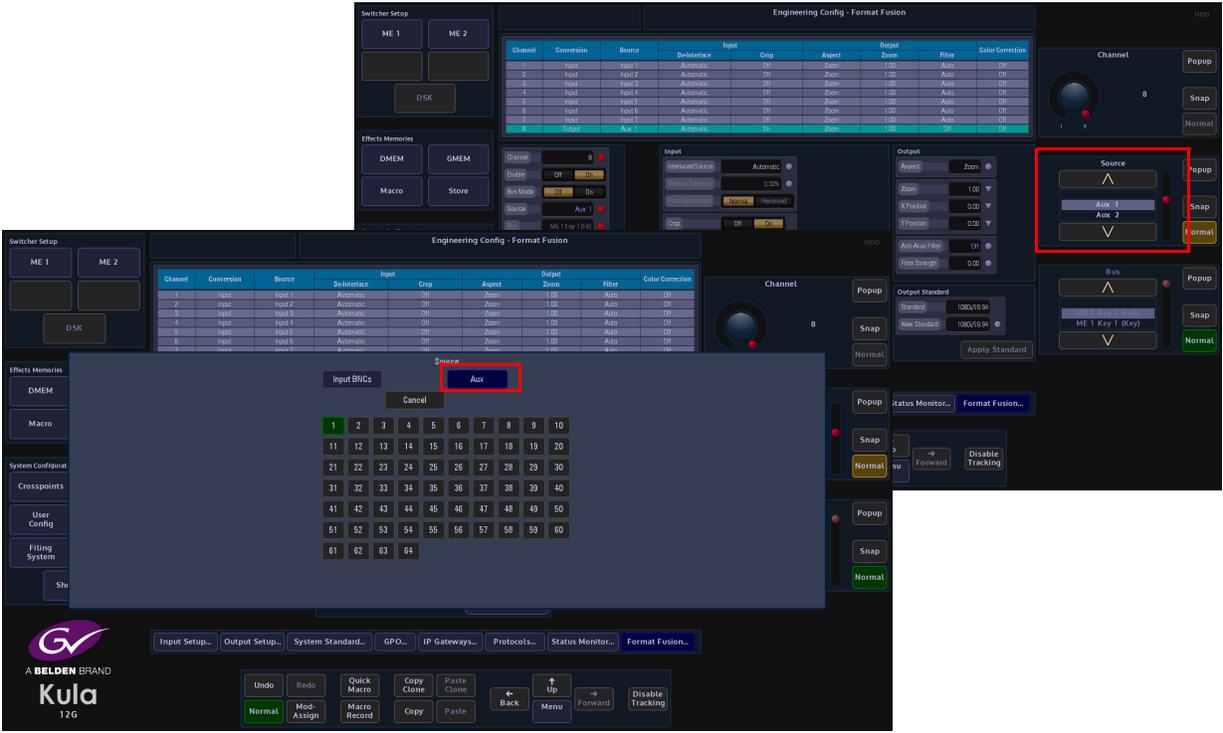


In the Engineering Config menu, touch the **{FormatFusion3...}** button to open the menu. The table at the top of the menu displays the available channels of FormatFusion3. There are 4 Channels when SME1 has been de-selected in the Mainframe Config menu and 8 Channels when both SME1/SME2 have been de-selected.



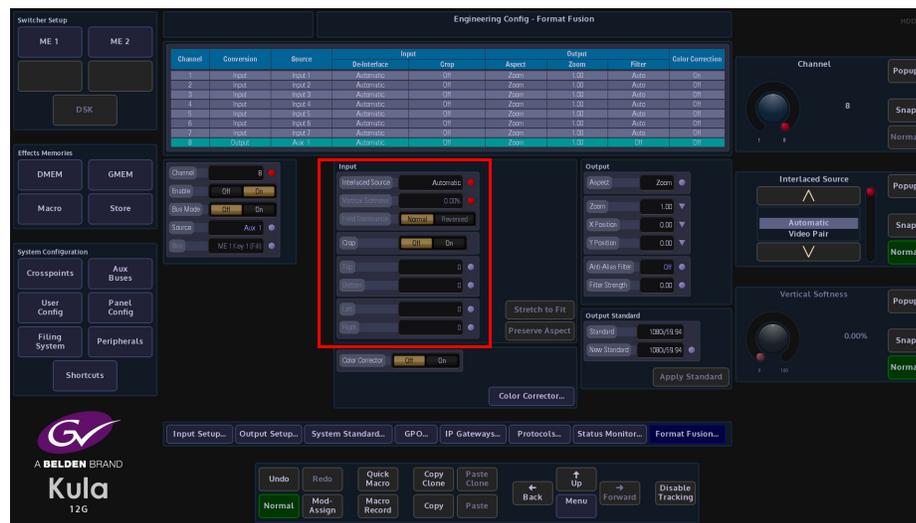
Each of the channels of FormatFusion3 in the table are individually enabled by setting the “Enable” parameter to “On”.

For each channel of “Output” FormatFusion3 required, select the channel in the table then use the “Popup” selector to select the Aux output.



Note: Remember that there are only 12 Outputs if all 4 DSKs are selected in the Engineering Config - Input Setup menu.

## Parameter Controls



## Input

**Interlaced Source** - This has 4 parameter settings, these settings are listed below:

**Automatic** is the default setting for Interlaced Source it is the most suitable mode for live programme making. When creating the current field/frame, the automatic setting will use the current input field and a percentage of both the previous and next input fields. Typically used when the output of a camera is fed to the switcher as a continuous stream of footage.

**Video Pair** is used when creating the current field/frame, will use the current input field and a percentage of either the previous or next field to maintain 1-2 or 2-1 pairing. This could be used for pre-prepared material with cuts on known field boundaries to prevent possible subtle artifacts appearing at cut points.

**Film Pair** is used when creating the current field/frame, will directly combine the current input field and either the previous or next field. This mode should only be used if the fields are temporarily matched, e.g. PAL film based sources or some animation.

**Single Field** is used when creating the current field/frame, will only use the current input field.

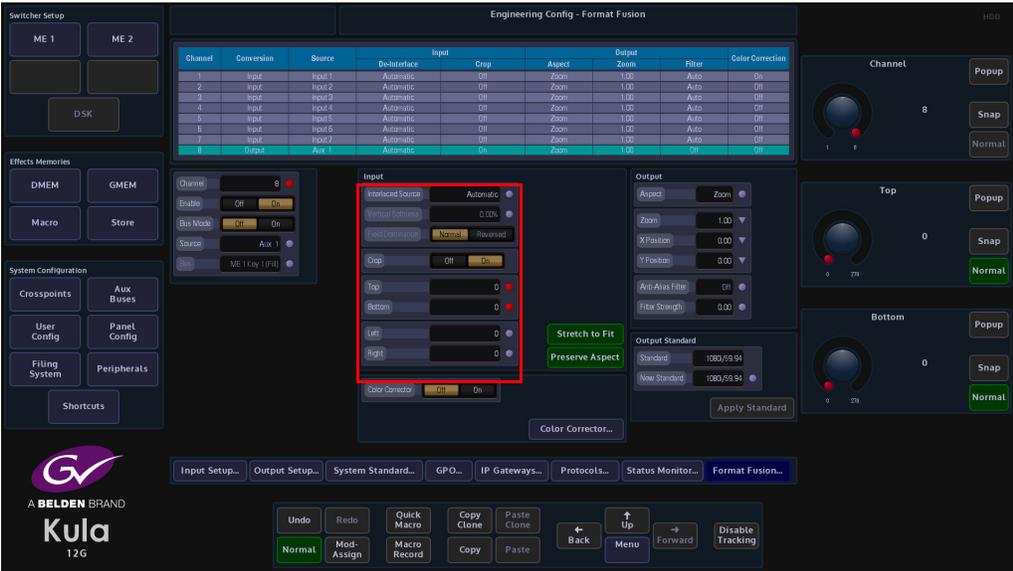
The **Field Dominance** control selects which field comes first. The **Normal** setting is the default field setting for the input standard, the **Reversed** setting should only be used to correct sources that have incorrect field order (swapped fields). Swapped fields will manifest as very jittery motion.

The **Vertical Softness** control, this feature allows the user to visually “soften” the source on the selected input. Generally, this control is not required and should be set to 0% for the best de-interlacing quality. It is de-activated in Automatic mode, the function will work in Video Pair, Film Pair and Single Field modes.

---

Note: Field Dominance and Vertical Softness can only be used with selected Interlaced Source settings.

---



The **Crop** adjustments allow the user to crop areas of the image that may need to be hidden from view. Adjustments can be made to the **Top**, **Bottom**, **Left** and **Right** of the image.

When the **Stretch To Fit** parameter is enabled the cropped picture content will stretched to fill the 16:9 area.

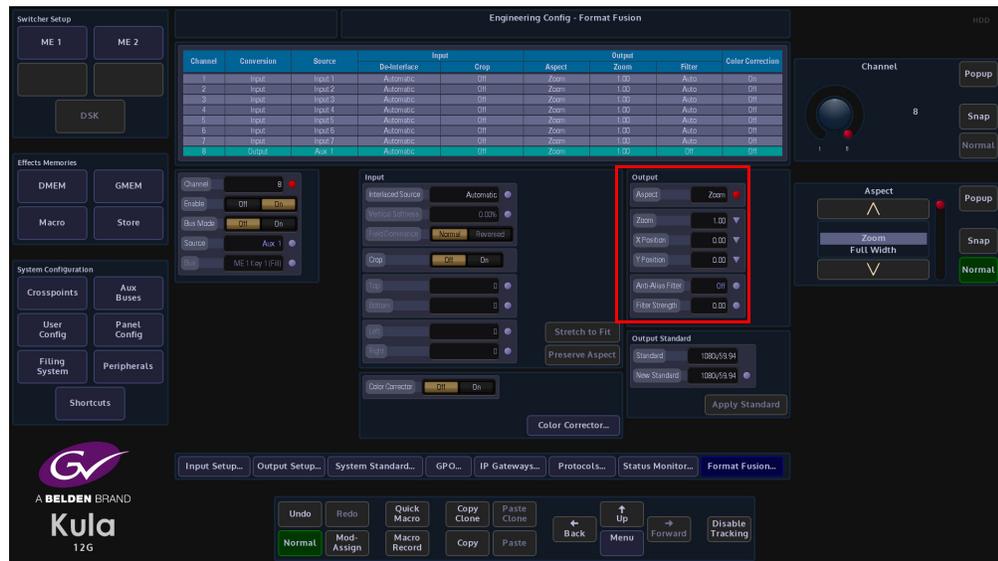
With the **Preserve Aspect** parameter is enabled, this will maintain the aspect ratio of the image e.g. If you crop left and right the image will zoom vertically to compensate. If a source has become very distorted or stretched, this function will adjust the source outwards from the center in all directions creating a 'zoom in' effect.

---

Note: This may cause a very small amount of the source material around the edge of the source to be lost.

---

## Output

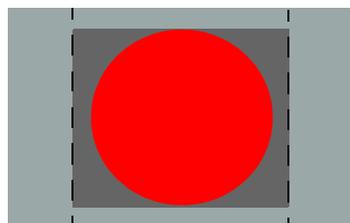


**Aspect Mode** has 3 settings: **Zoom**, **Full Width** and **Full Height**. The **Zoom** parameter allows the source to be zoomed out to fill the 16:9 aspect, when the source is zoomed to 16:9; it will appear slightly larger. The zoom function will not work if the aspect is set to Full Width or Full Height.

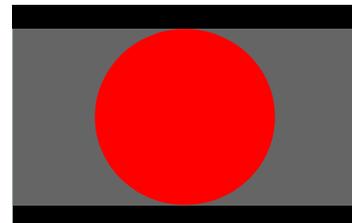
The **Full Width** parameter changes the aspect so that the full width of the 16:9 aspect is filled, in this setting a letter box effect is seen where there are bars at the top and bottom of the image.

The **Full Height** parameter will change the aspect so that the full height of the 16:9 aspect ratio is filled, leaving bars either side of the image.

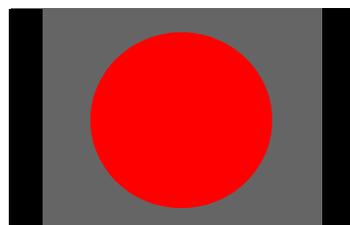
**Zoom, X and Y Position** - Will allow the source to be re-positioned within the 16:9 space.



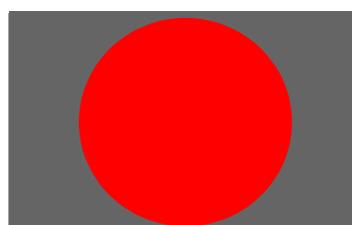
Original 4:3 Source on a 16:9 background



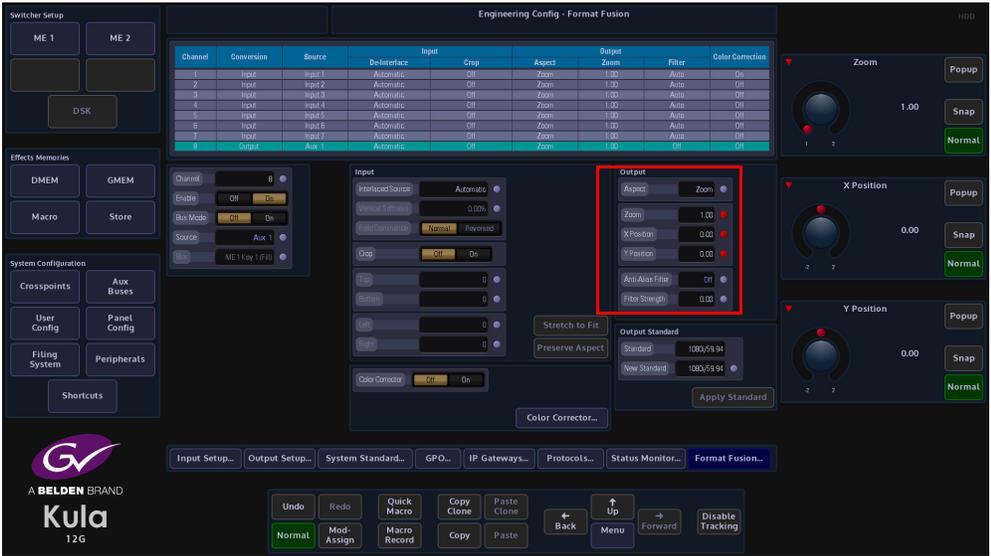
With Full Width Applied



With Full Height Applied



With Zoom Applied to fill 16:9 Aspect



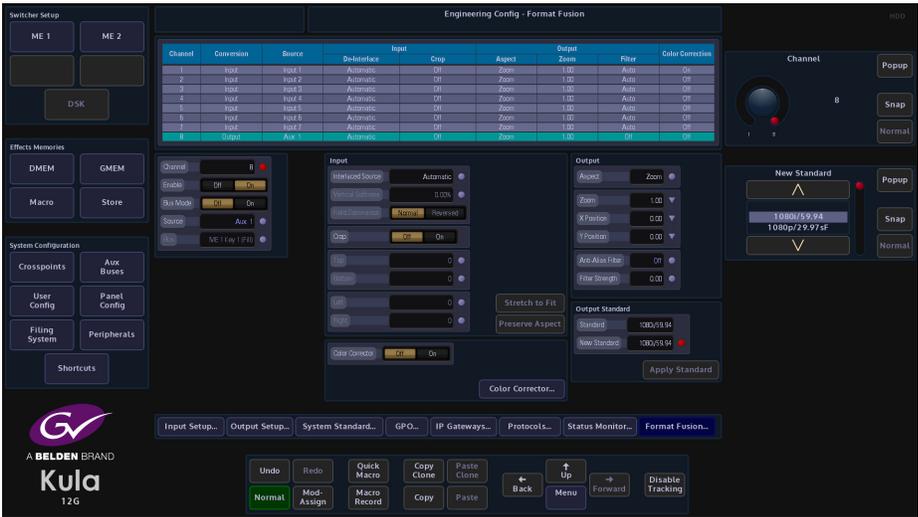
**Anti-Alias Filter** - is used to vertically soften interlaced outputs. This will reduce line 'twitter' and 'jaggies', replicating the vertical filtering that would normally happen in an interlaced camera. This is particularly useful on SD outputs.

- **Off** - will never apply the filter.
- **Auto** - will apply the filter when the output is interlaced and not the same standard as the input.
- **On** - will always apply the filter.

**Filter Strength** - 0.0 is the normal amount of filtering but the user can choose a bit more or a bit less than this if required.

**Output Standard**

The selected Aux Output, because it has had FormatFusion3 applied can now be set to a different video standard from the System Standard.



Use the "New Standard" parameter to select a new video standard, then touch the **{Apply Standard}** button.

---

Note: New video standard selection options will be the same frame rate as the selected System Standard.

---

# User Configuration

## M/E Outputs

Kula has a maximum of 18 outputs, all of which are programmable. This means that the user is not restricted and can assign any one of the outputs to be an M/E an SME output or an Aux output. All M/E outputs are programmable which means that the outputs can be configured and their states changed; in this menu, to suit the users needs.



### The Table:

**Output** - The number of M/Es/SMEs in system.

**Name** - This is the user assigned name for the M/E output

**Background** - This sets up which bus/buses are used as the background.

- **Black**= Background will always be black
- **A/B** = The main A and B buses will be used as the backgrounds in transitions.
- **A**= Just background A will be used and the background will not transition
- **B**= Just background B will be used and the background will not transition
- **U1/U2** = Utility Bus 1 and Utility Bus 2 will be used as the background and transition with the selected background transition or this output. Util1 and Util 2 crosspoints can be selected on the main panel.
- **U1 or U2** = Just Utility Bus 1 or 2 will be used and the background will not transition

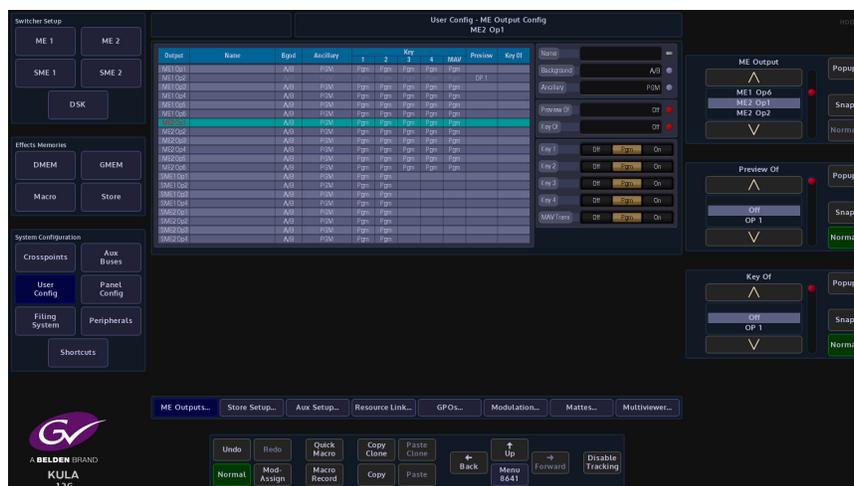
**Ancillary** - Use this parameter to tell the M/E where and when to handle the Audio using Ancillary from parameter to set the **"Audio to Follow"** the following options:

- **Off** - No HANC/VANC from M/E output.
- **PGM**- HANC/VANC will come from Program Bus Source.

- **PGM + Clip**- HANC/VANC will come from Program Bus Source until MAVTrans is done and then if the MAVTrans has Audio the HANC will cut to the MAVTrans audio.
- **PGM Early** - HANC/VANC will come from the B Bus as soon as you start the transition the once complete the A Bus (Which will now be what was the B Bus)
- **PGM Early + Clip** - HANC/VANC will come from A Bus then as soon as the MAVTrans transition starts the Audio on from the Clip (if it has Audio, HANC) then from PST until the transition complete.
- **PST**- HANC/VAN always from B Bus.
- **PST + Clip** - HANC/VANC from B Bus other than during a MAVTrans with Audio
- **PST Early** - HANC/VANC from B Bus or A bus during transition.
- **PST Early + Clip** - HANC /VANC B Bus, or PGM during bgnd trans, or HANC from clip during MAVTrans if clip has audio
- **Bus A** - HANC/VANC From A
- **Bus B**- HANC/VANC From B
- **Util 1** - HANC/VANC From always from Util 1
- **Util 1 + Clip** - HANC/VANC will come from the Util 1 Bus until a MAVTrans transition is done and then if the MAVTrans has Audio the HANC will cut to the MavTrans audio.
- **Util 2** - HANC/VANC From always from Util 2
- **Util 2 + Clip** - HANC/VANC will come from the Util 2 Bus until a MAVTrans transition is done and then if the MAVTrans has Audio the HANC will cut to the MAVTrans audio.
- **Clip** - From MAVTrans (only during transition - No HANC outside of Transition)

**Key1 to Key4** - These columns determine what Keys will appear on the M/E output.

- **Off** = This Key will NOT appear on this output
- **Program** = The Key is available on this output as determined by the transition status on the main panel
- **On** = The Key will always be present on this output. The main transition will NOT be able to remove it.

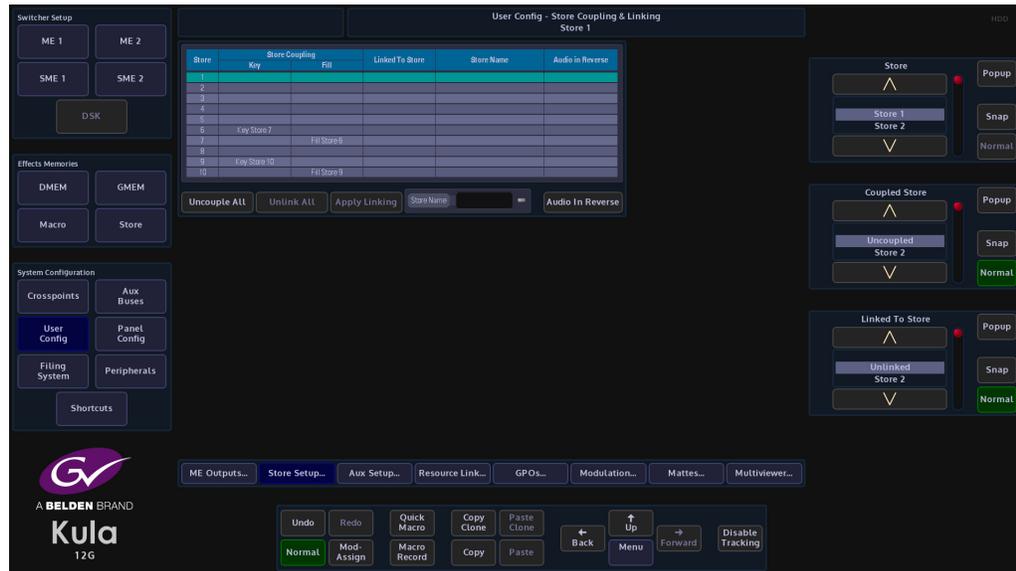


**Preview Of** - This sets this output to be a Preview for the M/E output you select. Previews can be re-entered but there will be no tally. Once you have selected this option all options to the right of this will have no effect.

**Key Of** - This sets this output to be a Key Only for the output selected. Once you have selected this option all options to the right of this will have no effect. It is normal in this case that the background for the output you want this to be the Key for is set to Black. E.g. OP2 in this row would set this output to be the Key for output 2 of this M/E.

## Store Setup

The Store Setup menu allows the user to setup the way the Stores are coupled when using a clip. The allocation of time to each Store can also be setup in this menu and the Stores can also be given names.



## Coupling & Linking

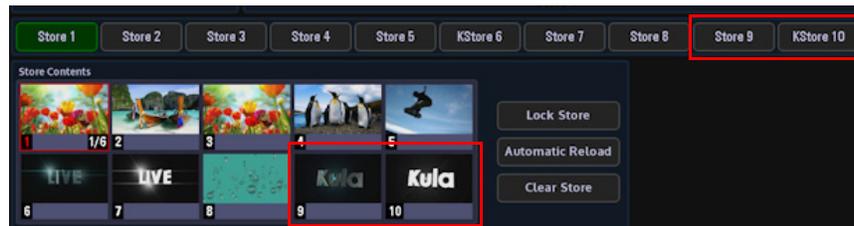
The **Coupling & Linking** menu allows the user to setup Stores which contain video clips or "Bugs", which are for example Keyed over a background where the Key source can be made to be transparent.

To do this the clip has to have a Key and Fill source coupled together over 2 Stores, this is done in the **Store Coupling & Linking** menu.

Store	Store Coupling Key	Fill	Linked To Store	Store Name	Audio In Reverse
1					
2					
3					
4					
5	Key Store 6				
6		Fill Store 5			
7					
8					
9	Key Store 10				
10		Fill Store 9			

In the table above, Stores 1 - 10 can be seen.

**Store Coupling** - the Key column is the Key Store that is coupled to the Fill Store. The Fill column is the Fill Store that is coupled to the Key Store. For example, in the table above, **Store 9** has a Key that is **Key Store 10** coupled to **Fill Store 9**. In the **Store Contents** menu it will look like this:



Store 9 is coupled to KStore 10, as can be seen in the minipics 9 and 10.

**Linked To Store** - this will display any Stores that are linked to each other.

**Store Name** - this is the user-defined name given to a Store, using the "Store Name" parameter.

**Audio in Reverse** - to select "**Audio In Reverse**", select a Store in the table and then touch the **{Audio In Reverse}** button. The selected row will display "**Yes**". This means that when a clip is played in reverse, if the clip has an audio file associated with it, the audio will still play when the clip is played in reverse, but the audio will not be played in reverse.

## Aux Setup

This menu allows the user to setup DSK's (Down Stream Keys) and Fade to Black on each of the outputs from the mainframe.



The table in the menu displays what is setup on each output from the mainframe. The Source/Usage column displays the type of signal output that is on each BNC, i.e. PGM, PWV, Clean or Multiviewer Head etc. The 4 DSK columns display which outputs the DSKs are enabled on, by default DSK 1 is always selectable, DSKs 2 to 4 are only available to select if they are enabled in the Eng Config - Outputs menu.

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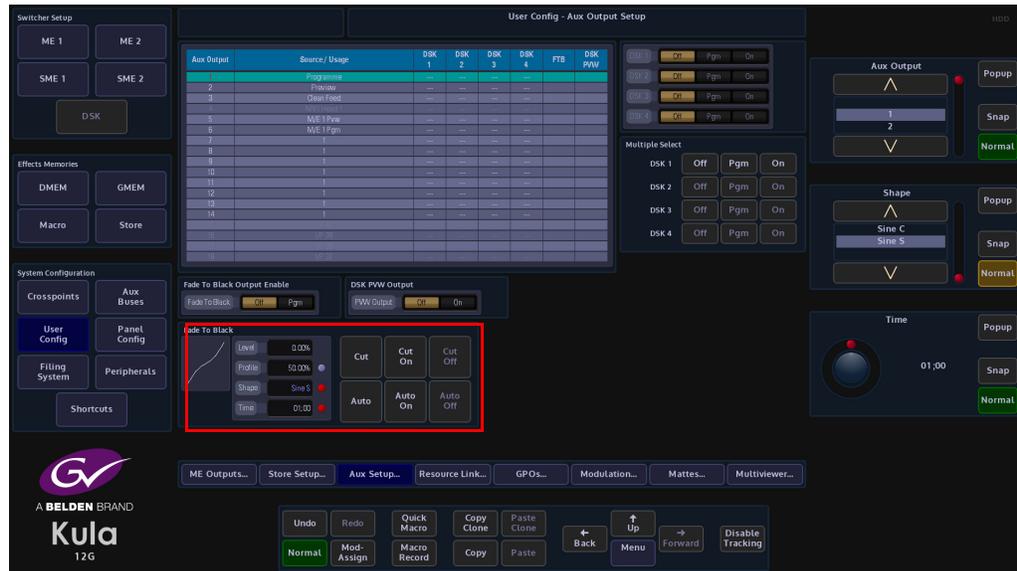
Note: Further information on DSKs can be seen in the **“Operator Information - DSKs”** chapter in this manual

---

## Fade To Black

The Fade To Black function is normally needed when a live broadcast has a problem, it would be used to take the programme output to "Black".

To use fade to black, enable FTB by selecting Fade To Black - "Pgm".



The above parameter controls alter the FTB profile and transition timing.

**Profile** - The Profile parameter control will adjust the FTB transition curve profile. Changing the curve profile will make the transition accelerate or decelerate at a specific moment in the FTB transition period. The curve profile can only be used to change the Cubic S/Sin S and Cubic Curve/Sin Curve profiles, which are selected using the Shape parameter control. The Linear profile cannot be adjusted.

**Shape** - Selecting one of the Shape options will depict the type of profile curve, this will alter the acceleration rate for a FTB transition.

**Linear** - constant transition, no change in transition acceleration

**Cubic C and Sin C** - these profiles are similar to each other, the default transition will have a fast acceleration at the start and slowdown towards the end.

**Cubic Curve and Sin Curve** - these profiles are also similar to each other, the default transition will accelerate at the start slow down towards the mid point and accelerate again.

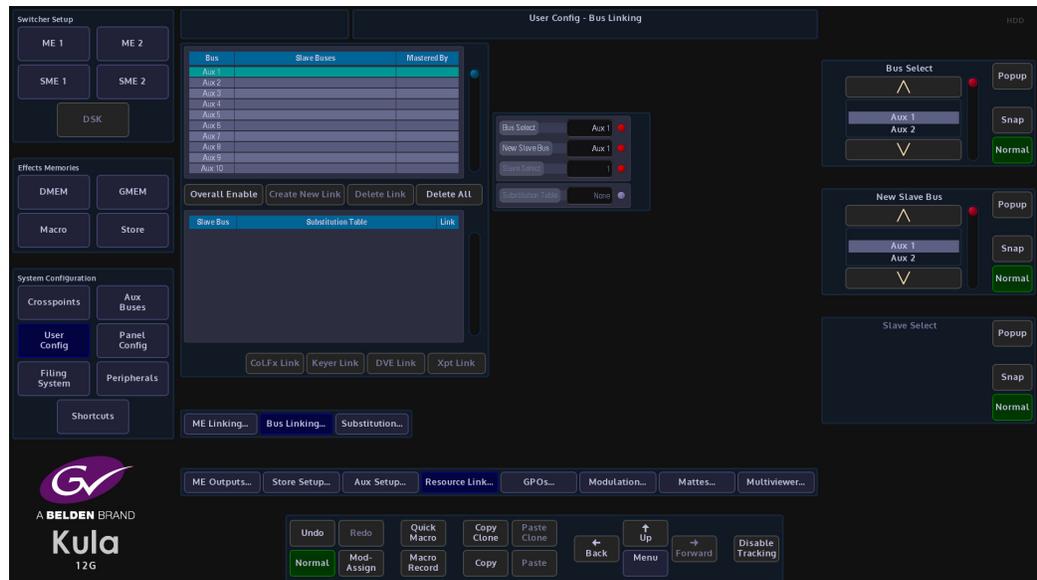
**Time** - this parameter alters the amount of time that it takes for the FTB to transition. The parameter adjusts the minutes/seconds, frames and fields.

## Resource Linking

This allows the user to Link Buses or M/Es, allowing Buses or M/Es to become “Slaves” of other Buses or M/Es/SMEs, e.g. M/E2 Key1 crosspoint selection will be mimicked on Aux1.

In the User Config main menu, press the {Resource Linking...} menu button.

### Bus Linking



### Parameter Controls

**Bus Select** - selects the Master Bus

New Slave Bus - selects the Slave Bus

**Slave Select** - selects the Slave Link

**Substitution Table** - assigns Links to a table (1 to 32 available) the selected table is where the Master Slave bus link will be saved

**Overall Enable** - turns the bus linking option On/Off

**Create New Link** - creates a new master/slave link

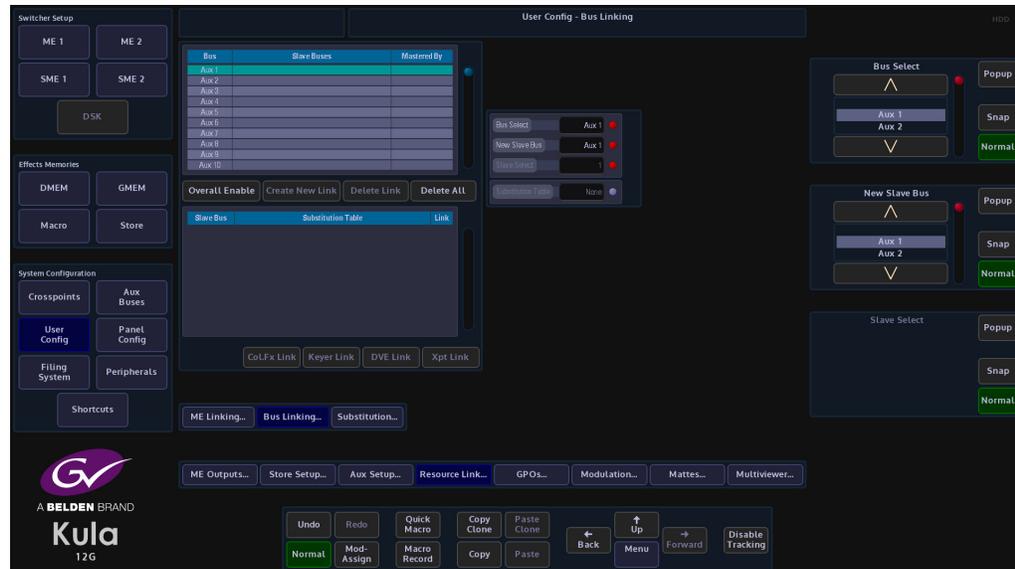
**Delete Link** - deletes the selected bus link

**Delete All** - deletes all master/slave links that have been created

## Using Bus Linking

To create a Bus Link select the Bus that will become the Master using the Bus Select parameter control, then select the Slaves to this bus using the New Slave Bus parameter, then press **{Create New Link}**.

There are no limits to the number of Slave Buses that can be linked to the Master bus. To delete a Link, select the Link using Slave Select parameter, or touch the entry in the Table, and then press **{Delete Link}**.



By default the links are 1-1 links e.g. Xpt1 on the Master will select Xpt1 on the Slave, although the bus linking can be further enhanced by use of substitution tables, where new crosspoint links can be created.

A **Substitution Table** can be generated where there is no link for some crosspoints (e.g. selecting a crosspoint on the Master Bus will not select a crosspoint on the Slave Buses), a single Substitution Table can be used multiple times.

---

Note: There is an Overall Enable to turn the use of Bus linking On/Off, along with independent Link Enables.

---



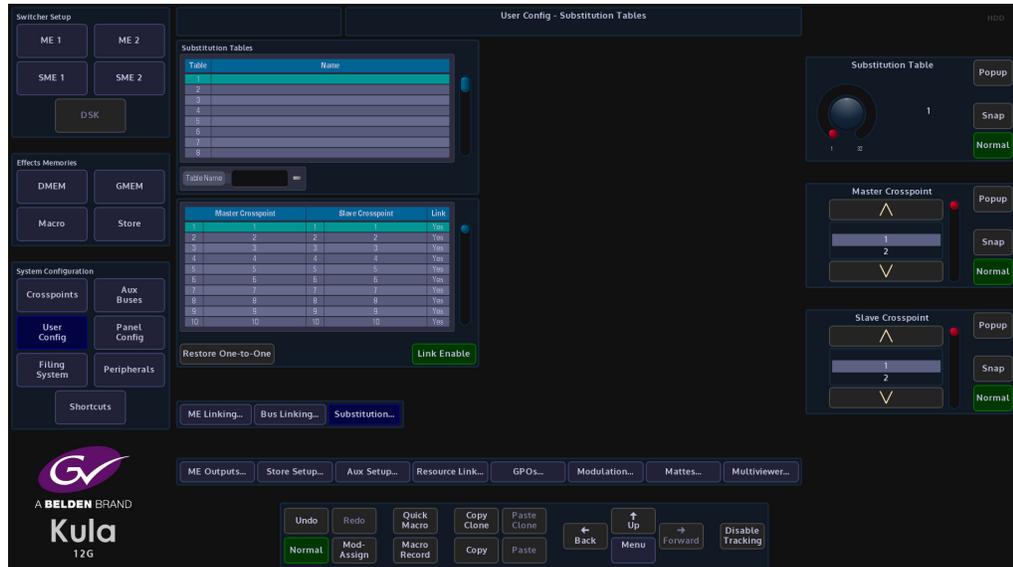
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Note: The **[UNDO]** button on the GUI will reStore the Link. By default the Substitution Table selected will be "None" (Substitution Table 0) which is a 1 to 1 crosspoint link.

---

## Substitution Tables

Substitutions allow the user to substitute a crosspoint for example; select xpt 1 on Master M/E which in turn selects the substitute Xpt on the slave M/E.



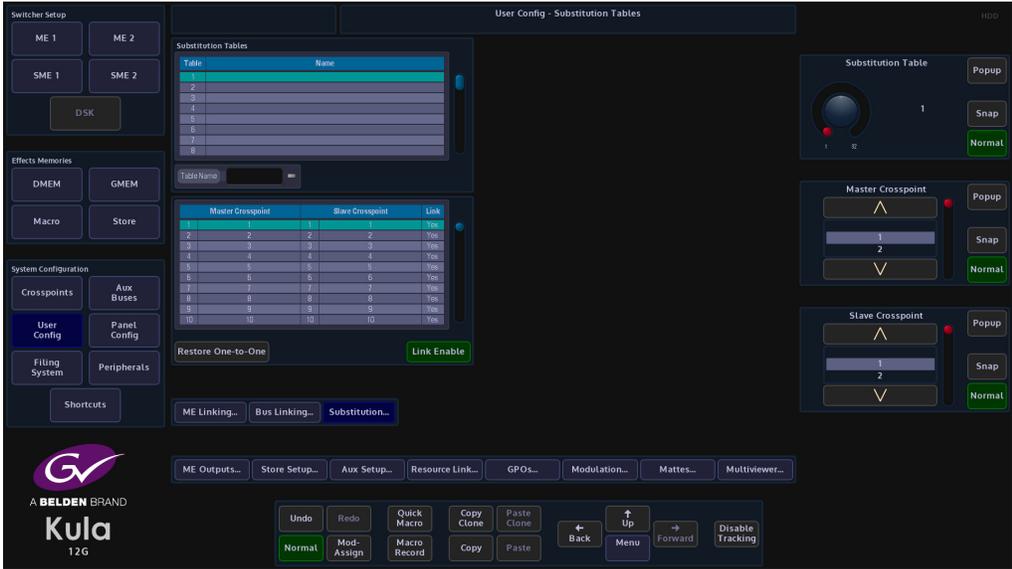
**Master/Slave Crosspoint** - selects the master/slave crosspoint link. As the crosspoint mapping is setup, the mapping will be automatically saved into the substitution table

**Link Enable** - enables/disables individual crosspoint mapping links

**ReStore One-to-One** - reStores all crosspoint mapping links to their original state (in the selected substitution table only).

### Creating a Substitution Table

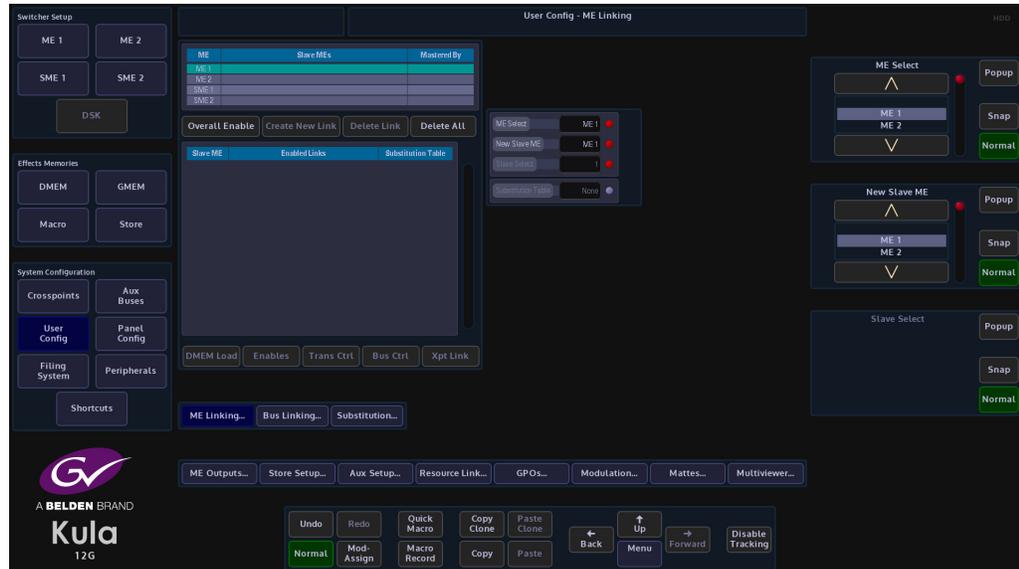
To create a Substitution Table select **{Substitution Tables...}**, then select a table number using the Substitution Tables parameter (this menu allows up to 32 substitution tables to be generated). The table can then be given a name in the **Table Name** attacher. Setup the crosspoint mapping as required, using the Master Crosspoint and Slave Crosspoint parameters. The crosspoint set-up is displayed in the table below the Substitution Table, this includes any link that may need to be disabled. As the crosspoint mapping is setup, this will be automatically saved in the table.



The Substitution Tables and crosspoint assignments are saved in the User Config File, in the File System that has a separate Enable for Bus Linking.

## M/E Linking

M/E Linking works in a very similar way to Bus Linking, M/Es to become “Slaves” of other Buses or M/Es



### Parameter Controls

**ME Select** - selects the M/E

New Slave ME - selects the Slave M/E

**Slave Select** - selects the Slave Link

**Substitution Table** - assigns Links to a table (1 to 32 available) the selected table is where the Master Slave bus link will be saved

**Link Enable** - enables/disables the master /slave link

**Overall Enable** - turns the M/E linking option On/Off

**Create New Link** - creates a new master/slave link

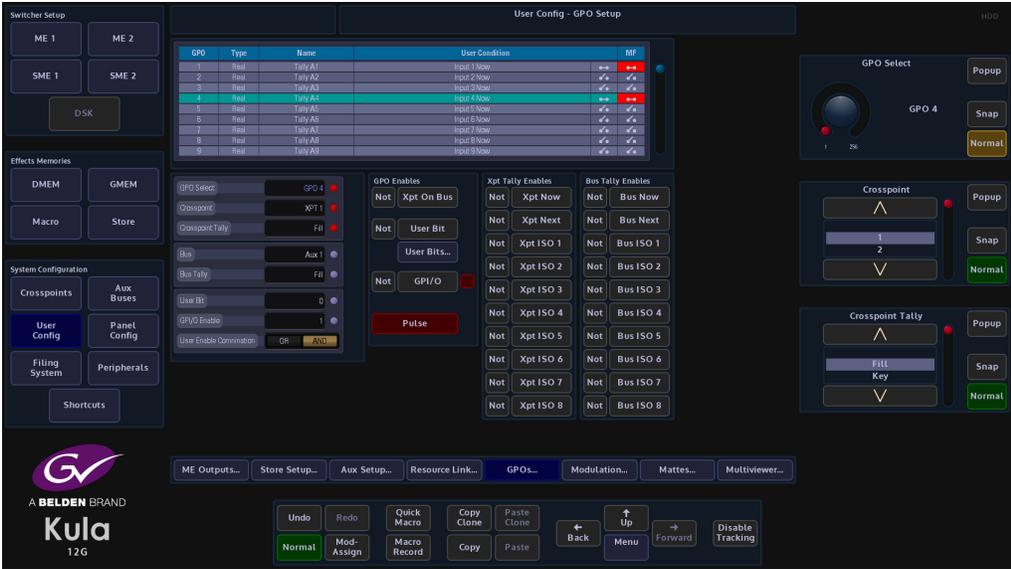
**Delete Link** - deletes the selected bus link

**Delete All** - deletes all master/slave links that have been created

# GPO Setup

This GPO Setup menu is used to tally Crosspoint based, Bus based and User BIT functions. The default setup state allows the user to tally GPO's 121 to 256 which are the physical and internal GPO's and are comprised of:

GPO 121 to GPO 132 and GPO 133 to GPO 144 are the physical GPO's, again at the rear of the mainframe. The Internal GPO's are used to trigger internal function such as Macro's or any internal function that can be switched On or Off.



This menu allows the user to trigger a GPO or GPI when for example a crosspoint is setup to trigger a GPO, or an Aux is setup to trigger a Bus tally.

Touch the attacher below the GPO table and the parameters will change allowing the user to setup a GPO trigger.

For a crosspoint tally for example, use the **GPO Select** parameter to the required GPO, use the **Crosspoint** parameter to select the crosspoint that will trigger the GPO, and then select the **Crosspoint Tally**. In the **GPO Enables** button area of the menu, press the **{GPO}** button and each crosspoint trigger will only trigger a GPO, or touch the **{Xpt Now}** button, then when the selected crosspoint button (as shown in the menu above) is pressed the GPO will be triggered.

---

Note: Touch the popup selector (blue square) in the Crosspoint parameter and a greater selection of GPO trigger options will be displayed.

---

## Crosspoint Options

When selecting the type of GPO or GPI trigger, as mentioned previously, press the popup attacher to easily access the other Crosspoint options.

The screenshot displays the 'User Config - GPO Setup' interface. At the top center, a table lists GPO configurations:

GPO	Type	Name	User Condition	MIP
1	Real	Tally A1	Input 3 Now	✓
2	Real	Tally A2	Input 2 Now	✓
3	Real	Tally A3	Input 3 Now	✓
4	Real	Tally A4	Input 4 Now	✓
5	Real	Tally A5	Input 5 Now	✓
6	Real	Tally A6	Input 6 Now	✓
7	Real	Tally A7	Input 7 Now	✓
8	Real	Tally A8	Input 8 Now	✓
9	Real	Tally A9	Input 9 Now	✓

The 'Crosspoint' popup window shows the following configuration options:

- Xpt 1..40, Xpt 41..80, Matte, ME O/P
- Stores, Cancel
- ME1: 1: M/E 1 Pgm, 2: M/E 1 Pvw, ME1 Op3, ME1 Op4, ME1 Op5, ME1 Op6
- ME2: 1: Programme, 2: Preview, 3: Clean Feed, ME2 Op4, ME2 Op5, ME2 Op6
- SME1: 1: SME 1 Pgm, 2: SME 2 Pvw, SME1 Op3, SME1 Op4
- SME2: 1: SME 2 Pgm, 2: SME 2 Pvw, SME2 Op3, SME2 Op4

The interface includes a sidebar with 'Switcher Setup' (ME 1, ME 2, SME 1, SME 2, DSK), 'Effects Memories' (DMEM, GMEM, Macro, Store), and 'System Configuration' (Crosspoints, Aux Buses, User Config, Panel Config, Filing System, Peripherals, Shortcuts). The right side features 'GPO Select' (GPO 4), 'Crosspoint', and 'Crosspoint Tally' controls. The bottom toolbar contains: Undo, Redo, Quick Macro, Copy Clone, Paste Clone, Back, Menu, Forward, Disable Tracking, Normal, Mod-Assign, Macro Record, Copy, Paste.

# Modulation

## Overview

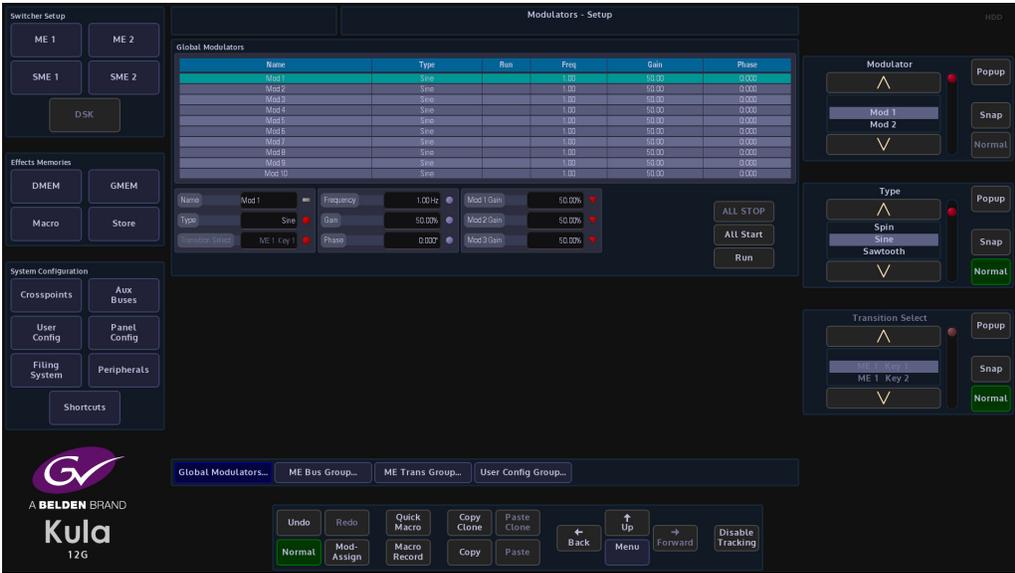
The modulation function enables the user to add modulation effects to transitions, wipes, borders and DVE. The type of modulation applied to a function is selectable and can be added to many different parameters, whether it is Global, Bus, I/O, DVE or User related.

The modulators are sorted into relevant Groups, determined by their subject matter: **Global Modulators** - are used to modulate multiple parameters in a fixed relationship. **M/E Bus Group** - displays modulator parameters within a Bus function, such as Transition of a Keyer.

**M/E Trans Group** - displays the modulates parameters within the Transition functions. **User Config Group** - displays modulated parameters within a User function, such as Mattes.

## Global Modulators

Global modulators, as mentioned earlier are used to run modulators globally across the logical switcher.



An example could be a color effect modulation that would affect all M/Es globally on the logical switcher.

### Global Modulators - Parameter Controls

**Name** - there are 10 individual modulation setup options in this column, each one can be given a unique name, by selecting the required row using the Modulator parameter, then typing the name into the Name attacher.

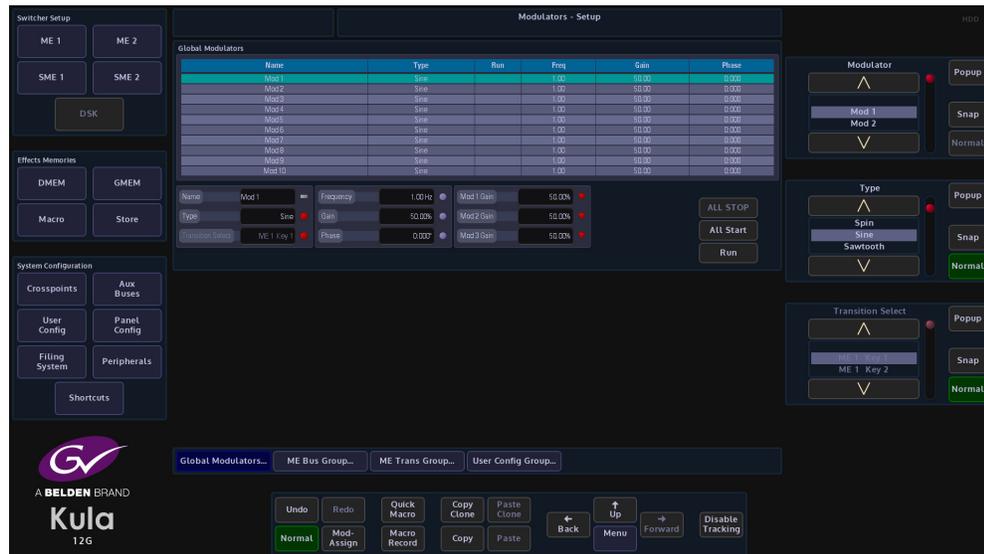
**Type** - this is the modulation effect used, either Spin, Sine, Sawtooth, Triangle, Square, Shake, Linear Drift and Cubic Drift, Static, Bounce and Transition. Preset to start with a Sine wave modulation.

**Run** - allows the modulation to run.

**Frequency** - adjusts the frequency of the modulation, range from 0Hz to 30Hz. Preset to start at 1Hz

**Gain** - adjusts the gain of the modulation, range from -100% to +100%. Preset to start at +50%.

**Phase** - changes the phase of the modulation, range 360° plus complete turns, i.e. 5:180° this is 5 complete turns plus 180°.

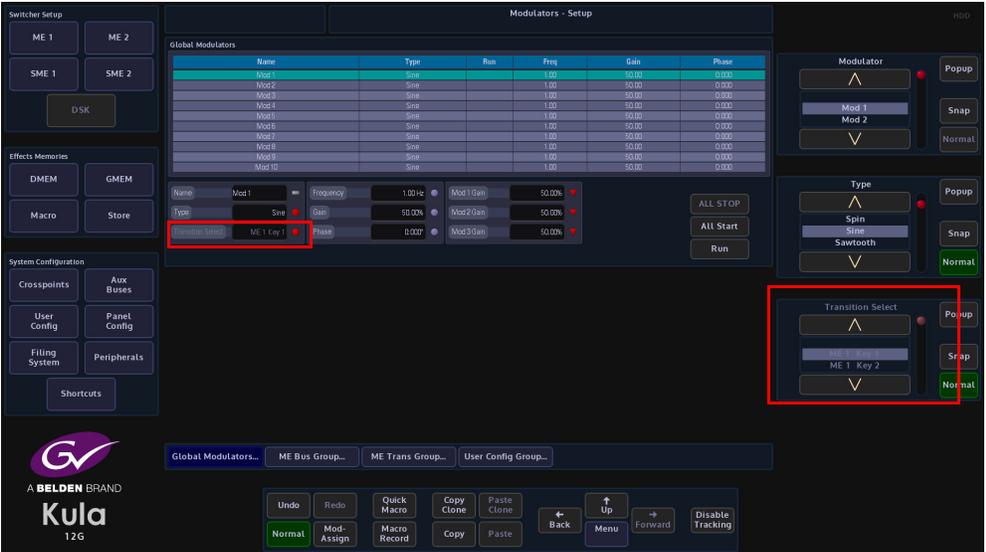


An individual modulator setup can be switched **On**, by selecting an individual modulation using the Modulator parameter. Next, touch one of the On/Off buttons in the **Frequency**, **Gain** or **Phase** parameter displays.

Notice that "Yes" has now appeared in the Run column of the table.

All the modulator setups in the table can be started by pressing the **{All Start}** action button, or stopped by pressing the **{All Stop}** button.

The **Transition Select** allows the use of the transition engines to control the level of other parameters. Using the Transition modulator type it is possible to use the AUTO and T Bar to control the level of a particular parameter.



If a Transition type Modulator is attached to a 'Store Pan H position' for example, the Store is then used as a Utility Wipe Border; when the Bgnd Transition takes place the T Bar moves the picture within the Store at the same time as the wipe edge.

To choose which T Bar controls the movement of the modulated parameter, select the M/E. By determining a Bgnd or Key Bus the modulation will only take effect when that Bgnd or Key bus is selected in the transition.

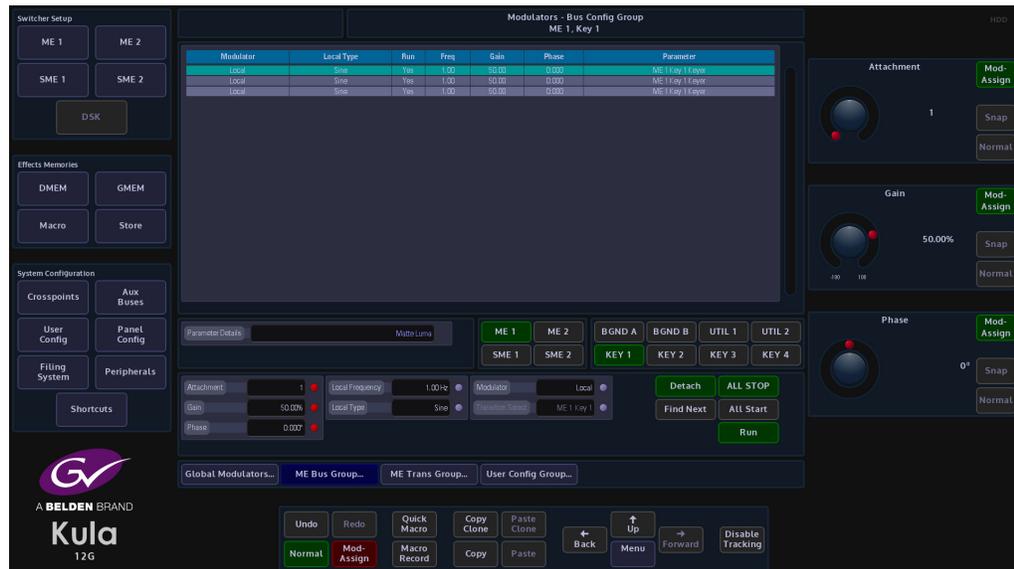
The modulator Gain can be used to adjust how much effect the transition engine has on the modulated parameter. Global Modulators as well as Bus and User Config group modulators can all use the Transition type modulator.

When using the transition modulator, the transition type needs to be selected (e.g. M/E2 Key1, M/E1 Background etc.) this is the parameter that will be controlled by the modulator.

## Bus Config Group

This is a modulation applied to a parameter that will affect a Bus e.g. transition wipe, Bus color and Keyer parameters, and is for example applied to a Key on an M/E.

Touch the **{Bus Config Group}** menu link button to enter the **Modulators - Bus Config Group** menu.



The table in this menu displays the modulation setup:

**Modulator** - this column will show if the modulation is Local to the Bus Config group or if it is attached to a **Global Modulators** setup (displayed as Mod 1 - 10 or named if setup in the **Global Modulators** menu).

Touch the **Modulator** attacher box (center of the menu), three parameters will appear. Use the Attachment parameter to scroll through and select a modulator setup in the table, then use the Modulator parameter to select if the modulation is "Local" to the Bus Group or attached to a **Global Modulators** setup. The **Transition Select** allows the use of the transition engines to control the level of other parameters.

**Local Type** - this is the type of modulation effect, notice that when the Modulator parameter is changed from Local to a Global Modulation the text in the Local Type, Run and Freq columns turns Gray and will not have any affect in the Local setup.

**Run, Freq, Gain and Phase** - these parameters have the same affect on a modulation setup as described on the previous page.

**Local Frequency and Local Type** parameters will only affect a modulation setup in the Bus Config Group.

**Parameter** - this column displays the Bus that the modulation effect is attached to.

**Parameter Details** - this named box displays the actual function that the modulation is attached to for the selected Bus modulation in the table.

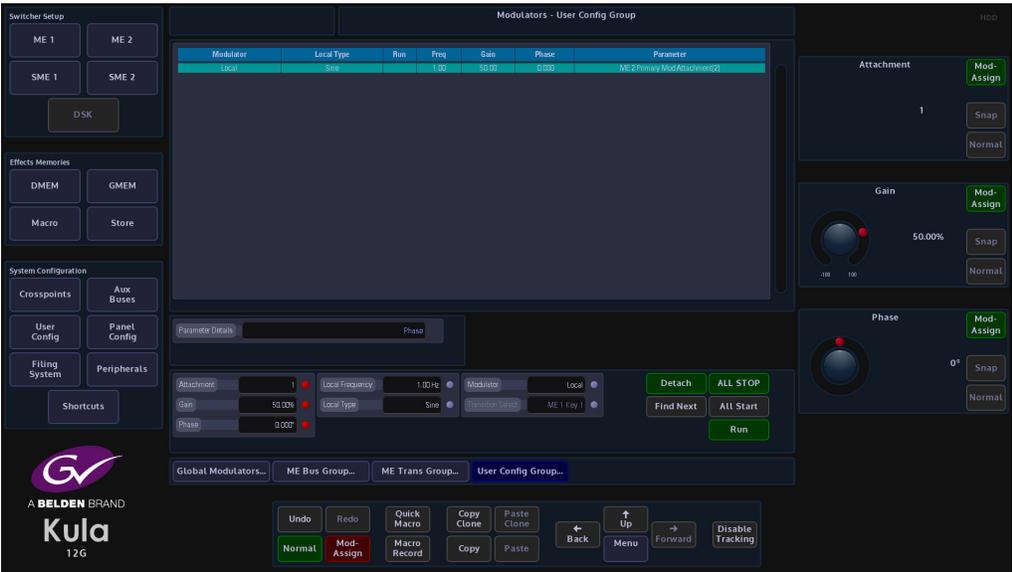
**All Start/ALL STOP** - as described on the previous page, this function will set all the modulation setups in the table to run or stop.

**Detach** - this will delete a selected modulation setup in the table.

### User Config Group

The menu below works in exactly the same way as the Bus Config Group. They all have a “Local” type modulation setup or can be attached to a Global Modulations setup.

**The User Config Group** modulators are attached to parameters in the Output Color and Mattes & Washes menus.



## Basic How to Use Modulators

### How to Use the Modulator Function

The setup sequence will follow these easy steps:

1. Turn On Mod-Assign
2. Select the function the modulation is going to be attached to
3. Select the parameter that the modulation will be attached to
4. Attach the modulator.

#### 2. Select the Function



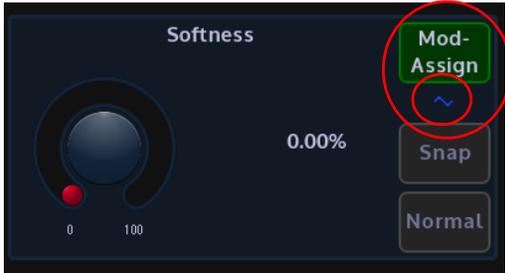
#### 1. Turn On Mod Assign

#### 3. Select the Parameter

#### 4. Attach the Modulator

Select the function the modulation will affect, then select the parameter the modulation will be attached to.

Touch and hold the **[Mod Assign]** button on the GUI, the button will turn green. Select the parameter that the modulation will affect and touch the green **[Mod Assign]** button in the parameter. Notice that the selected parameter display now has a blue sinewave symbol below the Mod-Assign button.



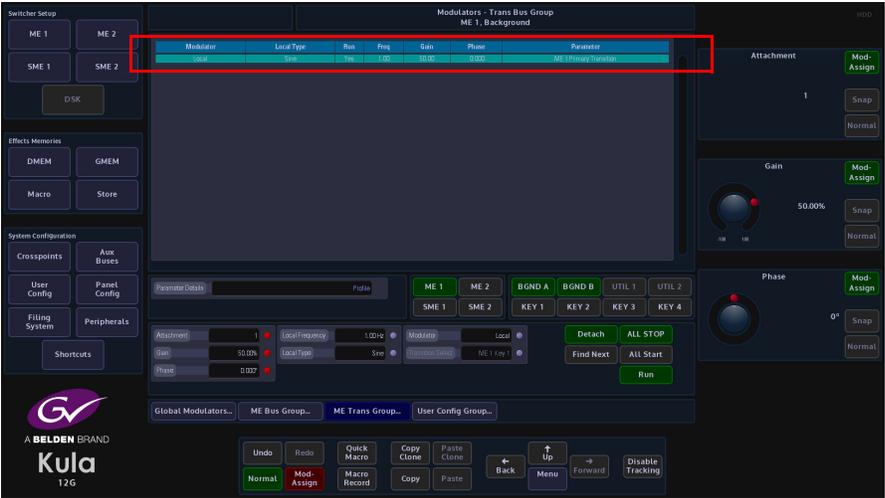
Also notice that the attacher that displays the parameter settings has turned green as shown below.



Once the **[MOD ASSIGN]** and **[SNAP NORM]** buttons are released the GUI display will jump to the assigned modulator menu and highlight the attached parameter function in the table and Parameter Function display box.

The specific modulator setup can now be adjusted.

If a parameter is selected and a modulator cannot be attached to, the **{Mod-Assign}** button will not function and the blue sinewave symbol will not appear.



## Multiviewer

The multiviewer provides great flexibility with its preset and user-defined layouts, and features the following:

Up to 4 or 8 flexible output heads (8 heads with Multiviewer 1 and 2 enabled)

Up to 16 Tiles. A further 12 tiles are available when in Multiviewer 2 mode.

All external and internal sources selectable to all heads and all windows

Instant preset layouts

Clear and follow-through labelling

Red and green tallies

Assign Multiviewer Heads to any output

Memorize and recall layouts as part of a show setup.

---

### IMPORTANT

All multiviewer outputs are set to 1080p video standard, irrespective of the system standard being used. But the frame rate is set by the system standard being used.

For example; if the system standard being used is 1080i/**59.94**, then the multiviewer output is 1080p/**59.94**.

Please make sure that any HD-SDI to HDMI or DVI converters being used are capable of receiving 1080p and the monitor being used is also capable of receiving 1080p.

---

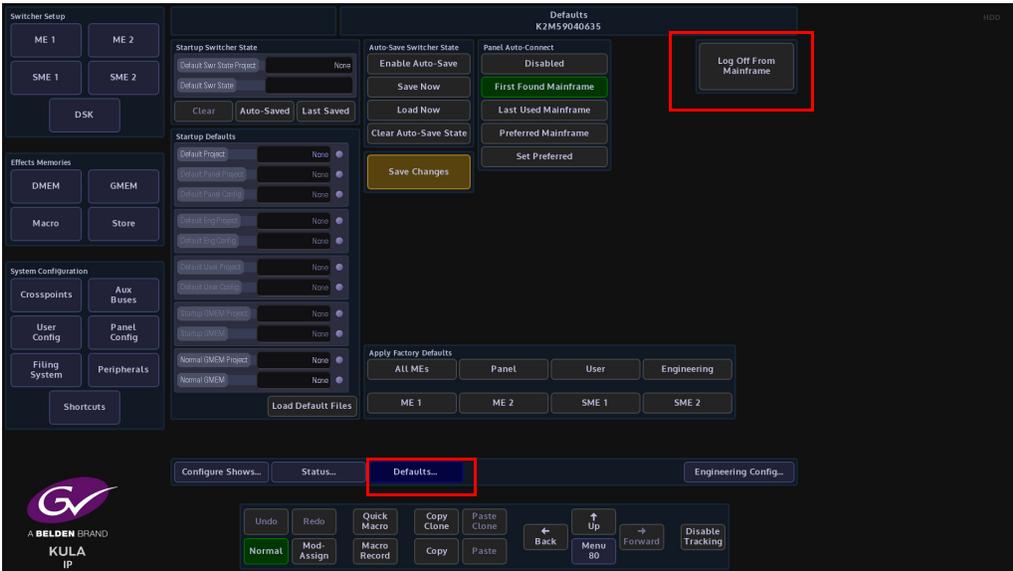
### IMPORTANT

#### **Please Note:**

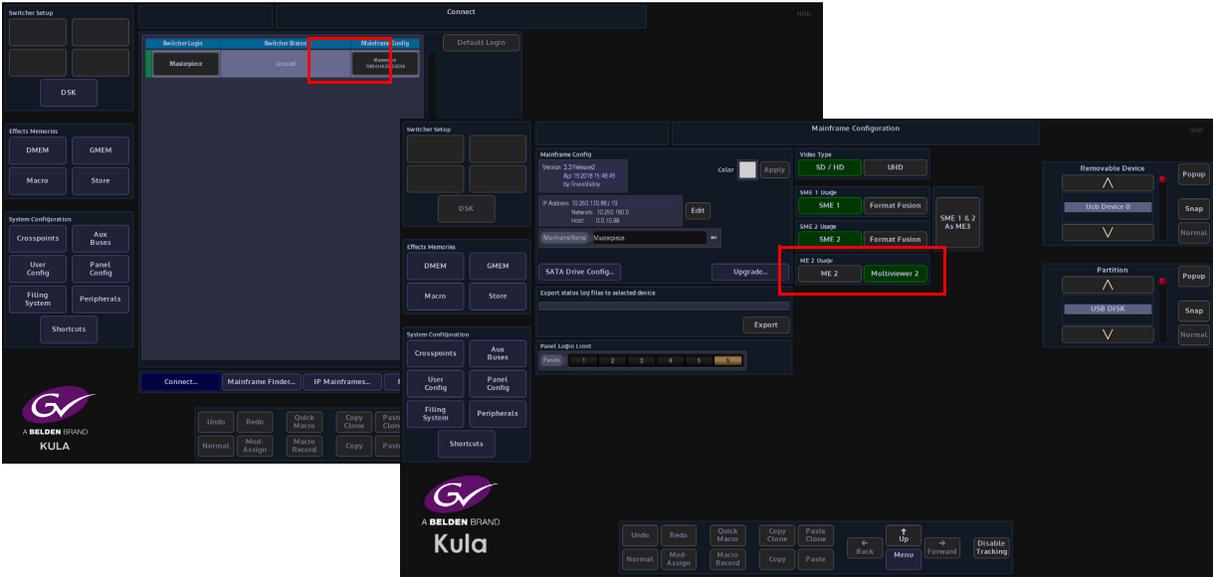
- **Multiviewer 1** - Has 16 tiles that can be used across the 4 heads (16 tiles on 1 head or 16 tiles spread across all 4 heads). 12 Tiles can display Input Sources, Stores or M/E Outputs (or a combination of all). The remaining 4 tiles display Outputs only. The maximum number of outputs you can show on the MV depends on the setup of the bi-directional BNCs
  - If all the bi-directional BNCs are set as outputs then you can display up to 14 outputs on the MV
  - If at least 2 of the bi-directional BNCs are set as inputs then you can display up to 16 outputs on the MV.
  - **Multiviewer 2** - Has 12 tiles that can be used across the 4 heads (12 tiles on 1 head or 12 tiles spread across all 4 heads). All 12 tiles display Input Sources only.
-

## How to Setup Multiviewer 2

Before explaining the multiviewer functionality, it is important to know how to access Multiviewer 2 giving the user access to an **extra 4 Multiviewer Heads and 12 tiles**. The user will have to log off the switcher by touching the “Up” button, then in the top menu, touch the **{Defaults}** button. In the Defaults menu touch the **{Log Off From Mainframe}** button.



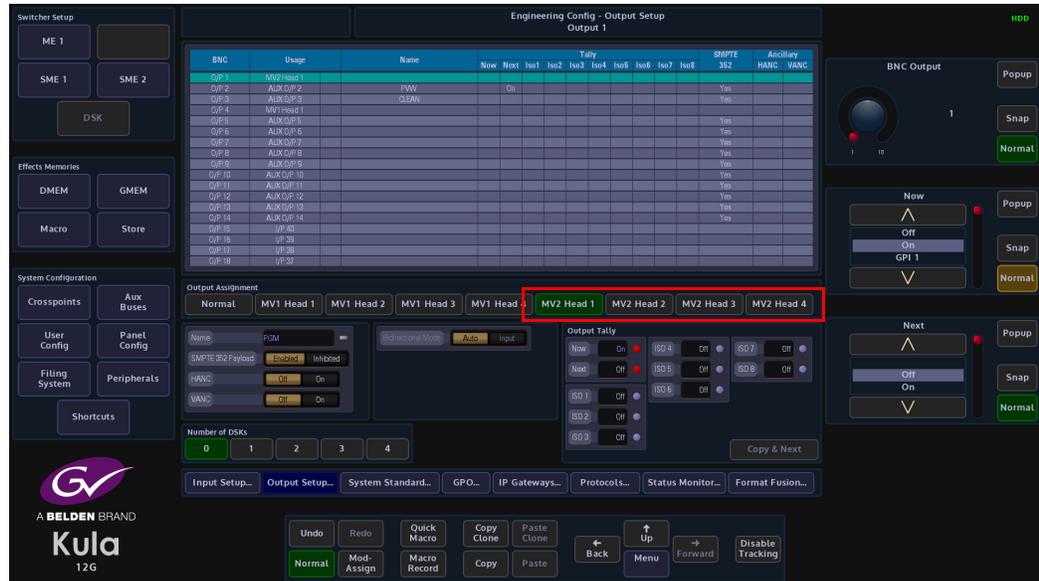
In the “Connect” menu, touch the **{Mainframe Config}** button. In the Mainframe Configuration menu, touch the **{Multiviewer 2}** button.



Note: It is important to understand that when the system has Multiviewer 2 selected, M/E2 is no longer available.

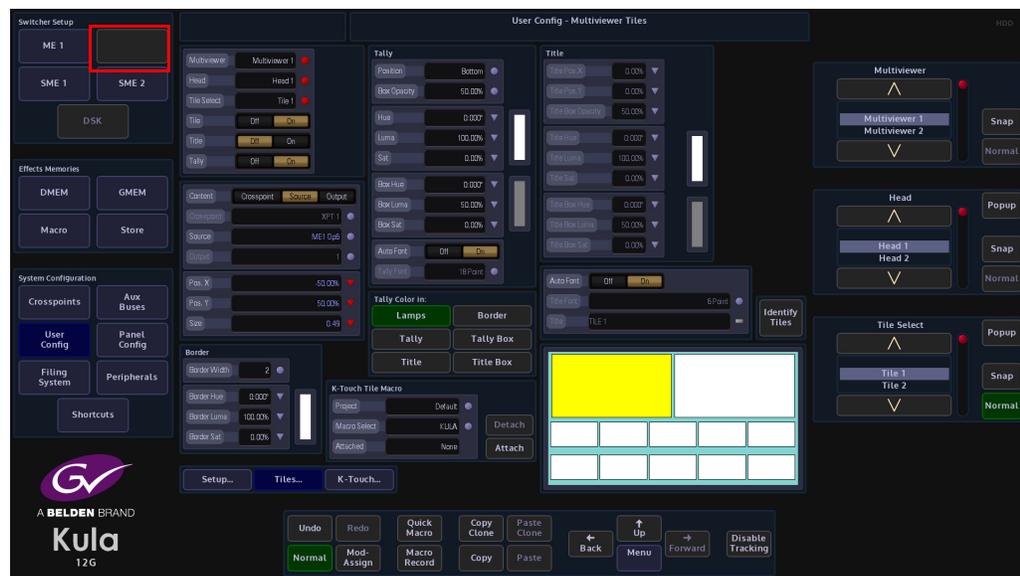
The button will turn green and the M/E 2 button is grayed out.

When logged back into the system, in the **Engineering Config - Output Setup** menu, the user is able to apply a Multiviewer 2 Head to an output.

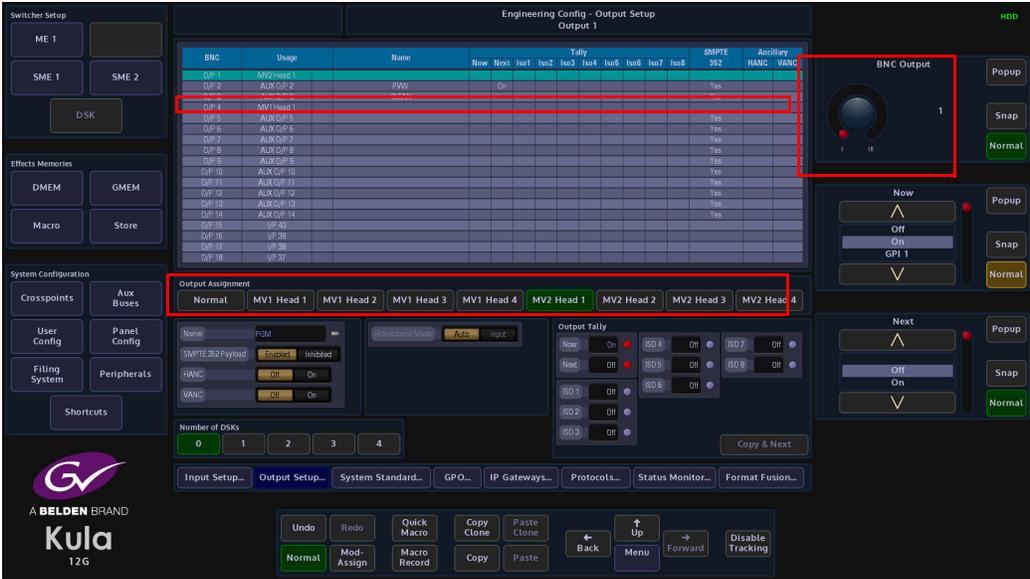


There are 4 Heads in the Kula multiviewer 1, the heads can have up to 16 tiles assigned to 1 head or 16 tiles assigned across the 4 heads which can be used across different outputs. These options can also be applied to Multiviewer 2 which also has 4 heads and 12 tiles.

Note: It is important to understand that when the system has Multiviewer 2 setup, M/E2 is no longer available.



Multiviewer heads are assigned to outputs from the mainframe like any other output, this is done in the **Engineering Config - Output Setup** menu see below.

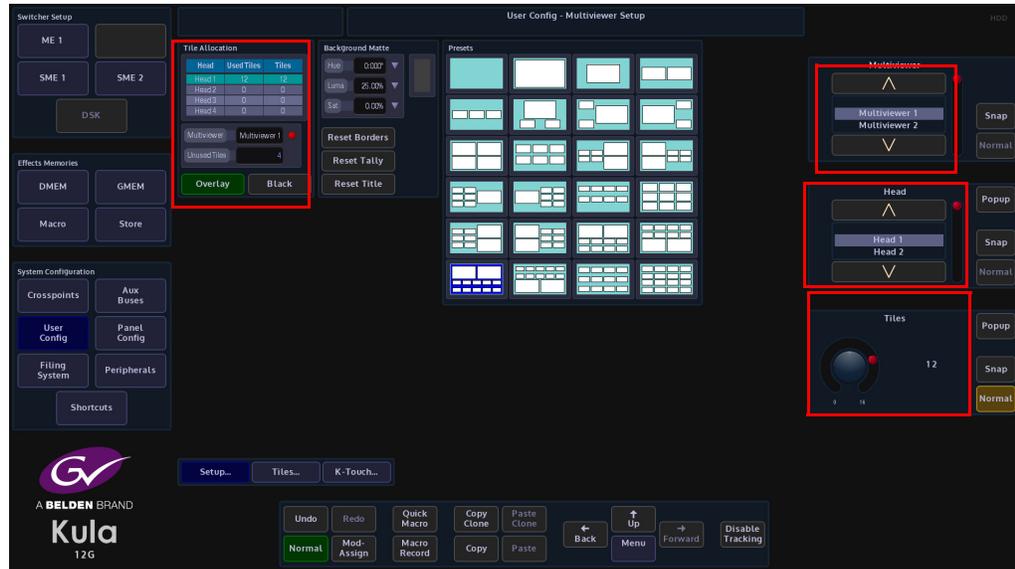


As shown in the menu diagram above, the user can select an output using the **“BNC Output”** parameter, then set the **“Output Assignment”** parameter one of the multiviewer heads MV1 Head 1 to MV1 Head 4 or MV2 Head 1 to MV2 Head 4 (if Multiviewer 2 has been setup).

This is then displayed as the selected **“MV Head”** in the output table. If the user now connects a BNC to the selected output, the multiviewer can be seen.

## Setup

Once the multiviewer output has been assigned, the next step is to assign tiles to the multiviewer heads.

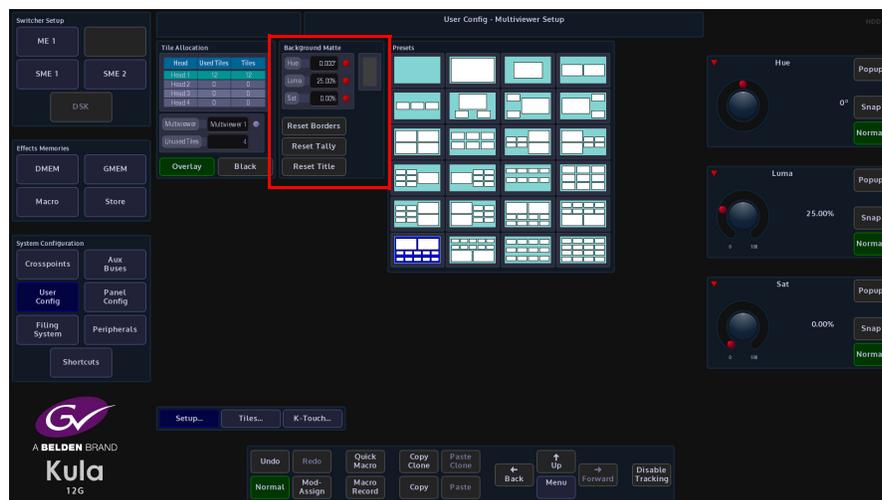


As can be seen in the diagram above, allocating tiles to a multiviewer heads is done using the "Multiviewer" parameter selects between Multiviewer 1 or 2, "Head" parameter controls are used to select the required multiviewer heads, then use the "Tiles" parameter to assign tiles to the head. The number of tiles assigned to a head is important because it will restrict the number of preset tile layouts and user-defined multiviewer layouts that can be used. The number of unused tiles are displayed in the "Unused Tile" window.

**Overlay On/Off** - will turn off the borders around all tiles and background behind the multiviewer tiles.

**Black On/Off** - when turned On will make the multiviewer output go black.

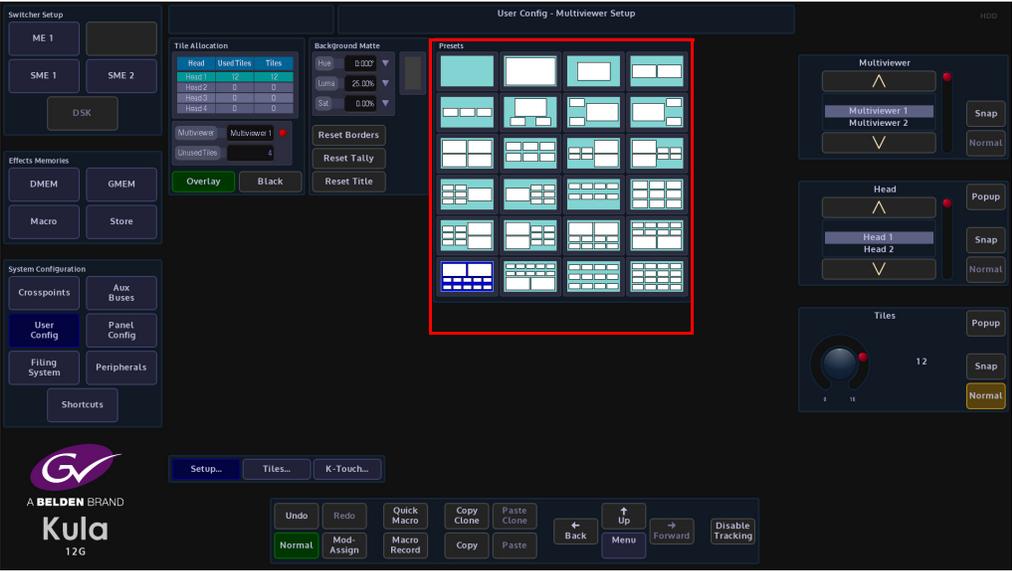
The background color behind the multiviewer tiles can be set by the user, touch the "Background Matte" attacher and use the parameter controls to set the required color.



The background color can now be set using the Hue, Luma and Saturation parameters.  
**Reset Borders, Tally and Tile** - will reset back to the default state, any unsaved setups will be lost.

### Presets

The Presets multiviewer layouts displayed in the menu, allow the user to select a multiviewer tile layout from a list of 24 layouts.  
A layout can only be selected if there are enough tiles allocated to the head currently being used.

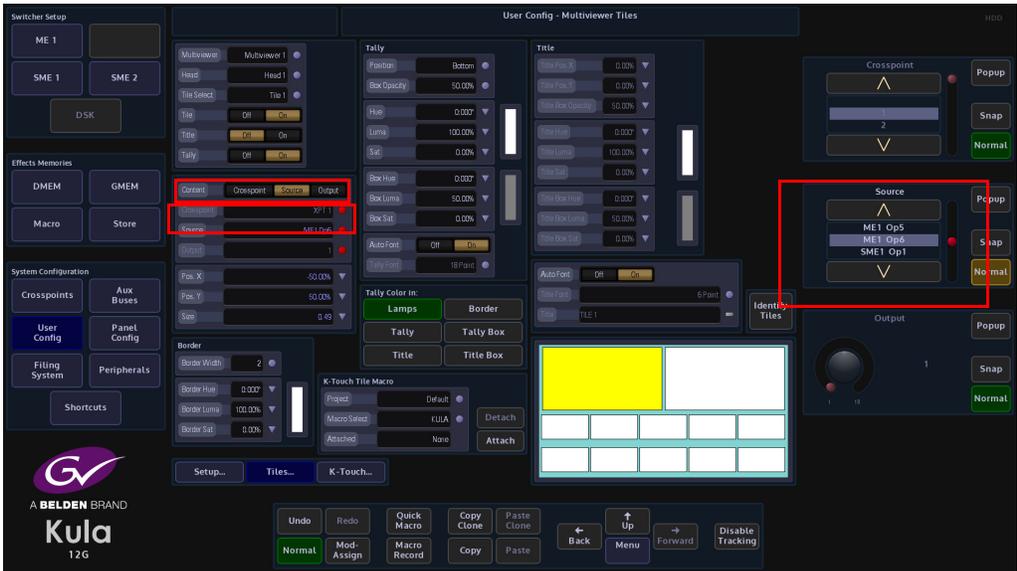


To use the preset layouts, make sure there are enough tiles allocated, then simply touch one of the preset layouts. Once selected, the layout image will light up with a blue boarder around the tiles.

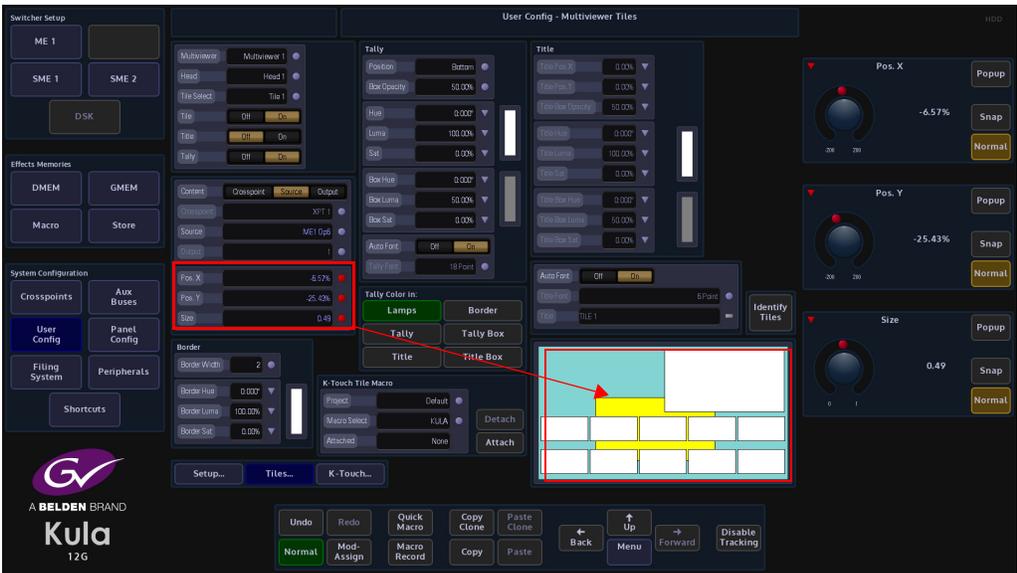
Note: A user-defined layout can be created by selecting a preset layout and using the **“Tile”** menu to reposition and size the tiles where as required.



Touch one of the options from the “Content” parameter (Crosspoint, Source or Output), the user can either scroll through the options for each of the content options, or touch the popup button and a list of options will appear. The multiviewer content selection has to be done for each individual tile.



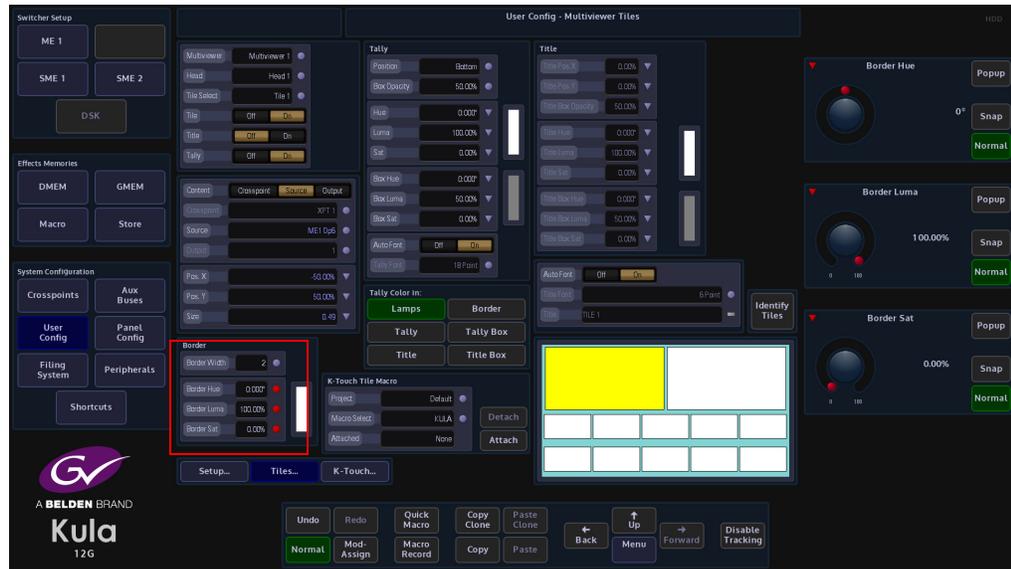
Tiles can be freely moved around the multiviewer screen area using the X, Y and Size parameters.



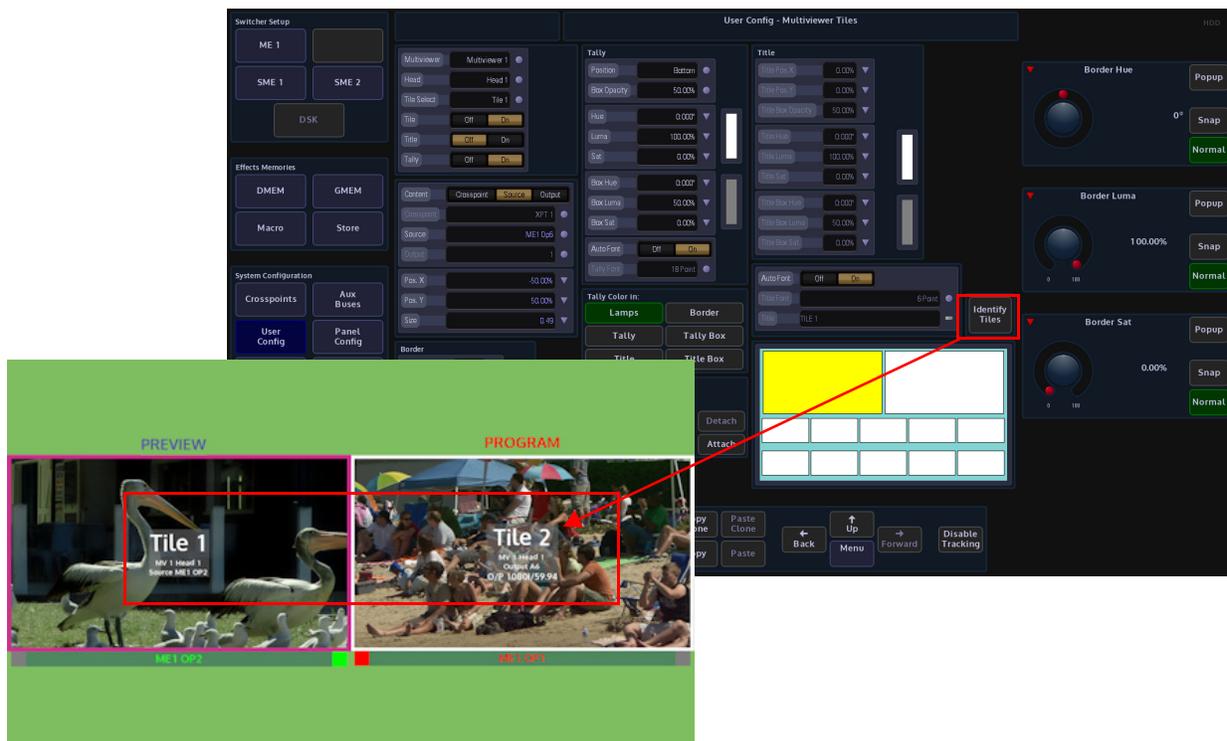
Use the parameter controls to position and size the selected tile as required.

## Configuration Multiviewer

The border around the edge of selected tiles can also be changed, touch the border width parameter to adjust the width of the border around the tiles, then touch the “Border Color” swatch to open the Hue, Luma and Saturation parameters that allow the user to change the color of the border.

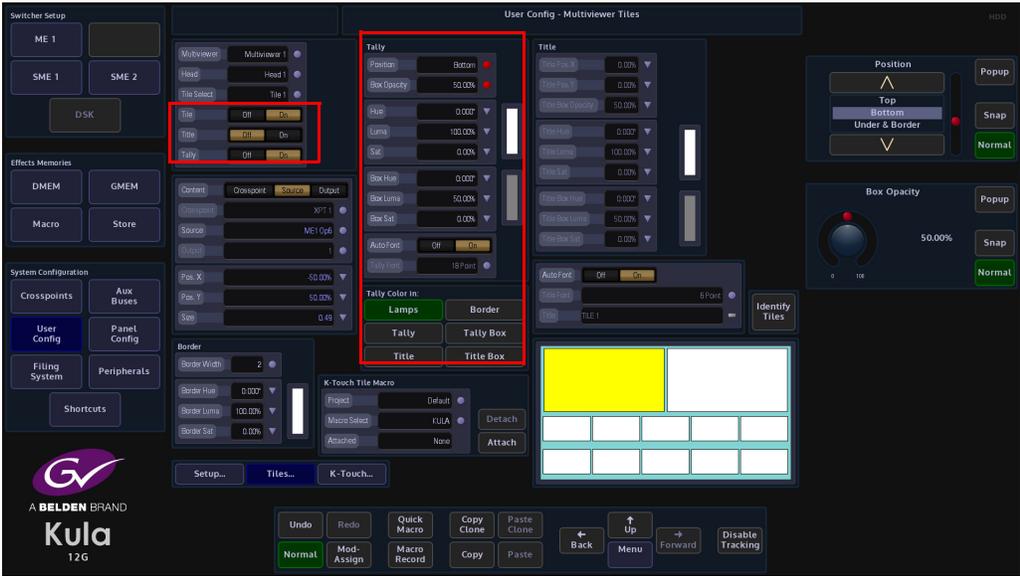


Touching the “**Identify Tiles**” button will display in the center of the tile the Tile Number, the multiviewer and head being used, the source feeding the tile and the output standard. the tile information will turn off once the button is let go.

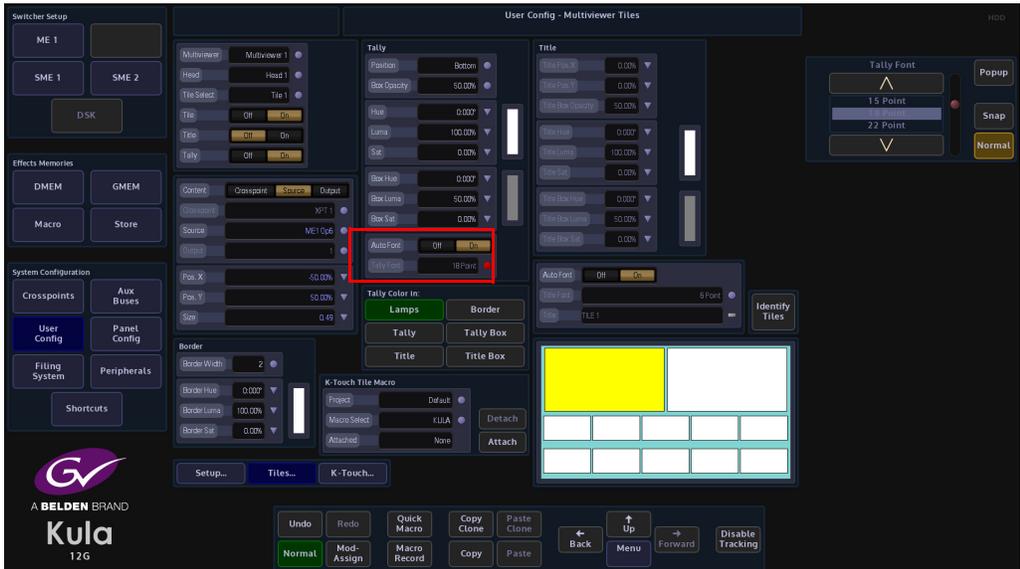


## Tally

The multiviewer tally menu allows the user to setup tally indicators and information for individual tiles, so that the user is constantly aware of the state of a source to a tile. Use the “Tile” parameter to select the required tile, the user has the option to display tally information on a per tile basis or not by using the “Tally” On/Off (green) button.



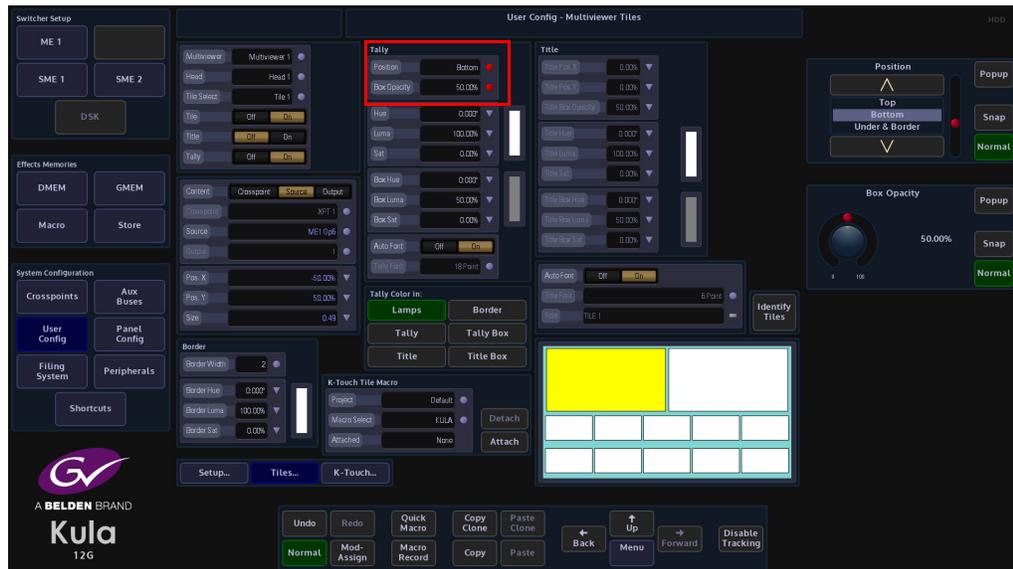
With the tally option now turned on for the selected tile, the source information is displayed in the center of the tally box i.e. ME2 OP1 or CAM1 etc. (the source information is automatically displayed when the sources for the tiles are setup in the Tile menu).



If the **Auto Font** button is set to the “Off” (unlit), then the “Tally Font” parameter can be used to set the tally font size for the selected tile. The font sizes range from 6 point up to 88 point.

The tally font color can also be changed by using the color parameters and adjusting the Hue, Luma and Saturation parameters (shown below).

**Tally Box Opacity**, will change the opacity of the box that the tally information is placed in. The tally box color can also be changed by using the Tally Box Color Parameters and adjusting the Hue, Luma and Saturation parameters (shown below).



**Tally Position** parameter, when the **Tally Lamps** and **Tally** are displayed, the user is able to move the tally indicator position up and down the tile. The options are:

**Bottom (default position)** - bottom just inside the tile border

**Under & Border** - places the tally indicators below, outside the tile with a border around the tally indicator as well as the tile

**Under** - under the tile with no border

**Top** - at the top of the tile just inside the tile border

**Over & Border** - places the tally indicators above, outside the tile with a border around the tally indicator as well as the tile

**Over** - at the top of the tile with no border

The **“Tally Color In”** buttons will switch On or Off individual tally indicators, titles and title boxes.

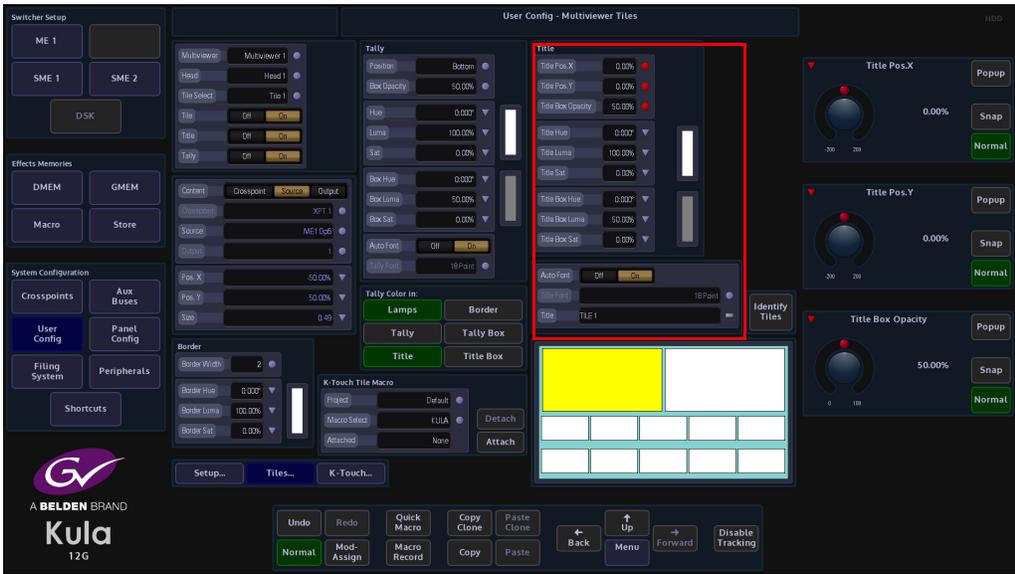
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Note: When a multiviewer tile is in **“Content”** mode **“Crosspoint”** it will display a tally for the crosspoint Fill and Key, so if either the Fill or the Key of the crosspoint is on-air an on-air tally will be seen. If a tally for a BNC is required use **“Content”** mode **“Source”**.

---

## Title

The **Title** menu as the name suggests, allows the user to place a title onto the selected tile. With the **“Auto Font”** button is turned On, the title font defaults to 18 Point. Turn the Title Auto Font button off and the font size can be changed using the **“Title Font”** parameter. Touch the **“Title”** name red button twice and use the on-screen keyboard to type in a new title name.



The **Title Color** can also be changed by touching the attacher (shown above) and adjusting the Hue, Luma and Saturation parameters.

The **Title Box Opacity** parameter changes the opacity of the box that the title sits in. The Title Box Color can also be changed by touching the attacher and adjusting the Hue, Luma and Saturation parameters (shown below).

The **Title/Title Box** for each tile can be freely moved around the multiviewer space, using the “Title Position X, Y” parameters.

## K-Touch

K-Touch software allows the user to create customized control touch screens. This provides a simple interface with live video for operators to control simple or complex effects using customized buttons on the 2nd touch screen.

The basic idea for having K-Touch is that provides an operational interface for gallery staff or even presenters.



With K-Touch the user can cut sources to the program, or select them to the preview, recall effects on the M/E banks, control the clip stores and select sub-clips. example of other functions are wipes, Clip transitions and mixes all by using customized buttons on the touch screen.

## Equipment Required

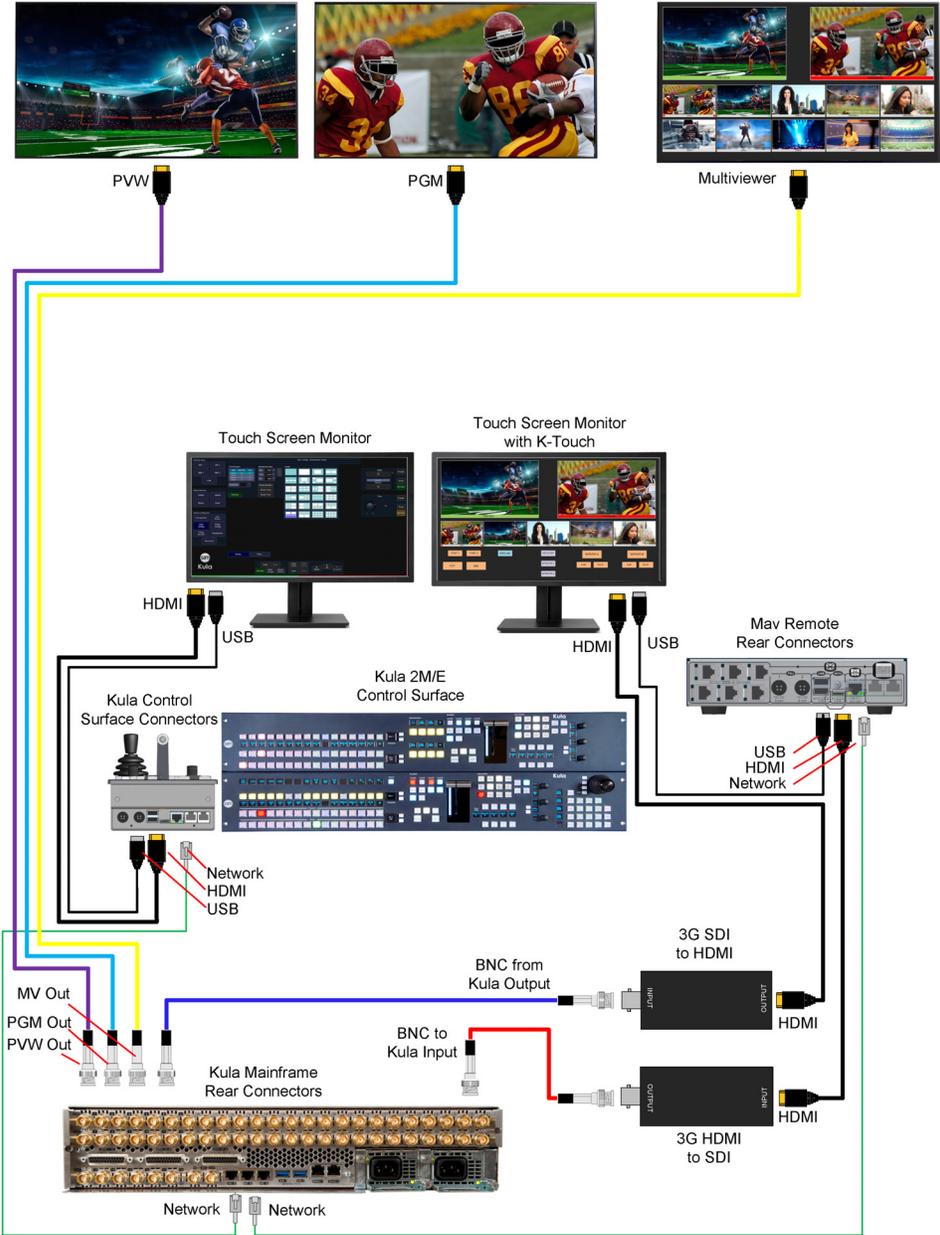
To use K-Touch, the Kula system requires a second interface controller to allow the touch screen monitor to communicate with the mainframe. An optional Mav Remote ancillary panel can be purchased.



The diagram on the following page displays how to connect a Kula system up to use K-Touch.

Connections

K-Touch Connection Diagram using the Mav Remote



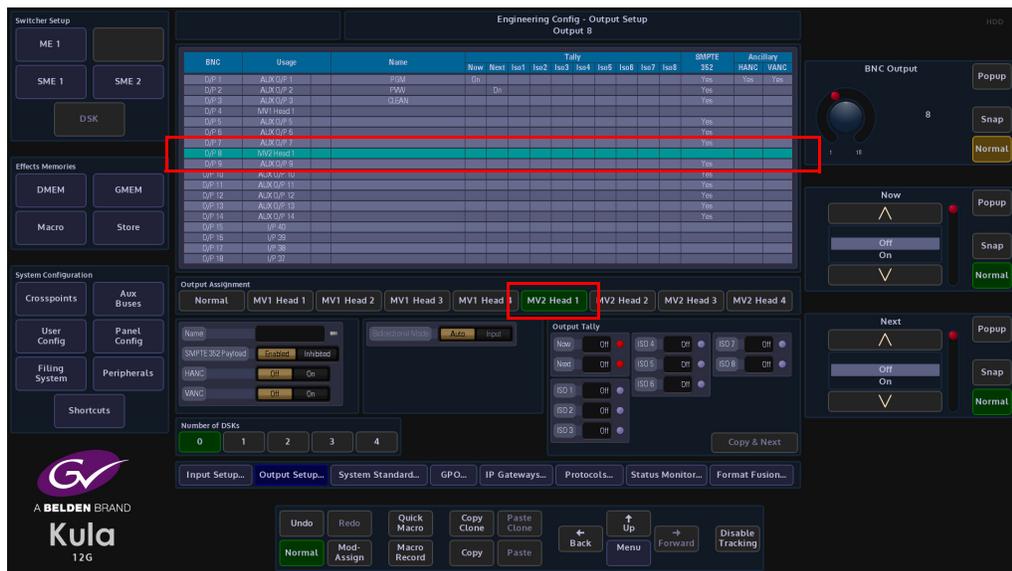
Note: The touch screen monitor that will be used for K-Touch has to be a 1920x1080 resolution.

### K-Touch Setup

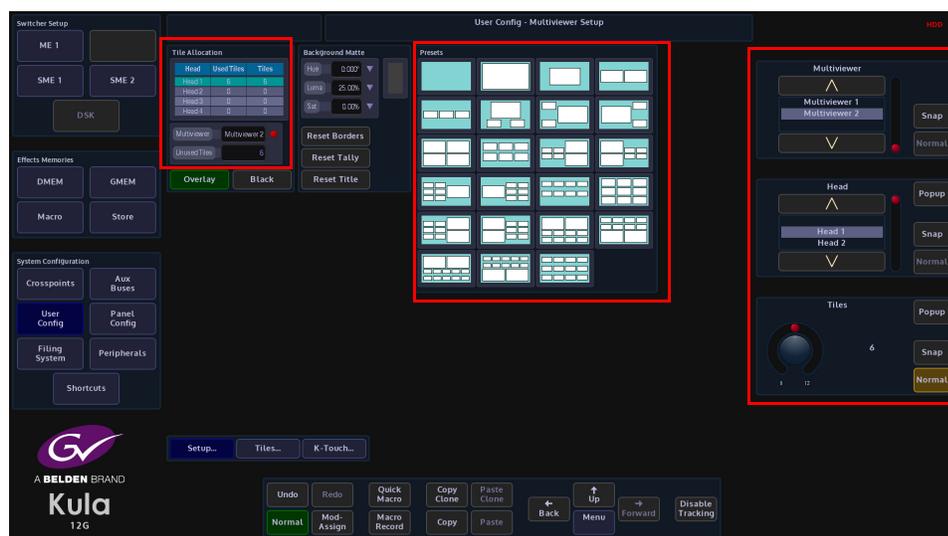
If you are using Multiviewer 1 as a multiviewer output, then to use K-Touch, you will have to turn on Multiviewer 2 in the logged out “**Mainframe Config**” menu. This is because K-Touch needs its own multiviewer output.

Note: When using Multiviewer 2, M/E2 is no longer available to use!

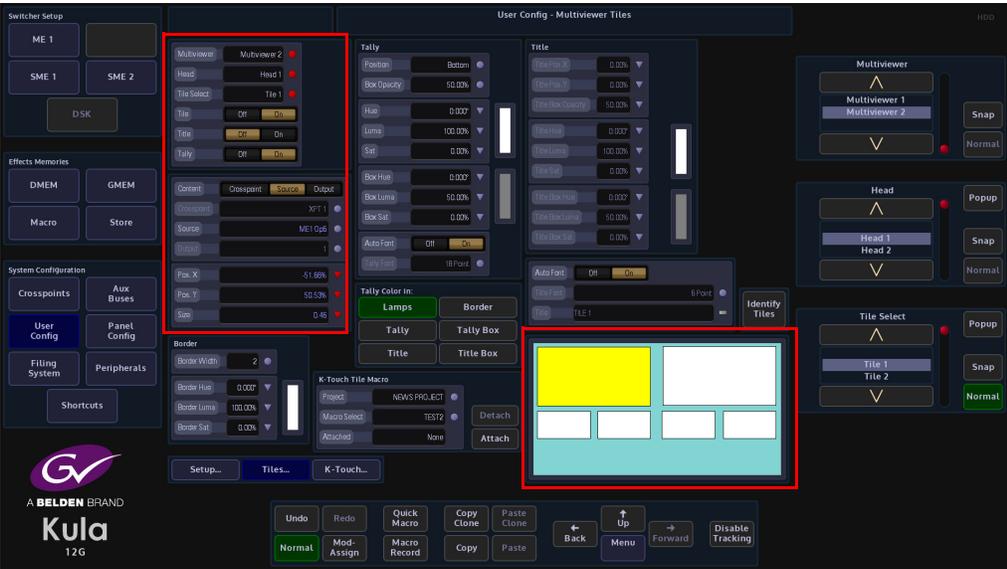
In the “**Eng Config - Output Setup**” menu, select and output for K-Touch and then touch the {**MV2 Head 1 to 4**} button.



In the “**User Config - Multiviewer Setup**” menu, use the “**Multiviewer**” parameter to select “**Multiviewer 2**”. Select one of the output Heads (1 to 4) and then select how many Tiles are required for the K-Touch output. Touch one of the “**Presets**” to form the basis for the video output tiles.



Touch the **{Tiles...}** button to open the **“Multiviewer - Tiles”** menu, here you can position the multiviewer tiles to the required position within the K-Touch window.



Touch a tile in the window and it will turn yellow, indicating that it is selected (as shown above). Then use the **“X/Y Pos and Size”** parameters to position and size the tiles to the required position within the window. At this point you can also add the required sources to each tile.

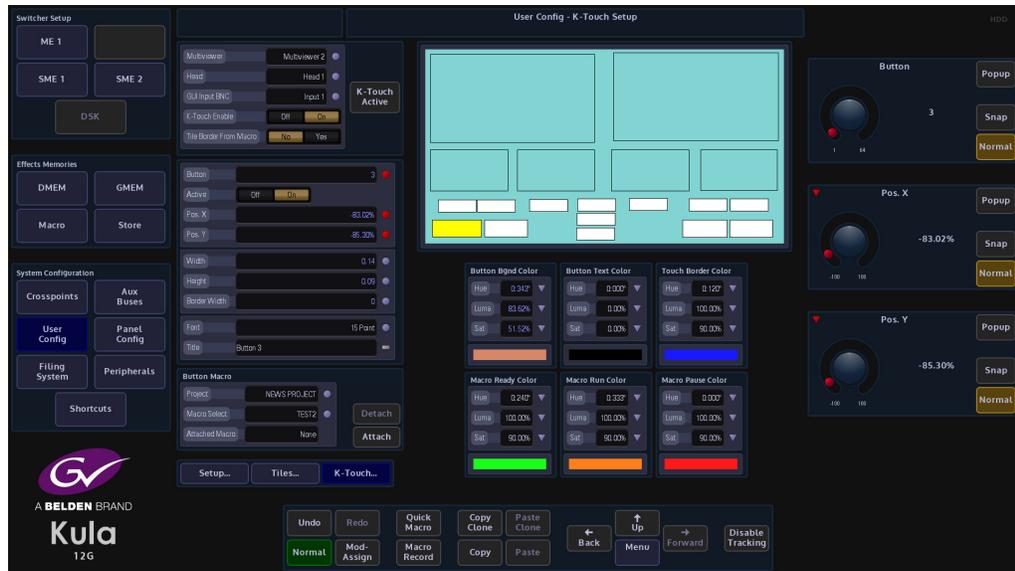
Touch the **{K-Touch...}** menu link button to open the **“K-Touch Setup”** window.



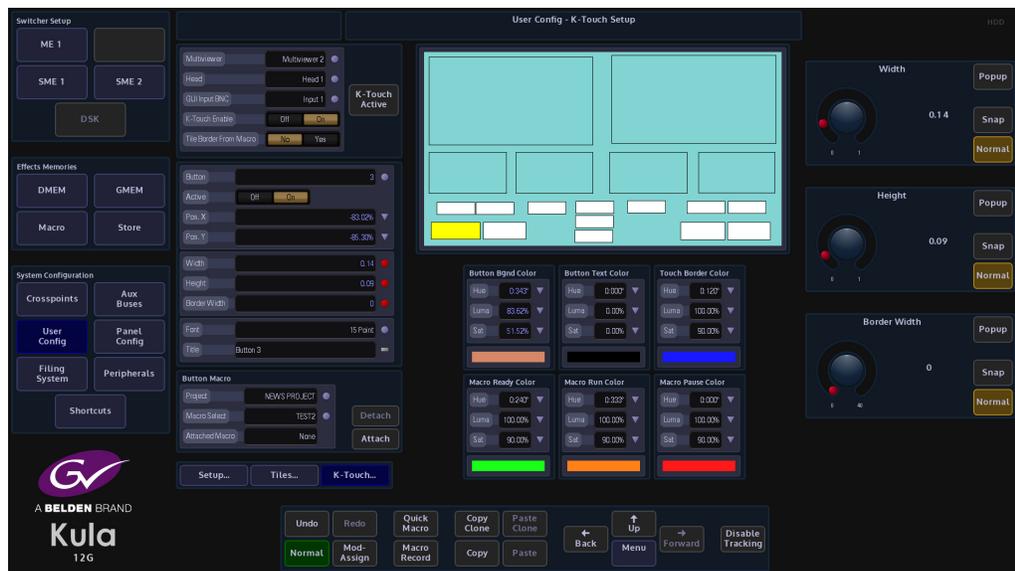
The **“Multiviewer”** and **“Head”** parameters display which multiviewer and head is being used for K-Touch.

**GUI Input BNC** - this parameter selects the input to the mainframe from the **“Monitor”** output from the Mav Remote.

**Tile Border From Macro** - when “Yes” is selected, this allows a border to be added around a macro button in the K-Touch window.



A small white square will be displayed in the default K-Touch window. This is the first button. To add more buttons, use the “**Button**” parameter to increment by “1” and then touch the “**Active**” {On} button. Use these parameters to add the required amount of buttons to the K-Touch window.



All adjustments using the following parameters are done on a button by button basis. Use the “**Pos. X/Y**” to position the buttons and the “**Width**” and “**Height**” parameters to change the size of the buttons..

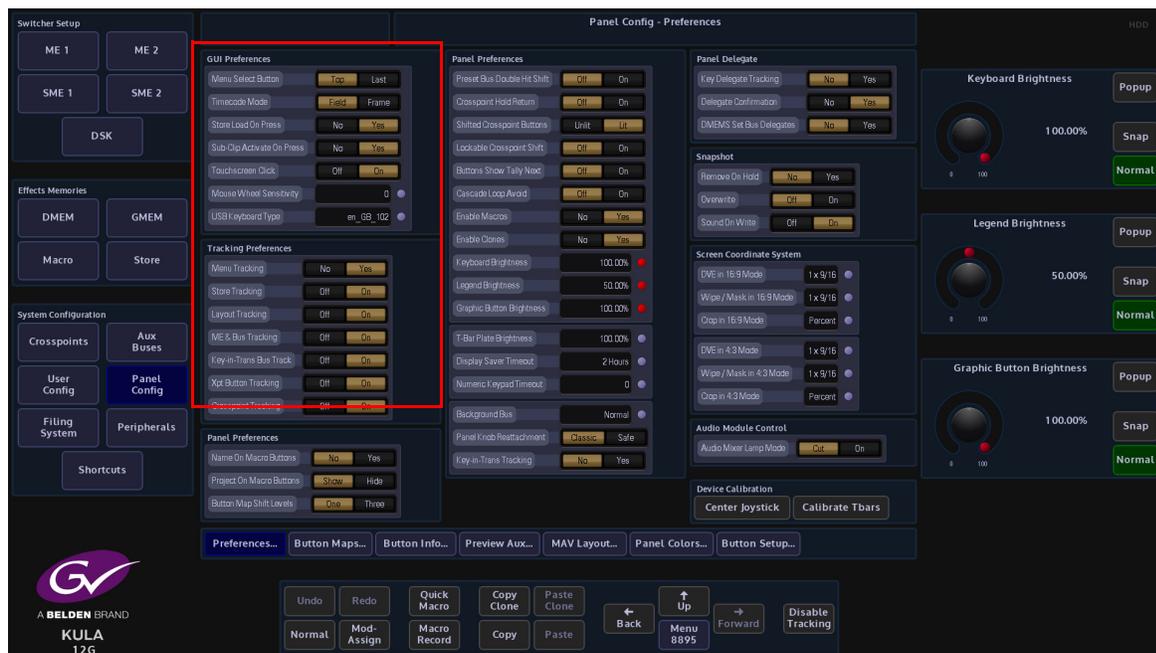
## Panel Config

### Preferences

Preferences menu allows the user to enable/disable functions on the GUI and Control Surface.

### GUI Preferences

GUI Preferences are a set of options that are designed to help the user access or control functions within the GUI more quickly and efficiently.



**Menu Select Button** - This menu allows the user the choice of two styles of menu navigation.

**Top** is used when travelling between different menus using the GUI panel buttons the system enters via the 'Top' menu, or front page of that 'menu tree'.

**Last** is used when the GUI records the last menu the user was in before leaving that menu tree.

**Timecode Mode** - this sets timecode increments to be set to the nearest Frame or Field.

**Store Load On Press** - this gives the option to load a still when pressing a minipic in the Store menu, or by selecting "No", allows the user to select a still but not actually load until the {Load} button is pressed. This allows the user to clone the still selection by "Copy, Copy" pressing a minipic and "Paste, Paste" the action onto a User Function button. The still will not load into the selected Store until the User Function is pressed. The selected Still can also be loaded into the selected Store by pressing {Load Selected Still} in the Shortcuts menu.

**Sub-Clip Active On Press** - this will load a sub-clip into a Store when touched in the Store - Sub-clips menu.

**Mouse Wheel Sensitivity** - allows fine adjustment for the mouse wheel.

**USB Keyboard Type** - the user can now select between 22 different types of USB keyboard preferences, US, UK, French, German, Spanish and Latin American etc. Use the parameter control to scroll through the keyboard type options. This option is saved in the EEPROM of the Panel and not in the Panel Config.

**Tracking Preferences:**

**Menu Tracking** - when the user selects a function on the control surface i.e. [CHROMA] in the Key Control area and presses the button twice, with **Menu Tracking** turned **On**, the GUI screen will switch to the Chroma Keyer menu. So as the function suggests, the GUI menus will track a function selected on the control surface.

**Store Tracking** - When a Store is selected on the control surface, the Store menu will follow the selected Store.

**Layout Tracking** - this allows button press actions on one M/E on the control surface to be tracked on all other M/Es.

**ME & Bus Tracking** - any Key or M/E delegates selected on the control surface, **M/E & Bus Tracking** causes the GUI Delegate buttons to follow.

**Key-in-Transition Delegate Tracking** - When active, a double-tap of any of the 'KEY1 - 4' buttons on the control surface.

**Xpt Button Tracking** - this allows Xpt button tracking in the GUI menus.

**Crosspoint Tracking** - causes the menus that are crosspoint oriented to update their crosspoint selector to track any crosspoint selections on the control surface.

## Panel Preferences

Panel Preferences are a set of options that are designed to help the user access or control functions on the Control Surface more quickly and efficiently.



**Name On Macro Buttons** - selecting "Yes" will place the macro "saved file name" on the mnemonic display above the macro button on the control surface.

**Project On Macro Buttons** - when "Show" is selected the mnemonic display will display the "Project and Macro File Number" (this is the default setting). When "Hide" is selected, the macro "File Number" is displayed.

**Button Map Shift Levels** - This adds an extra two shift levels to Button Maps. When "Three" is selected, and extra two shift levels are added to the "Edit Button Maps" menu.

**Shifted Crosspoint Buttons** - This function when set to LIT, will light both the crosspoint button and the **{Shift}** button of a shifted source. When set to UNLIT, the actual crosspoint button for the shifted source will not be lit until the **{Shift}** button is pressed.

**Lockable Crosspoint Shift** - this will allow the locking of the shift function to display the shifted Xpts continuously.

**Buttons Show Tally Next** - this is used in conjunction with the **User Config - GPO Setup** and allows the tally function to show what is being tallied on.

**Cascade Loop Avoid** - avoids cascade loops when setting up button maps etc.

**Enable Macros** - this allows a lamp to be lit from a macro assignment.

**Enable Clones** - will set the button lamp to light up the same as the cloned function, i.e. if live to air the button will turn Red.

**Keyboard Brightness** - this adjusts the brightness of all the buttons on the Kula control surface.

**Legend Brightness** - this adjusts the brightness of the mnemonic displays on the Kula control surface.

**Graphic Button Brightness** - this adjusts the brightness of the OLED user function buttons.

**T-Bar Plate Brightness** - adjusts the brightness of the T-bar plate.

**Display Server Timeout** - This causes the touch screen GUI to go into sleep mode after a designated amount of time. Default is 2 hours, maximum On time is 4 hours, can also be disabled so the GUI is on constantly.

**Numeric Keypad Timeout** - use the parameter control to adjust the numeric keypad timeout in increments of 5 minutes, up to 30 minutes. When set to 0 the keypad will not timeout.

**Background Bus** - use the parameter control to step through Normal, Reversed and Follow Tbar.

**Panel Knob Reattachment** - this function has 2 modes:

**Classic** - the Key Control functions that work in conjunction with the Assignable Controls will behave in the normal way.

**Safe** - when using the Key Control functions in conjunction with the Assignable Controls for Resize, Border, Mask and Bus Color, pressing the function button in the Key Control area will make the button go Green, and the Assignable Controls will reflect and adjust the selected function.

If a different function is selected, the previous function button used in the Key Control area will remain Green, this allows the user to step back and forth between the selected functions.

To switch the function off, press and hold the button, and the Green light will go off.

**Key-in-Trans Tracking** - links the Key 1 - 4 buttons in the Transition Control area on the control surface to the Key 1 - 4 buttons in the Key Control area on the control surface.

**Panel Delegate:**

**Key-in-Transition Delegate Tracking** - When active, a double-tap of any of the 'KEY1 - 4' buttons on the control surface and the Layout Group will change delegate to follow the Key bus just selected.

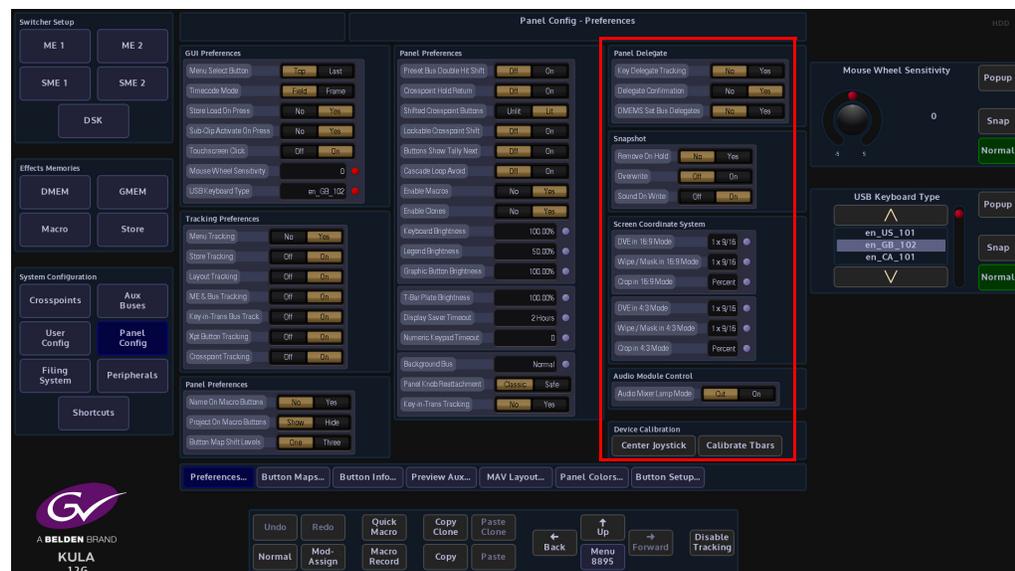
## Snapshot

**Remove On Hold** - Touch and hold a “Macro” OLED button to create a snapshot. With the “Remove On Hold” parameter set to “Yes”, touch and hold the OLED button again and the snapshot is removed.

Note: If you hold and remove the snapshot from the button, it also deleted the snapshot from the Filing System.

**Overwrite** - when a snapshot has been attached to a button, with this parameter set to “On” you can press and hold the button and the original snapshot will be overwritten.

**Sound On Write** - when holding a OLED button down, the control surface will “bleep” to indicate that a snapshot has been written.



## Screen Coordinate System

The Screen Co-ordinate System is a tool by which the user can adjust the display of co-ordinates on the GUI screen; co-ordinates that relate to the Resize engine, Mask areas and Wipe positions.

**Crop:** The ability to set the crop positions into Screen Grid mode (as per Wipe/masks) to allow the copying of Positions and Crops. To copy parameters “press and hold” the **{Copy}** button on the GUI and select the parameter using the **{Normal}** button associated with that parameter.

Multiple parameters can be copied while copy button is held down, next go to the parameters you want to paste these values too, hold down **{Paste}** and press the **{Normal}** button associated with that parameter. The default mode for the Crop grid is percent.

**Center Joystick** - this button will calibrate and center the Joystick axis.

**Calibrate Tbars** - this is the end to end calibration for the Tbar/Tbars on the control surface. Touch the **{Calibrate Tbars}** button and the Up/Down arrow indicator for the Tbar will flash

orange. Move the Tbar end to end a couple of times to calibrate. When calibrates the Up/Down indicators stop flashing and the Tbar now behaves normally.

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Note: Do not offset the Joystick when pressing this button.

---

**Audio Module Control:**

**Audio Mixer Lamp Mode -**

**Cut** - lamps is red when audio channel is muted/off and equivalent back-lit when on.

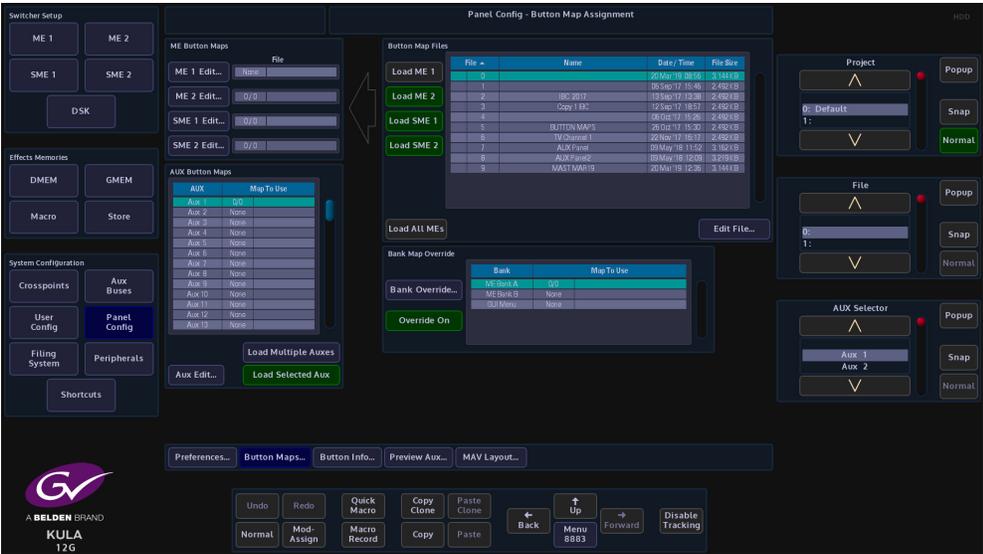
**On** - lamps active when audio channel on and equivalent back-lit when muted/off.

## Button Maps

In this menu, the mapping of the control panel buttons to the system's crosspoints can be changed to suit a user's preference on a bank-by-bank or M/E by M/E basis. Button maps are easy to setup and are the preferred way to setup crosspoints on a control surface. You can also setup the sources for the Aux outputs, to attach to the Aux Panels.

Buttons on the Buses can have any source assigned to them using a Button Map. This can be done by saving and loading Button Map Files, or by creating Custom maps.

When assigning sources to buttons on the Buses, it is normal the button map to be assigned on each ME or Aux so that whatever physical bank that ME or Aux is delegated to, that map will appear on those buttons. There is, however an additional mode of operation Bank Override. In this mode, a physical bus is forced to have a specific button map regardless of what that bank is delegated to control.



### The button maps main menu

The main menu allows the user to load a button map from a file, directly to any ME bank (or all) or any combination of Aux Buses. There is also a table showing which physical banks have maps loaded and whether Bank Override is enabled.

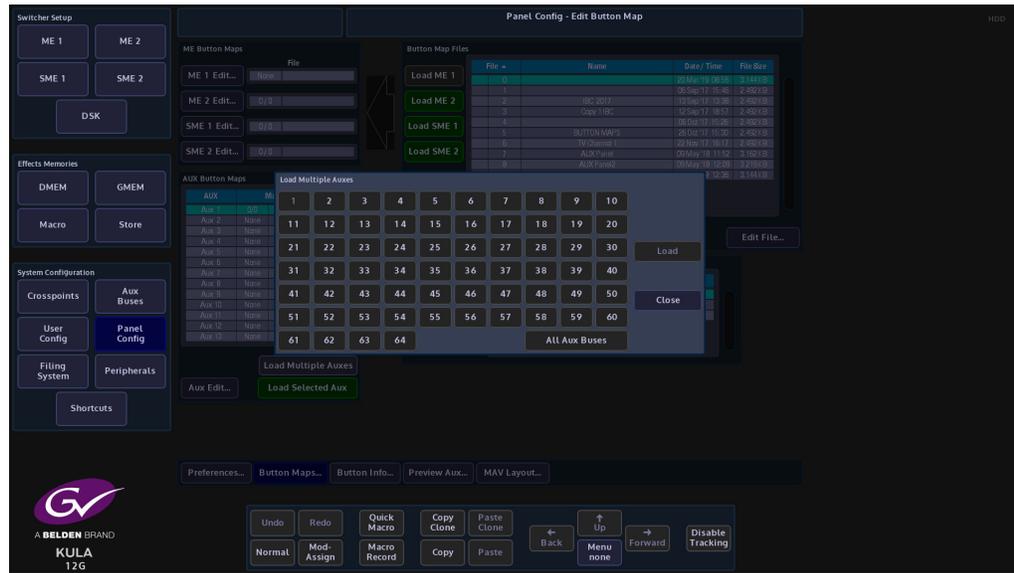
#### Loading a Button Map onto an ME

First, select the required file in the Button Map Files table. That file is loaded into the ME by touching the **{Load ME 1}** (for ME1) button, or the **{Load All MEs}** button for all the MEs.

#### Loading a button map onto an Aux Bank

Once the file is selected in the Button Map Files table, it is loaded to a single Aux Bus by selecting the required Bus in the Aux Button Maps table and then touching the **{Load Selected Aux}** button. Touching the **{Load Multiple Auxes}** button allows the user to load a map to all, or any combination of Auxes.

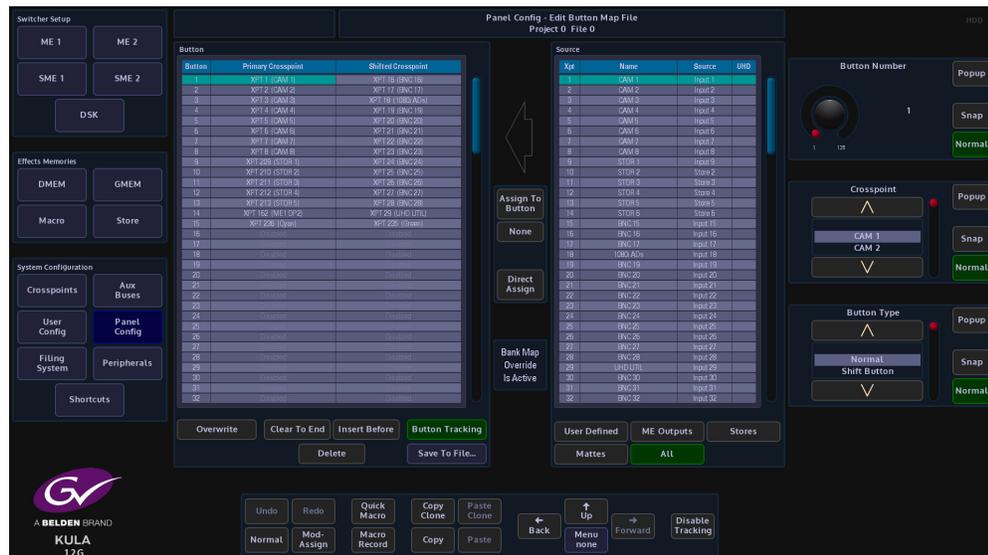
Touching the **{Load Multiple Auxes}** button displays the pop-up (shown below) where the you can select the required Auxes.



Note: Aux maps are only used in Aux selector panels and are not used when an Aux is selected on an ME bank panel.

### Editing a Button Map

Any map can be edited by touching one of the Edit buttons. In the case of ME1, the user touches the {Edit ME1...} button. This displays the Edit menu (below) and any changes made on this page will happen in real time on the ME1 buttons.



The Button table is split into two columns, on the left are the primary (unshifted) button functions and on the right are the shifted button functions. To assign a source to a particular button, the user must highlight the appropriate button on the primary or secondary side then select a source from the source table. The source crosspoints are

broken down into separate groups which are selectable on the set of buttons below this table. Touching the {All} button selects one complete scrollable list of all the available crosspoints.

Having selected both the button and the source crosspoint, the user then touches the {Assign to Button} button to complete the action. At this point both the button table and source table automatically advance one entry - this enables the user to assign consecutive sources quickly.

**None** - assigns no source to the selected button.

**Direct Assign** - when this is selected the assignment is made as soon as the source is selected in that table without the user needing to push the assign button. This mode cancels as soon as the user navigates away from that menu.

The Button Type selector is used to select the overall function of the bus button and has 3 options: **Normal** - the button selects the assigned primary and secondary sources.

**Shift** - The button is now used to select between shift and unshift for the whole bus of buttons. Traditionally this is placed at the far right of the bus.

**Bus Lock** - pushing this locks the operation of the entire bus. Pushing a second time cancels this.

**Clear to End** - this clears all buttons beyond the selected button. Note, this will not clear shift or lock buttons.

**Insert Before** - inserts a blank button and moves all subsequent buttons on one position. Note, shift and lock buttons will not move.

**Delete** - removes the selected source and moves all subsequent buttons back one position. Note, shift and lock buttons will not move.

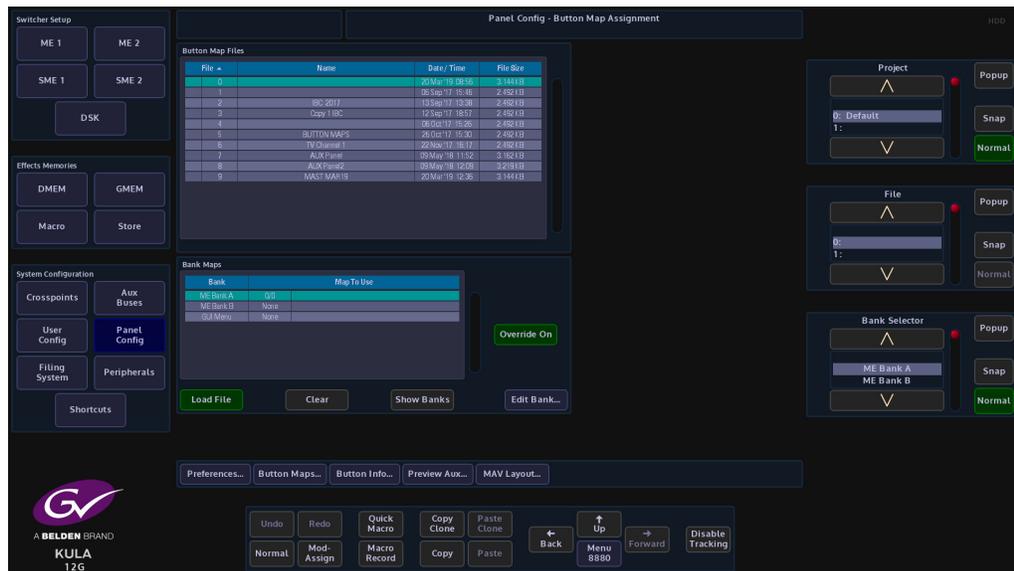
**Discard Changes** - reverts the button map to how it was before the current editing process was begun.

**Save to File** - the edited map can be saved to a file.

## Bank Override

Each physical bank of buttons (ME or Aux selector panel) can have a map forced onto it which overrides any ME or Aux map assignment. This can be useful where button banks are of different lengths, or if an operator wants to control one bus from 2 banks in order to increase the number of sources available.

It is important to note that this mode will change the normal operation of a bank. For this reason, the **{Override On}** button control is on the main button maps menu so the user can easily see if this is enabled. Touching the **{Bank Override...}** button takes the user to the Bank Override menu.



---

Note: If the **{Override On}** button is turned "On"; the button is green. Loaded button maps will not be displayed on the Control Surface or any attached Aux Panels.

---

The same Button Map files are available in the Files table. All the available banks are listed in the Bank Maps table. To find out what the designation of a particular bank is, the user can push the Show Banks button and all the displays on the panel will show their designation.

**Override On** - enables the Bank Override on the selected bank.

**Load Bank** - Loads the selected map to the selected Bank.

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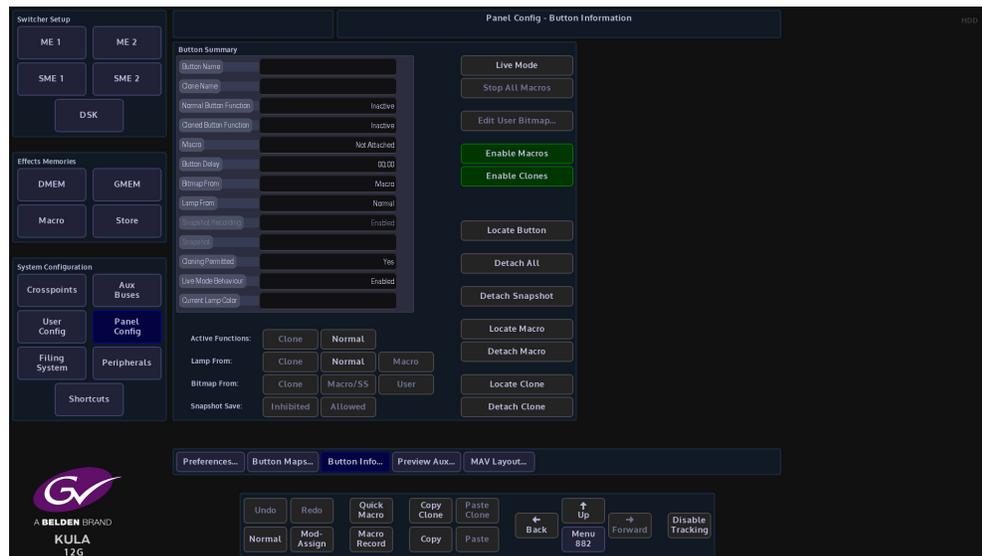
Note: The loaded map will not be used unless Override On is active.

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**Edit Bank** - the user can make live edits to the map on the selected bank when override is on.

## Button Information

The **Panel Config - Button Information** main menu displays information about Clone button functions and Macro buttons. The Button Summary table displays all the information related to a selected button.



### Button Summary

**Button Name** - the normal button function.

**Clone Name** - the clone function attached to a button.

**Normal Button Function** - displays if the normal button function is active.

**Cloned Button Function** - displays if the cloned button function is active.

**Macro** - displays if a macro is attached to the button

**Button Delay** - this displays the delays attached to a macro function

**Bitmap From** - display where a bitmap is derived from, when cloned to a User Function button

**Lamp From** - displays lamp from cloned function or from the normal function

**Snapshot Recording** - inhibits the user function buttons ability to record a snapshot.

**Cloning Permitted** - if a function can be cloned, this parameter will display Yes

**Live Mode Behavior** - Shows "Enabled" if Live Mode can be set on this function.

**Current Lamp Color** - this displays the default or any user-defined lamp color that has been applied to a button.

## Button Functions

These buttons are used to locate and disable Clones or Macros associated to a button.

**Live Mode** - will turn Live Mode On or Off

**Stop All Macros** - will stop all macros running

**Locate Button** - this will allow the current function of any button to be summarized in the table. Buttons with Clones and/or Macros attached will light Green when the Locate Button is Active. To locate a button Press the "Locate Button", it will go Red and the panel will only light up Normal Button (e.g. Clones, Macros attachments and Button that have had their Normal Functionality Disabled), the Table will then Display the current Information about that button. The Locate button will then return to Gray.

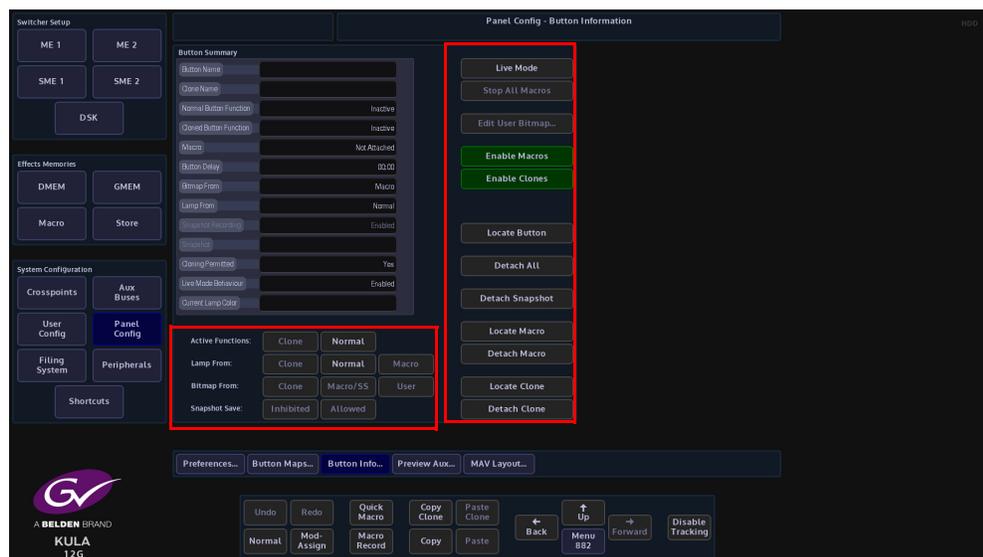
**Detach Snapshot** - this will detach a Snapshot from the selected button

**Locate Macro** - works in the same way as Locate Clone, and locates a Macro function button

**Detach Macro** - detaches a macro function from a button

**Locate Clone** - locates the clone button by turning off all the lamps on all the buttons on the control panel and GUI except the clone button which will turn Red.

**Detach Clone** - detaches the clone function from a button.



When a button is selected, this menu can be used to enable/disable functions listed below.

### Active Functions

**Clone** - switches the clone function On/Off

**Normal** - switches the normal function of a button On/Off.

These can be selected together so that both functions are active.

### Lamp From:

**Clone** - will set the button lamp to light up the same as the cloned function, i.e. if live to air the button will turn Red.

**Normal** - switches the lamp between its normal Green color and the Red cloned color

**Macro** - this will allow a lamp to be lit from a macro assignment

**Bitmap From**

**Clone** - displays a bitmap from the cloned function

**Macro/SS** - by default, a User Function Button would be blank normally, however the button can also have a bitmap from a macro or snap shot.

**User** - displays a bitmap from the User Function, Edit Button Bitmap menu.

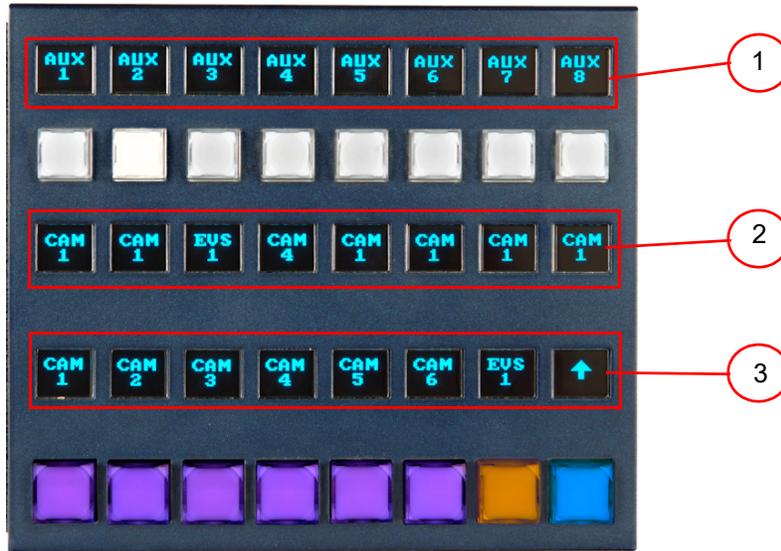
**Snapshot Save**

**Inhibited** - inhibits the user function buttons ability to record a snapshot.

**Allowed** - allows a user function button to save a snapshot.

## Preview Aux

The Preview Aux function can be used to setup the MAV-AUX module that can be connected to the Kula control surface. The Switched Source mnemonic emulates the Crosspoint or Button Map setup on the MAV modules on the control surface.

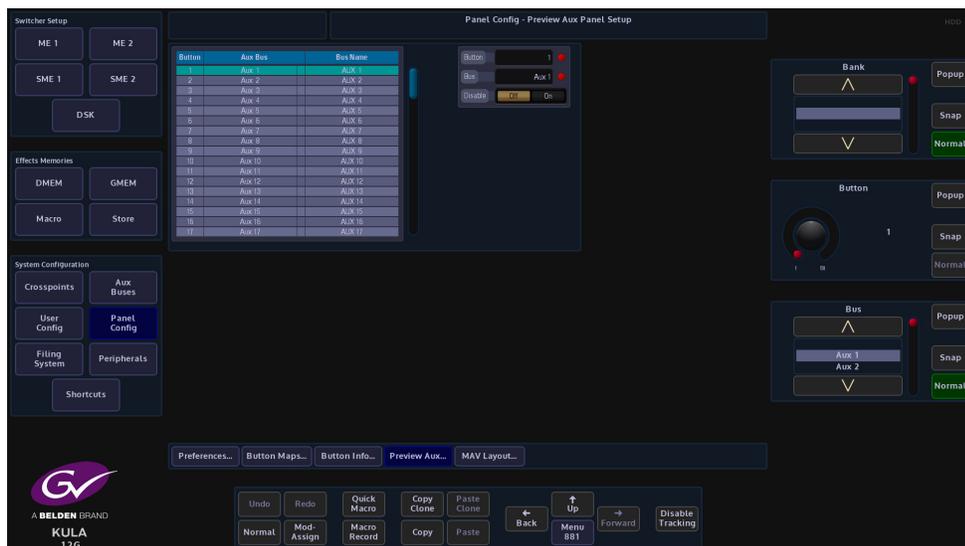


The MAV-AUX modules are enhanced Aux Bus control modules that have three mnemonic displays which give the operator three levels of information:

- 1 Aux Output Designation - allowing the user to rename the Aux output designation.
- 2 Current Source to the Aux Output
- 3 Crosspoint - crosspoint or button map driven sources

Aux Bus setup for Kula is done in the **User Config - Aux Bus menu**.

Using the MAV-AUX module is simple, select the required Aux bus using the top row of buttons, then select the source for that Aux Bus using the bottom row of buttons.



The Aux Bus name can be assigned in the **User Config - Aux Setup** menu.

The Aux Bus Select buttons are numbered starting at 1 on the left of the panel and can have any available Aux Bus assigned to them, using the **Bus** rotary control.

Preview Aux Parameter Controls

**Bank** - this selects an aux modules. The "Bank" that the aux module sits in is setup in the **Panel Config - MAV Layout** menu.

**Button** - scrolls through the Aux Selection Buttons at the top of the MAV-Aux module.

**Bus Type** - this sets the Aux Buses 1 to 64

**Bus** - this allows the user to select the Aux Bus that will be displayed on that button and sets the Aux Buses 1 to 64

**Disable** - disables the button leaving it blank and inactive.

## LCD and LED Aux Panel Setup

To complement the Kula range of control panels, LCD and LED Aux Panels are available to purchase. The Aux Panels can be used for remote Aux output switching.

One panel has 35 LCD buttons and a rotary shaft encoder, the other has 40 LED buttons, 1 LCD button and a rotary shaft encoder.

### LCD Aux Panel



### LED Aux Panel



## Setup and Configuration

Both of the Aux panels connect to the Kula mainframe via an RJ45 network cable and have external power supplies.

### Rear View (the LCD and LED panels have the same rear)



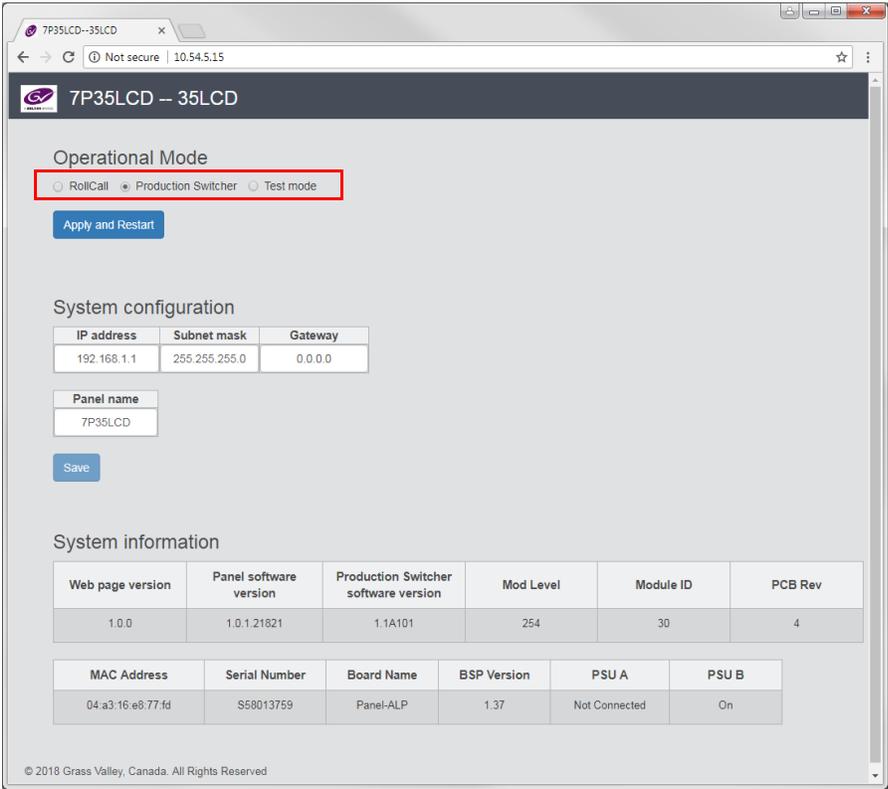
Network Connector

Power Supply  
Connectors

Before connecting the panels to the Kula mainframe, they have to have their default IP address changed to be within the IP address range of the Kula mainframe.

To do this, connect a PC or laptop directly to the Aux panel via a network cable to the RJ45 ports. Set the PC/Laptop IP Address to within the range of the default IP address of the Aux panel which is "192.168.1.1" so for example, set the PC/laptop IP address to "192.168.1.2".

Once this is done, open a browser window on the PC/laptop and type in the Aux panel IP address and when selected a "Web Page" for the Aux panel will open.



In the Web Page window, select **“Production Switcher”**, then in the **“System Configuration”** area enter an IP address that is within the range of the Kula mainframe and enter Subnet Mask.  
For example, if the Kula mainframe has an IP address of **“178.162.20.86/19”** then enter an IP address of **“178.162.20.87”** and a Subnet Mask of **“255.255.224”**. You can also give the panel a unique name if required.  
Finally click on the **“Save”** button. The new IP address and Subnet Mask has been updated on the Aux panel and the Aux panel is ready to use with the Kula system.

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Note: Change the IP address on the PC/laptop back to its original IP address.

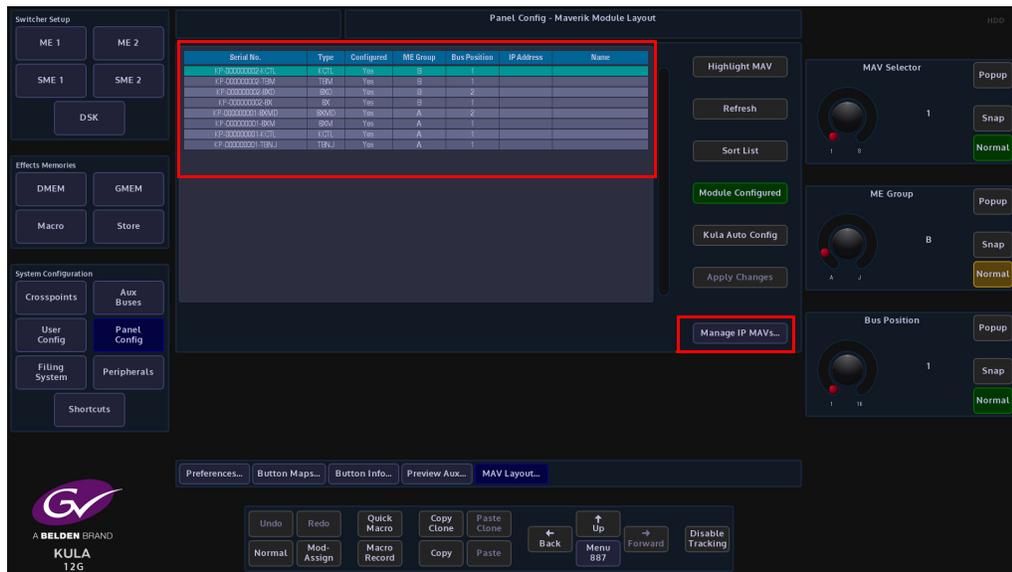
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The process of setting up the IP address and Subnet Mask for the LCD and LED Aux panels is the same.

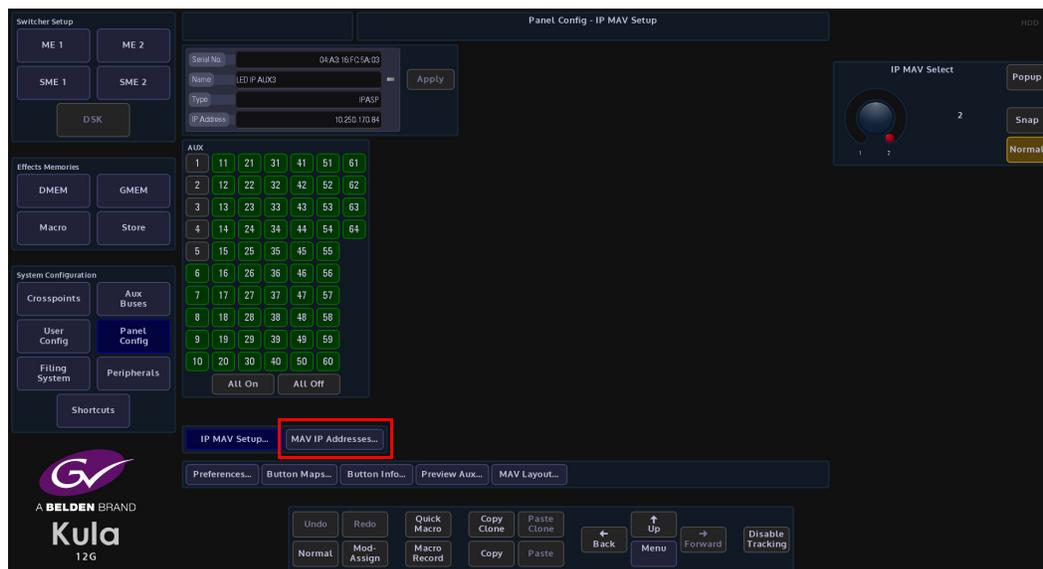
## Setting Up an Aux Panel on Kula

Connect the Aux panel up to one of the network ports on the Kula mainframe and connect the power supply.

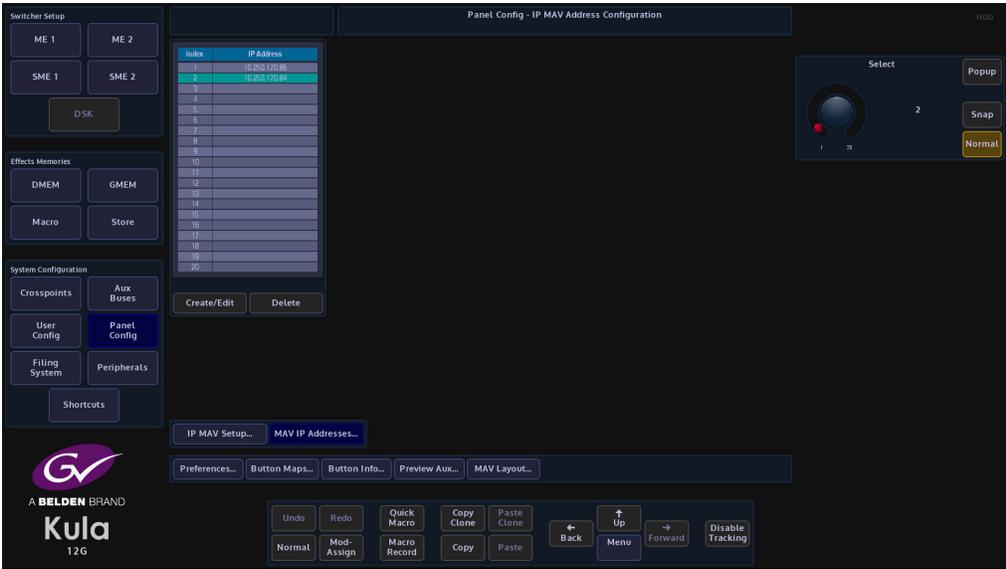
On the Kula GUI, touch the **{Panel Config}** button, then touch the **{MAV Layout...}** menu link button.



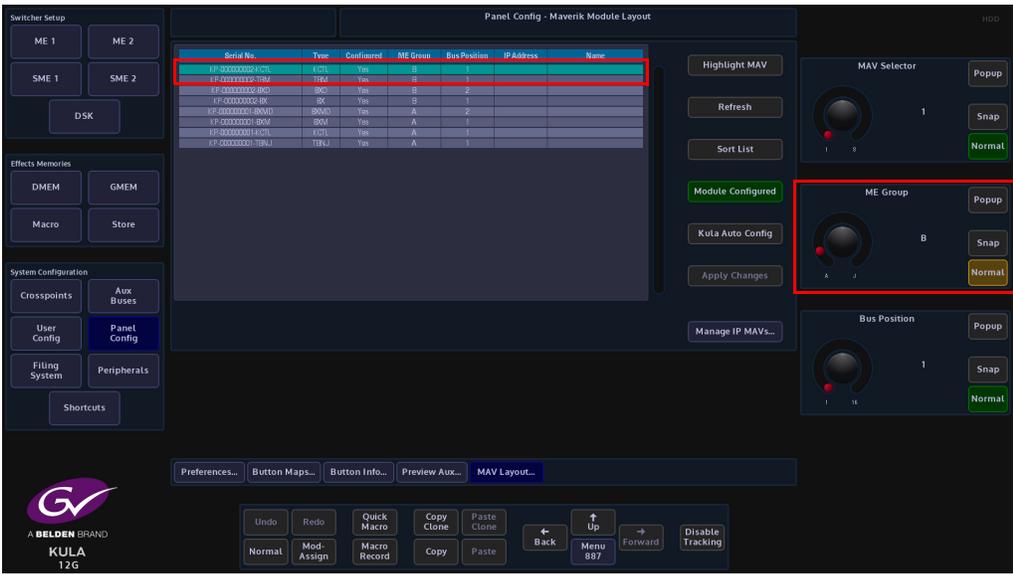
The MAV Layout menu is used to configure control surfaces and any ancillary MAV Modules or Aux Panels connected to the system. All modules and panels connected are displayed in the table at the top of the menu. At this stage of setting up the Aux panels, they will not be displayed in the table, even though they are connected to the mainframe. The Aux panels will need to be configured before the system recognizes them. To do this, touch the **{Manage IP MAVs...}** button to open the “**IP MAV Setup**” menu.



At the bottom of the IP MAV Setup menu, touch the **{MAV IP Addresses}** button to open the **“IP MAV Addresses Configuration”** menu



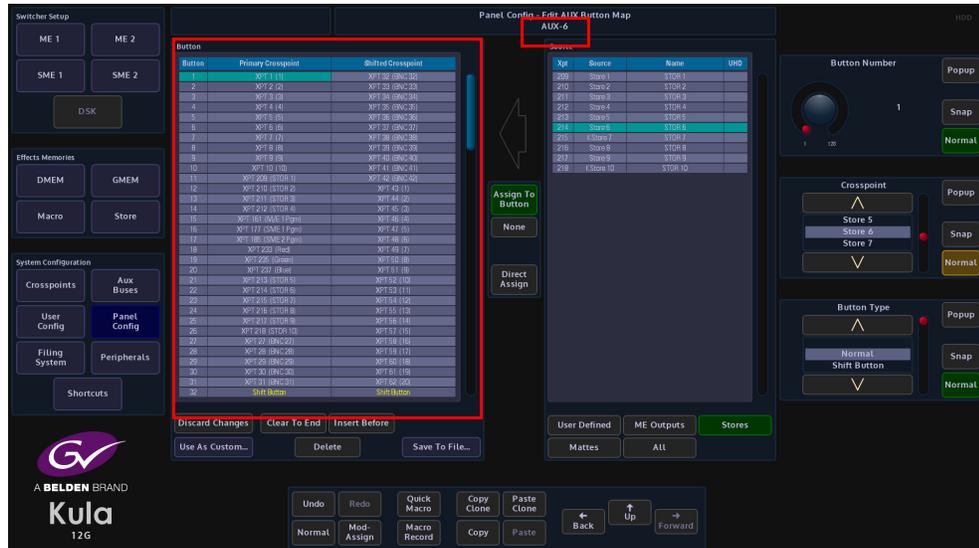
The system has to know the IP address of the Aux panel before it is recognized in the MAV Layout menu. Touch a free slot in the table, then touch the **{Create/Edit}** button and enter the IP address of the Aux panel into the table. Next, you will have to go back to the **“MAV Layout”** menu to configure the Aux panels.



Notice that the Aux panels are now displayed at the bottom of the table. Touch the table row to select the Aux panel and then use the **“ME Group”** and **“Bus Position”** parameters to give the Aux panel a unique ME Group/Bus Position (this has to be different to all other ME Groups/Bus Parameters in the table). Touch the **{Module Configured}** button and finally **{Apply Changes}**. The Aux panels are now ready to start setting up to use.

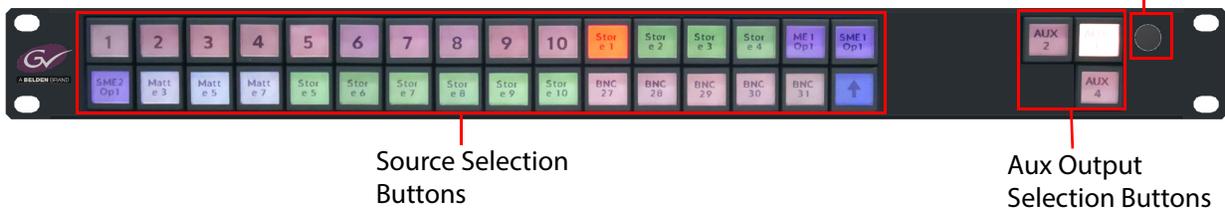
## Using the LCD and LED Aux Panels

Button Map menus are used to assign button maps for Aux outputs. This allows individual button maps to be assigned to individual Aux outputs.



Once the button maps have been assigned to the Aux outputs, you can call up the Aux output on the Aux panel.

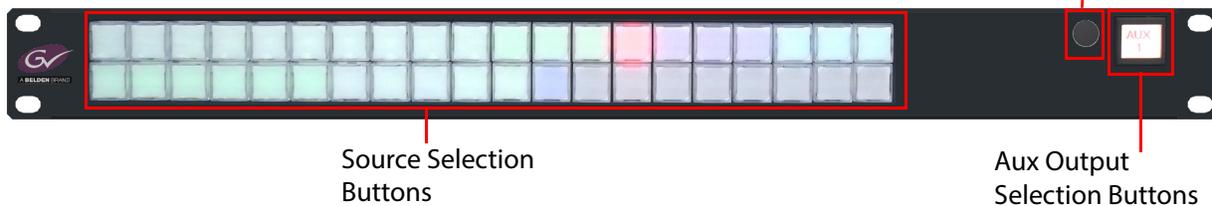
LCD Aux Panel



Source Selection Buttons

Aux Output Selection Buttons

LED Aux Panel



Source Selection Buttons

Aux Output Selection Buttons

Aux output selection on the LCD and LED Aux panels is done using the rotary shaft encoder and the Aux output selection buttons.

To select an Aux output, press an Aux output selection button and then press the rotary

shaft encoder inwards. The Aux output button will go a darker color. Rotate the rotary shaft encoder clock-wise or counter clock-wise to scroll up or down through the Aux outputs and then press the rotary shaft encode inwards to confirm the Aux output selection.

Pressing and holding in an Aux selection button will lock out the button for the selected Aux output. This is confirmed by a "padlock" symbol displayed on the button.

Pressing and holding in the rotary shaft encoder and rotating counter clock wise will display further information about the Aux panel, which includes the:

- IP Mask information
- IP Address information
- Name given to the Aux panel
- PSU1 and PSU2 information

Once an Aux output is selected, the Source Selection buttons will display the button map set for the selected Aux output.

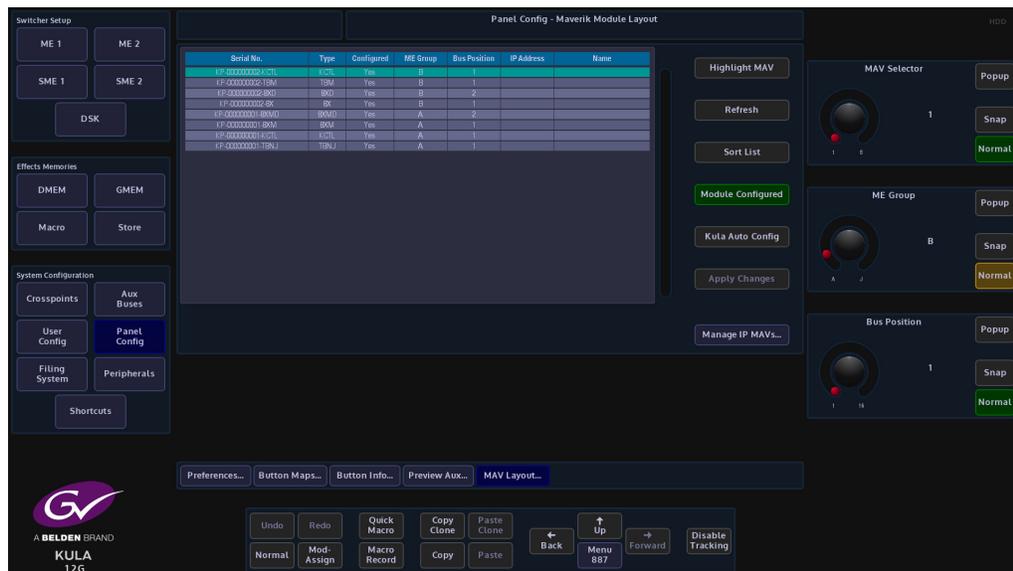
## MAV Layout

The MAV Layout menu is used to configure control surfaces and any ancillary MAV Modules or Aux Panels connected to the system. All modules and panels connected are displayed in the table at the top of the menu. At this stage of setting up the Aux panels, they will not be displayed in the table, even though they are connected to the mainframe.

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Note: When the system has booted up, if the control surface doesn't light up as expected, touch the **{Kula Auto Config}** button to make sure that the Kula control surfaces are configured properly.

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If an extra control surface is added to a 2M/E system, to make the system work as a 3M/E system, once the 3rd control surface is added, touch the **{Kula Auto Config}** button and the 3 control surfaces will be configured correctly.

The other uses for this menu is when MAV Modules such as the MAV-AUX module has been added to the system or the 1RU LCD/LED Aux Panels and the user needs to configure them to work with an M/E Group.

Use the MAV Selector parameter to scroll to the MAV module. Use the M/E Group parameter to set the MAV Module into the correct M/E group. Finally touch the **"{Apply Changes}"** button.

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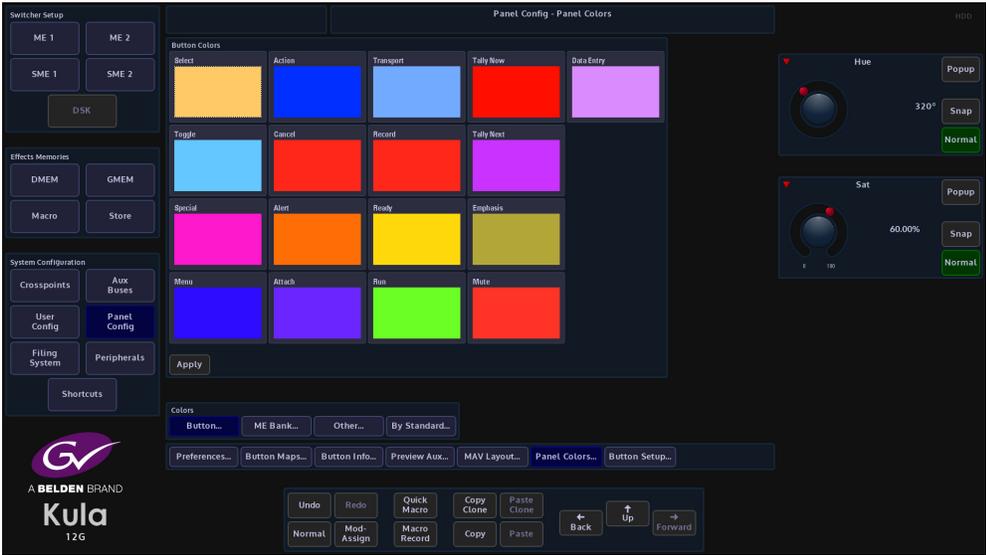
Note: When adding the one of the LCD or LED Aux panels, they must have their own individual "ME Group" assigned for them to work.

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# Panel Colors

## Button Colors

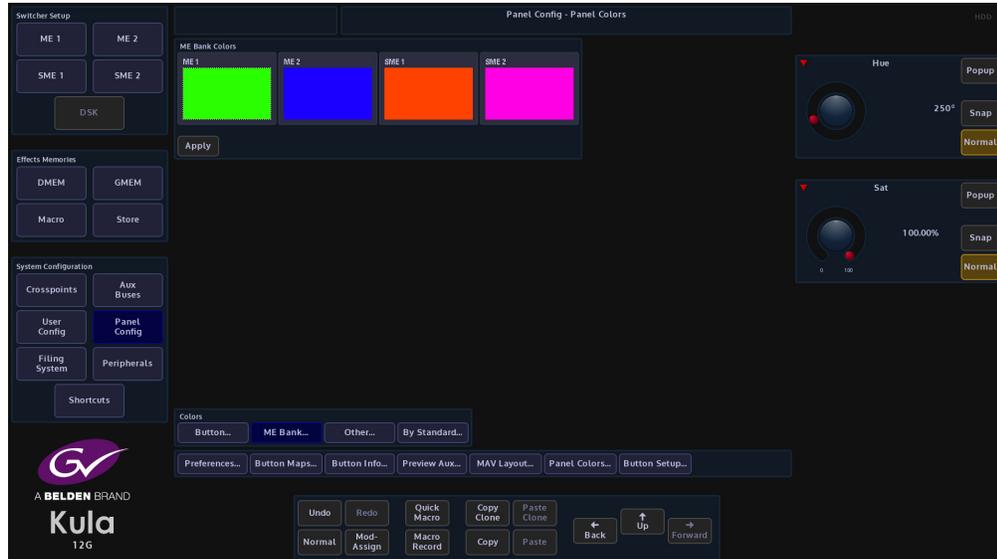
This menu allows the user to set user defines color schemes to specific buttons on the control surface and changes color schemes for actions and alerts.



All of the buttons on the control surface can have their default color schemes changed in this menu. The diagram above Shows an example of the Tally Now adjustment menu. touch one of the items in the main menu and an adjustment menu will appear. The default color can be changed by adjusting the Hue and Saturation parameters.

### ME Bank Colors

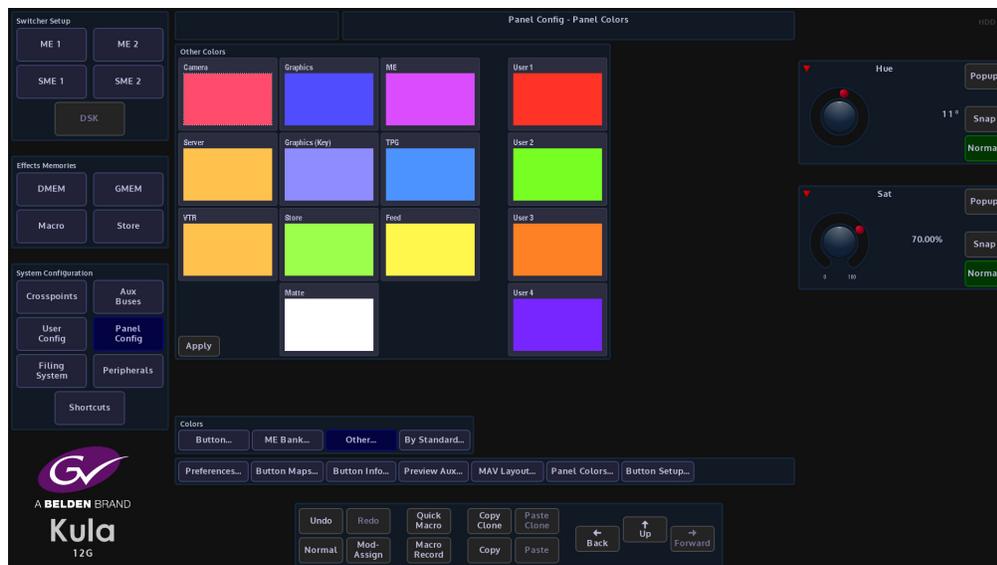
This menu allows the user to set different color schemes for individual M/Es on the control surface.



Adjusting the parameter control will change the color scheme on all the available M/Es. Press the **{Apply}** button to apply the color scheme to the M/Es.

### Other Colors

The Other Colors menu allows the user to change the preset color scheme of the Kula color crosspoint buttons.

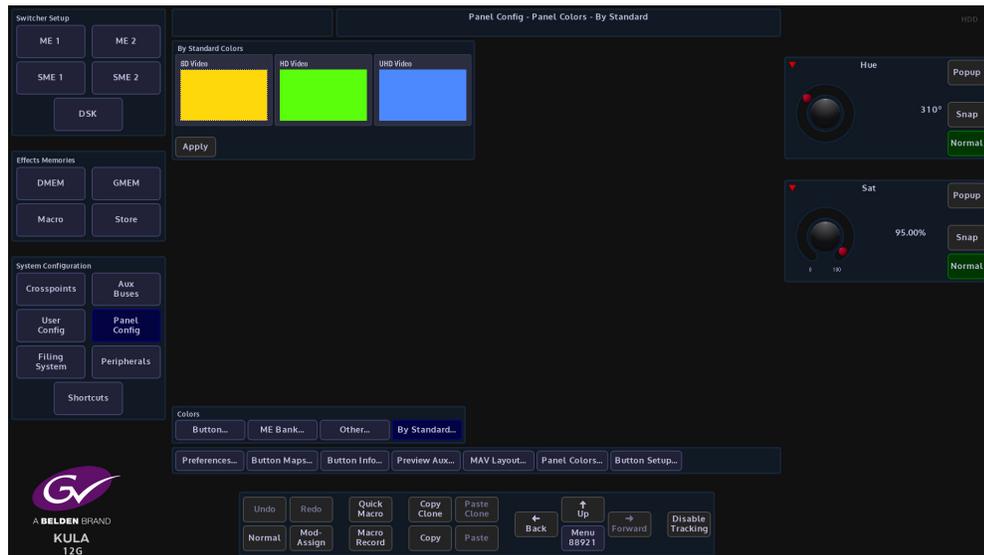


In the **Crosspoint Mapping** menu on the **GUI**, the user can select crosspoint in the table and then use the **Xpt Lamp Color** parameter to set a preset color scheme for the selected crosspoint.

The Other Colors menu allows the user to select and change the preset colors in the Color list. Touch one of the colors and then use the Hue and Saturation parameters to adjust to the desired color, then press the **{Apply}** button.

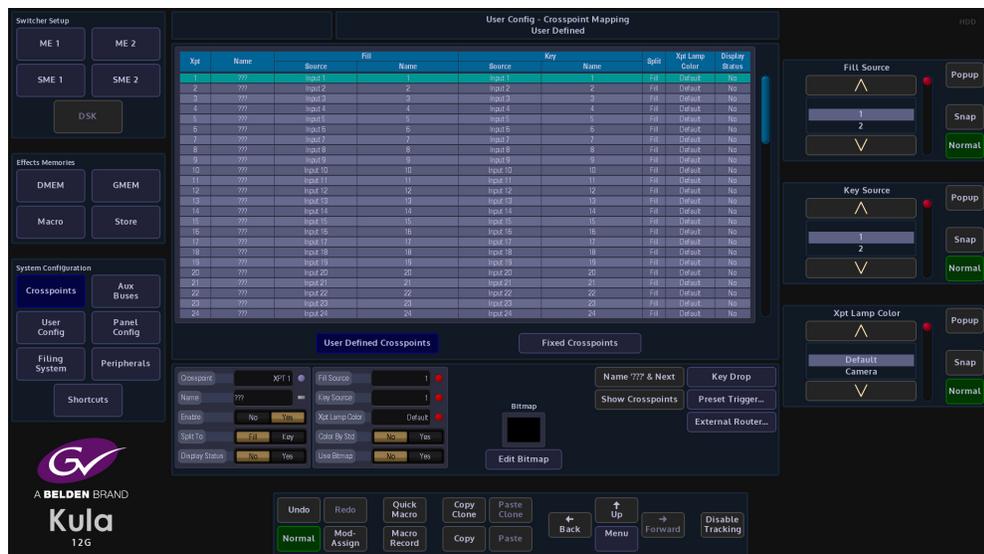
## By Standard Colors

This menu allows the you to set crosspoint button color for the video standard for the source assigned to that crosspoint. So that the crosspoint buttons will display different color schemes for video standards on the control surface.



You can keep the default color scheme for the video standards or touch one of the colors to select it and then use the Hue and Sat parameters to alter the color.

When done, touch the **{Crosspoints}** button and then touch and select a crosspoint in the table that you want to set a video standard color to.



Then set the "Color By Std" parameter (shown above) to "Yes". An asterisk "\*" is displayed next to the lamp color name in the "Xpt Lamp Color" column.

# Button Setup

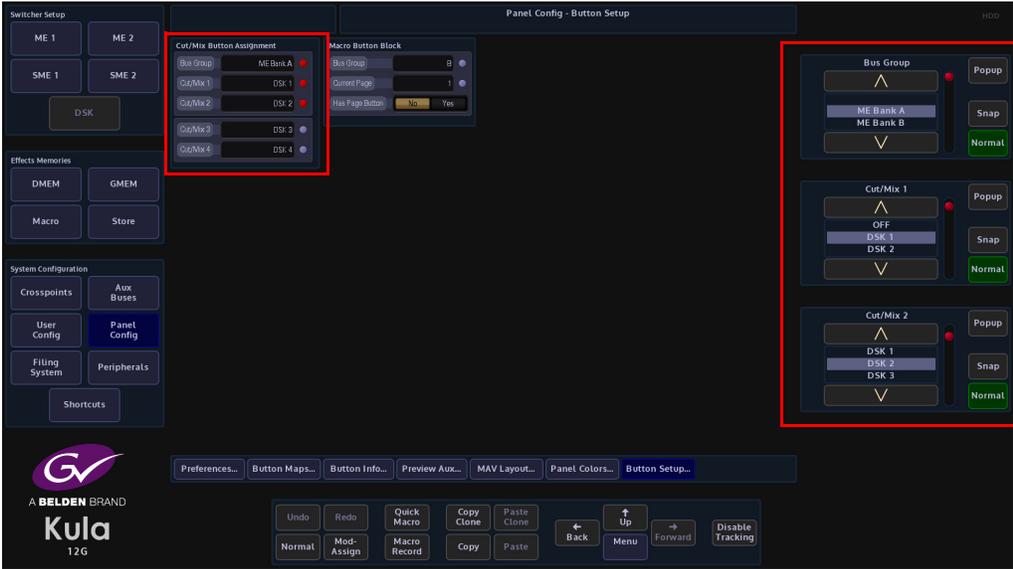
## Cut/Mix Button Assignment

These parameters set the Cut/Mix function for the Cut/Mix buttons on the control surface.



Use the parameters to scroll through the list of functions for each Cut/Mix button. The list includes:

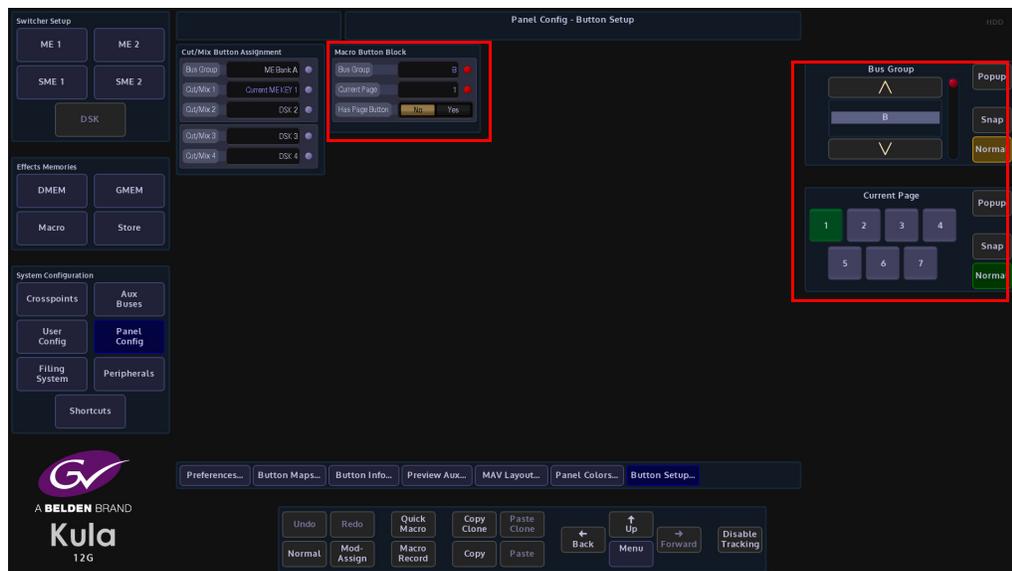
- Off
- DSK 1 to 4
- Current ME Key 1 to 4
- M/E 1 Key 1 to 4
- M/E 2 Key 1 to 4
- SME 1 Key 1 to 4
- SME 1 Key 1 to 4



As a new function is selected, notice that the mnemonic display changes to reflect the attached function.

## Macro Button Block

This changes the block of Macro buttons to having a “Page” functionality, with 7 pages available to use.



The user can select a “Bus Group” B or C (for M/E2 or 3) depending on the number of control surfaces. Then select page in the “Current Page” parameter, or when this function is enabled in the Panel Preferences menu.

The user first needs to select the Bus Group for that panel and then set the page require for that set of buttons. Each Bus Group Macro Button Block can either have all 8 buttons assigned to the Selected Page, or the bottom L button can become a page selector button - this is controlled using the “**Has Button Page**” selector. Holding the page button down, the other 7 buttons now display the numbers 1 to 7. Pressing one of the buttons will select that Block of buttons to that particular page.

# Crosspoints

The crosspoint mapping menu displays all the physical inputs to the mainframe and all the internal sources are mapped to the Crosspoints in the crosspoint mapping table. The crosspoint map has been setup in a factory default state from new. In the User Defined Crosspoints map you can setup crosspoint functions like the Key and Fill ready for coupling Stores, and set up Mattes/Washes etc. Fixed Crosspoints cannot be changed.

Note: The user-defined Crosspoints can be setup in any way the User wishes. The Fixed Crosspoint cannot be changed.



If the crosspoint map is going to be changed or modified, touch the attacher below the crosspoint map table and a new set of parameter controls will appear on the GUI.

### User Defined Crosspoints

These allow you to set sources to crosspoints on the control surface. Using the "Fill Source" and "Key Source" parameter controls, you can map any of the physical input sources or internal sources, change the Key and Fill associations, setup the Xpt Lamp Colors which allows you to set up groups of colored Xpt buttons on the control surface and re-name the crosspoints.

### Fixed Crosspoints

As the name suggests the crosspoints cannot be changed and are factory set. The sources on these crosspoints can still be mapped to any crosspoint but cannot be changed in any way.

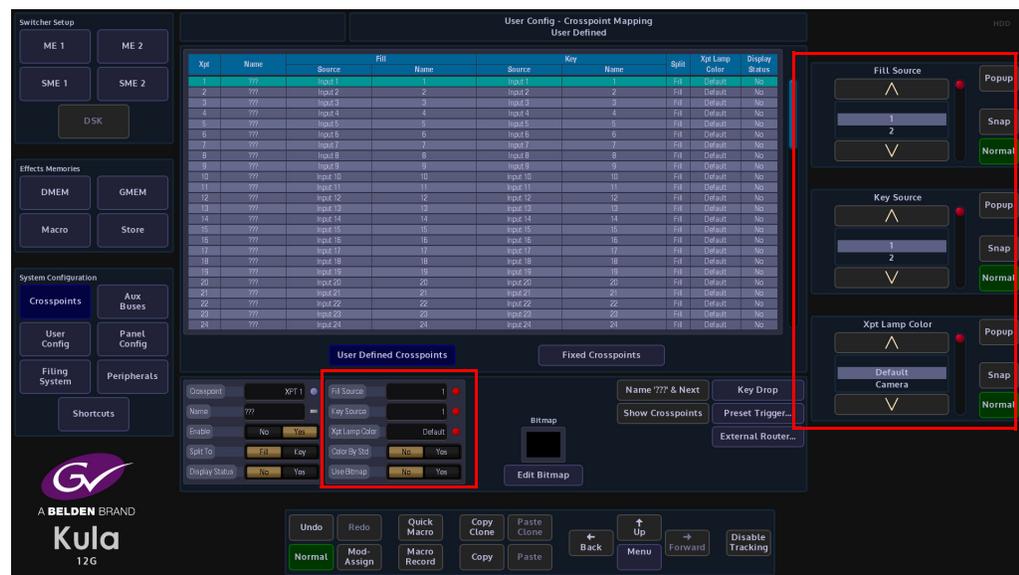
### Parameter Controls

**Xpt** - crosspoint 1 to 80 **User-Defined Crosspoints** and 161 to 247 **Fixed Crosspoints**. Use this parameter to scroll down the list of crosspoints.

**Name** - This column is for a crosspoint name that the user can set using the on-screen keyboard. When giving a name to the crosspoint, up to 11 characters can be entered, the characters font will vary in size and height depending on how many characters are typed in, that means characters 11 maximum.

**Enable** - this function enables/disables the selected crosspoint. When disabled, the crosspoint "Name" will display as "Disabled" and the panel mnemonic is left blank.

**Split** - this function is used when the user wants to use a Fill or a Key source to give you a key signal for the Key Layer. Split to Fill/Key means that the setting on the crosspoint the user has "Split", will determine a Key signal for the Key Layer. When Fill is selected, the Fill signal of the crosspoint is used for the Key signal of a Split Key. When Key is selected, the Key signal of the crosspoint is used for the Key signal of a Split Key.



**Fill Source / Name** - This column is used to set the Fill Source, which is the signal that provides the Fill when selected on a Key bus or provides the source for the background buses.

**Key Source / Name** - This column selects the Key Source which provides the Key (hole cut) signal when selected on a Key bus. It has no effect when selected on a background bus.

**Xpt Lamp Color**- This sets a color to the selected Xpt. There are a range of preset colors that can be selected for a Xpt, using the Xpt Lamp Color parameter.

Note: More Xpt colors can be selected in the Panel Config - Colors menu

**{Name '???' & Next}** - this button is a quick short cut. It puts '???' into the current Source Name and then jumps on to the next Source in the list, forcing the switcher to take the NAME from the Source itself. This helps to make naming all sources quicker.

**{Show Crosspoints}** - this button when pressed will go Green. This will cause the mnemonic display on the control panel to change and show the crosspoints in their "unnamed" form, i.e. XPT1, XPT2, XPT3 etc. Press again to go back to the user specific crosspoint setup.

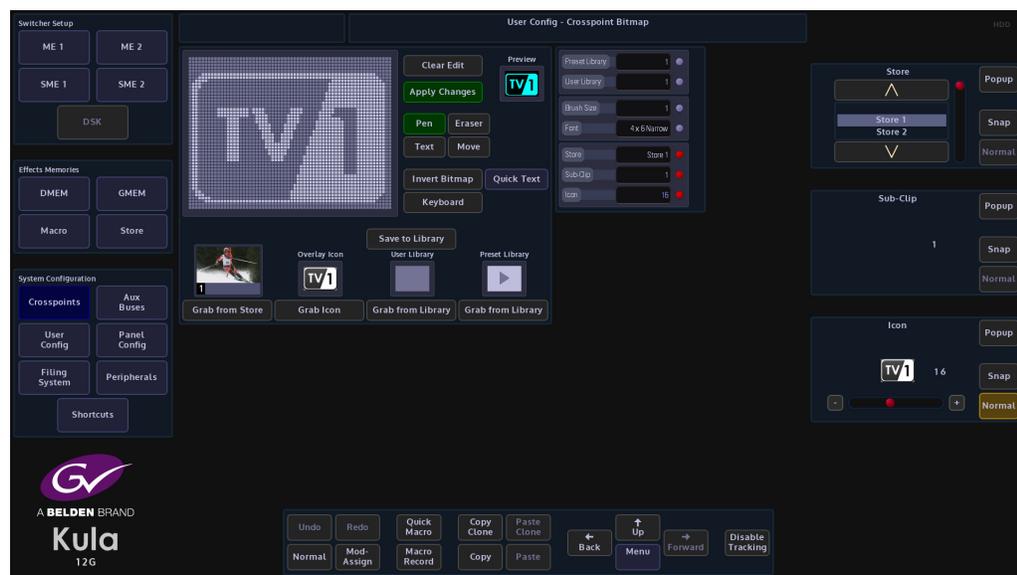
## Key Drop

Note: For information about using Key Drop, please see the **Configuration - Keyer** chapter of this manual.

## Crosspoint Bitmap

The **“Edit Bitmap”** function in this menu, you can set up text or an icon to be displayed on the mnemonic displays on a crosspoint by crosspoint basis.

In the **“Crosspoint Mapping”** main menu, select a crosspoint row in the table and then touch the **{Edit Bitmap...}** menu link button and the Crosspoint Bitmap menu is displayed.



A bitmap can be selected from a Preset shapes library, an icon library, User library from shapes or text created by the user, from a Store minipic or from text entered from an on-screen keyboard.

Which ever method you use, the gray grid area in the menu will display a monochrome image, which is previewed top right of the menu.

To use **“Grab from Store”**, touch the bottom attacher where **“Store”** is the first parameter, then use the **“Store”** parameter to scroll through the Stores. As you scroll through the stores, a minipic is displayed above the **“Grab from Store”** button. When you reach the required store, touch the **“Grab from Store”** button. The store minipic is displayed in the bitmap grid.

The above method is used for Icons, User and Preset Libraries. To apply the selected bitmap to a crosspoint mnemonic, touch the **{Apply Changes}** button.

**Quick Text** - Entering text into the bitmap grid can take a little time to get the text into the correct position with the right font size. The **"Quick Text"** menu allows you to quickly place text into the gray bitmap square and whilst typing, the text automatically size itself within the boundaries of the bitmap grid.

Touch the **{Quick Text}** button and the **"Quick Text"** menu will be displayed. Turn the **"Auto Font Size"** parameter to **"On"** and then start typing the text with the on-screen keyboard.

As more text characters are added the font will auto size itself the size of the quick text box grid. Text can also be aligned more accurately using the **"Alignment"** buttons.



After finishing entering the text, touch the **{Apply}** button.

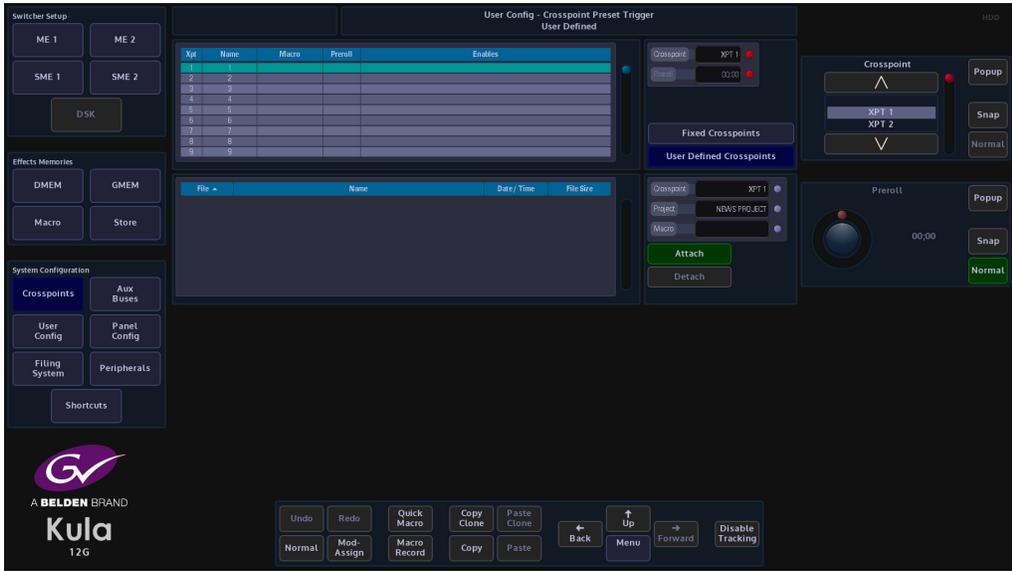
**{Name '???' & Next}** - this button is a quick short cut. It puts '???' into the current Source Name and then jumps on to the next Source in the list, forcing the switcher to take the Name from the Source itself. This helps to make naming all sources quicker.

**{Show Crosspoints}** - this button when pressed will go Green. This will cause the mnemonic display on the control panel to change and show the crosspoints in their "unnamed" form, i.e. XPT1, XPT2, XPT3 etc. Press again to go back to the user specific crosspoint setup.

## Preset Trigger

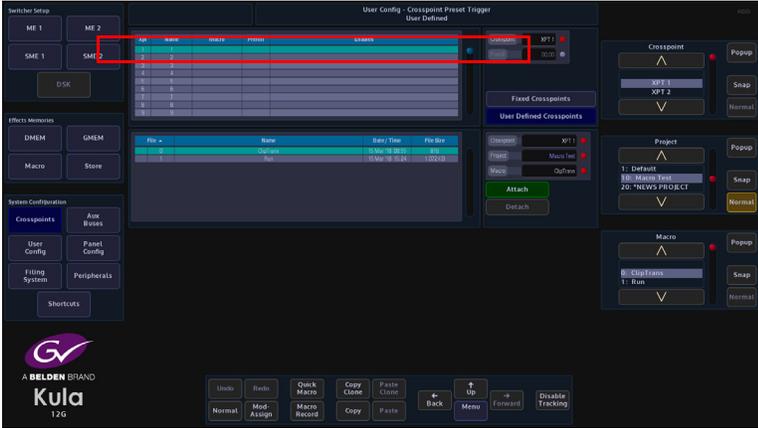
Preset Trigger is a function which allows a Macro to be triggered whenever a particular crosspoint is selected onto the output of an M/E, using a transition on the Transition Panel. A Preroll Delay can be specified which will delay the actual transition for a specified duration after the Macro has been triggered.

Note: The Macro will only be triggered by a transition made on the Transition area of the control surface, i.e. Cut, Auto or a physical transition of the T-Bar. It will not be triggered by a cut made directly on a bus row, i.e. "hot cutting" along the on-air bus.

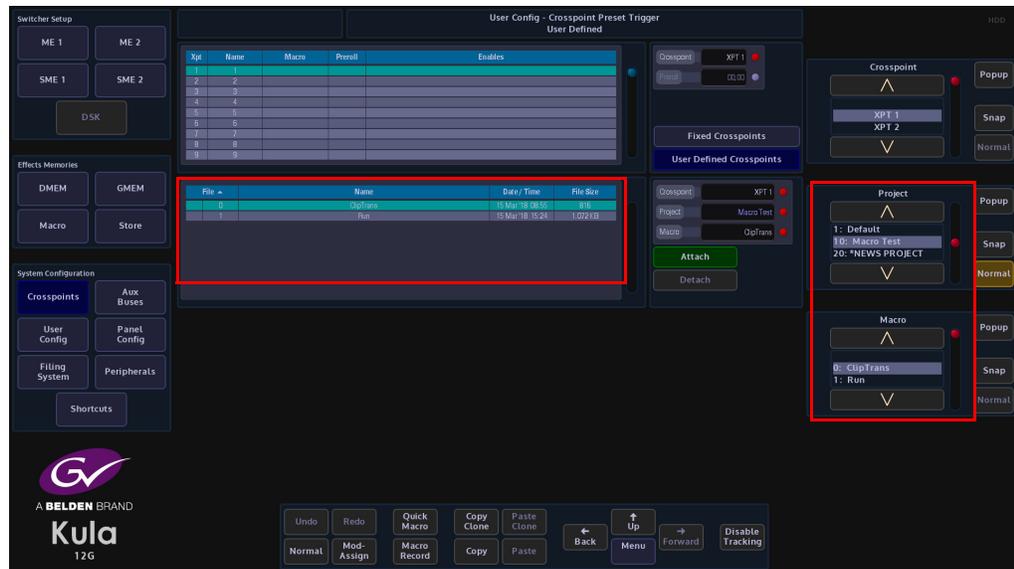


The Preset Trigger menu is accessed from the Crosspoints menu. In the Crosspoints menu, touch the **{Preset Trigger...}** button.

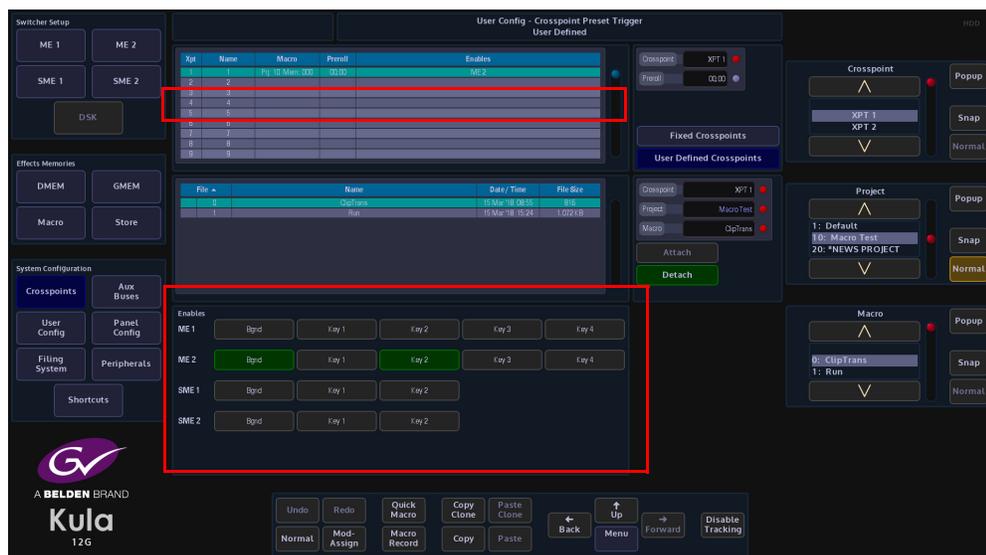
Firstly the operator needs to select the Xpt which will be used to trigger the Macro. This is done either by touching the relevant Xpt in the top table, or by using the parameter top right of the menu.



Next, use the **“Project”** parameter to select the project that contains the required macro. Then use the **“Macro”** parameter to select the macro that will be triggered when the crosspoint is selected by a transition.



Once all the parameters are selected in the above menu, touch the **{Attach}** button to attach the macro to the crosspoint. The “Enables” options menu will appear, which will allow the user to set which M/E and which Bgnd, Key the transitions will actually trigger the Macro.



By selecting Xpt 5, then selecting M/E2, Bgnd and Key 2 the Macro will be triggered whenever a transition is made, which will bring “Xpt4” onto the output of “ME2” using a transition on the Background or selecting Key 2. Touch the top attacher to display the “Preroll” parameter. This parameter allows the user to set a delay for the transition, as a predetermined time after the Macro has been triggered.

## External Router

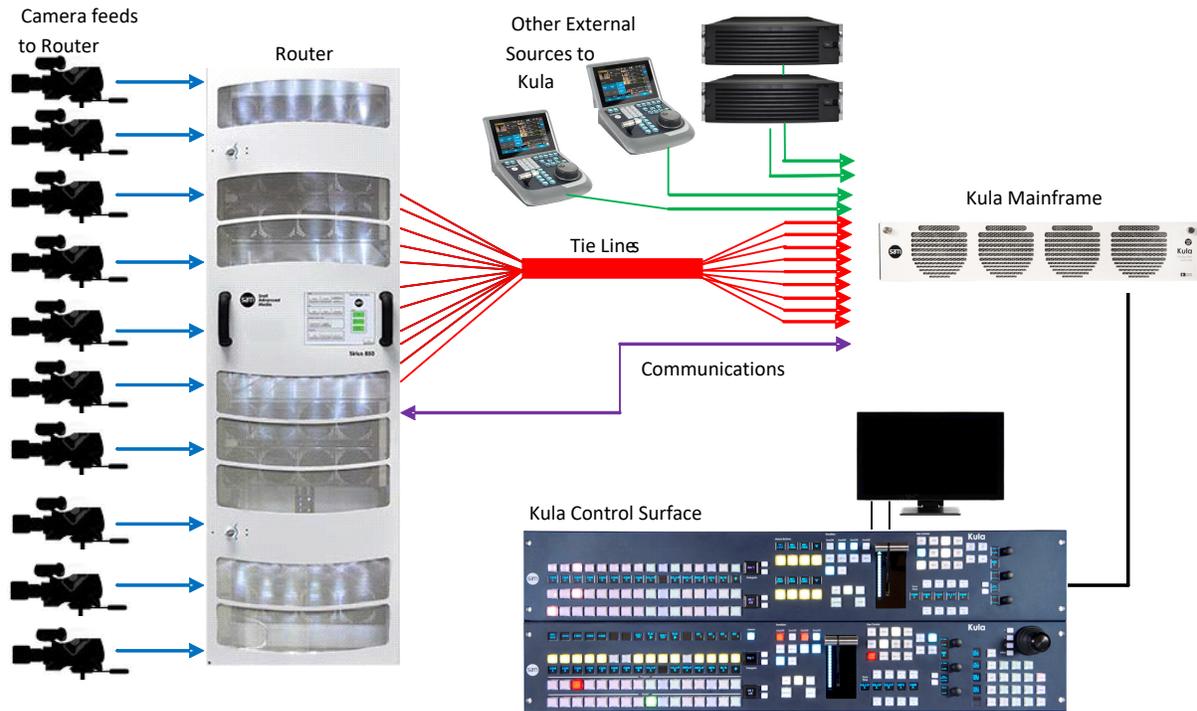
Kula has the mechanism to expand the number of sources coming into the mainframe using an external router. This is primarily due to a system setup running in UHD. Using this feature, the number of sources to be used with the Kula, are expandable up to the size of the upstream router.



## Intelligent Tie Line Concept

Kula deploys an intelligent “Tie **Line**” approach, the desired external router outputs (destinations) are connected to Kula inputs. These inputs on the Kula and destinations from the Router are treated as “Tie **Lines**”. Each Tie Line acts as a floating video bus between the router and Kula, they are intelligently assigned and used as required. Source selection on any Bus is transparent to the operator, regardless from where the Xpt is being made, i.e. in the external router, or in the Kula itself.

The Kula software knows what physical inputs / Tie Lines are allocated and what are not being used on a bus. Kula then assigns the Physical input /Tie Line to the desired Bus upon a source selection. Kula updates the upstream router's destination /Tie Line with the selected source.



Source selection on any Bus is transparent to the operator. Once setup, the operator sets the desired router source by selecting the appropriate router XPT on the required bus. The selection on the external router and the Tie Line path into the Kula is automated.

### How Many Tie Lines?

How many Kula inputs do you need to convert to Tie Lines? This is entirely dependent on a few external factors, such as:

How many inputs available on the Kula (max number shown below):

- HD = 40 Tie Lines
- UHD = 12 Tie Lines

How many router destinations are available.

How many router sources need to be selected on Kula at any one time.

**For example:**

If the user wants to select different external router sources on the A and B bus of ME2 this would require 2 Tie Lines.

- For HD this would require 2 router destinations and 2 Kula inputs.
- For UHD this would require 8 router destinations and 8 Kula inputs.

If the user requires external router sources on the A and B bus plus Key 1 and Key 2, this would require 4 Tie Lines.

In summary: Each different external router source selected simultaneously requires a Tie Line. Kula

Each Tie Line requires one router destination and Kula input in HD, or 4 router destinations and 4 Kula inputs in UHD.

---

Note: If at all possible, it is recommended that the user creates more Tie Lines than are actually required. This gives some redundancy and reduces the risk of the system running out of available Tie Lines

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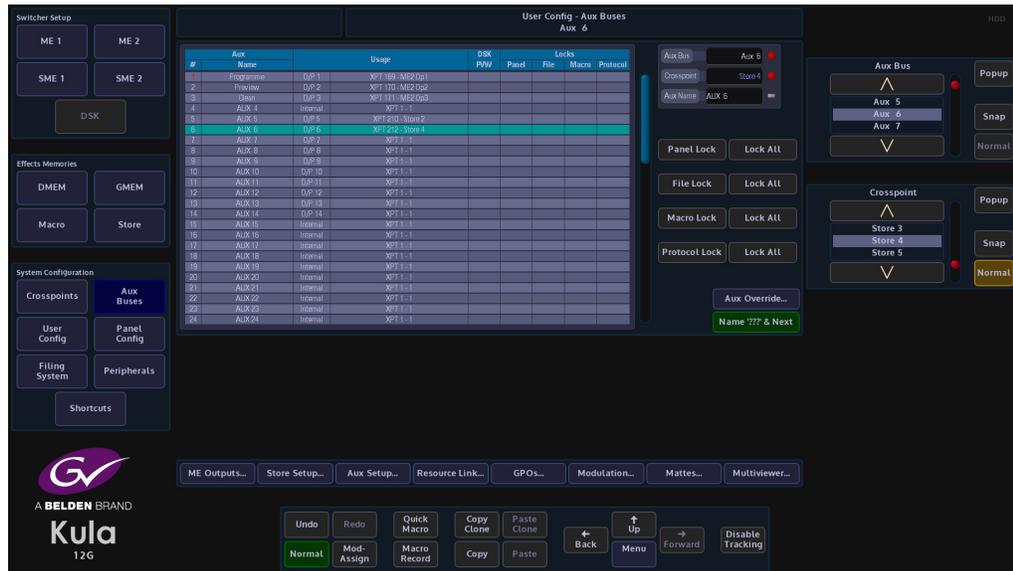
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Note: External Router setup and configuration is in the Peripherals menu.

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## Aux Buses - Aux Setup

In this menu, the exact setup for each individual Aux Bus can be adjusted. The center of the menu screen Shows a table, which contains each Aux Bus details. The attacher boxes at the bottom of the screen contain the individual parameters controls.



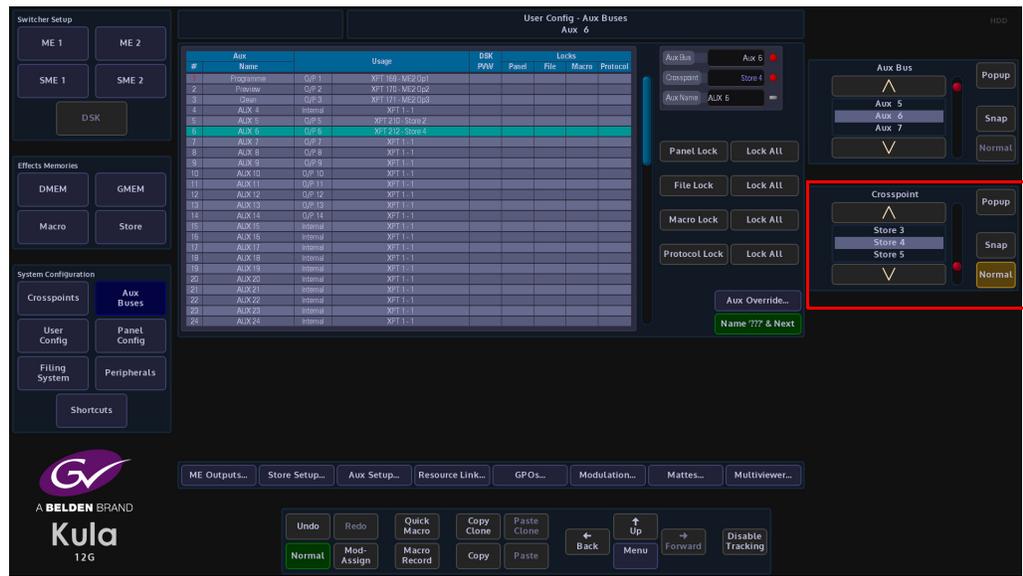
The Kula mainframe has freely assignable outputs; which means that any output can be assigned to be either an M/E output, Aux output or a Multiviewer Head.

The table in the center of the menu displays the setup of the Aux Buses and the sources that are assigned to them.

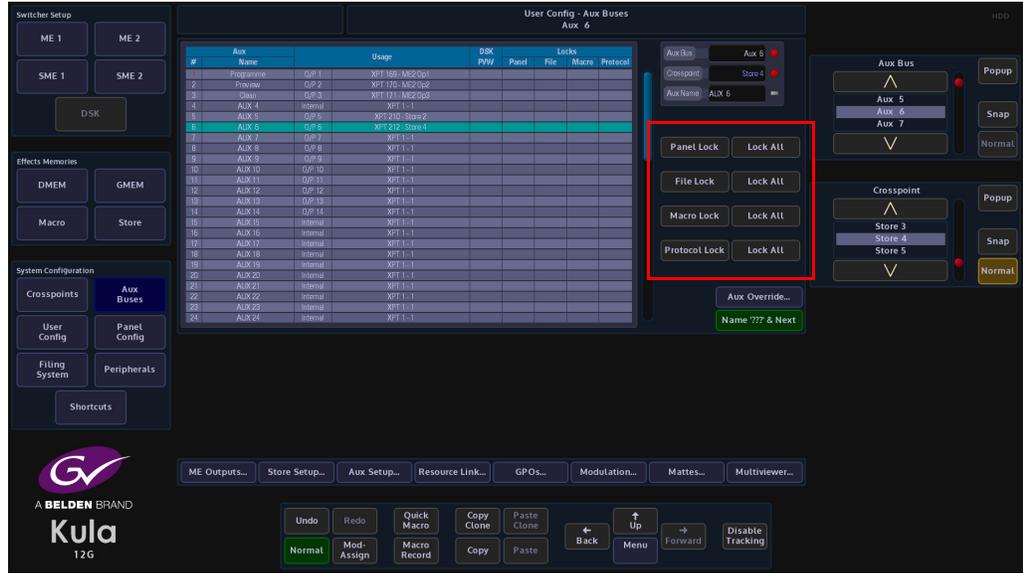
Sources for the aux buses can be M/E output Xpts, Store Xpts or any of the sources on the 08 Xpts.

### Setup an Aux Bus

To setup an aux bus, use the **Aux Bus** parameter to select the required aux and the **Crosspoint** parameter to select the source for the aux bus or use the pop-up list selector to quickly select the required source. This will also set what goes on each of the available outputs 1 to 18, as shown in the **User Config - Aux Setup** menu.



The Lock parameters are used to lock out specific functions on an Aux panel.

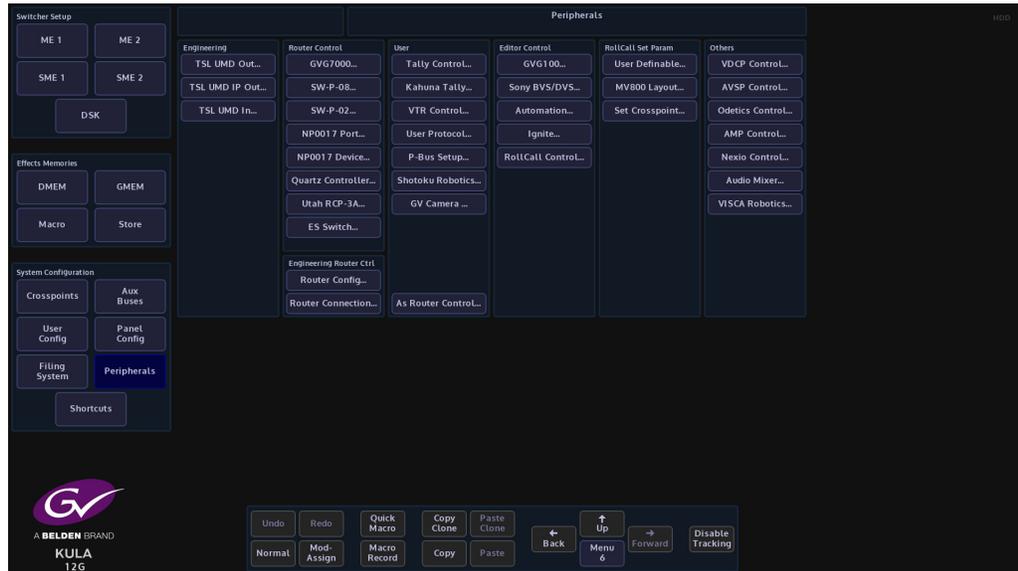


The **Panel Lock**, lock out the selected crosspoint assigned to the Aux Panel so that when the button is pressed, the crosspoint does not operate.  
**File Lock** stops the user from loading a file.  
When a Macro is attached to a crosspoint, the **Macro Lock** parameter disables the crosspoint so that the attached macro cannot be triggered to run.

## Peripherals

The Peripherals menu is used to control various external equipment; such as VTR's, video disks, routers etc.

Touch the **{Peripherals}** button on the GUI to enter the Peripherals main menu.



Note: Before using any of the Peripheral menus it is important to understand how the Protocols are setup and assigned. See the next page.

## How to Setup Protocols

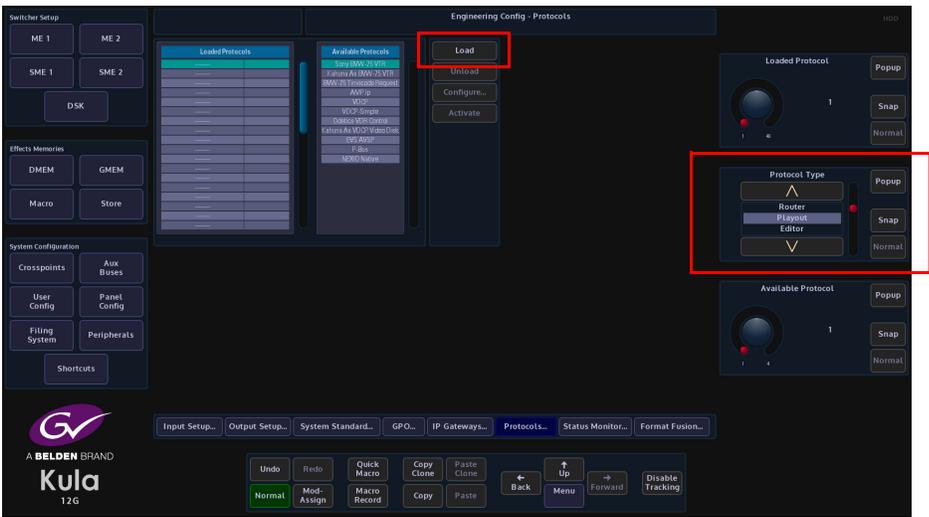
The Protocols menu is used to set parameters for bi-directional communication with external devices either by one of the RJ45 RS422 ports or selecting one of the IP protocol connections.

Protocols have to be setup in this menu before the Peripherals functions can be used.

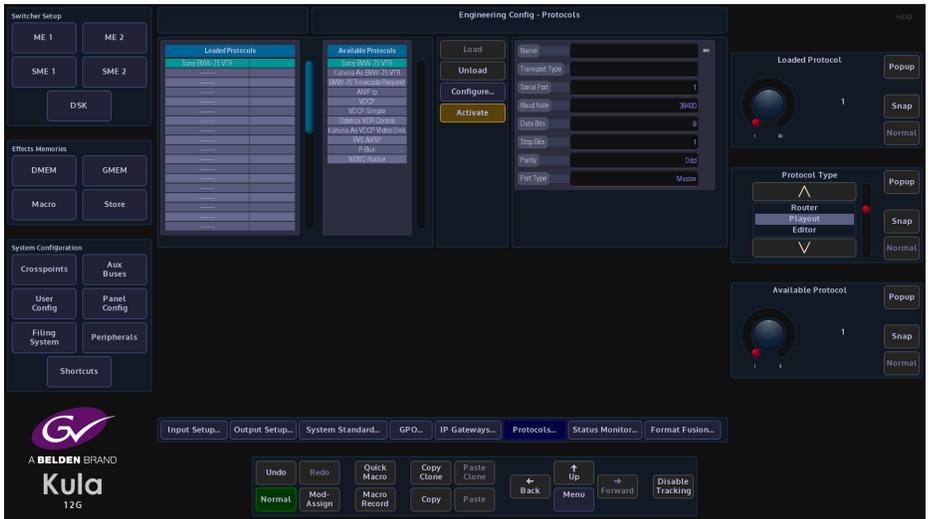
There are 7 Protocol Types to choose from; Tally & UMD, Router, Playout, Editor, Camera, Audio, and Miscellaneous. Each protocol type has a number of available sub-protocols to choose from, that allows the users to connect to a large number of different types of external equipment.

## Selecting a Protocol

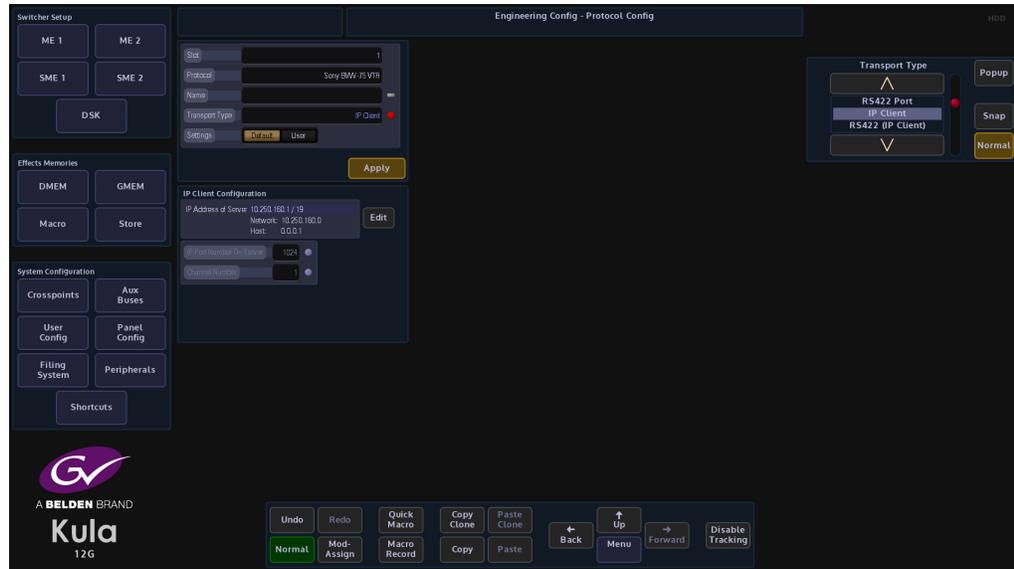
Using the Loaded Protocol parameter, select a free row in the Loaded Protocols table, then use the **Protocol Type** parameter is used to scroll through the protocol sets.



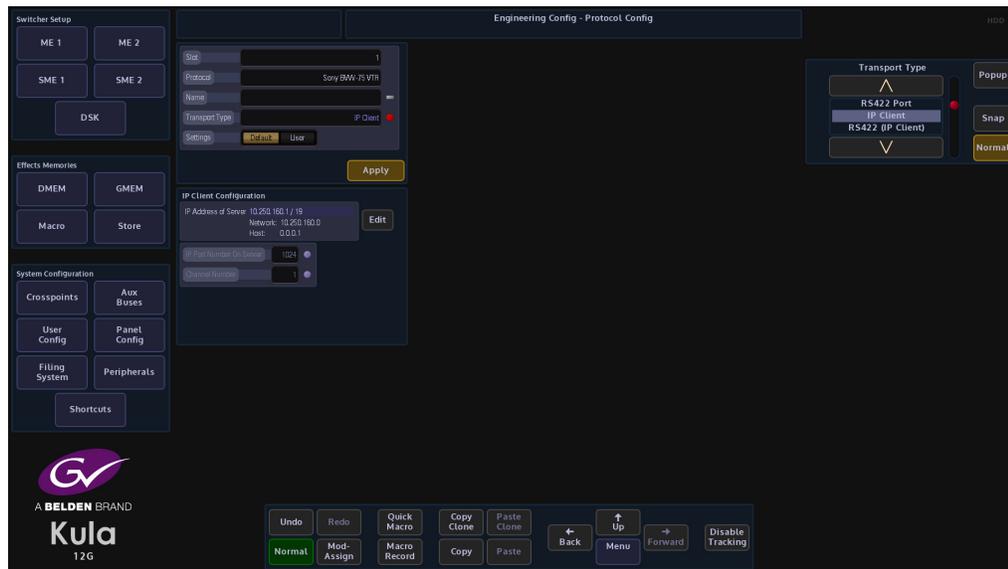
Once the required Protocol Type has been selected, use the **Available Protocol** parameter to scroll to the required protocol and then touch the **{Load}** button.



After the Load button was touched, the selected protocol is placed in the **Loaded Protocols** table, touch the **{Configure}** button to enter the **Protocol Config** menu.



The user is able to select the type of connection that is required “**Transport Type**” i.e Serial or IP, and also set user-defined parameters for the protocol. The **Settings - Default** as the name suggests is the default setup to communicate with an external device (normally this would default to “RS422 Port”). If a specific setup is needed, press the **{User}** button in the **Settings** parameter, the user is now able to setup the protocol as required.



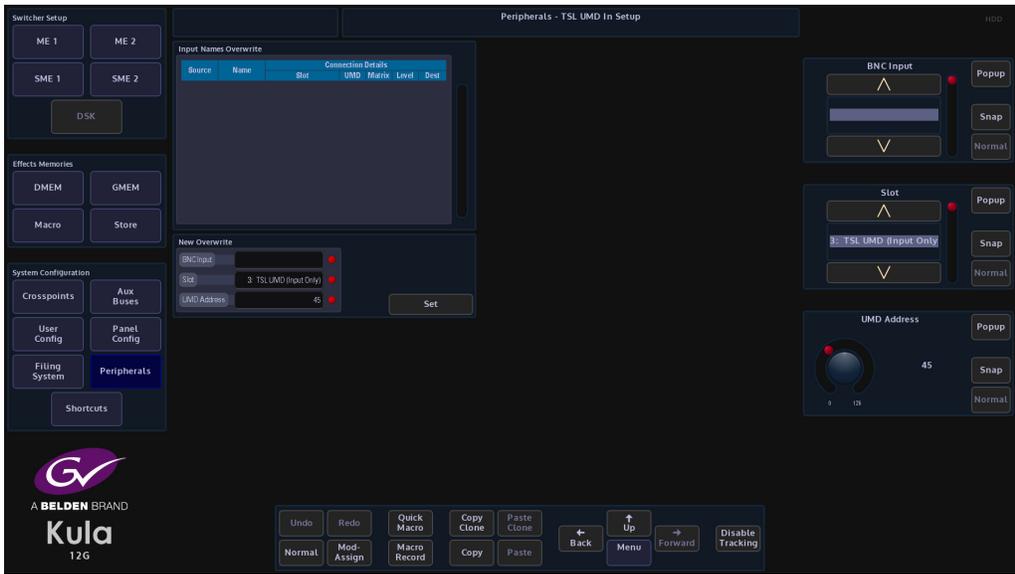
When the parameters have been set correctly press the **{Apply}** button. The menu will now return to the main Protocols menu.





### TSL UMD In

This protocol allows Kula to receive source names from external devices (for example a Router) **Eng Config - Input Setup** menu allows Kula to use the source names.



The protocol is setup in the **Eng Config - Protocols** menu, this will allow the Kula mainframe to communicate with the external device. Kula is able to receive source name information from the external device via the RS422/IP connection or the BNC, each source name is mapped to a UMD address.

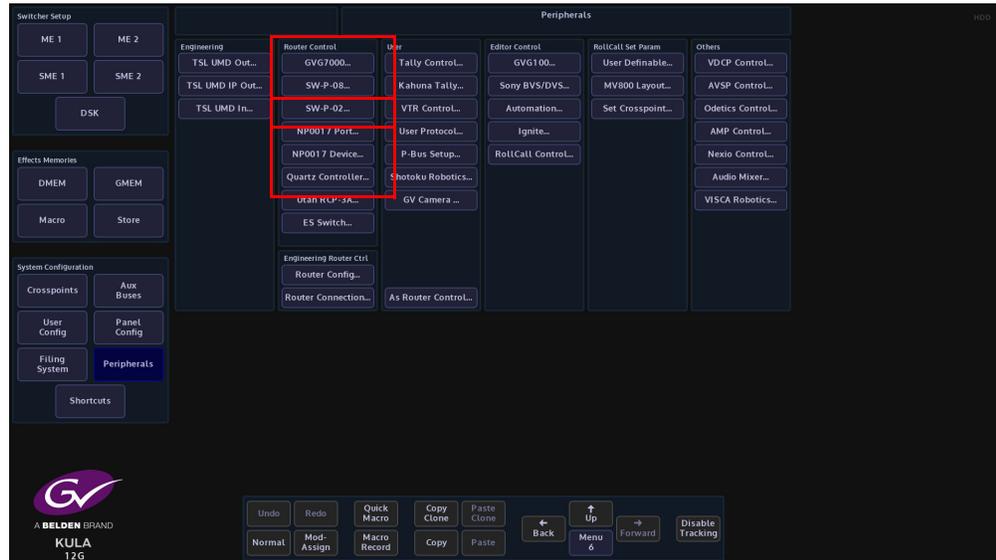
From the menu above, assume a source called VTR87 is mapped to UMD address 87 and it is feeding Kula input 3, the name “VTR87” will overwrite the default name “BNC3”



Using the **Router Overwrite** parameter in the **Eng Config - Input Setup** menu, Kula is able to receive UMD information from any of the BNC inputs. This information will then be displayed in the input menu’s and can also be used for the mnemonic displays on the control surface for selecting sources.

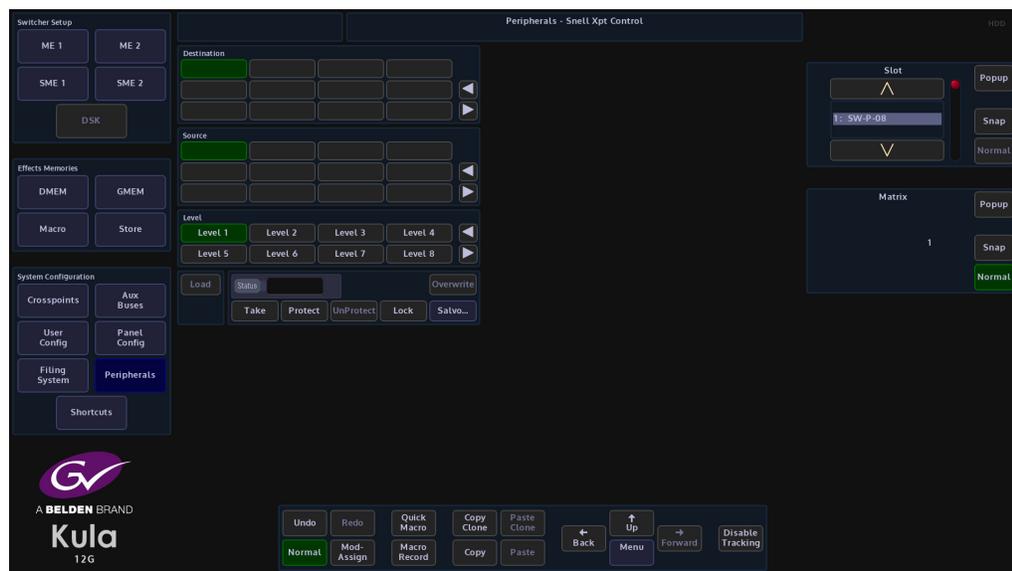
## Peripherals - Router Control

This function allows Kula to control a third party router. The menus are similar in functionality for the GVG7000 and Utah RCP-3A, and the menus for the Snell SW-P-08 through to the Quartz Controller are also similar in functionality to each other. In the following section one example form each Router Control function will be explained.



For this example, we are going to look at the SAM SW-P-08 Router Control Peripheral.

### Snell SW-P-08 - Xpt



This menu enables the user to control the router Names.

When first connecting to a system controller, Kula will request all the names for the Destinations, Sources and Levels.

The user can then assign names to the 12 destination buttons and 12 next source selection buttons, the level names will then also appear in the Level Mapping by Names menu.

Router Control Buttons

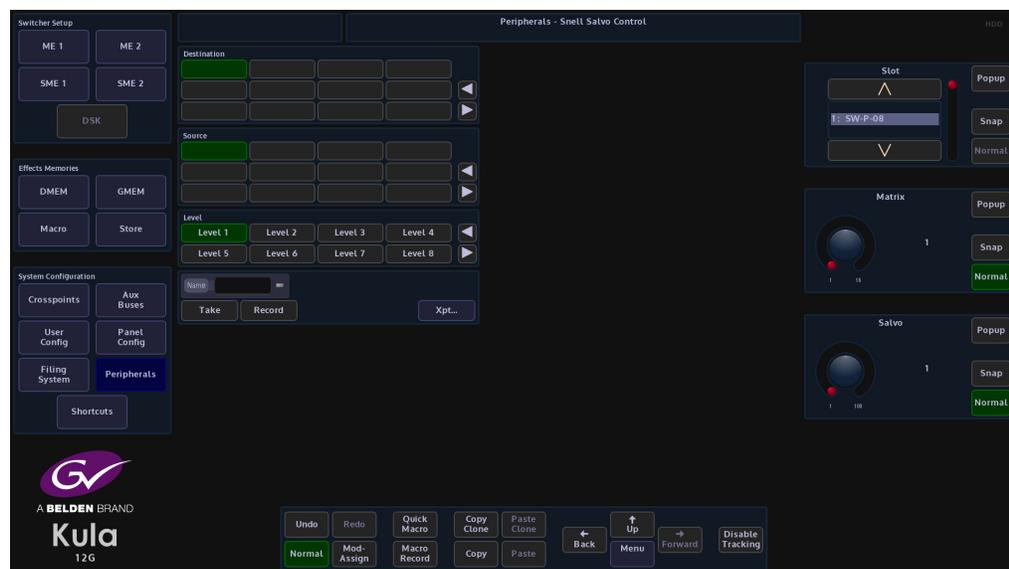
**Take** - Sets a crosspoint

**Protect** - protects a destination

**UnProtect** - removes the destination protection

### Salvo Control

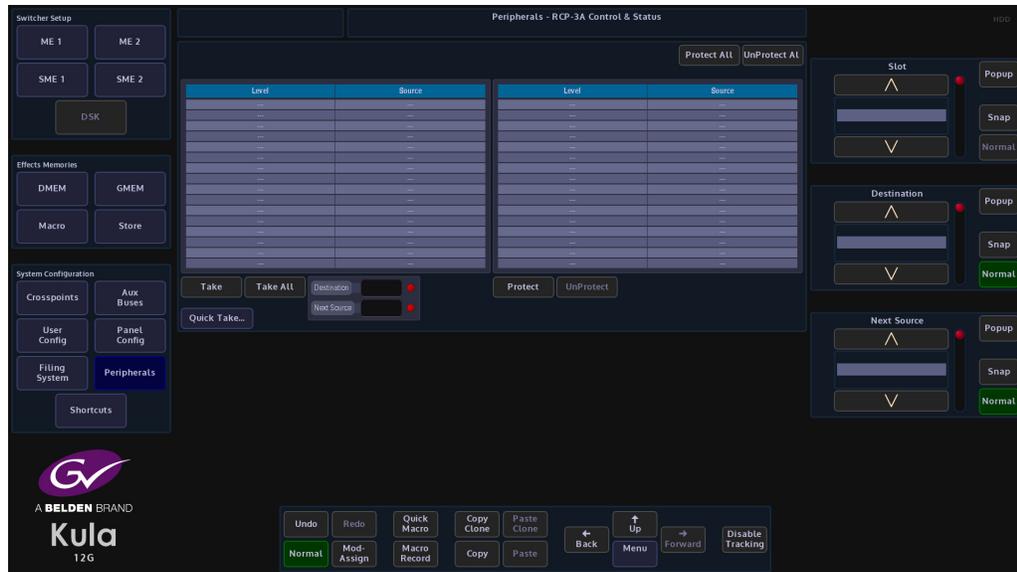
This menu works in exactly the same way as the previous menu.



The Xpt button reverts back to the Xpt Control menu.

## Utah RCP-3A

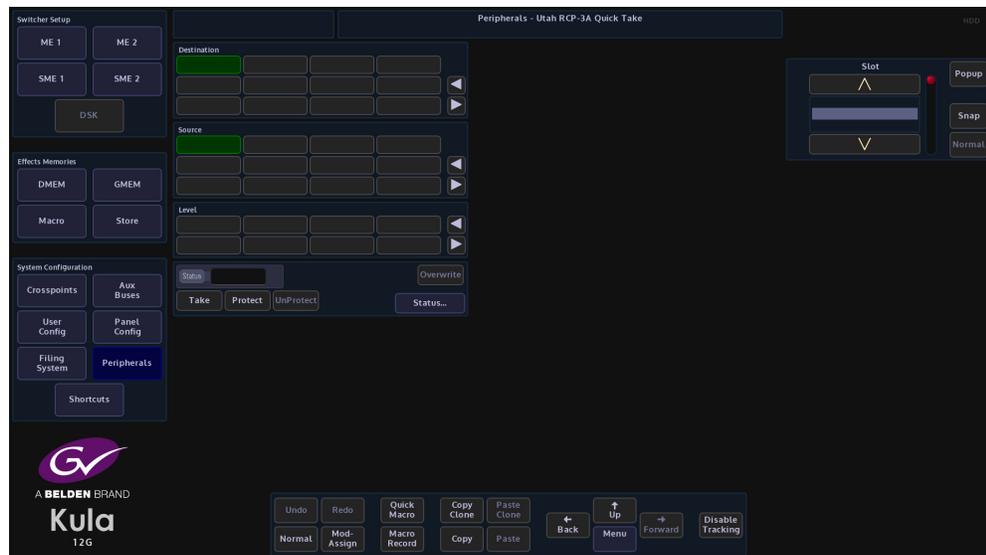
Touch the **{Utah RCP-3A...}** button, which will open the RCP-3A Status & Control menu.



If the Router is connected the sources and destinations will be displayed as shown in the above menu.

To perform a take, select the **Source** and **Destinations** using the parameters, on the desired level and then touch **{Take}**. The Green selection indicates which level is active - which level the Takes and (un) Protects will be acted on. There can be multiple active levels selected at an time.

Alternatively, select the **{Quick Take...}** button at the bottom of the menu, which will take the user to the RCP-3A QuickTake menu as shown below.



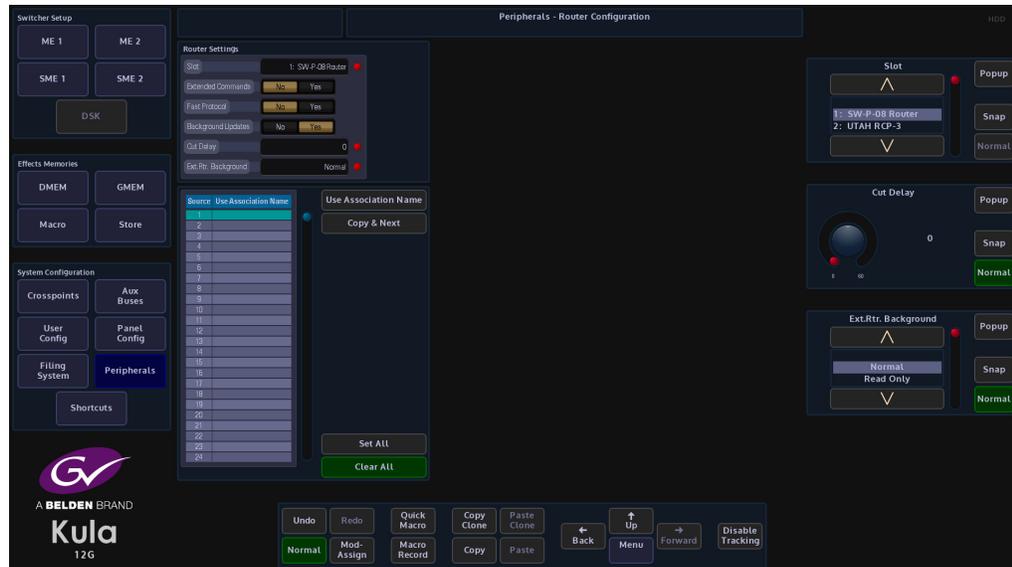
To perform a take, select the **Source** and **Destination** on the desired level and then touch **{Take}**. To lock the assignment press **{Protect}**. To Unlock press **{UnProtect}**.

## Peripherals - Engineering Router Control

The menus in this section of the Peripherals menu are used to setup Kula to communicate with external routers. One of the features that can be used with these menus is Kula's new Intelligent "Tile Line" concept (this will be described later in this section).

### Router Config

This menu allows the user to make changes to the way routers work with Kula.



If for example a source switch on the external router is changing later than, the timing can be adjusted. This will delay the cut on the to ensure the router switch is complete. Adjust the Cut Delay until clean switching is achieved. For routers that use the SAM SWP08 protocol the Fast Protocol selection can be enabled. This sends out multiple commands per video field. It will depend on the implementation of SWP08 whether this mode works.

#### Ext Rtr. Background:-

**Normal** - will send Xpt Take requests and Source Name requests.

**Read Only** - will stop Xpt Take requests but continue Source Name requests.

**Slow Read Only** - will stop Xpt Take requests but continue Source Name requests.

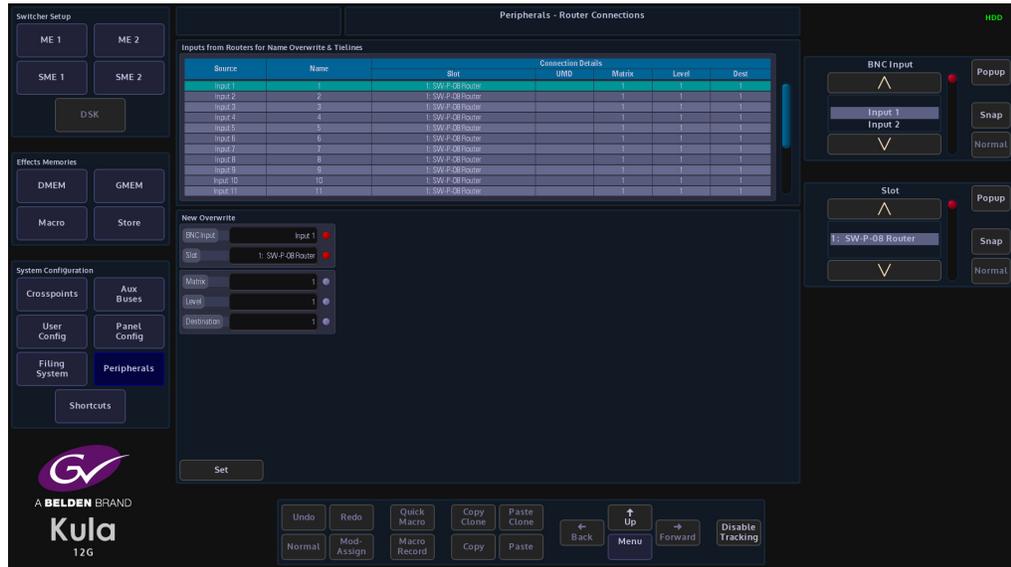
**V.Slow** - will send Xpt Take requests and Source Name requests at a very slow rate.

**V.Slow Read Only** - will stop Xpt Take requests but continue Source Name requests at a very slow rate.

**Off** - will stop both Xpt Take and Source Name requests.

## Router Connections

Here the physical router outputs (Including Matrix and Levels) can be mapped to the physical Kula inputs.  
Each of the input sources has to be setup individually, as each one is setup, touch the **{Set}** button.



**Matrix** - this is the router connected to Kula.

**Level** - this refers to the different levels within a router, video, audio and other.

**Destination** - this is the output from the router

### External Router Control - Practical Application

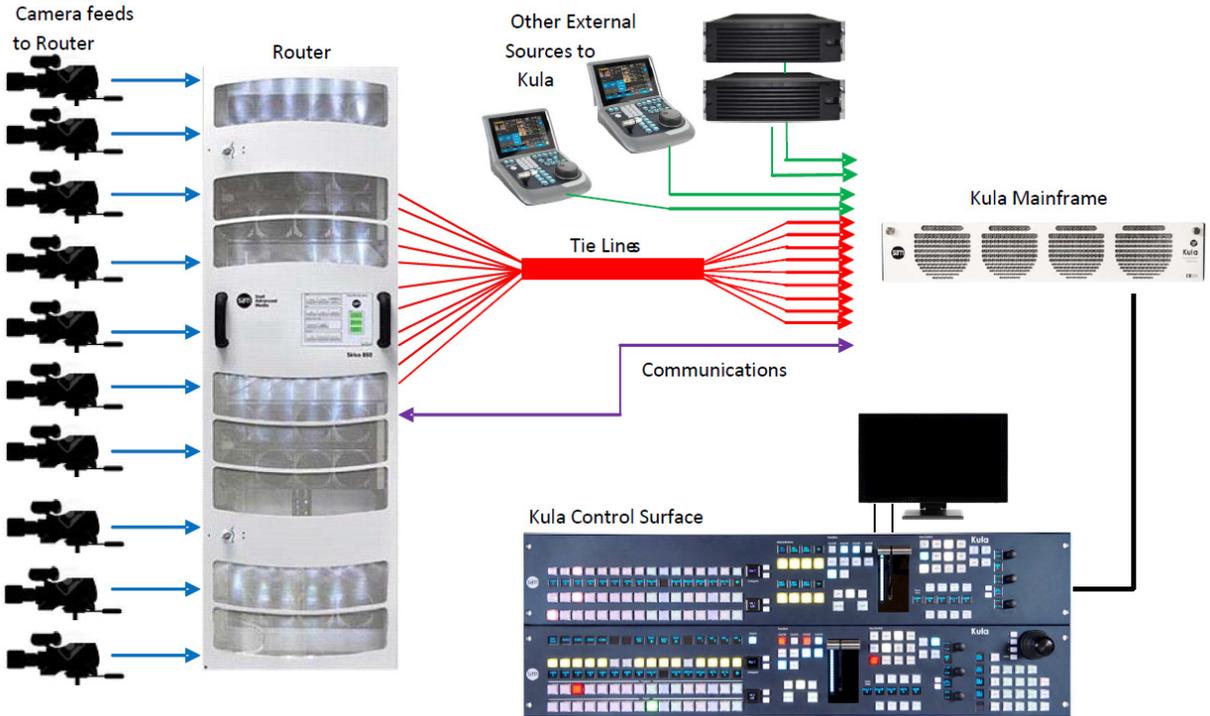
Kula now has the mechanism to expand the number of sources coming into the mainframe using an external router. This is primarily due to a system setup running in UHD. Using this new feature, the number of sources to be used with the Kula, are expandable up to the size of the upstream router.

### Intelligent Tie Line Concept

Kula deploys an intelligent “Tie Line” approach, the desired external router outputs (destinations) are connected to Kula inputs. These inputs on the Kula and destinations from the Router are treated as “Tie Lines”. Each Tie Line acts as a floating video bus between the router and Kula, they are intelligently assigned and used as required.

Source selection on any Bus is transparent to the operator, regardless from where the Xpt is being made, i.e. in the external router, or in the Kula itself.

The Kula software knows what physical inputs / Tie Lines are allocated and what are not being used on a bus. Kula then assigns the Physical input /Tie Line to the desired Bus upon a source selection. Kula updates the upstream router's destination /Tie Line with the selected source.



Source selection on any Bus is transparent to the operator. Once setup, the operator sets the desired router source by selecting the appropriate router XPT on the required bus. The selection on the external router and the Tie Line path into the Kula is automated.

### How Many Tie Lines?

How many Kula inputs do you need to convert to Tie Lines? This is entirely dependent on a few external factors, such as:

- How many inputs available on the Kula (max number shown below):
- HD = 40 Tie Lines
- UHD = 12 Tie Lines
- How many router destinations are available.
- How many router sources need to be selected on Kula at any one time.

**For example:**

If the user wants to select different external router sources on the A and B bus of ME2 this would require 2 Tie Lines.

- For HD this would require 2 router destinations and 2 Kula inputs.
- For UHD this would require 8 router destinations and 8 Kula inputs.

If the user requires external router sources on the A and B bus plus Key 1 and Key 2, this would require 4 Tie Lines.

In summary: Each different external router source selected simultaneously requires a Tie Line. Kula

Each Tie Line requires one router destination and Kula input in HD, or 4 router destinations and 4 Kula inputs in UHD.

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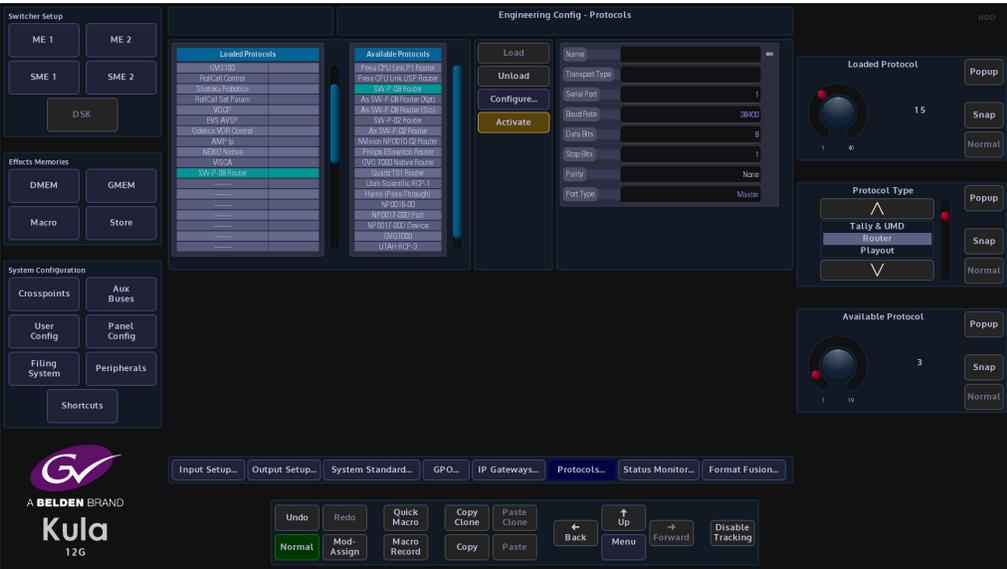
Note: If at all possible, it is recommended that the user creates more Tie Lines than are actually required. This gives some redundancy and reduces the risk of the system running out of available Tie Lines.

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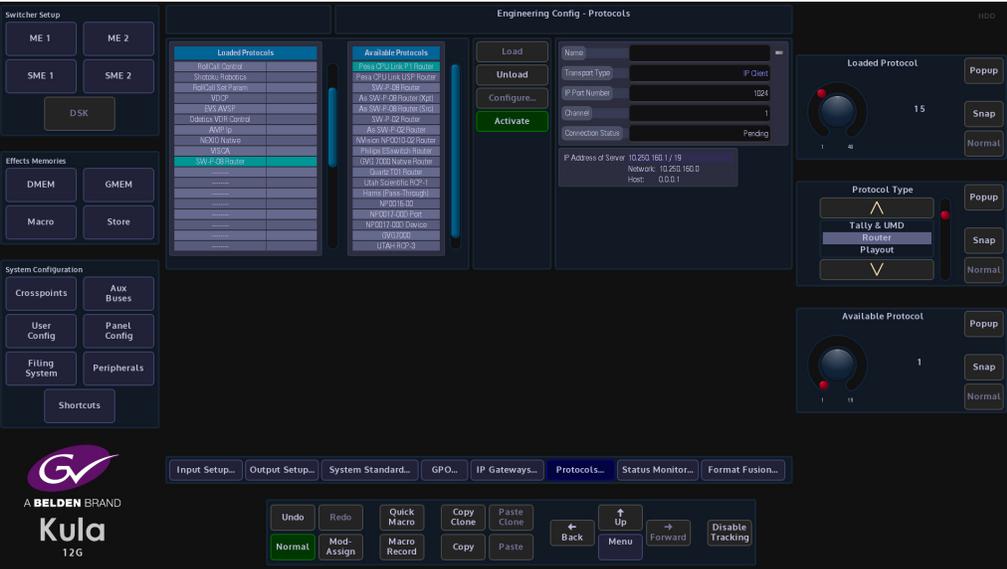
## Setup

### Protocol Setup

To setup the protocol, the user will have to go to the **Eng Config - Protocols** menu. Use the “**Protocol Type**” parameter to select “Router”, then, use the “**Available Protocol**” parameter to select the required protocol. For this example, “**SW-P-08 Router**” is selected. Touch the **{Load}** button to add the protocol to the “**Loaded Protocols**” table.



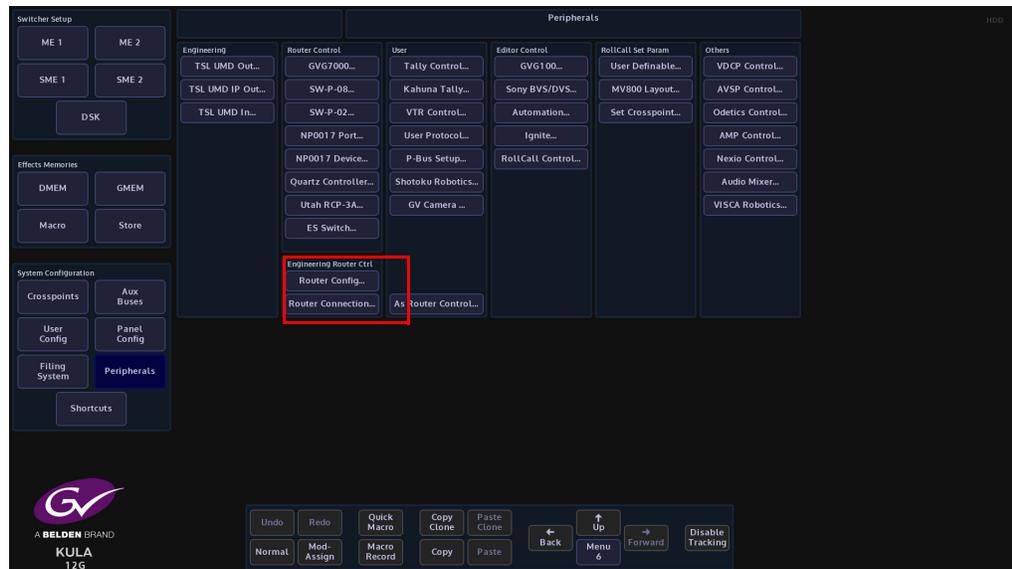
The user will now have to configure the protocol so that Kula can communicate with the router. Touch the **{Configure...}** menu link button and the “**Protocol Config**” menu is displayed. Use the “**Transport Type**” parameter to select the communications transport type, then, setup the “**IP Client Configuration**” details.



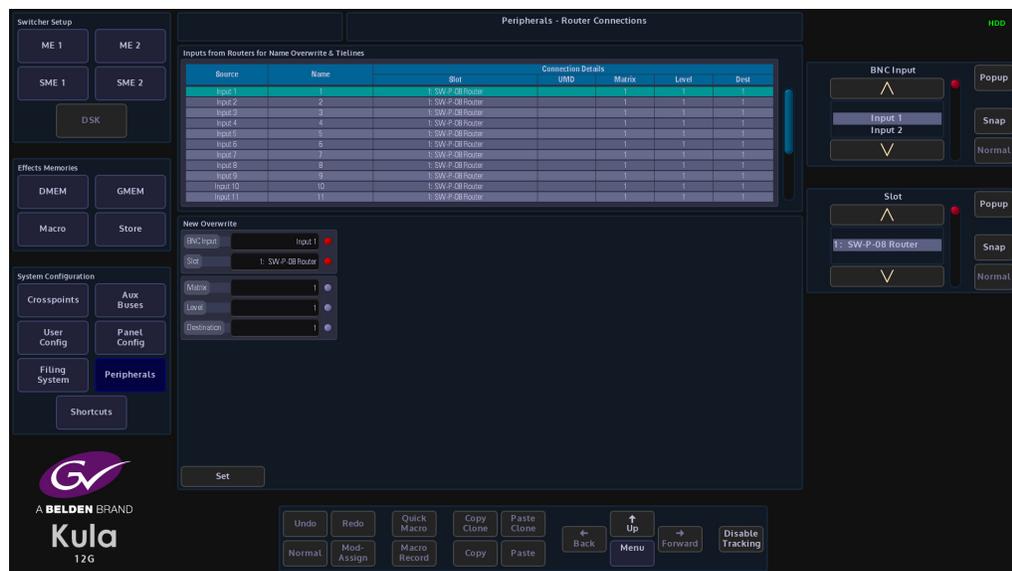
Once setup, touch the **{Apply}** button.  
Then back in the Peripherals main menu, touch the {Activate} button to activate the protocol.

### Peripherals Setup

Touch the **{PERIPH}** button to enter the “Peripherals” menu. Then touch the **{Router Connections...}** menu link button.



Then select “Router **Connections**”. Here the physical router outputs (Including Matrix and Levels) need to be mapped to the physical Kula inputs. These connections will form the “Tie Lines”



After each router connection row is set, touch the {Set} button.

### Setting Up Names and Tie Lines

Next, go to the **ENG Config - Input Setup** menu. In this menu, select the BNCs that were set to connect to the router destinations in the “Peripherals - **Router Connections**” menu and use the “**Router Tie Line**” parameter set the Tie Lines to “Yes”. Do this for all the inputs that will become Tie Lines from the router.



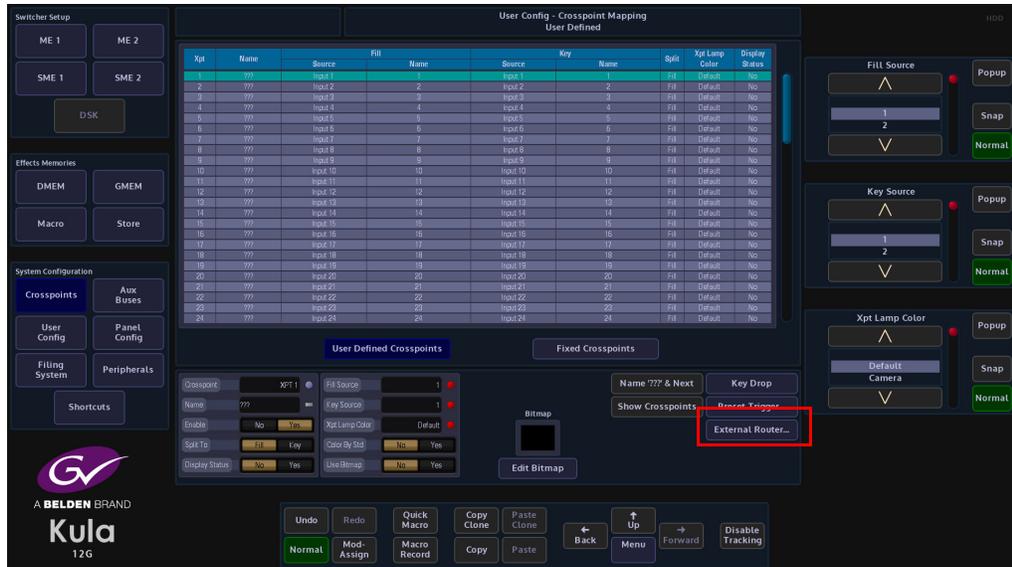
Note: For inputs that are set as “Tie Lines”, it is recommended that the “Source Standard” parameter (in the Eng Config - Inputs menu) is set to “Auto Standard”.

Note: It’s recommended that sources which are off standard (and therefore requires format conversion) do not come via Tie Lines if hot cutting is required.

Make sure at this point to “Overwrite” or “Save” the **ENG Config** setup.

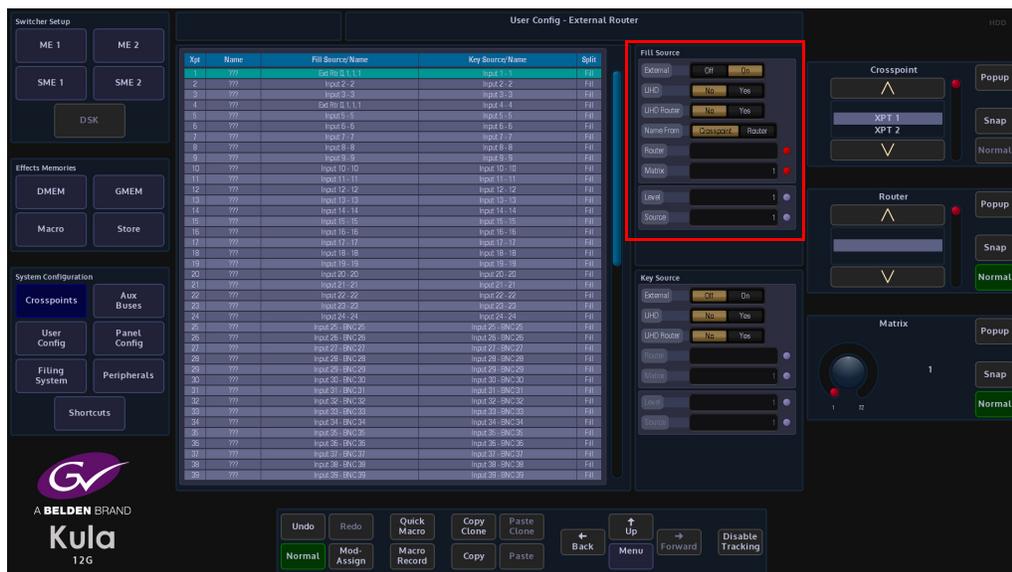
## User Config - Crosspoint Mapping - External Router Setup and Configuration

In the Crosspoint Mapping menu, touch the **{External Router...}** menu link button.



In the **“External Router”** menu, select free Xpts that are not being currently used, there are a total of 160 variable Xpts available. Each external router source required on the Kula will need its own router Xpt.

Use the **“Crosspoint”** parameter to select the required **“Xpt”** and then touch the **“Fill Source”** attacher to enable the parameters and set the **“External”** parameter to **“On”**



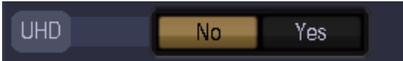
Touch the attacher below the **“Fill Source”** attacher, then use the parameter controls to set the **“Matrix, Level and Source”** for the selected XPT (originally set in the **“Peripherals - Router Connections”** menu).

If the source is UHD set the **"UHD"** parameter to **"Yes"**.

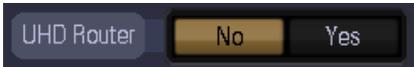
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Note: When in UHD mode the 4 quadrants or streams from the router have to be consecutive.

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If the router has its sources and destinations ganged as UHD then set **"UHD Router"** = **Yes**. This differentiates between the control protocol setting 4 router XPTs (un-ganged) or just the first router XPT (ganged).



**"Name From"** - Router means the name is fed into the Kula from the external router (should the protocol allow this).

**"Name From"** - Crosspoint uses the internal XPT name as set in the **User Config - Crosspoint - Name** menu.



Repeat the above for the **"Key Source"** for the Xpt if required. Otherwise it's recommended to set the Key source to black or white for the external router XPT.



Make sure at this point to **"Overwrite"** or **"Save"** the User Config.

## Operation

The Router XPTs can be mapped to the buttons on the control panel as per normal using the Panel Config - Button Maps menu.

The operator just selects the router XPT as per any other source and its fed via the Tie Lines from the external router.

If too many router sources are selected for the Tie Lines available, the following red text warning is displayed above the table (top left):

The screenshot shows the 'User Config - External Router' interface. At the top left, a red warning reads 'Insufficient Router Tie Lines'. Below this is a table with columns: Xpt, Name, Fill Source/Name, Key Source/Name, and Split. The table lists 24 rows of XPTs, including TV Chan, SPORT, SHOP, STOR, and PLAY. To the right of the table is a 'Fill Source' panel with controls for External, UHD, Name From, Router, Matrix, Level, and Source.

Xpt	Name	Fill Source/Name	Key Source/Name	Split
1	TV Chan 1	Store 6 - STOR 6	Store 6 - STOR 6	Fill
2	TV Chan 2	Store 5 - STOR 5	Store 5 - STOR 5	Fill
3	TV Chan 3	Store 1 - STOR 1	Store 1 - STOR 1	Fill
4	SPORT 1	Store 2 - STOR 2	Store 2 - STOR 2	Fill
5	SPORT 2	Store 3 - STOR 3	Store 3 - STOR 3	Fill
6	SPORT 3	Store 4 - STOR 4	Store 4 - STOR 4	Fill
7	SPORT 4	Store 7 - STOR 7	Store 7 - STOR 7	Fill
8	SHOP 2	Store 8 - STOR 8	Store 8 - STOR 8	Fill
9	SHOP 3	Store 9 - STOR 9	Store 9 - STOR 9	Fill
10	STOR 1	Store 10 - STOR 10	Store 10 - STOR 10	Fill
11	STOR 2	Matte 6 - Cyan	Matte 6 - Cyan	Fill
12	STOR 3	Matte 11 - Dark Red	Matte 11 - Dark Red	Fill
13	PLAY 1	Matte 10 - Orange	Matte 10 - Orange	Fill
14	PLAY 2	Matte 13 - Dark Blue	Matte 13 - Dark Blue	Fill
15	PLAY 3	Store 4 - STOR 4	Store 4 - STOR 4	Fill
16	???	Input 16 - BNC 16	Input 16 - BNC 16	Fill
17	???	Input 17 - BNC 17	Input 17 - BNC 17	Fill
18	???	Input 18 - BNC 18	Input 18 - BNC 18	Fill
19	???	Input 19 - BNC 19	Input 19 - BNC 19	Fill

In this instance either extra Tie Lines need to be added, or router XPTs deselected from buses if not required.

## Timing

If the source switch on the external router is changing later than Kula, the timing can be adjusted. This will delay the cut on the Kula to ensure the router switch is complete.

## Peripherals - Router Control - Router Config

Adjust the **Cut Delay** until clean switching is achieved.

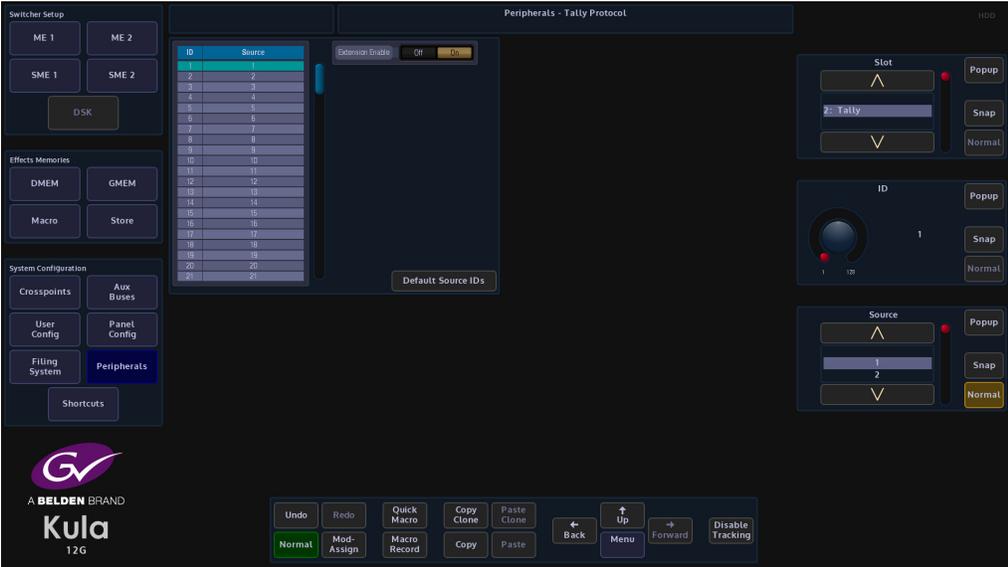
For routers that use the "SAM SWP08" protocol the Fast Protocol selection can be enabled. This sends out multiple commands per video field. It will depend on the implementation of SWP08 whether this mode works.

The screenshot shows the 'Peripherals - Router Configuration' interface. It features several panels: 'Router Settings' with options for Slot, Expanded Commands, Fast Protocol, Background Locks, and Cut Delay; a 'Source' table with columns for Source, User Association Name, and Use Association Name; and control panels for Slot, Cut Delay (with a knob), and Ext.Rtr. Background. The interface also includes a sidebar with navigation options like ME 1, SME 1, DSK, Effects Memories, System Configuration, and a bottom toolbar with Undo, Redo, Quick Macro, Copy, Paste, and other controls.

# Peripherals - User

## Tally Control

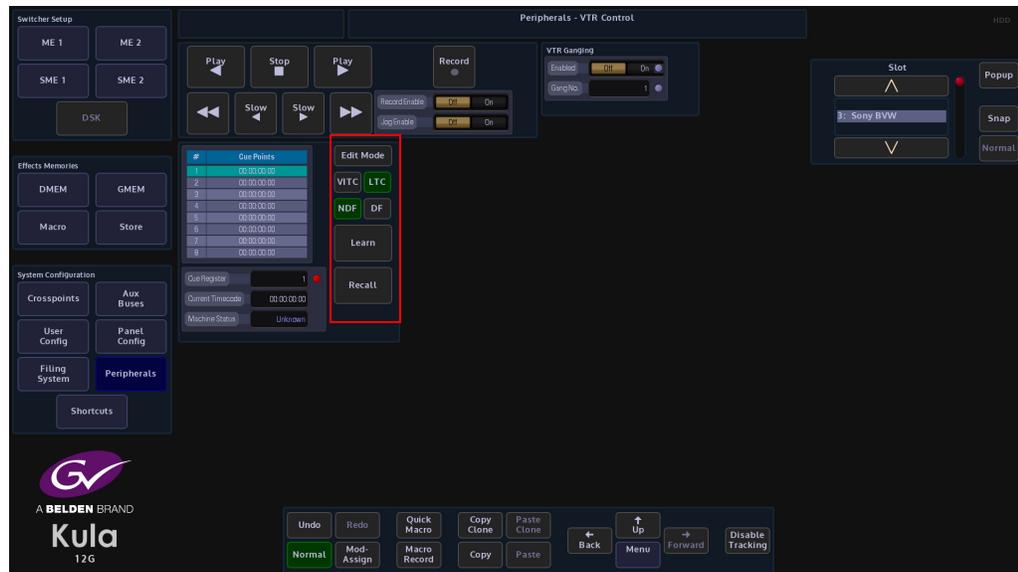
This menu allows the setup of a Tally serial port that is connected to an external devices. Tally protocol supports 128 Source IDs.



- Slot** - selects the protocol that is currently being used
- Extension Enable** - this enables the SAM extension in the protocol
- ID** - 1-84 are for BNC inputs and 85-128 are fixed, therefore greyed out.
- Source** - is the 120 BNC inputs, 84 Source IDs are not enough. So the users have to “choose” which 84 out of the 120 BNCs they want to tally. Any BNC that has not been assigned, an ID will not be tallied. Default Source IDs button will reset the mapping table to be one to one mapped, i.e. ID 1 is BNC 1, ID 2 is BNC 2 etc.

## VTR Control

This menu will allow control of VTR's connected via the RS422 ports.



Select the device using the “Slot” parameter. The status of the connection will be displayed in the “Machine Status” parameter. Use the standard controls to **Play, Fast Forward/Rewind, Cue** or **Record** the material on the device.

When in **Edit Mode** Cue points can be set up, which can be controlled directly from this menu or can be saved to a button on the panel as a macro.

When selecting **Edit Mode** the Edit Cue Point will stop and you can manually adjust the Timecode to reach a particular frame. Pressing Learn will record that as a Cue point and add it to the list. Turn off Edit Mode until you are ready to Recall this point.

To Recall a Cue point, select it in the list and press **Edit Mode** and press {Recall}. You will notice the VTR will now scroll to that Timecode and wait for further instruction.

**Cue Register** will scroll through your list of recorded Cue Points.

### {VITC} - Vertical Interval Time Code

VITC assigns a specific time in hours, minutes, and seconds to each vertical blanking interval in a video recording, along with a frame number. The time code can be used to start a recording at a certain chronological time (such as 5:00:00 p.m.), or it can be used to keep a playback machine synchronized with a master time source. The former application might be used by a home television viewer, while the latter application would more likely be used by a broadcaster.

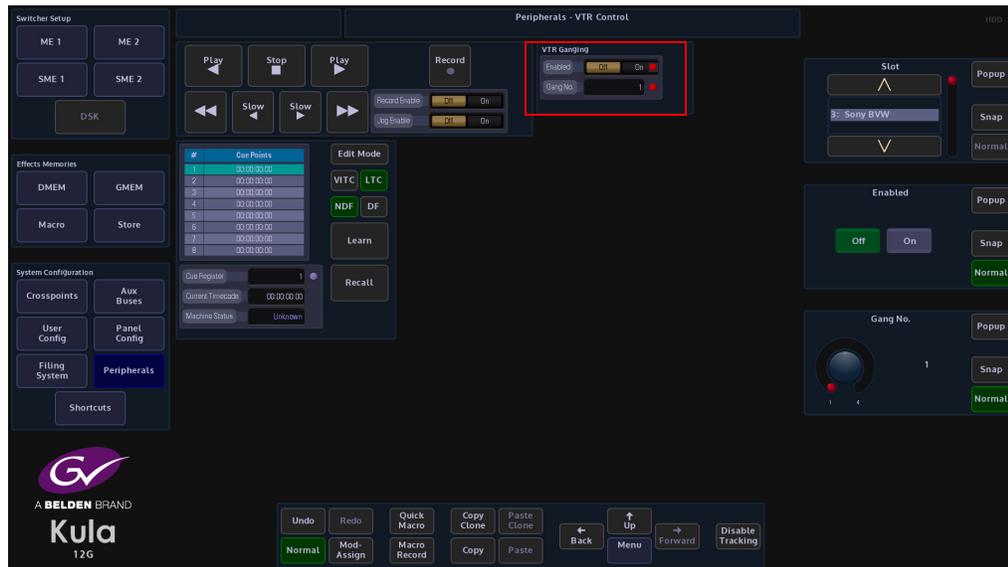
### {LTC} - Longitudinal Time Code

LTC is recorded along the length of the tape in the form of a modulated audio signal. The signal may be recorded on a spare audio channel or, in the case of professional equipment, on an “address track” available for just this purpose.

### {NDF} - Non-Drop-Frame Format

## {DF} - Drop-Frame Format

The difference between the two is that with Drop-Frame format the frame address is periodically adjusted (once every minute) so that it exactly matches real time (at the 10 minute mark), while with Non-Drop-Frame format the frame address is never adjusted and gets progressively further away from real time.



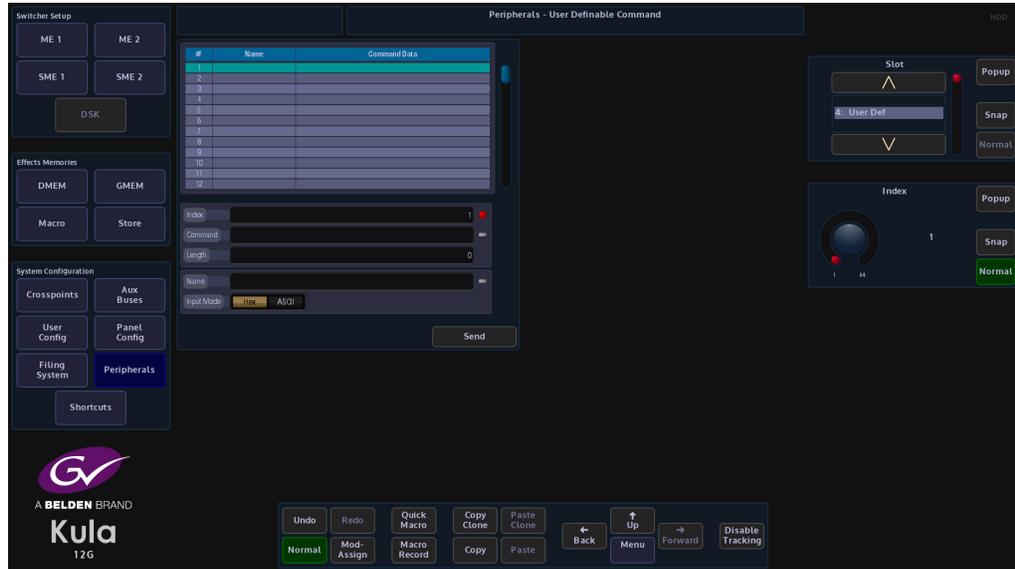
**VTR Ganging** - this allows the ability to “GANG” Roll up to 4 VTRs.

The Jog Enable function can be assigned to the Joystick on the control surface.

This can be permanently assigned to the joystick by pressing and holding of the **[MEM]** button, either on the Joystick. With the MEM enabled the Joystick will return to the VTR Jog Shuttle.

## User Protocol

This function will allow the user to type in an ASCII or Hex command/message and send it out to a serial port.



**Slot** - selects the serial port that will be used to send the commands

**Index** - the index number in the table for the selected command

**Input Mode** - selects between ASCII or HEX as a command form.

**Command** - command code written by the user. When in ASCII mode, Kula can be made to also send out two special characters.

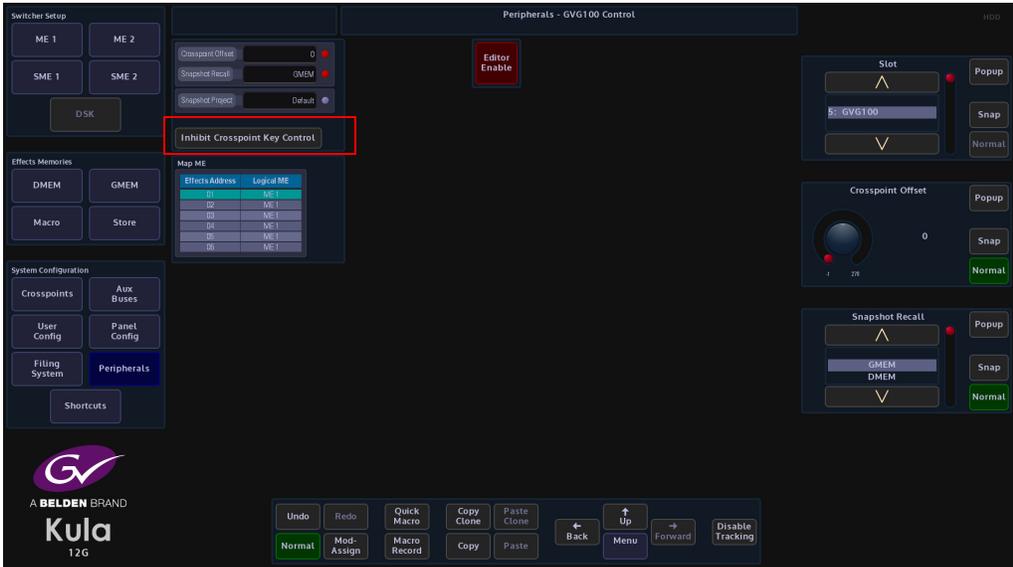
To send a carriage return character type "<cr>" and "<lf>" for a line feed character

**Length** - command length

**Name** - name (function) given to the command data.

### Editor Control

This function allows external equipment software to control some functionality on Kula, such as the Crosspoint selection, DMEM's, Transition Control.



Before using this protocol the required DMEM that are going to be used with the external equipment software should have been saved into the "Default" file on the Kula mainframe. This will enable external equipment software to recall the required DMEM.

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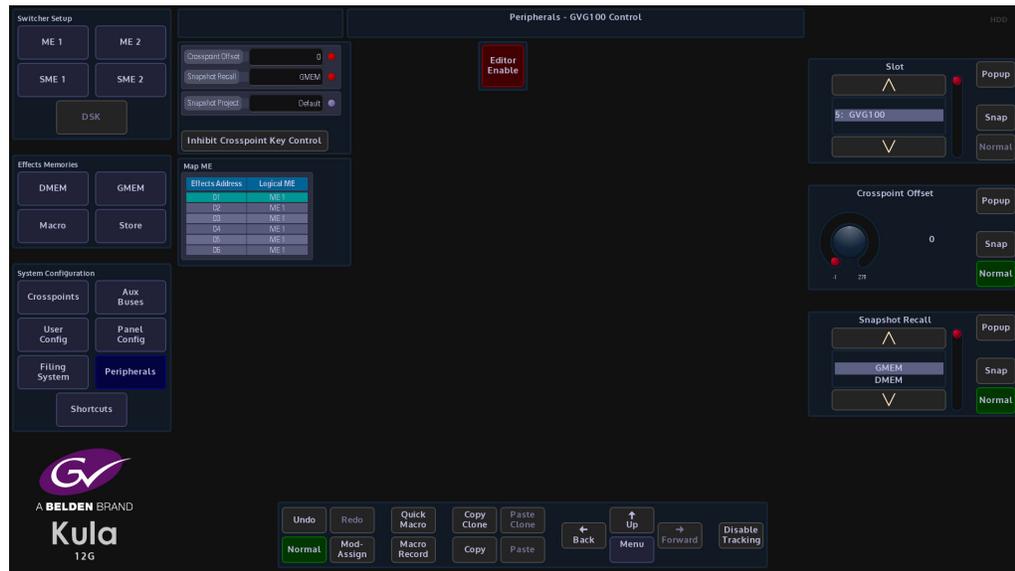
Note: This example the GVG 100 Control protocol will be used.

---

The **Snapshot Recall** parameter should be set to "Auto" allowing the external equipment software to recall DMEM, but the user can also set the parameter to only allow DMEMs to be selected.

## Crosspoint Selection

GVG 100 Control protocol directly drives linked Mixer parameters for Bus Control and Transition Control.



The Map ME parameter allows the user to offset the Mixer with the Editor, so for example the "PP" (Program/Preview) can be set to the Mixer.

Crosspoints can be selected to the following buses for each Mixer in the User Config - Crosspoint Mapping menu.

- BKGD A
- BKGD B
- KEY 1 FILL
- KEY 1 KEY
- KEY 2 FILL
- KEY 2 KEY

Crosspoint selection for Auxes

Crosspoints can be selected to be used with the Aux buses.

## Transition Control



The following can be included in a transition:

- Transition mode - can include background, Key1, Key2, Key3 and Key4 in the transition
- Transition Types - includes MIX, WIPE and MATTE MIX
- Auto Transition Start
- Transition rate
- Transition Preview
- Transition Key On/Off

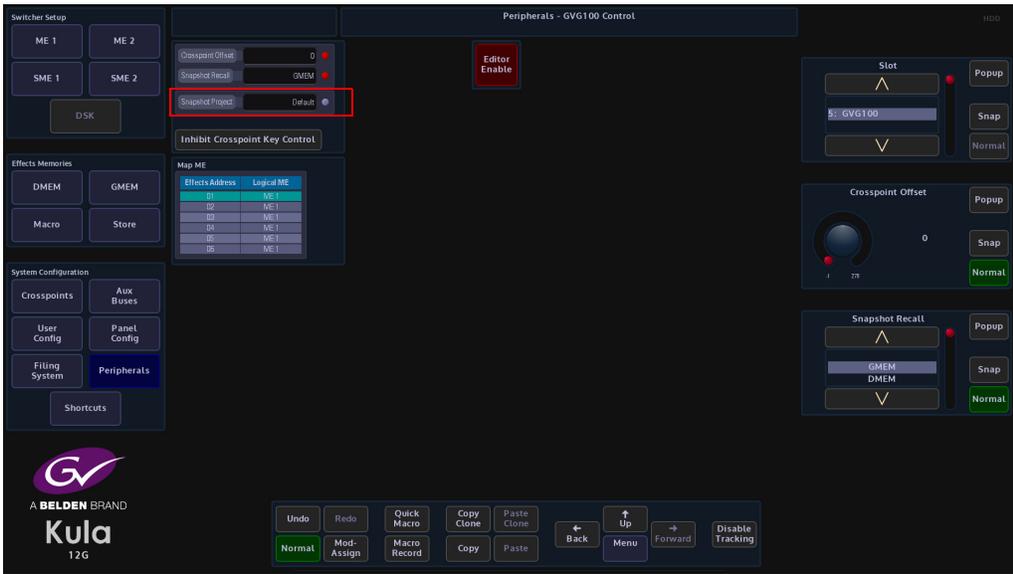
## Key Control



The following can be selected to affect Key1, Key2, Key3 and Key 4

- Matte Fill On/Off
- Key Source Select - Auto (Coupled), Split and Self
- Mask Source Select
- Key Type - Full, Linear, Luma
- Key Edge Modify - Border
- Key Invert

### Snapshot



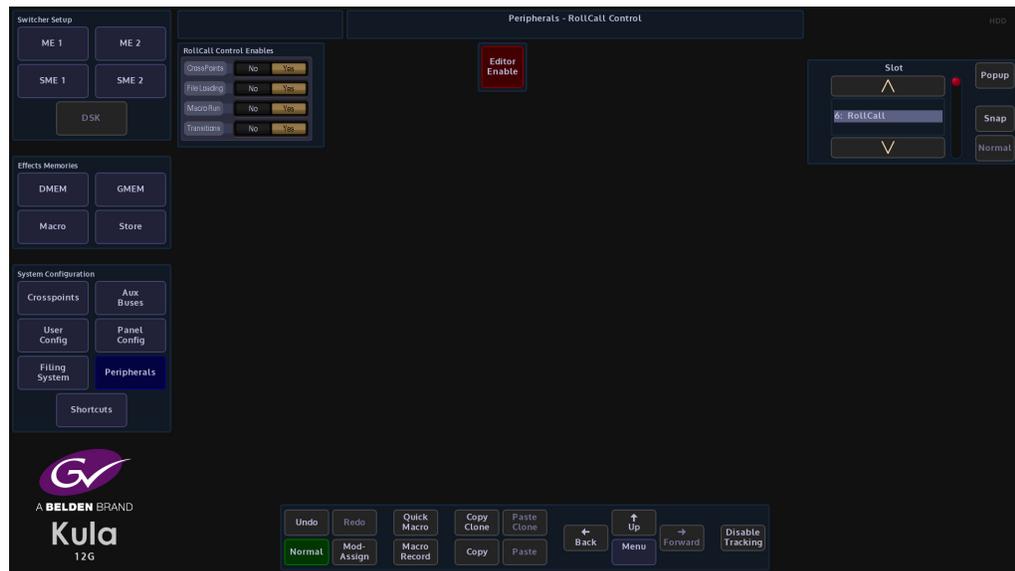
**Snapshot Recall** - Loads a Kula DMEM Snapshot.

## RollCall Control

This function allows external equipment running RollCall control software to control certain function on Kula.

Only one instance of the RollCall Control protocol can be loaded at any one time. This instance of the protocol is system wide, facilitating control of all the available switchers on the mainframe.

RollCall software will need to be installed onto a computer/laptop which is connected either directly to one of the network ports on the Kula mainframe or to a network switch that is connected to the Kula mainframe.



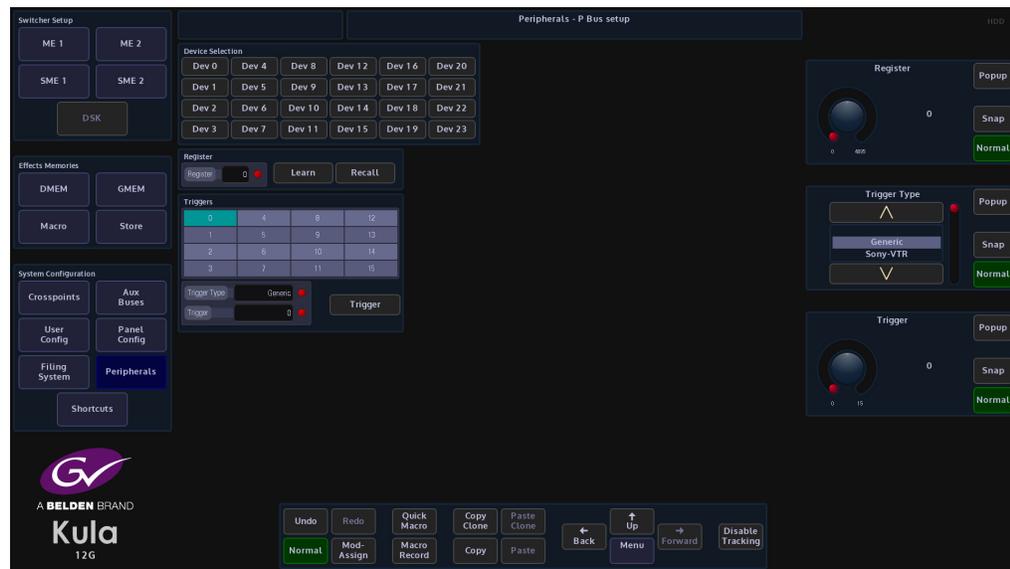
The "Yes/No" parameters allow the user to filter incoming RollCall messages to affect certain areas of Kula.

Touch the **{Editor Enable}** button to enable the protocol, then select which RollCall message is enabled.

The RollCall software is able to control the functions listed above, but with the crosspoint control, the RollCall software is able to control both internal crosspoints in the Kula mainframe and allow crosspoints to be controlled via an external control panel.

## P-Bus Setup

This menu allows the control of Peripheral Bus Interface Boxes that can be connected to the serial ports on the Kula mainframe. The P Bus boxes have various external devices connected to them such as VTRs, cameras etc. The P-Bus boxes when “daisy chained” allow more than one device to be controlled through one serial ports on the Kula mainframe, this allows up to 24 P-Bus boxes to be controlled.



**Register** - is a store for the setup and position of the P Bus device, 4096 registers are available. For example, the start point on a VTR tape can be set in a register by selecting a register number at a certain point relating to the time code then pressing the {Learn} button. {Recall} will wind the tape back to the start point again which relates to the register point.

**Trigger Type** - this is a selection of devices that are pre loaded on to the mainframe hard drive with the trigger functions setup ready to use, the trigger settings for each device are displayed in the Triggers matrix in the menu. Scroll through this parameter and observe that the triggers will change for each device selected.

**Trigger** - selects one of the 16 trigger options in the Triggers matrix

### Button Controls

**Device Selection** - Touch one of the 24 (0 to 23) available Device Selection buttons to control up to 24.

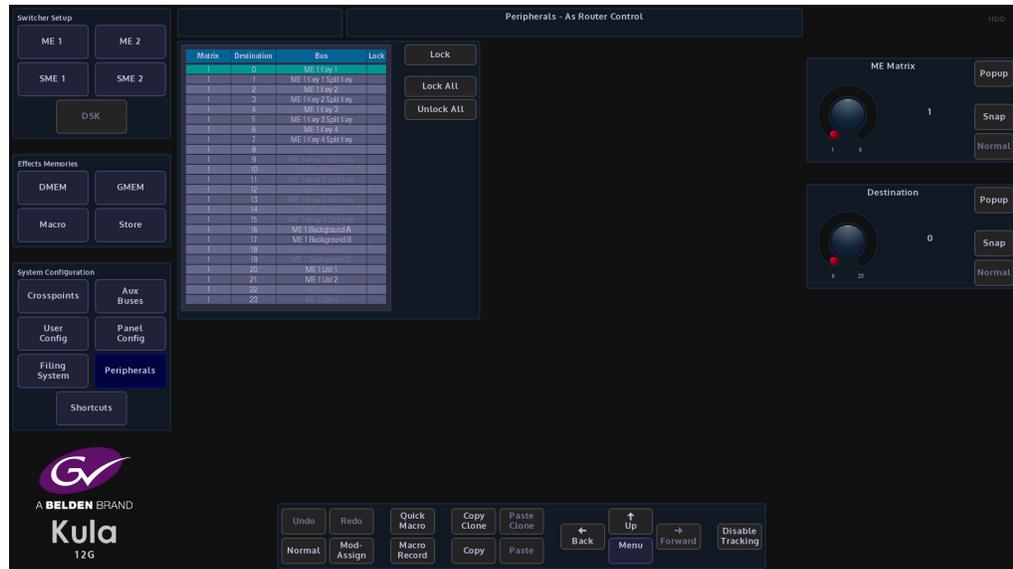
**Learn** - will learn an action from an external device and set the action to a register point

**Recall** - will recall the “Learned” action to the selected register point

**Trigger** - the Trigger facility allows the switcher to be used to control various functions of the connected device such as Play, Stop, Slo-Mo or Reverse Play.

## As Router Control

This section details the protocol for controlling Kula Switcher as routers. It covers the protocol used to Change the Source Destination.



**Matrix** - Retrieve source names (Router Control systems can contain a multiple of Matrix configurations).

**Destination** - Physical outputs associated with currently selected router matrix.

**Bus** - selects the source on the currently selected ME Matrix

**Lock** - this button locks the currently selected bus

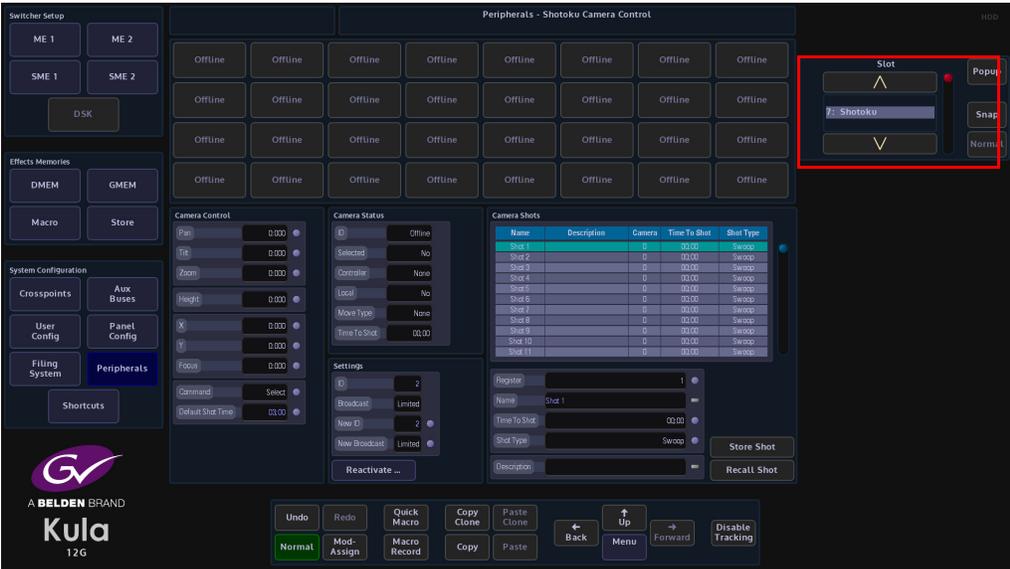
**Lock All** - will lock all the buses displayed in the table for the currently selected ME matrix only.

### Shotoku Robotics

This function allows Kula to communicate with and control a Shotoku robotic camera heads using an IP Server protocol.

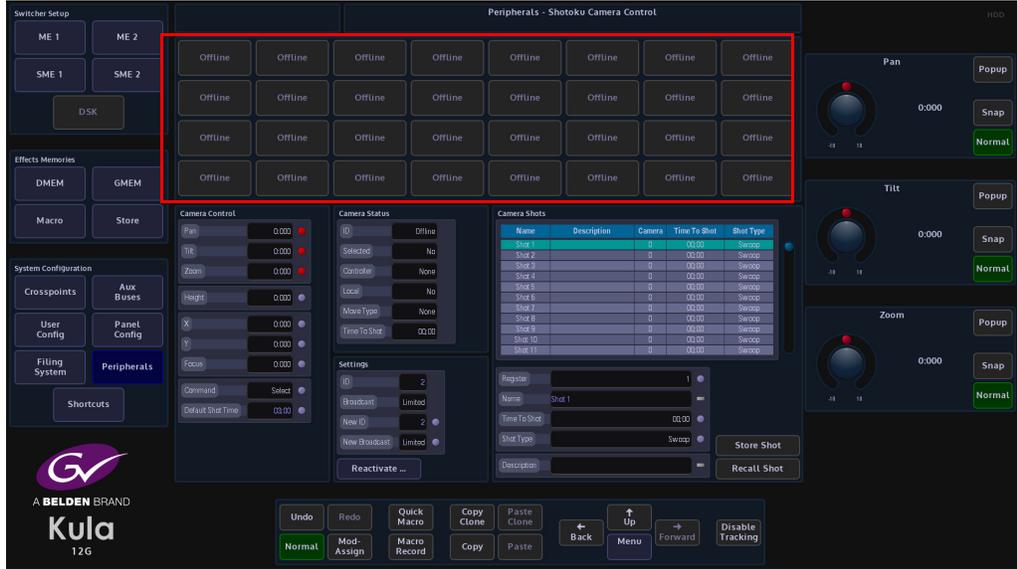
### Using the Shotoku Robotic Peripheral Controls

This function is used to control Shotoku Robotic Camera Heads. In the "Home" menu, touch the **{Peripherals}** menu link button, then in the Peripherals menu, touch the **{Shotoku Robotics}** menu link button.



### Shotoku Camera Control

The opening menu will display that the Shotoku Robotics protocol is active (as shown below).



The 32 buttons in the top half of the menu are control buttons, they display the current cameras that are on-line (when active, they will light up). They can be used along with the "Command" parameter to Select, Detach and Grab cameras. The user can select a device by touching one of the Camera Control Buttons, making sure that the correct parameter controls is selected for the type of device, i.e. Pan, Tilt and Zoom.

Note: Each control button can have a number of commands and attachments, so the cloning of camera control buttons is recommended.

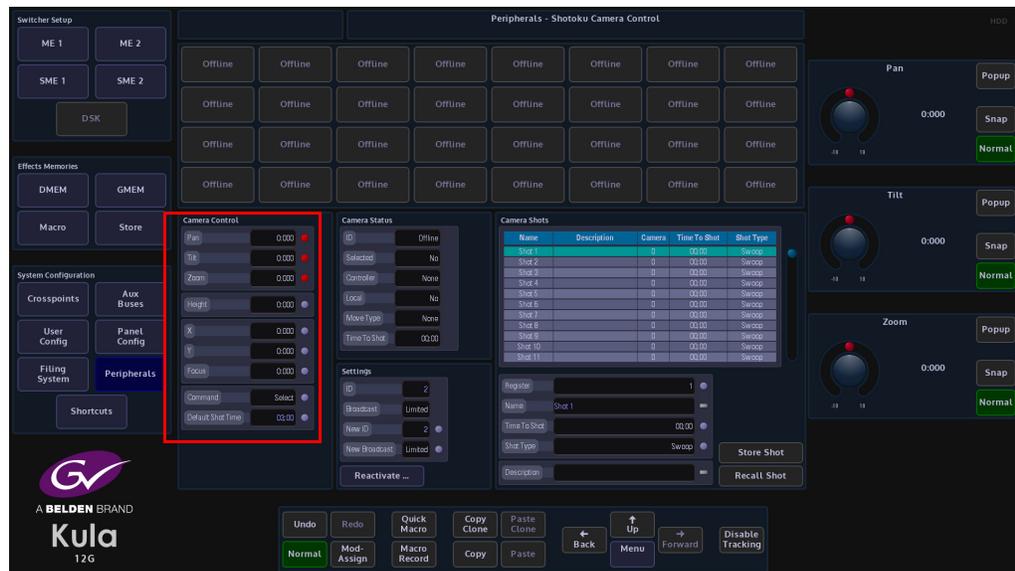
**Pan, Tilt and Zoom** - move the camera as described, as soon as the attachers is touched the selected parameters can now be attached to the control surface joystick (if available).

**Height** - adjusts the height of the camera pedestal

**X, Y and Focus** - work in the same way as the parameters above and are selected by touching the attachers, and selecting **X, Y & Focus**.

**Command** - makes the number button select that camera for controlling. *Detach* makes the number button deselect that camera.

**Default Shot Time** - The default time entered for camera shot storage control.



### Camera Status Menu Link Button

The menu displays the camera head connection status, when connected to either the Kula system or the Shotoku Robotic camera head control panel.

**ID** - this displays the number of Robotic Camera heads that are connected and can be controlled,

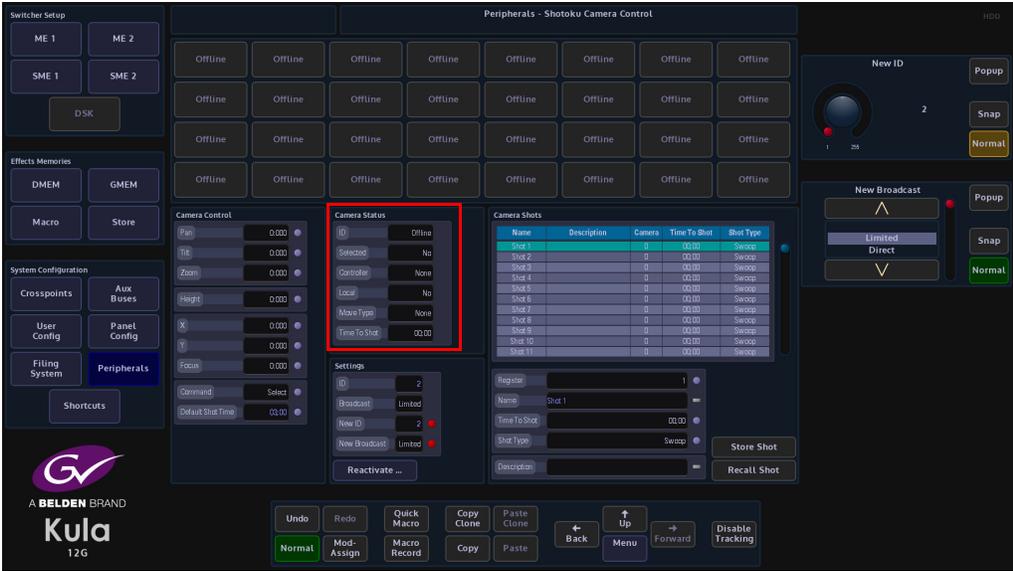
**Selected** - this displays if the Robotic Camera heads are selected and active

**Controller** - this displays a unique number for the controlling device, for example, the Shotoku Control panel could be Controller ID 1, and Kula could be Controller ID 2 depending which Kula ID value is entered by the user.

**Local** - this indicates if the camera head is currently under local control.

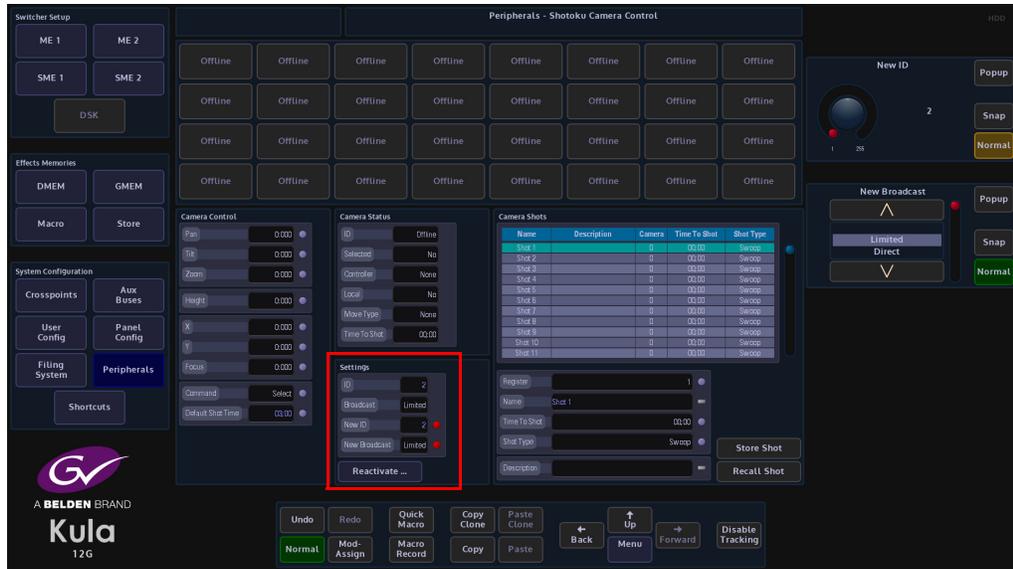
**Move Type** - this shows the 'shot type' of the current move. This will only display something during the shot recall.

**Time To Shot** - if a camera head has got a preset position setup in one of the Registers (shown later), this is the time that the camera head would take to move into that preset position.



## Settings Menu Link Button

**ID** - A unique ID set as the controlling device, when online this field will be greyed out.

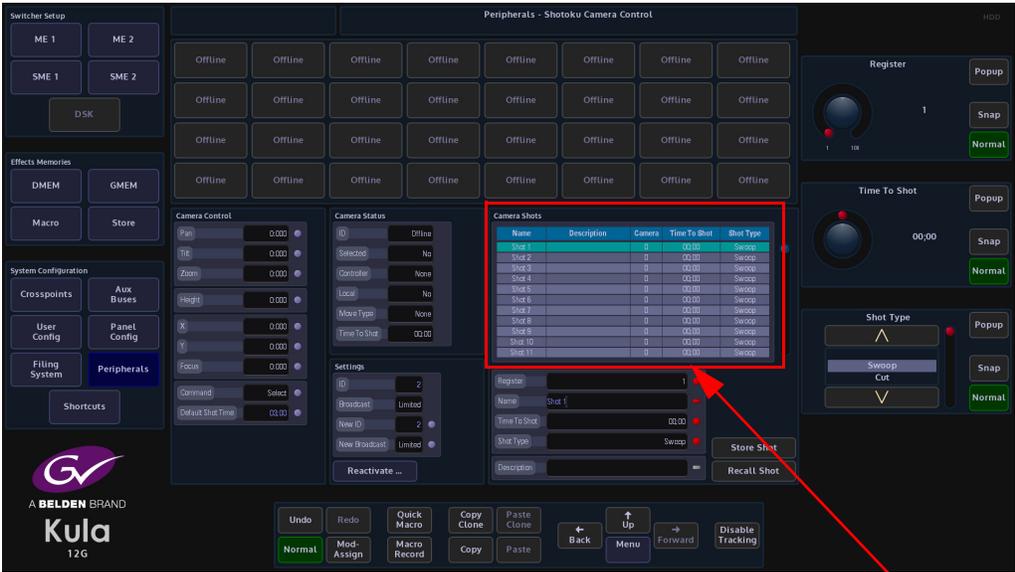


The user can manually select which camera head they wish to use by touching one of the 32 available buttons.

The camera head can only be selected if it is deselected on the Shotoku controller.

### Camera - Shots Menu

This menu allows the user to store **{Store Shot}** up to 100 recorded robotic camera head positions into registers, and recall them **{Recall Shot}** at any time.



Store Shot registers

### Using the Store Shot

To use this function, the user will have to go back to the Camera Control Menu and touch either the Pan, Tilt, Zoom or X, Y, Focus attacher (depending on the type of camera head used) then press and hold down one of the 4 **{MEM}** buttons located next to the joystick. This will allow the user to move the camera head using the joystick whilst in the Camera Shots menu.

Go back into the Camera Shots menu, select a camera head by pressing one of the available buttons (in the top half of the menu), the button will turn Green when selected. Next use the joystick to position the camera head, select a register position in the table, and then press the **{Store Shot}** button.

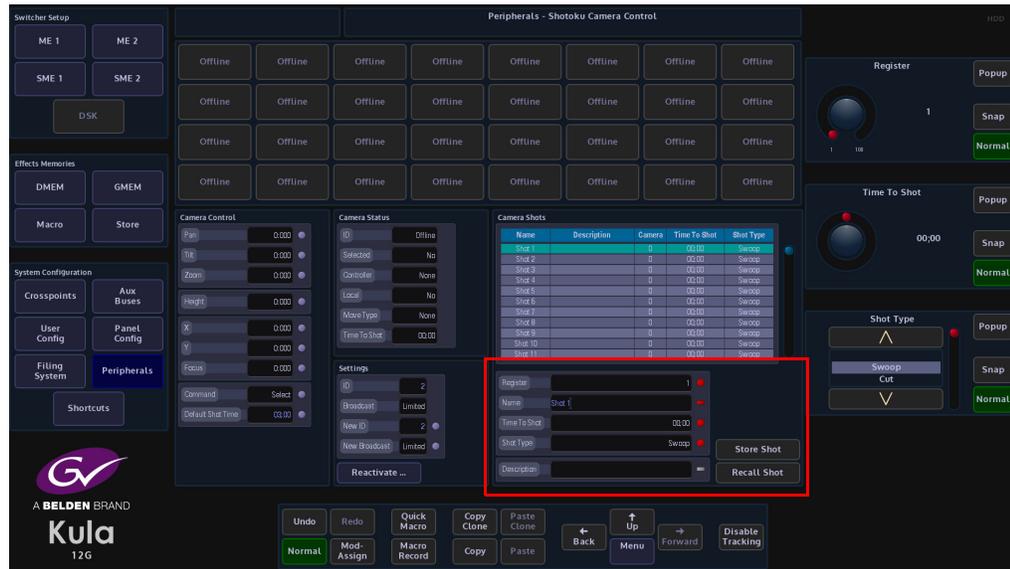
The stored position can be recalled by scrolling to the required "Shot" and pressing the **{Recall Shot}** button.

### Store Shot Table

The table displays the Name of the Shot (this can be altered using the Name attacher below the table), the Description (again, this can be given a name using the Description attacher below the table), Camera ID, this is the selected camera head when the Shot was saved and Time To Shot is the time that the camera head takes to move from its current position to its saved position in the selected register.

Touch the **Name** attacher twice and the on-screen Keyboard will appear, allowing the user to enter a new name for the stored shot.

Touch the **Description** attacher twice to enter a description for the stored shot.



**Register** - Scrolls through the table.

**Name** - the name of the Shot.

**Camera** - will select one of the available camera heads, use either the parameter control or press one of the buttons in the menu.

**Time To Shot** - this changes the time that the camera head moves from its current position to its saved Store Shot position.

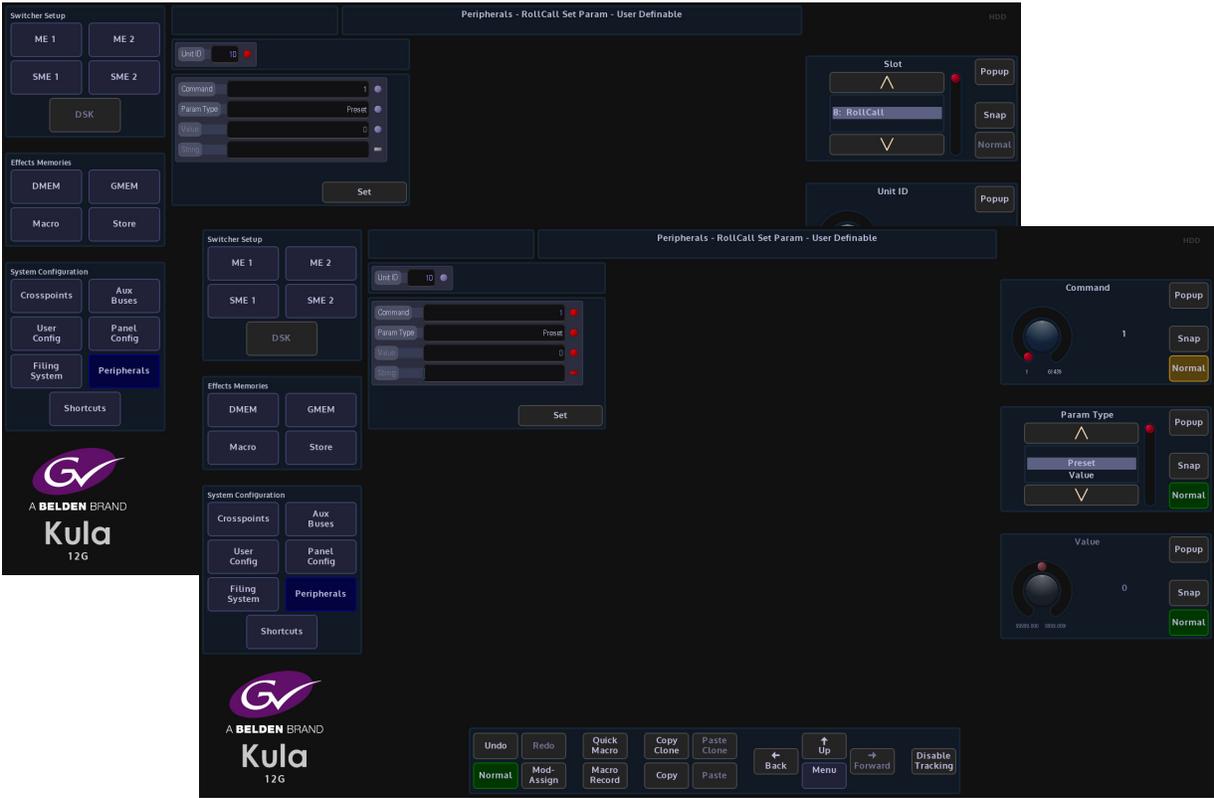
**Shot Type** - this controls the way the recorded shots are recalled by the system. Swoop, Cut and Fade.

## RollCall Set Param

The RollCall Set Param menus are to send a set parameter message over the RollCall network. Kula is the RollCall Client. The parameter can be a value, a string or both. You can construct a general purpose message using the "User Definable" menu, or a specific message such as "MV800 Layout" or "Set Crosspoint" message.

### User Definable

Set the Unit ID, you must specify the ID that you are trying to talk to. This is a unique ID which every unit has.

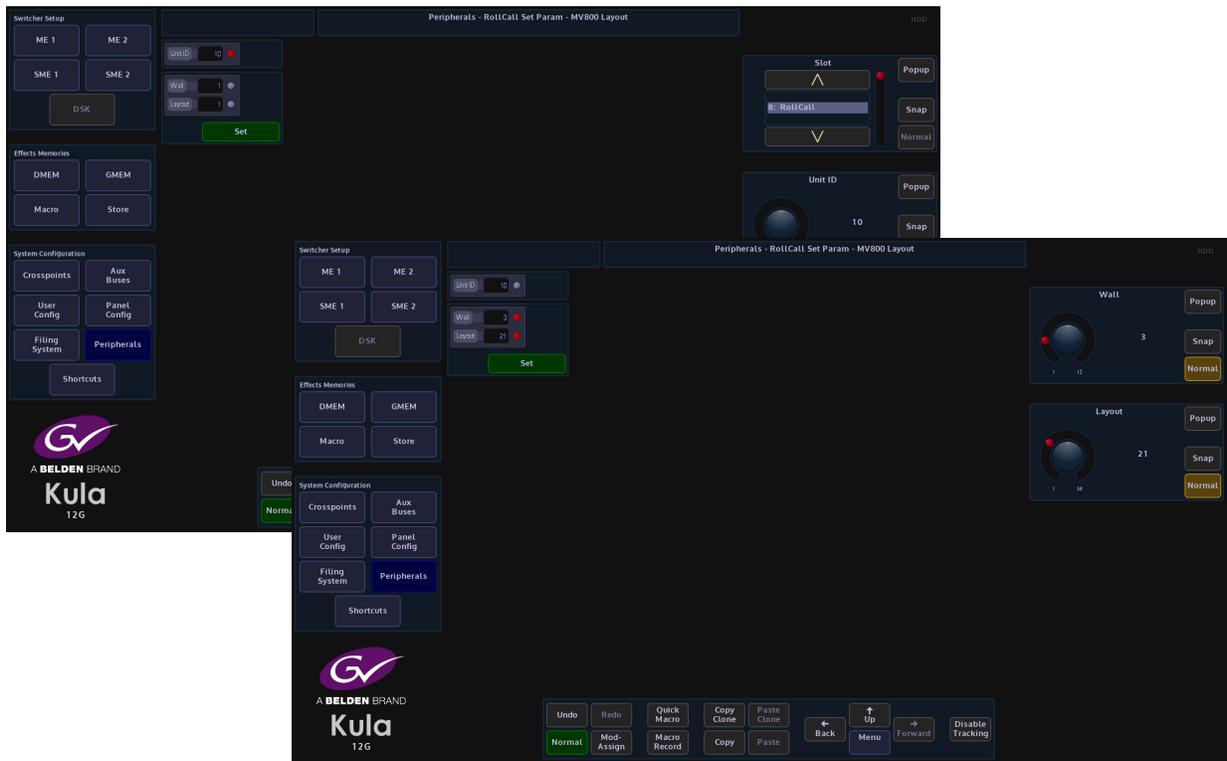


The RollCall Set Param menus are for sending a message to any unit on the RollCall network. The message can be a general purpose one, which consists of a command and a parameter. The parameter can be a value, a string or both.

## MV 800 Layout

This parameter allows Kula using RollCall set parameters to communication with the MV-800 integrated multiviewer fitted in the Grass Valley Sirius 800 range of Routers.

Set the unique **Unit ID** to communicate with the multiviewer.

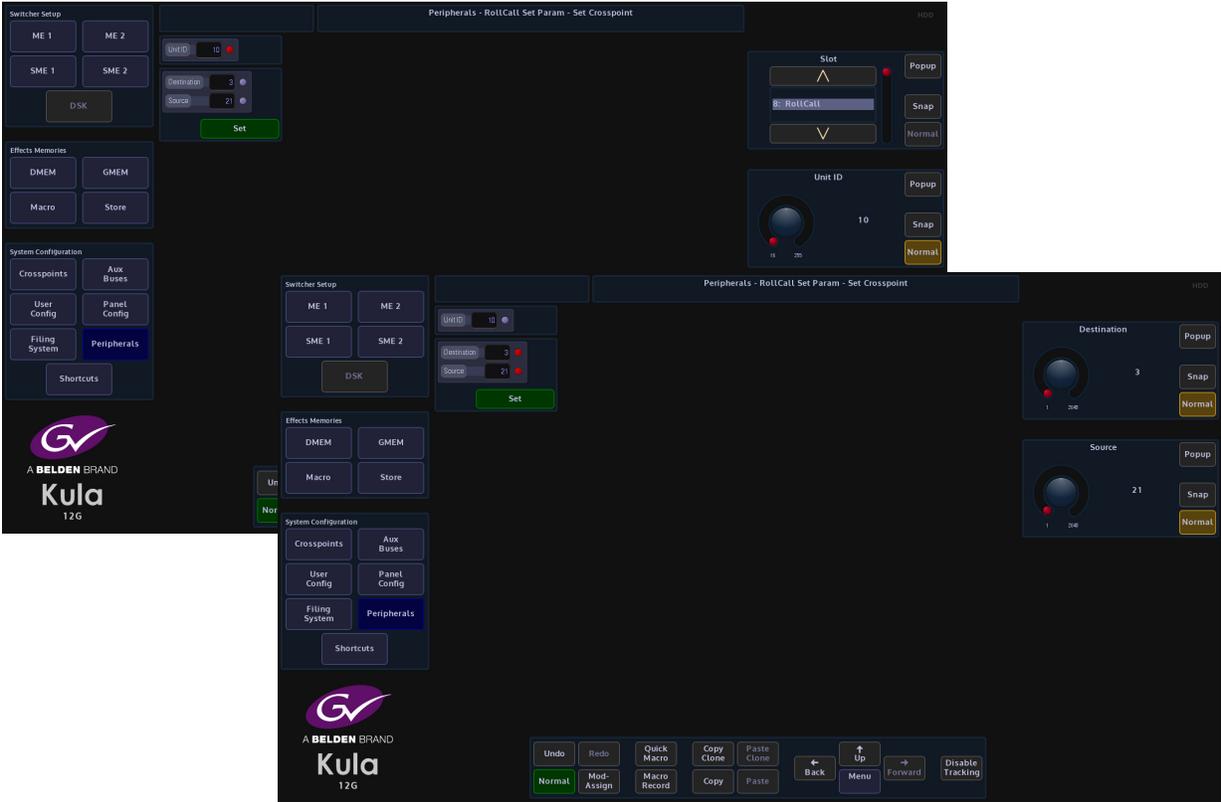


**Wall** - this selects video wall outputs 1 to 12

**Layouts** - this accesses the user defined video wall layouts (up to 64 individual layouts) saved.

## Set Crosspoint

Set Crosspoint message is for switching a router source on a destination.



Set the unique ID for the unit that you are trying to communicate with.

**Destination** - the destination on the router

**Source** - the source that you are trying to switch on the router

## Peripherals - Others

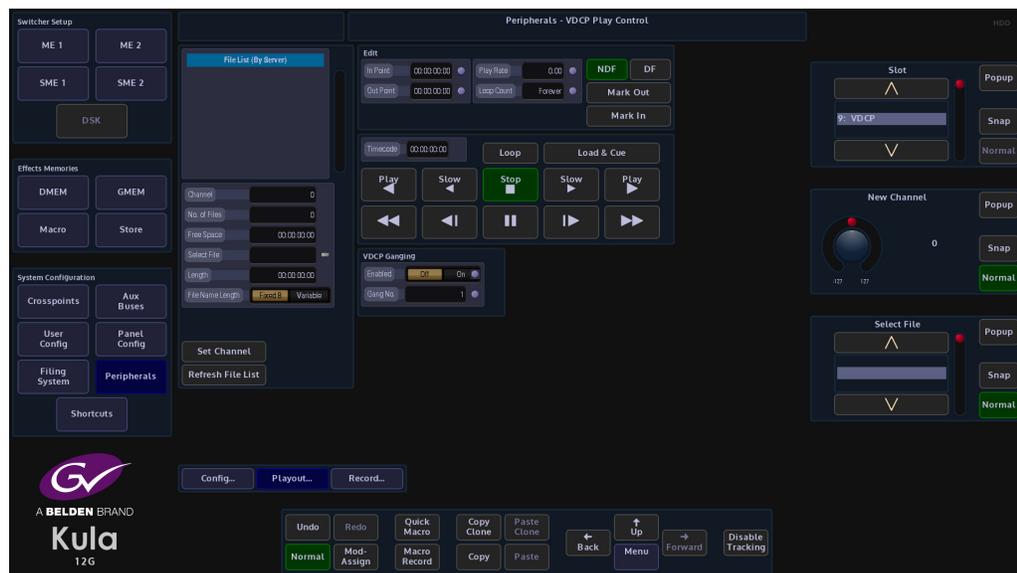
### VDCP Control

VDCP is a common protocol for video servers. Note that only some commands (which means also functions) are mandatory; many are optional. If optional commands are not implemented in the disk server, VDCP Simple should be selected instead.

A video server is a system that has hard disk storage for video, and one or more audio/video channel connected to it. A channel on a server can play or record or both. The number of channels on the server, and what capabilities they have, are server dependent.

### Playback

Press the **{VDCP Control...}** menu link button, this option is used to control video disk servers. Enter the Playback.



### Parameter Controls

**Slot** - selects the slot that was setup in the Protocols menu

**New Channel** - selects a channel on the server

**Select File** - selects a clip by name

Edit

**In Point** - displays the play out start position of the selected clip

**Out Point** - displays play out end position of the selected clip

**Play Rate** - will allow the user to speed up or slow down a clip and change the direction of play

**{Mark In Point}** - used to set a play out start point within a clip

**{Mark Out Point}** - used to set a play out end point within a clip

**{NDF}** - Non-Drop-Frame format

**{DF}** - Drop-Frame format

The difference between the two is that with Drop-Frame format the frame address is periodically adjusted (once every minute) so that it exactly matches real time (at the 10 minute mark), while with Non-Drop-Frame format the frame address is never adjusted and gets progressively further away from real time.

### File List Attacher Controls

**Channel** - displays the selected channel on the server.

**No of Files** - displays the number of files in the File List

**Free Space** - displays the Free Space left on the Video Servers Hard Disk

**Select File** - allows the user select a file and to also rename a file

**Length** - displays the duration of the selected clip

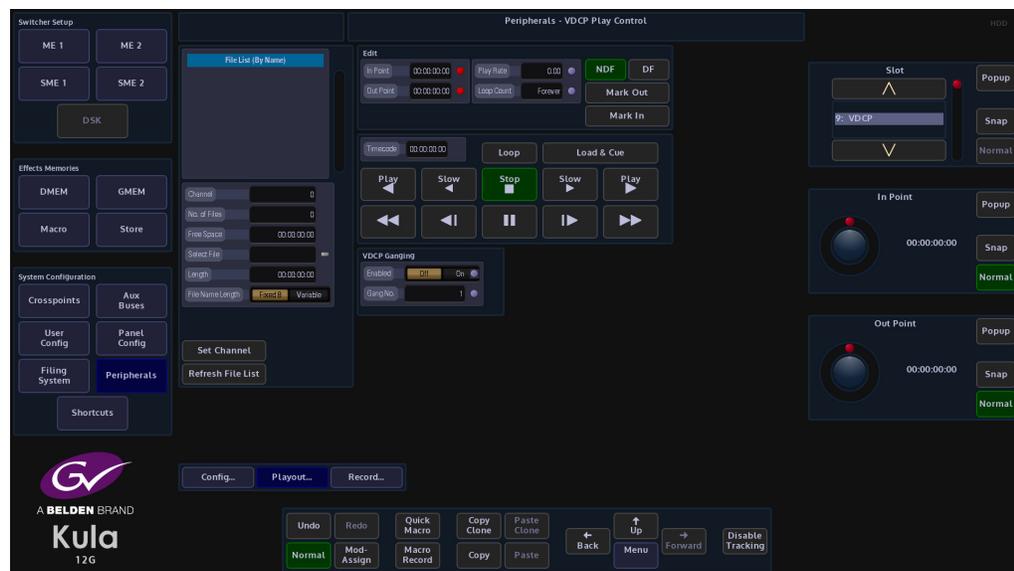
**File Name Length** - allows the user to input file names greater than 8 characters by selecting Variable

**{Set Channel}** - action button once the Channel has been selected. Note that if the channel selected is not available on the server, or the access has been denied (normally because some other device is currently using this channel), the Channel will be set to 0 after the button is pressed.

**{Refresh File List}** - refreshes the file list after clips have been deleted or added.

Using this menu

Select a clip and touch **{Play}** to start back-to-back play out. The attacher shows which clip is playing or about to play and its current timecode. While a clip is playing, Play Rate parameter can be used to change the play speed and direction.



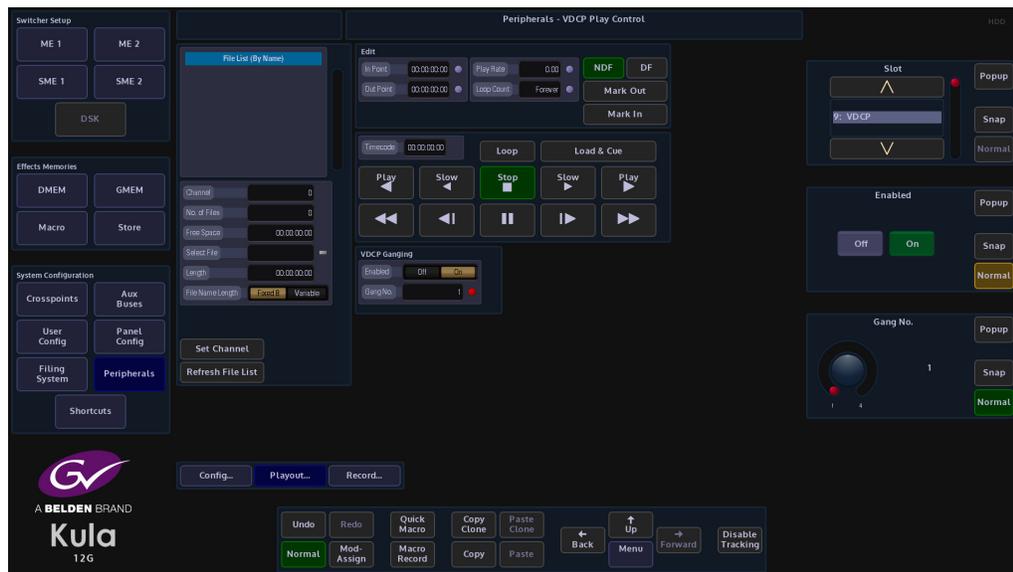
Using the Port parameter select the port the Video Disk system is connected to. This will then be displayed in the Configure Channel attacher, then select the channel number on the server and press the **{Set Channel}** button. Any stored clips will then be displayed in the File List. Using the Select File parameter, select the required clip.

The total length of the clip will be displayed below the File List table, here the clip can also be re-named or deleted. The user can choose to play a whole clip or just a part of it by setting a play out start or/and play out end position(s).

The Current Clip box will display the name of the current clip being played or about to be played.

## VDCP Ganged Commands

Ganged Commands - this allows for VDCP devices to be gang rolled or cued. Press the **{Gang Commands}** button, notice that a new option has appeared in the menu next to the Transport Control buttons, this option displays the available Gang VDCP Ports. There are 4 Gang Ports available.



## Transport Control

**Play** - will play a clip backwards and play forwards at standard speed

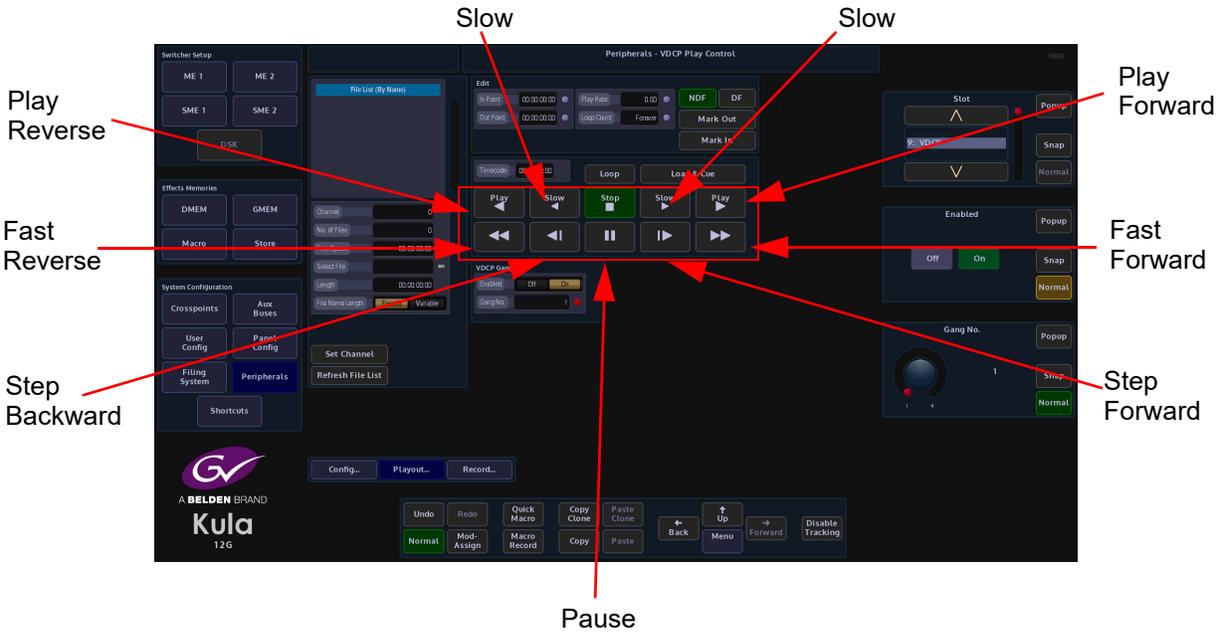
**Slow** - will play a clip backwards and forwards at slow motion speed

**Stop** - stops a clip

**Fast Reverse and Fast Forward** - like fast rewind and fast forward

**Pause** - pauses the current clip

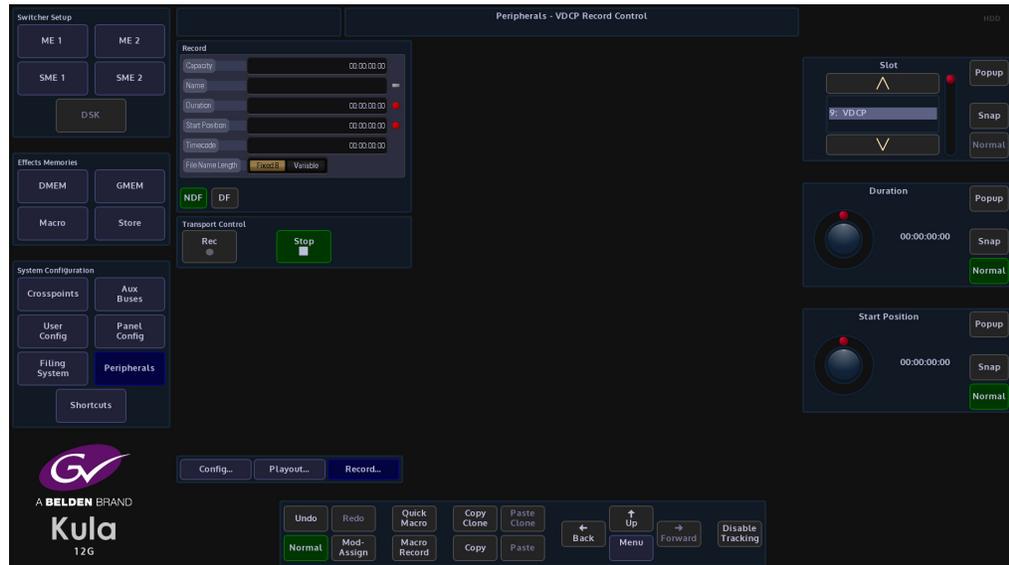
**Step Forward Step Backward** - Steps a clip forward and backward by one frame



## Record

This menu will allow video/audio material to be recorded to the video disk system. The user needs to give the new clip a name and record duration and then press the Record action button.

The new name can not duplicate any existing ones and all names are case sensitive.



## Record Attacher

**Capacity** - displays the server hard disk capacity

**Name** - put in the name of the clip that is going to be recorded  
Variable in the File Name Length parameter allows names longer than 8 characters)

**Duration** - displays the record duration.

**Start Position** - sets the start position timecode, for the start of the record process

**Timecode** - displays time code as the clip is being recorded

Transport Control

**Record** - starts recording

**Stop** - stops the recording process

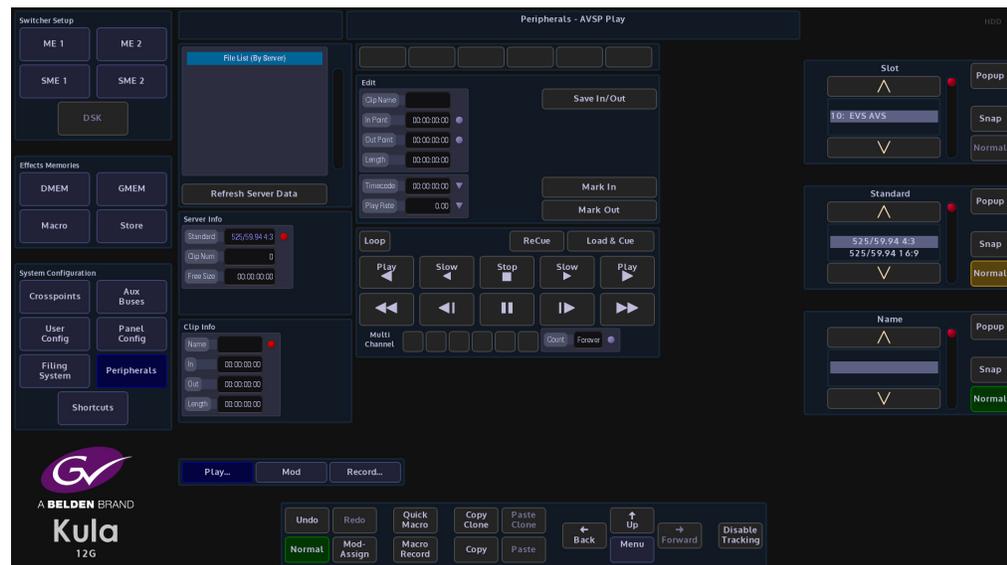
## AVSP Control

Advanced Video Server Protocol, It allows the running, recording and editing of clips from up to 6 channels with either EVS XT or EVS XT2.

The protocol is connected via a Serial Port, one serial port will support the use of 6 channels of EVS, either in Playback or Record modes.

## Play

The box in the top middle will display the number of configured EVS channels and their relevant details, these channels are displayed as "Rec" or "Play".



**Center Top Buttons** - (Channel Selector Area) - which channel of EVS is being controlled.

**Slot** - this displays the serial port that is connected to the server.

**Standard** - this has to be set to the video standard being used by the server.

**Name** - the Clip Name

### Server Info

Data regarding the server being used which includes:

**Standard** - the Video Standard of and number of Clips stored on the server

**Clip Num** - the number of the clip being played

**Free Size** - the remaining Free Storage Space,

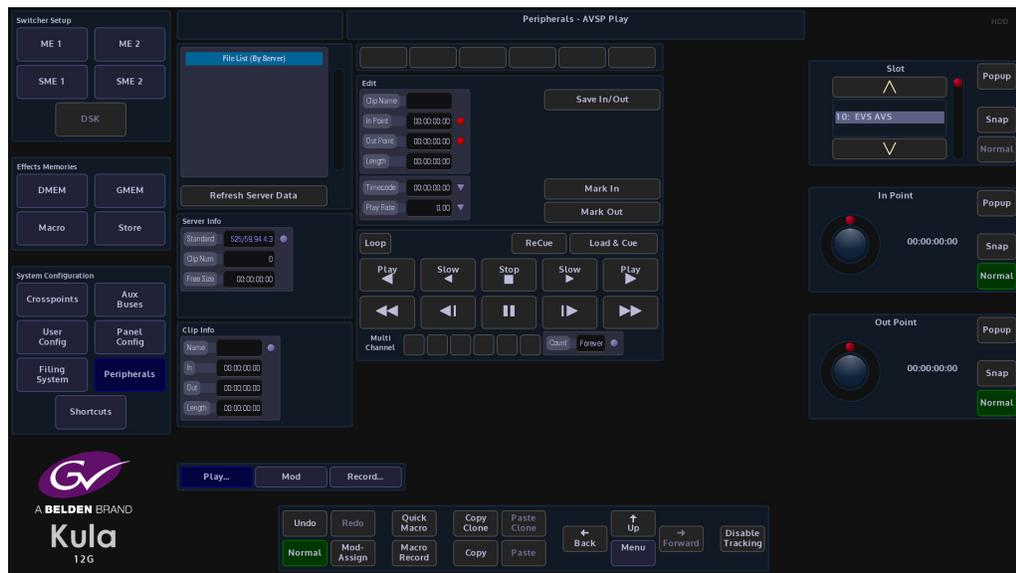
**Clip Info** - data regarding the name of the chosen clip, total clip duration and In/Out points.

**Transport Control** - generic play controls affecting the selected clip includes PLAY Fwd, PLAY Rev, Play ½ speed fwd, rev, Pause.

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Note: It is advisable to {Pause} when the clip is needed again because Stop will stop the clip from running, and has essentially emptied the contents of that channel, it is then necessary to Load and Cue the next clip. This will set the new clip to the marked In point.

---



**Edit In / Out Points** - the currently stored In and Out points for the currently loaded clip. Using the attachers and Snap/Normal buttons it is possible to scroll through the clip to re-assign a new In or Out point.

Note: Pressing and holding the Snap Normal button on the GUI brings up the internal popup number pad, for the inserting of Time Code

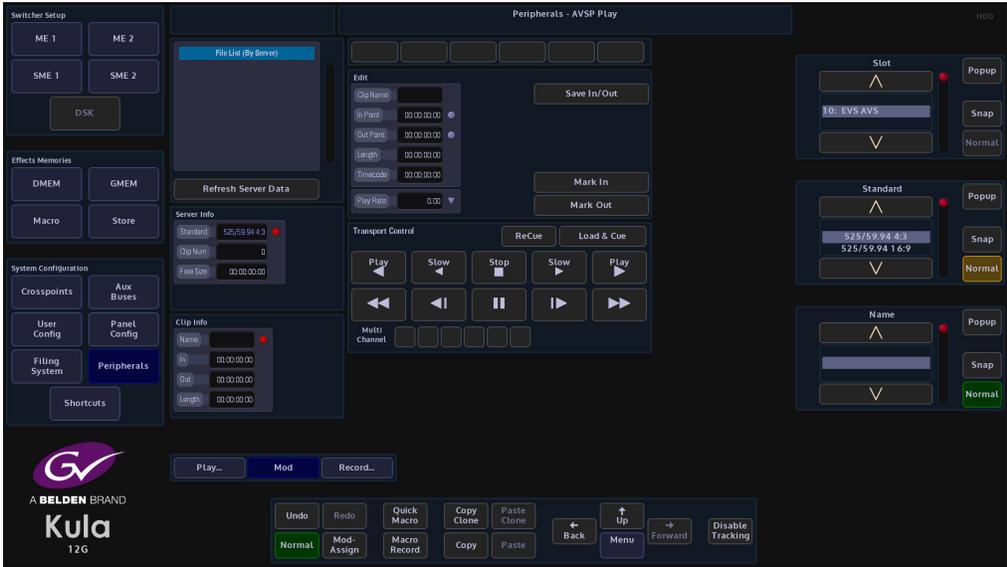
**Length** - total duration of the currently loaded clip

**Timecode** - current Timecode of loaded clip

**Play Rate** - controls the playback speed of the clip

**Save In/Out** - saving the In and Out points will save to the server. Editing a clip and re-saving will overwrite the original In/Out points. The action will be validated then Save - this ensures that a clip will always start on field 0 when using Interlaced standards, it is a requirement of the EVS that a clip begin on field 0 and end on field 1.

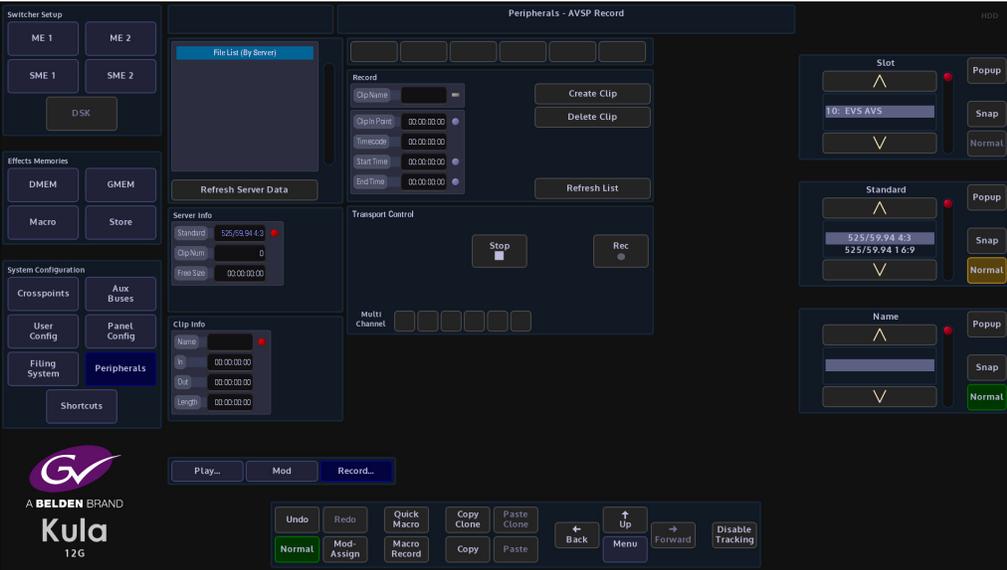
## MOD



The Play Rate parameter in this menu means that it is possible to Modulate the play rate. Modulators can be attached to this parameters in the usual fashion.

## RECORD

Recording will create a stream of footage within the selected server, additional recordings are appended onto the end of the stream.



Ensure the "Rec" channel(s) is selecting a video source that is running in the same video standard as the server, it may be useful to route this source and the record channel to a monitor, to be certain that pictures are actually being recorded. The EVS can be set to record from ME Opt's or directly from external sources.

### **Start Recording**

Select the correct "Rec" channel from the top section, then give the Clip a name (it is advisable to give the recorded clip a name as the EVS generates a random number that is not easily remembered), press the **{Rec}** button, record until satisfied, then Stop

Finally press **{Create Clip}** and the Clip will be saved to the server and appear in the Clip List

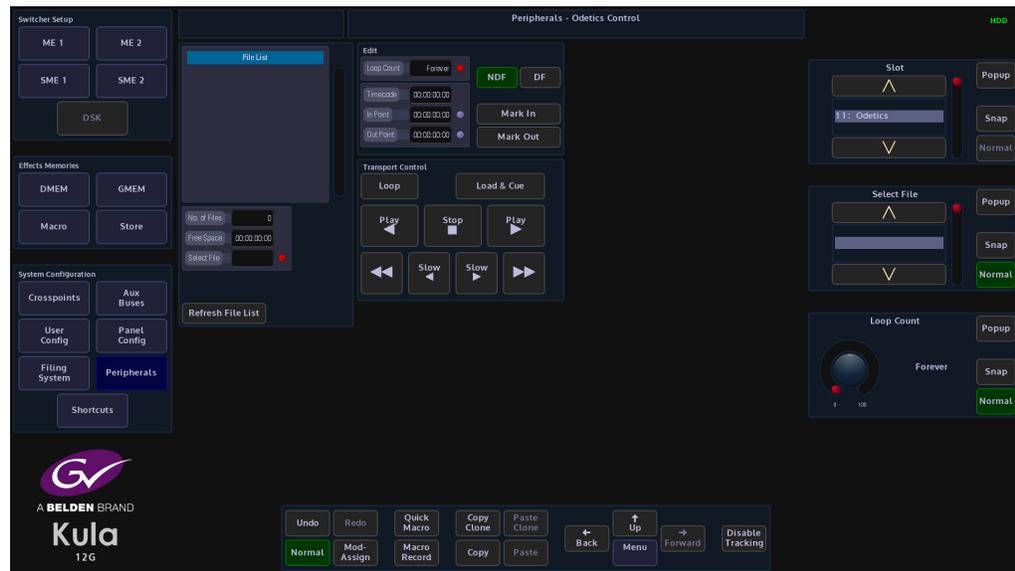
Now it is possible to go back to the Play menu and Edit the In and Out points of the newly recorded clip.

**Delete Clip** - will delete the recorded clip

## Odetics Control

Odetics protocol is a serial based protocol, that will allow Kula to control external equipment such as disk servers.

### Using Odetics Control



### Controls and Parameters

**Slot** - selects the serial port that is connected to the external equipment

**Select File** - selects a file by name

**Loop Count** - when a file is set to play, if the **{Loop}** button is touched, the **Loop Count** parameter can be set to play the file; Forever or from 1 time up to 100 times then stop.

**Mark In / Out Points** - the currently stored In and Out points for the currently loaded clip. Using the attachers and Snap/Normal buttons it is possible to scroll through the clip to re-assign a new In or Out point.

**{NDF}** - Non-Drop-Frame format

**{DF}** - Drop-Frame format

The difference between the two is that with Drop-Frame format the frame address is periodically adjusted (once every minute) so that it exactly matches real time (at the 10 minute mark), while with Non-Drop-Frame format the frame address is never adjusted and gets progressively further away from real time

**File List** - this table displays all available files external tape or equipment

**No of Files** - total number of files in the File List

**Free Space** - displays the free space left on the external equipment disk

**Select File** - allows the user to select a file from the File List

**Refresh File List** - refreshes the file list after file had been deleted or added.

## AMP Control

AMP protocol is an IP Based control structure, it will support 4 channels (VTR1, VTR2, VTR3, & VTR4) in a single device, and also supports multiple devices over different IP Addresses.

---

Note: Name the device as required e.g. Server1, this name will appear wherever the user needs to select it.

---

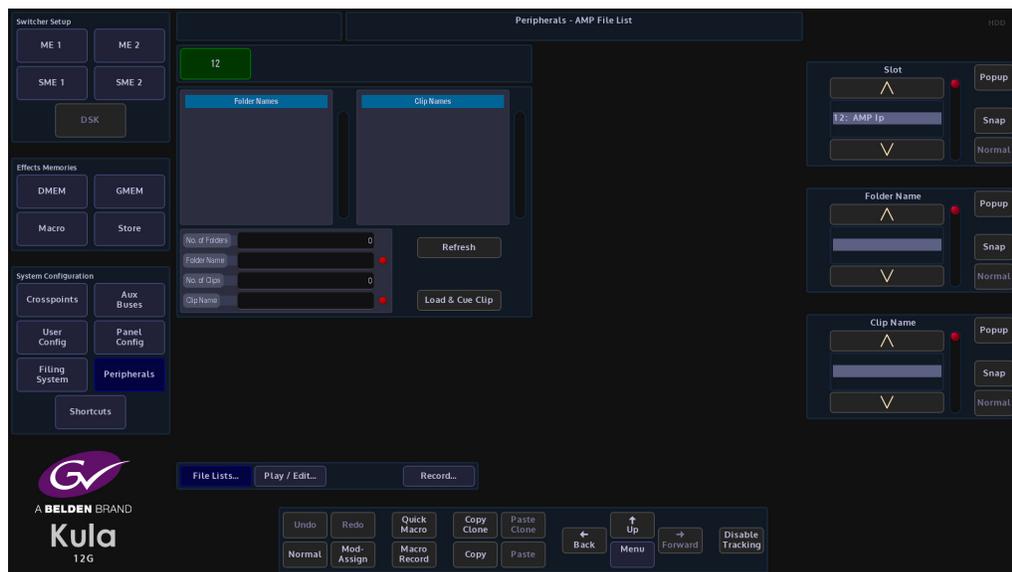
---

Note: If the server is not on a local network, an IP Gateway will be required.

---

## Using AMP Control

Kula can manage Folder (Bin) selection; set In and Out points, as well as the Standard VTR type commands. It is recommended that Macros and/or Clones are used to assign these controls to the main control surface.



The **Peripherals - AMP File List** menu allows the user to set the VTR that is being controlled (green button at the top of the menu) and setup the working Folder Name and Clip Name lists.

---

Note: Each VTR can be set to contain different Folders/Clips.

---

The **Clip Name** table displays all the clips in the current working folder on the server. **{Refresh}** button will refresh the Folder and Clip tables (e.g. if another controller adds a new Folder/Clip).

---

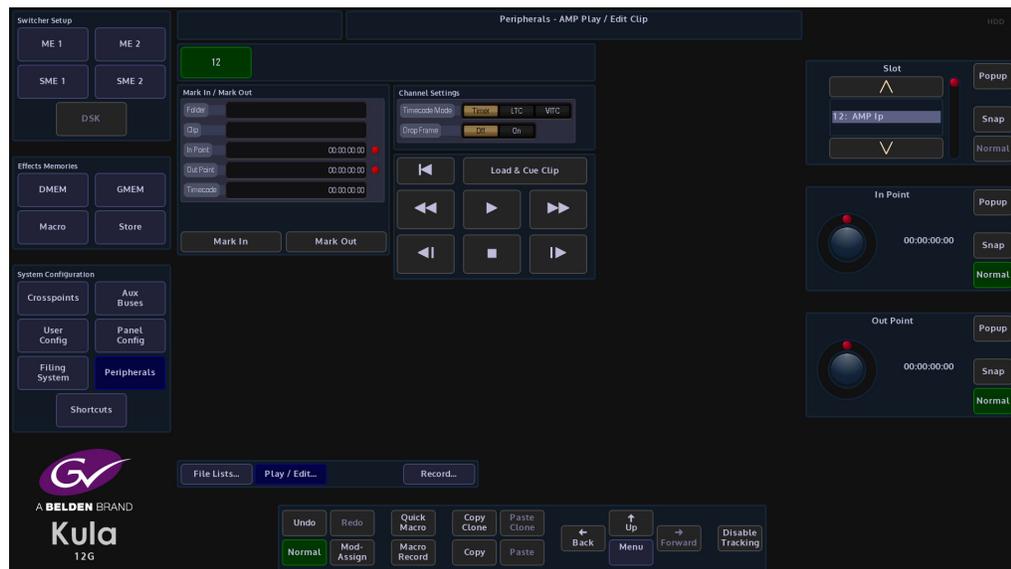
Note: Kula uses the Folder Name and Clip Name for reference.

---

**{Load & Cue Clip}** button will load and cue the currently selected clip to the currently selected VTR.

## AMP Play/Edit Clip

The **Play/Edit Clip** menu allows the user to set In/Out points for the currently selected VTR and clip, setting the In/Out points can be done either by using the VTR command buttons to position the clip then press the **{Mark In}** or **{Mark Out}** buttons, or by direct input using the In and Out parameter controls.



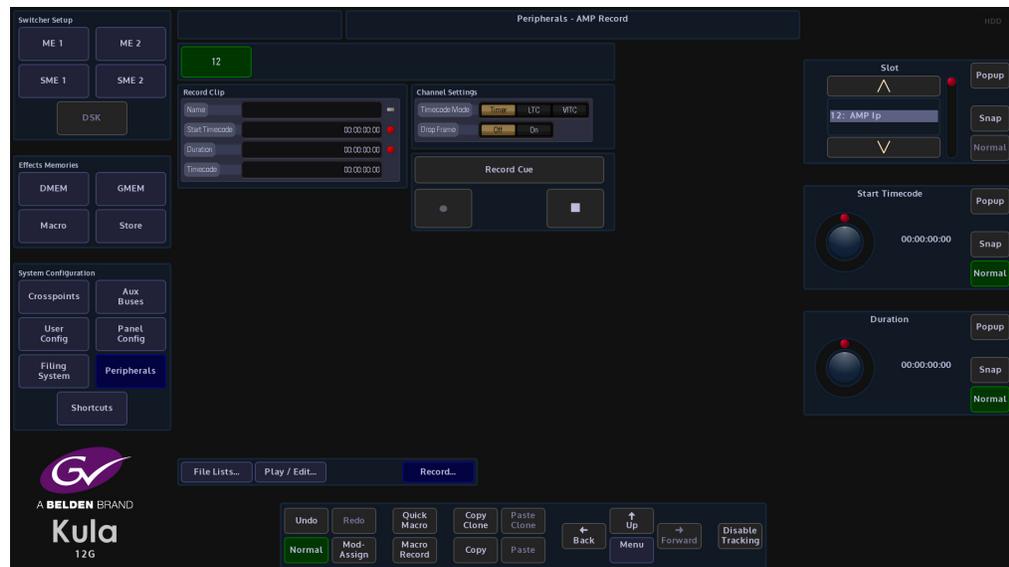
To assert the In/Out points, press the **{Load & Cue Clip button}**. To make a Macro that will Cue a clip and assert In and Out points, set the Clip as described above, once happy with the Clip, including its **In/Out** points, press **[MACRO REC]** button on the GUI.

Next, press **{Load & Cue Clip}** button, then press **[MACRO REC]** to stop recording the macro.

The macro will now Load and Cue the selected Clip in the Macro main menu. View the macro and notice that it has stored the **Clip Name** and **In/Out Points**.

## AMP Record

Kula can also be used to set-up the Record VTR (Channel).



The record VTR/channel is set on the K2 server. To set the **Clip Name**, and **Timecode** press the **{Record Cue}** button.

## Nexio Server - AMP Protocol

Nexio Server is an Ingest and playback server supporting SD, HD and 1080p formats. Kula is able to communicate with Nexio via the AMP protocol over RS422 or IP Client transport types.

### Nexio Play Menu

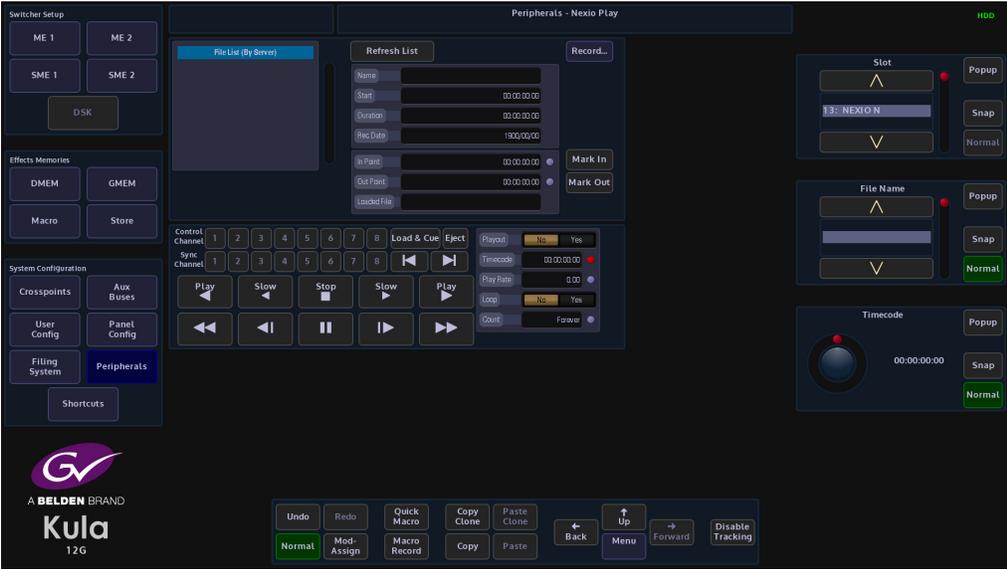
The **Nexio Play** menu allows the user to select files in the playout File List, set In/Out points for the currently selected file, setting the In/Out points can be done either by using the VTR command buttons to position the clip then press the **{Mark In}** or **{Mark Out}** buttons, or by direct input using the In and Out parameter controls.

Once the protocol is activated, Kula will automatically download the file list from the Nexio server. Touching the title bar of the **File List** will sort the files by Server, by Name, or by Date. (By Server means it is in the order that the Nexio server sends to Kula).

**Control Channel** is the channel for the transport commands to the Nexio server (play, stop, pause etc.). The control channel will initially set to the highest channel number for the server (i.e if it is a 4 channel server, it will set to 4 at start). If the user needs to change the control channel, change it before pressing **{Load & Cue}**.

The **Sync Channel** is the channel that follows the control channel i.e. if Sync Channel 1 is the Fill channel and Sync Channel 2 is Key channel, the user can set Control Channel for the transport commands to 1 and Sync Channel to 1&2, so the Key channel will always follow the Fill. channel.

If there is no need to edit the In/Out points, Kula will use the first/last frame of the clip as the In/Out points; if the user needs to trim the clip, set the In/Out points then press **{Load & Cue}**.



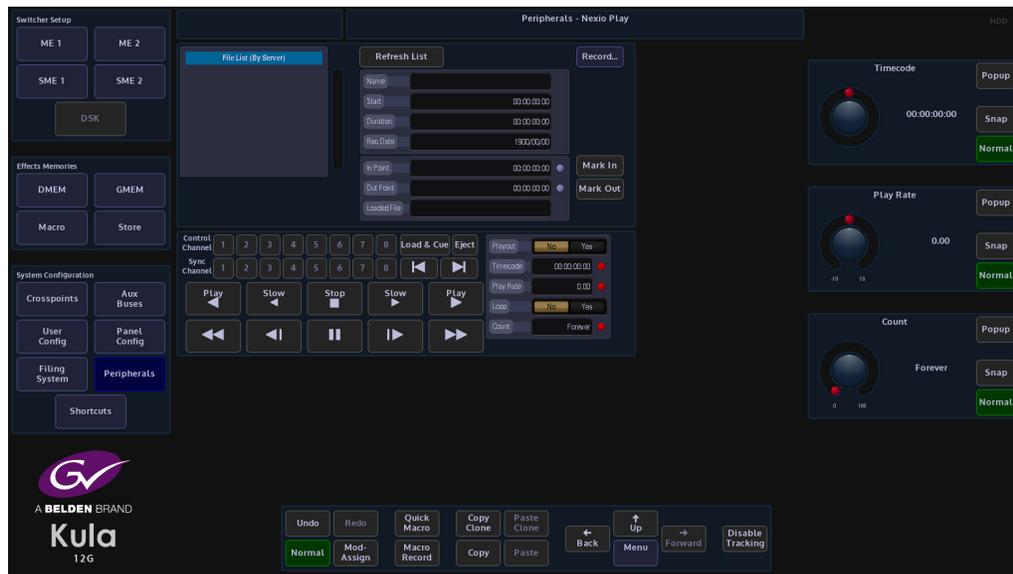
---

Note: It is recommended to setup the loop play parameters before doing a {Load & Cue}.

---

Select a file in the File List, press the **{Load & Cue}** button and the file will show in the **“Loaded File”** window. Use the **In Point** and **Out Point** parameters to set the **Mark In/Out** points as required.

Select the transport command Control Channel, and then select the Sync and then press the Play button.

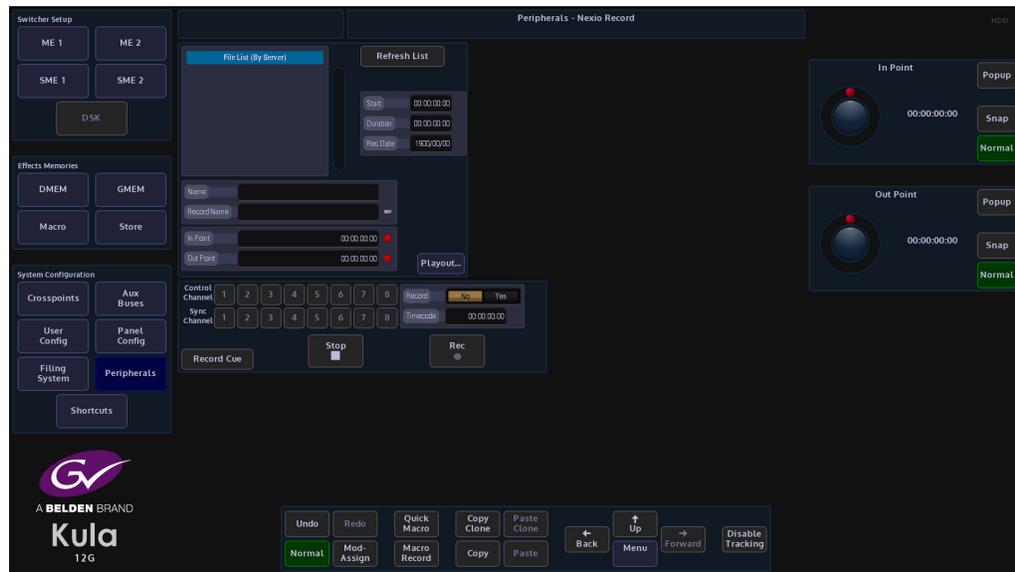


Touch the “Playout” attacher at the bottom of the menu, here the Play Rate parameter can be adjusted and the file set to “Loop” a set amount of times or forever if required.

The **Playout Yes/No** indicates what the control channel is capable of doing, i.e. if you have selected a control channel that is a Record Only channel, it will have Playout No in the window, then none of the playout transports will work

To jump to a particular frame in a file, set the **Timecode** to the frame and press **{Play}**.

## Nexio Record Menu



Select the correct **Control** and **Sync Channels**, then give the file a name for playout identification. Set the record **In Point** and **Out Point** and then press the **{Record Cue}** button.

Once happy with the settings press the **{Rec}** button and recording will commence.

## Audio Mixer

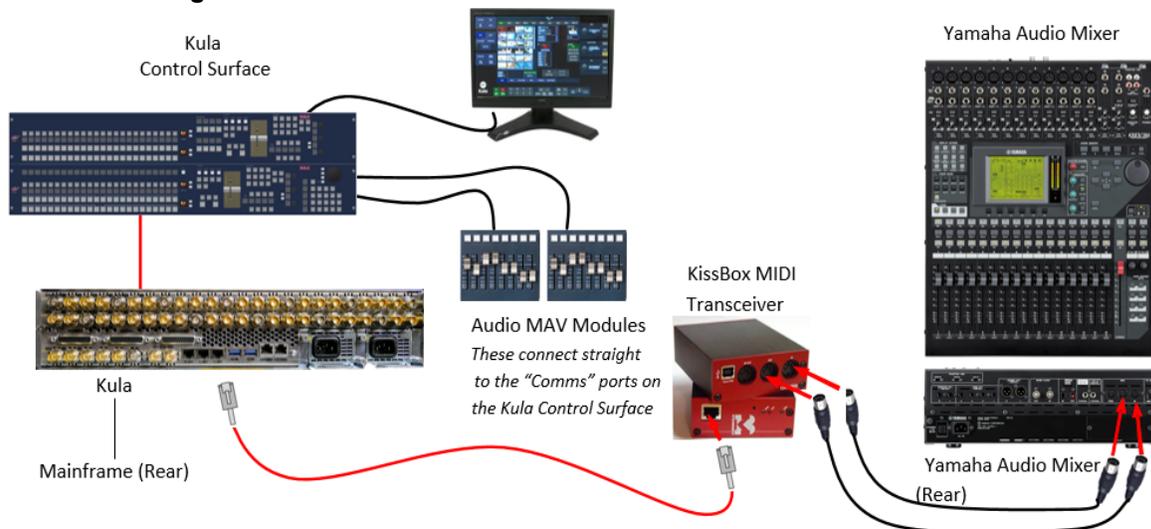
With the release of V1.3 software, Kula is now able to control functionality on a Yamaha (01V96) Audio Mixing desk. Some of the functionality includes:

- Map MAV Audio Module faders to correspond with the Yamaha Mixer Faders.
- From MAV Audio Module:- Turn Audio On/Off per channel/Audio Fader off (unassigned).
- Channel Fader position set/modified from start point.
- Allow Yamaha panel override of Audio Faders separately from MAV Audio Module.
- Transition to Air Time & Delay.
- For Audio Follow Video, Audio Channel assigned to Mixer Input and set/learn levels on source selection.
- Audio Follow Video Override.

### What is Required:

- Kula Control Surface.
- Kula mainframe
- Touch screen monitor
- Yamaha Audio Mixer from list above (we tested the 01V96)
- KissBox CM-MIDI - MIDI transceiver for RTP-MIDI networks (this is the one that we have tested. Other makes may be compatible).
- Ethernet cable from Kula Mainframe to KissBox
- 2x MIDI to MIDI cables (from KissBox to audio mixing desk)
- Laptop/desktop computer (initial setup of KissBox IP address)

### Connection Diagram



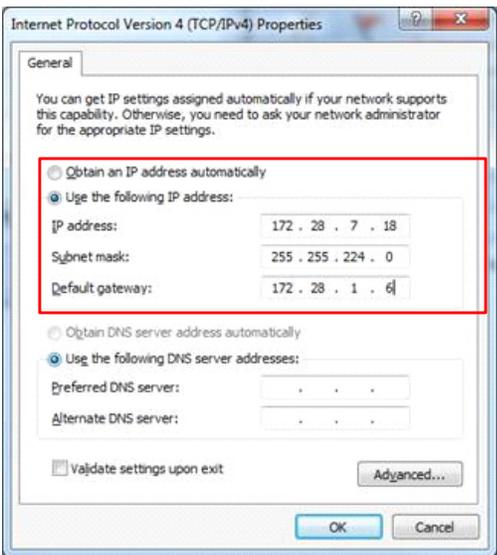
**Note:** The KissBox is only one unit.  
The diagram shows two units to display front and rear connectors

## KissBox Setup

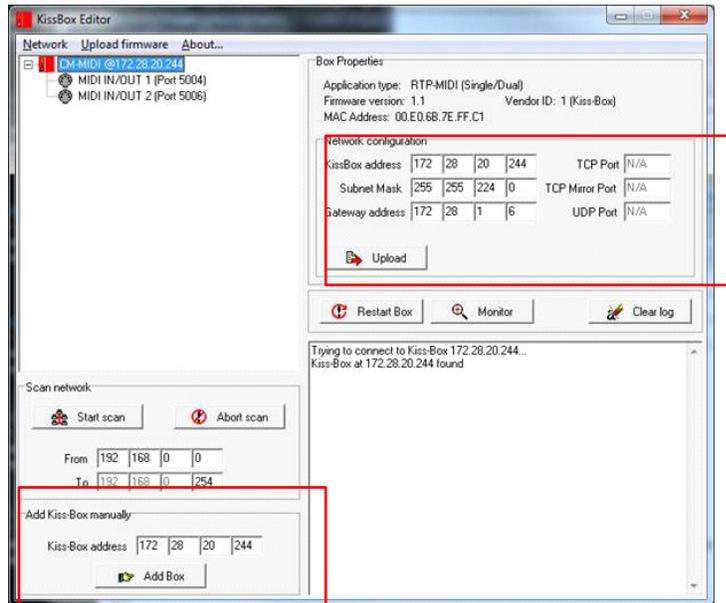
Note: Before connecting the hardware (as shown above), the KissBox IP address has to be set so that the Kula mainframe can communicate with it. The following section will describe how this is done.

The KissBox editor software which comes with the product has to be installed on the laptop/PC being used to set the IP address. Install the "KissBox\_Editor\_Win\_11\_0\_0". Unplug the laptop/PC from any network being used (this is to stop any network IP address conflicts).

Configure the laptop/PC so that it is on the same network as the KissBox, as shown below. Click on "OK". The network settings can be found in the "Control Panel\Network and Internet\Network and Sharing Center\Local Area Connection\Properties\Internet protocol Version 4(TCP/IPv4)"



Start up the KissBox Editor software, then in the “Add KissBox manually” area of the KissBox Editor menu, type in the IP address of the KissBox and click on “Add Box”. The menu will now look like the one below:

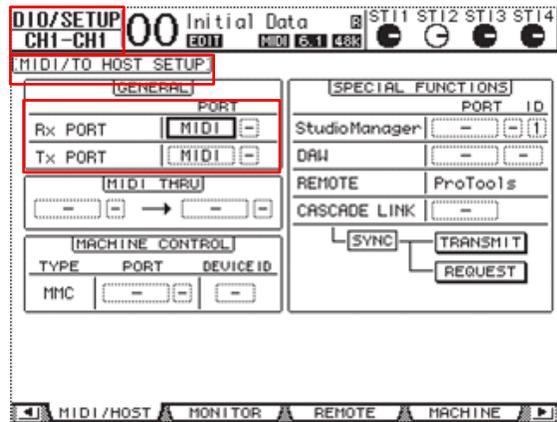


Change the IP setting in the “Network Configuration area of the menu to match the required IP network and click on “Upload”. Then re-start the KissBox. Change the laptop/PC network configuration back to the required network. Type the new KissBox IP address into the “Add KissBox manually” area of the menu, then click on “Add Box”. You will now see the updated network configuration.

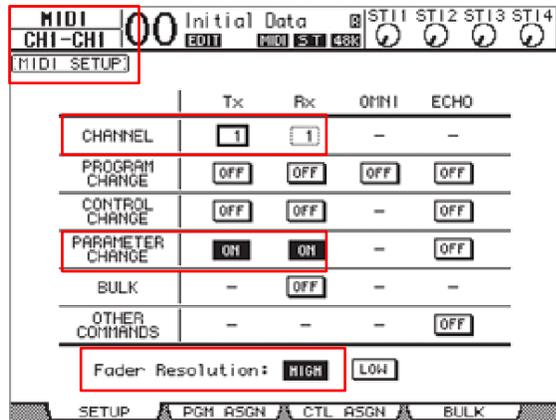
## Setup the Yamaha (this example 01V96i) Audio Mixer to communicate with the KissBox

From the MIDI connectors on the back of the back of the KissBox, connect a MIDI cable from the “MIDI IN” port on the KissBox from the “MIDI OUT” on the Yamaha mixer. Connect a MIDI cable from the “MIDI OUT” port on the KissBox from the “MIDI IN” on the Yamaha mixer, (as shown in the diagram on page 1).

Power up the Yamaha audio mixer, then using the LCD screen on the Yamaha mixer, navigate to the “DISPLAY ACCESS - DIO/SETUP - MIDI HOST” menu and select “MIDI” for both the “Rx Port” and the Tx PORT”.



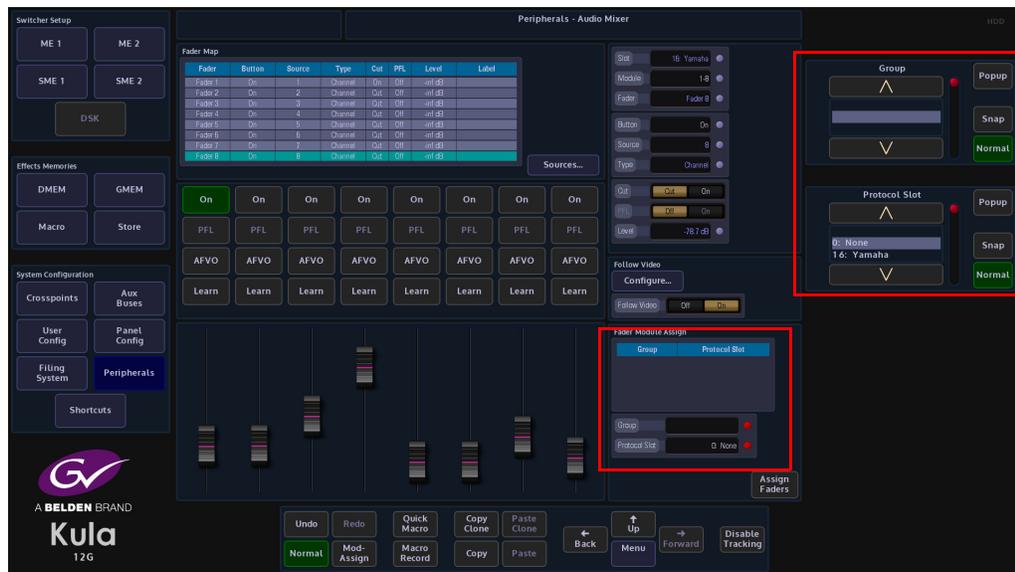
Next, go to the “DISPLAY ACCESS - MIDI - SETUP” and set:  
 CHANNEL - Tx to 1 and Rx to 1  
 PARAMETER CHANGE - Tx to ON and Rx to ON  
 Fader Resolution: HIGH  
 All other options need to be set to OFF.



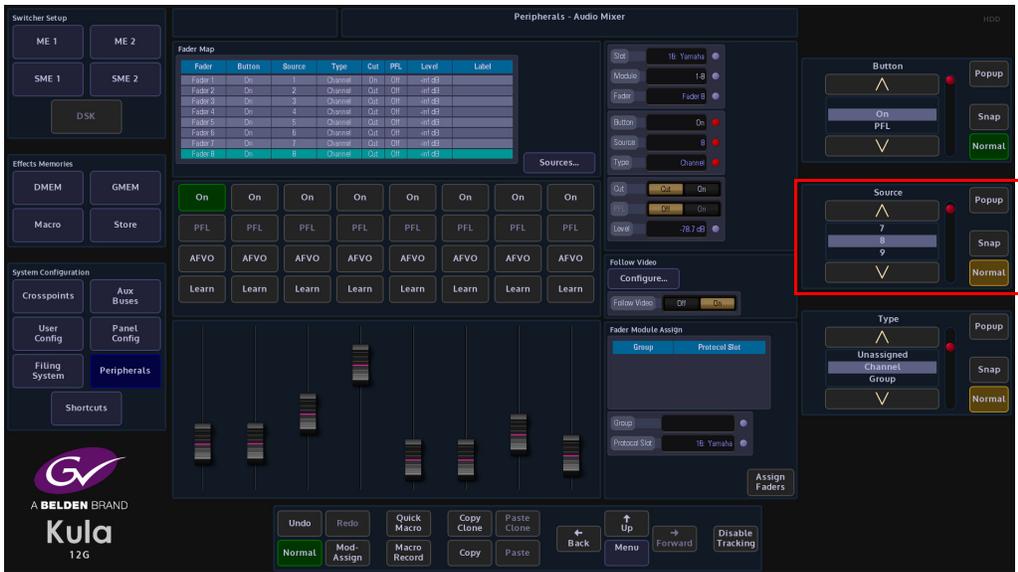
## Peripherals Setup

Touch the {Peripherals} menu button, then in the Peripherals main menu, touch the **{Audio mixer...}** menu link button.

In the "Audio Mixer" menu, use the "Fader Module Assign" parameters to assign the MAV-Fader modules to the "Protocol Slot" this will allow the MAV-Faders to work with the Yamaha Audio Mixer.



Use the protocol "Source" parameter to map the protocol sources to the Yamaha Inputs, Auxes, Buses, Groups etc.  
See the "Protocol Source Mapping" tables at the rear of this document as a reference.



Assign a fader type in the menu (MAV-Audio Fader) for each fader to enable the Yamaha communication.



You should be able to slide faders via the Visual or Fader Module and see corresponding faders move on Yamaha Audio Mixer for communication test.

**Parameters:**

**Slot** - this relates to the protocol setup slot that the Yamaha protocol was assigned to in Eng Config - Protocols.

**Module** - this relates to the GUI on the Kula control surface. The first being 1-8 which relates to the faders on the MAV-Audio Fader module.

**Fader** - relates to the Faders on the selected (Module) MAV-Audio Fader module.

**Button** - this selects one of the 4 types of buttons above the fader sliders in the menu. The buttons are:

**Cut** - this will cut the fader On or Off.

**PFL** - (Pre Fade Listen), this displays if the "PFL" function is set or available to use. PFL allows the user to listen to the channel's audio at a point before the fader takes effect.

**AVFO** - (Audio Follow Video Override), this is an audio sources that is associated with a video source which can be linked in the Fader Map.

**Learn** - this allows the button to copy a button function from the audio mixer.

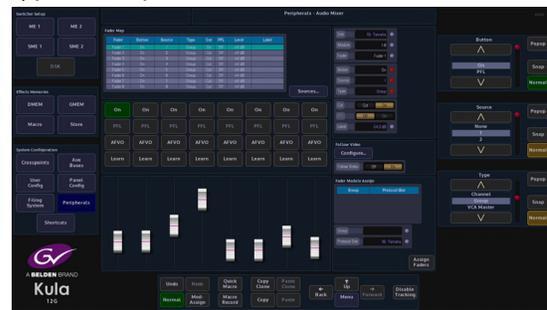
**Source** - this is the Protocol Source that is mapped to the audio mixer's Inputs, Aux, Buses etc. (see the Protocol Source map table at the back of this document).

**Type** - this sets the type of audio fader control in the menu, see below (Unassigned means that no fader type is selected).

Type - Channel



Type - Group



Type - VCA Master



Type - VCA Main



Type - Track



### **Audio Mixer Parameters Continued:**

**Cut** - On/Off. This displays if the "Cut" function is set or available to use.

**PFL (Pre Fade Listen)** - On/Off. This displays if the "PFL" function is set or available to use. PFL allows the user to listen to the channel's audio at a point before the fader takes effect.

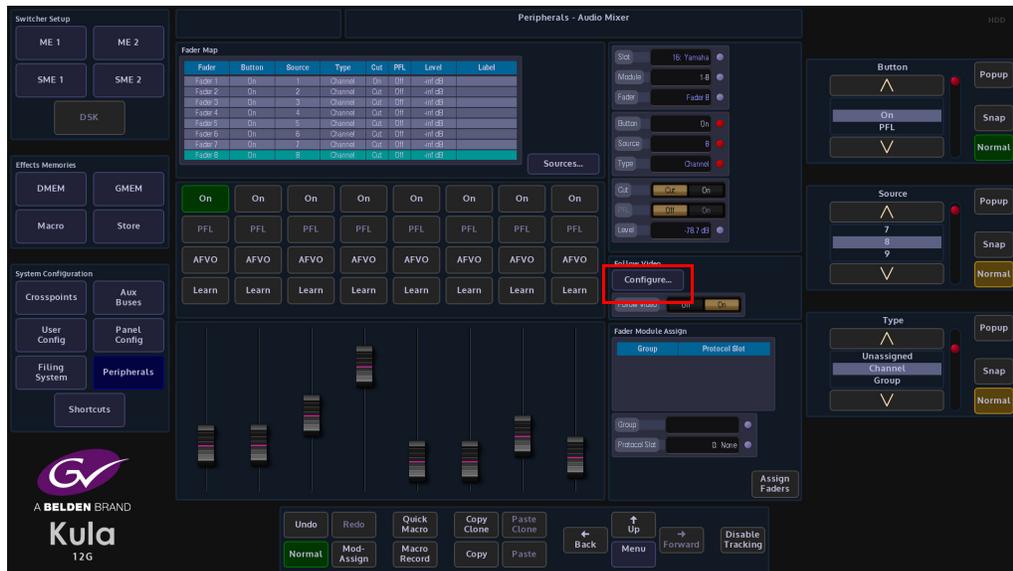
**Level** - this is the fader audio level; the level is default at 0dB, with a range of - infinity to 10dB.

**Follow Video** - On/Off. Touch the {Configure...} menu link button at the top of the menu to go to the Audio Follow Video menu.

The Follow Video Menu Allows the user to map a Crosspoint to a Yamaha audio mixer Source. When the Tally Now is configured (Eng Config, Output Setup, Tally) Any Crosspoint that goes to air, the assigned protocol audio source will also go to air. If there is no transition time, the audio faders will use the quick crossfade cut buttons to follow, otherwise they will follow the transition time to air. The user can also set a transition delay, which delays the time for the audio source to go to air after the crosspoint has gone to air.

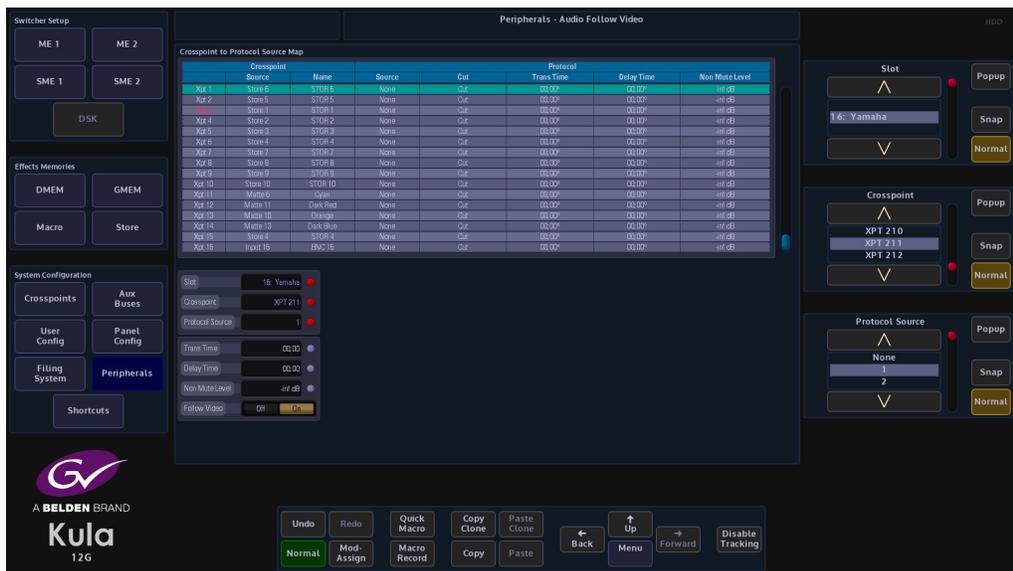
## Audio Follow Video Configuration Test

In the Peripherals - Audio Mixer menu, touch the {Configure...} menu link button to open the “Audio Follow Video menu.

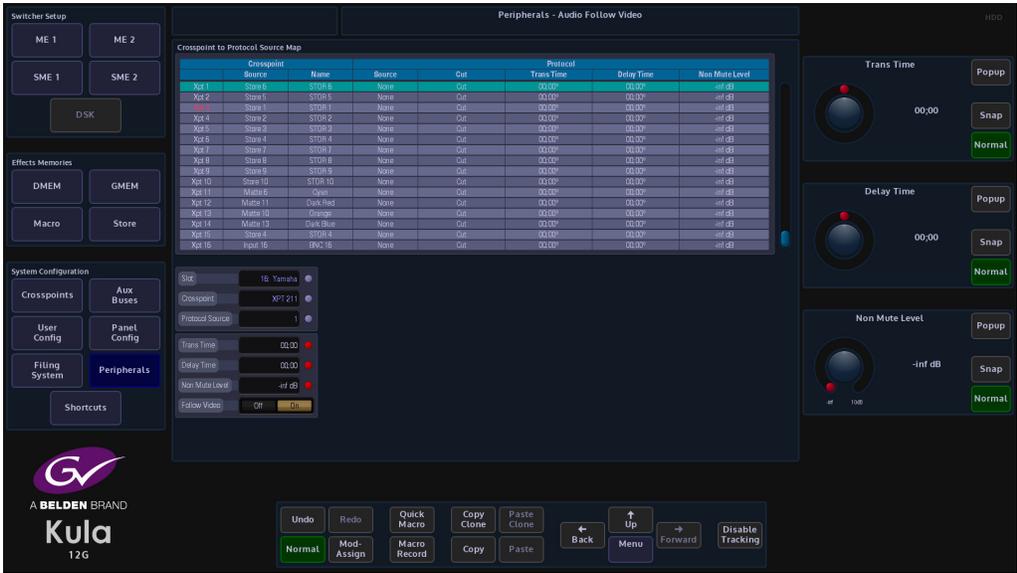


Again in this menu use the “Protocol Source” parameter to map a “Protocol Source” to the Kula Crosspoint.

See the “Protocol Source Mapping” tables at the rear of this section as a reference.



To see a Fader Move set the “Trans Time” to video standard field rate and greater (less than field rate will act as a quick crossfade cut on/off).



Set the desired non muted level for each Crosspoint.

On the Kula GUI, touch the “**arrow up**” button to get to the “**Top**” menu. Touch the {**Defaults...**} menu link button. In the “**Defaults**” menu, touch the {**Engineering Config...**} menu link button.

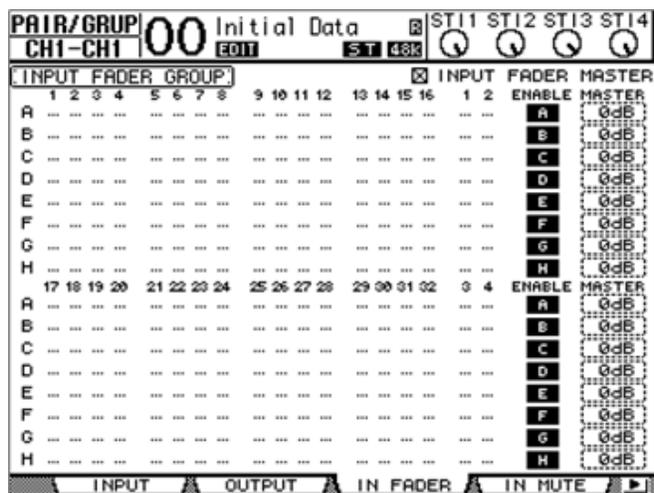
The menu now displayed is the “**Engineering - Config**” menu. Touch the {**Output Setup...**} menu link button and in the menu, ensure '**Tally Now**' is on for desired BNC O/P. Cutting along the desired bus will trigger the fader to crossfade to non muted level as Crosspoint goes to air.

## Additional Functionality using the Yamaha Audio Mixer menus

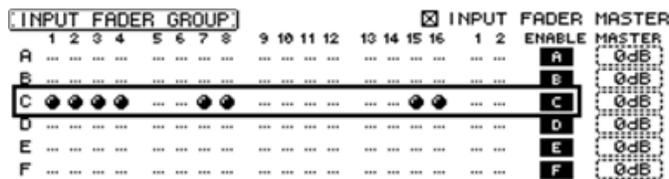
### MIDI Protocol Control Features

- Inputs 1 to 32 Fader and Cut Button Control - Split over 2 layers (Layer 1 and Layer 2) - Kula Fader Protocol Source {1 - 32}
- Aux Outputs 1 to 8 Fader and Cut Button Control - Master Layer - Kula Fader Protocol Source {113 - 120}
- Bus Outputs 1 to 8 Fader and Cut Button Control - Master Layer - Kula Fader Protocol Source {129 - 136}
- Stereo Inputs 1 - 4 Visual Fader and Cut Button Control - ST IN 1/3, ST IN 2/4 - Kula Fader Protocol Source {33,34} {35,36}, {37, 38}, {39, 40}
- Input and Output Master Fader Group - Visual Fader and Cut Button Control (can be mapped to a physical remote fader layer as a user assignable layer)

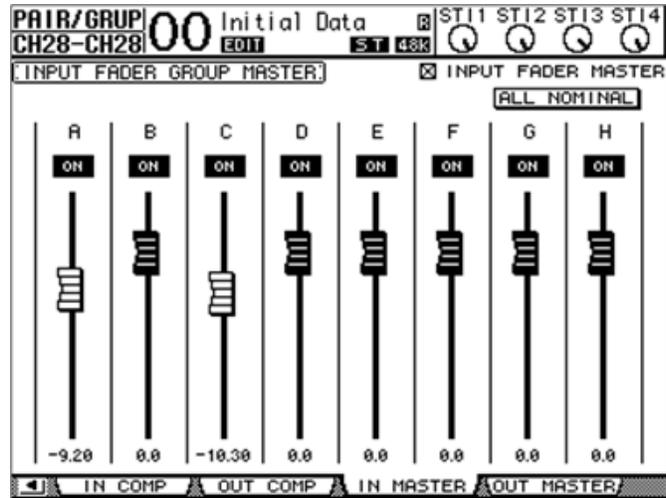
On the Yamaha Audio Mixer user interface, press the DISPLAY ACCESS [PAIR/GROUP] button and select IN FADER or OUT FADER Menu, to set Fader Input Master Group (A-H). For Input Channels 1-32 and Output Master Group (Q - T) for Auxes 1-8 and Buses 1 - 8



Ensure that INPUT FADER MASTER or OUTPUT FADER MASTER is checked and the Desired LAYER is selected. Then press the [SEL] button for the channel you wish to assign to the group (data entry controls maybe useful here).

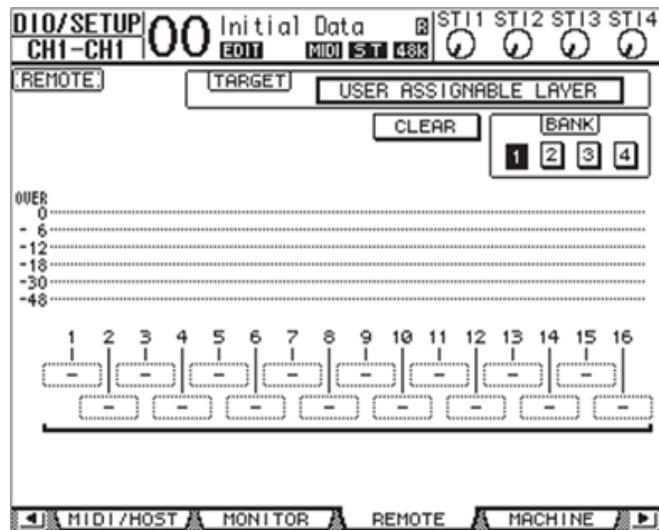


The corresponding Protocol Sources for Kula control of Fader Input Master Group(A-H) are {145 - 152} and Fader Output Master Group (Q - T) are {161 - 164}.



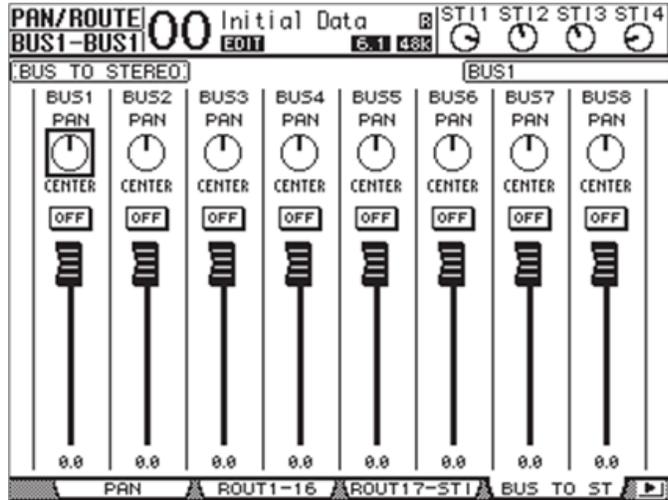
The Visual Fader can be mapped to a physical fader on the Yamaha desk by assigning to the remote layer.

1. Select [REMOTE] Layer or DISPLAY ACCESS [DIO/SETUP] and set the Target to 'USER ASSIGNABLE LAYER' in Remote Menu.



2. Select the group channel you wish to assign to using the Parameter 1 - 16 boxes.

Bus Out (1 - 8) to Stereo Bus Visual Fader and Cut Button Control - Kula Fader Protocol Source {177 - 184}.  
Select DISPLAY ACCESS - PAN/ROUTING - BUS TO ST Menu or [MASTER] and DISPLAY ACCESS [VIEW] and [SEL] Bus for view.



Stereo Out - Fader and Cut Button Control - Kula Fader Protocol Source {Main1, Main2}.

## Kula Protocol Source to Yamaha Input Map List

### Yamaha (01V96) Audio Mixer

Protocol Source	Input Map
1	INPUT 1
2	INPUT 2
:	:
32	INPUT 32
33	ST IN 1L
34	ST IN 1R
35	ST IN 2L
36	ST IN 2R
37	ST IN 3L
38	ST IN 3R
39	ST IN 4L
40	ST IN 4R

Protocol Source	Aux Out Map
113	AUX 1
114	AUX 2
:	:
120	AUX 8

Protocol Source	Bus Out Map
129	BUS 1
130	BUS 2
:	:
136	BUS 8

Protocol Source	Input Group Master Map
145	INPUT A
146	INPUT B
:	:
152	INPUT H

Protocol Source	Output Group Master Map
161	OUTPUT Q
162	OUTPUT R
163	OUTPUT S
164	OUTPUT T

Protocol Source	Bus Out To Stereo Bus Map
177	BUS 1
178	BUS 2
:	:
184	BUS 8

Protocol Source	Stereo Out Map
Main 1	STEREO OUT L
Main 2	STEREO OUT R

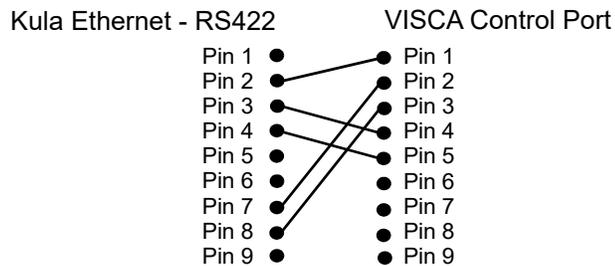
### VISCA Robotics Camera Control

With the release of V1.3 software, Kula can now use the VISCA protocol. Kula is now able to control a range of robotic CCD cameras, with the ability of a remote pan/tilt/zoom operation.

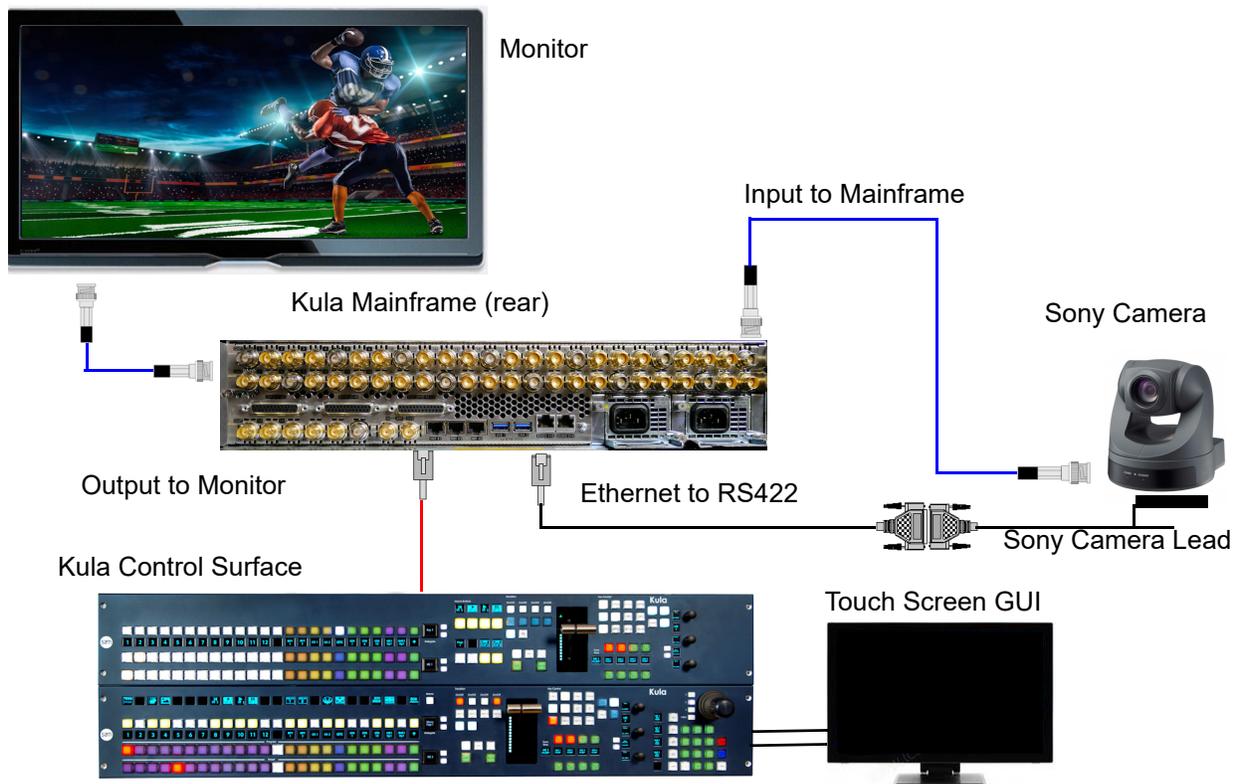
Kula uses an RS422 (IP Client) port and VISCA protocol to communicate and control the device.

### RS422 Cable Information

An Ethernet to RS422 cable with 9 Pin D-type connector at one end and a connector that suites the interface to the camera. (this example uses the Sony EVI-D70P camera) Use the following pin out information:



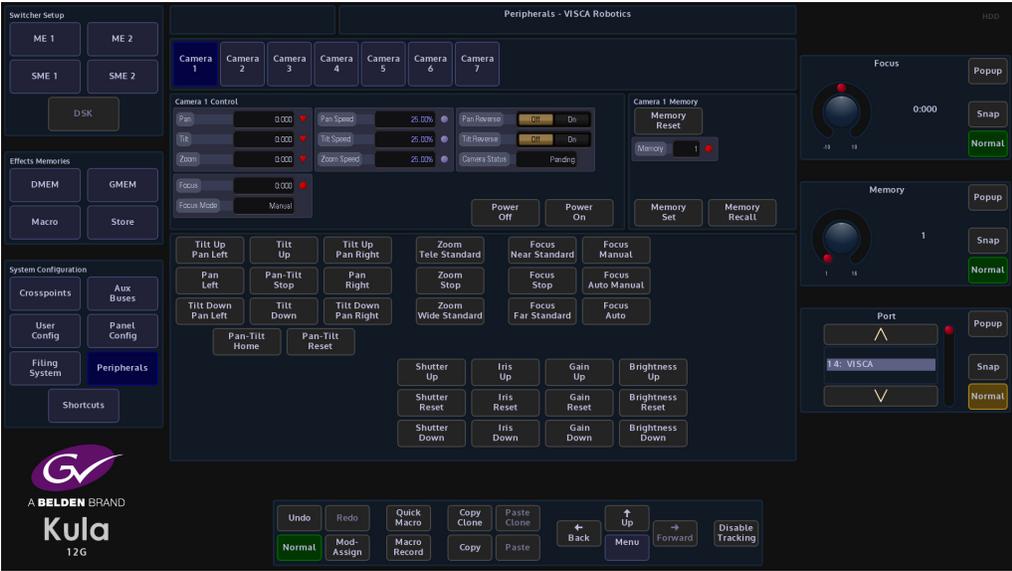
### Connecting Kula to the Sony Camera



### Using the VISCA Protocol

Touch the **{Peripherals}** menu link button, then in the Peripherals menu touch the **{VISCA Robotics...}** menu link button.

Once in the VISCA Robotics menu, using the Port parameter select the RS422 port (named VISCA) that is connected to the camera, once connected, one of the camera control buttons will turn Blue with a number, up to 7 cameras can be connected.



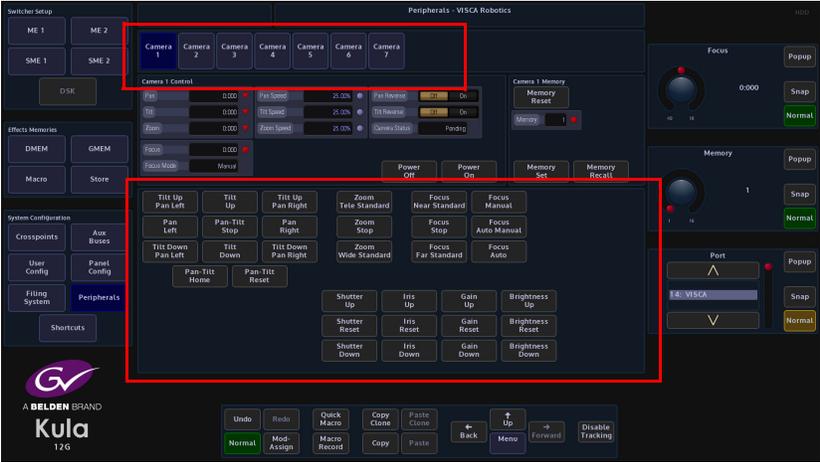
### Controlling the Camera

There are two ways to control the robotic camera:

- Using the Pre-Defined Command parameter
- Using the Kula Control Surface joystick

### Pre-Defined Camera Commands

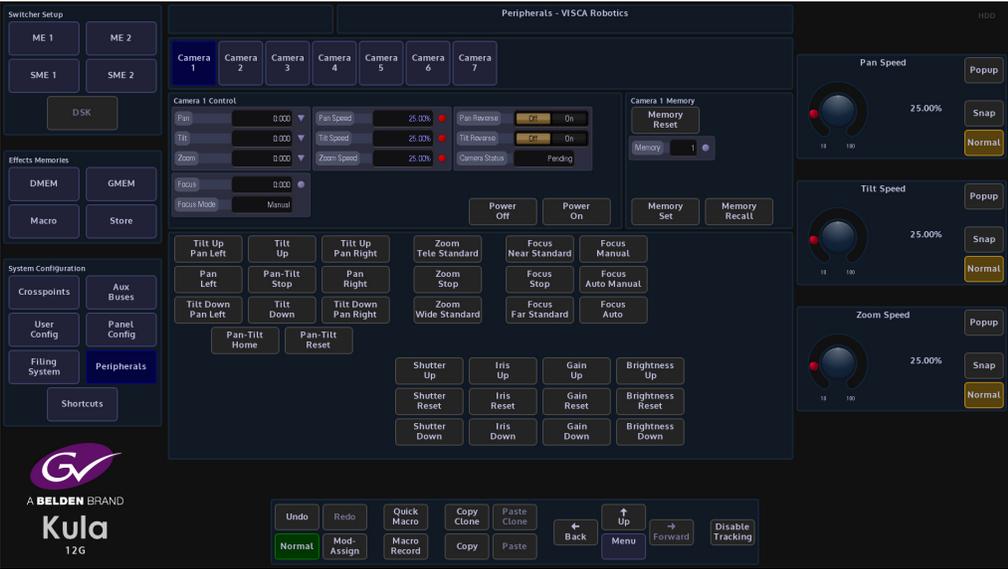
The first method described here will be using the Pre-Defined camera commands in the Command parameter.



The pre-defined camera commands are selected by touching one of the commands and then pressing the Blue Camera button, the camera will then move and keep moving until a different command is selected.

#### **Pre-defined Camera Commands**

Select  
Power On  
Power Off  
Pan Tilt Stop  
Tilt Up  
Tilt Down  
Pan Left  
Pan Right  
Tilt Up, Pan Left  
Tilt Up, Pan Right  
Tilt Down, Pan Left  
Tilt Down, Pan Right  
Pan Tilt Home  
Pan Tilt Reset  
Zoom Stop  
Zoom Tele (Standard)  
Zoom Wide (Standard)  
Focus Stop  
Focus Far (Standard)  
Focus Near (Standard)  
Manual Focus  
Auto Focus  
Auto/Manual Focus  
Shutter Reset  
Shutter Up  
Shutter Down  
Iris Reset  
Iris Up  
Iris Down  
Gain Reset  
Gain Up  
Gain Down  
Brightness Reset  
Brightness Up  
Brightness Down  
Memory Reset



Pan Speed and Tilt Speed parameters are only available when controlling the camera with pre-defined commands. When panning left or right, adjust the Pan Speed parameter using the GUI rotary control knob and the camera head will speed up or slow down. The same action is defined when using the Tilt Speed parameter.

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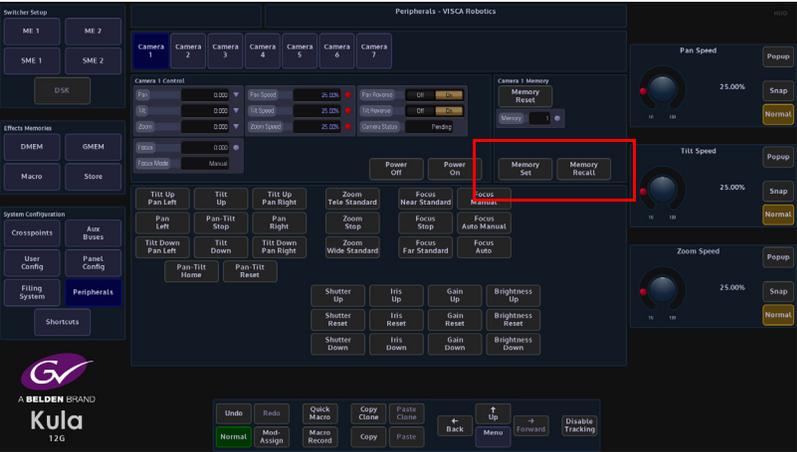
Note: Pan, Tilt, Zoom and Focus can be used when using the pre-defined commands, but they will override the current Pan/Tilt/Zoom/Focus type commands.

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### Saving Camera positions into the Camera Memory

The camera is able to store up to 16 different camera memory positions.

Move the camera to the required position, use the Memory parameter to select a memory position and then press Memory Set. If the memorized camera position is required in the future, select the memory location and then press Memory Recall and the camera will move to the memorized position.





# 8

## UHD Setup - UHD Quad and UHD 2SI

### UHD Setup and Operation - UHD Quad and UHD 2SI

Working in UHD with Kula is as simple as working in any other video format, the user can select between UHD-Quadrant mode or UHD-2SI mode. The setup menu structure is easy and intuitive and will allow the user setup UHD with just a few button presses. UHD demonstrates the power and flexibility of Kula, where the 2x UHD Key Layers and 1x DSK are available, transitions are easy, a UHD Keyed source such as Clip transitions or UHD graphics can be keyed over the full UHD screen.

### Connecting UHD to the Inputs and Outputs

The first step when using UHD with Kula is to understand how to correctly connect a UHD source to the inputs and outputs of the mainframe.

#### Inputs to the Switcher Mainframe

There are 42 inputs on the mainframe, this will give the user 10x - UHD inputs (10 groups of 4 BNC inputs). The 4 quadrants of the UHD source have to be connected to consecutive BNCs so that the **Input Setup** menu can be setup correctly (this will be explained in the following sections).

The 4x UHD quadrants have to be connected in the following order, for example; Input 1 (top left), Input 2 (top right), Input 3 (bottom left) and Input 4 (bottom right), then the next source Inputs 5, 6, 7 and 8 following the same quadrant order. So, the first quadrant of each UHD source is connected to Inputs 1, input 5 and the next Input 9 etc.

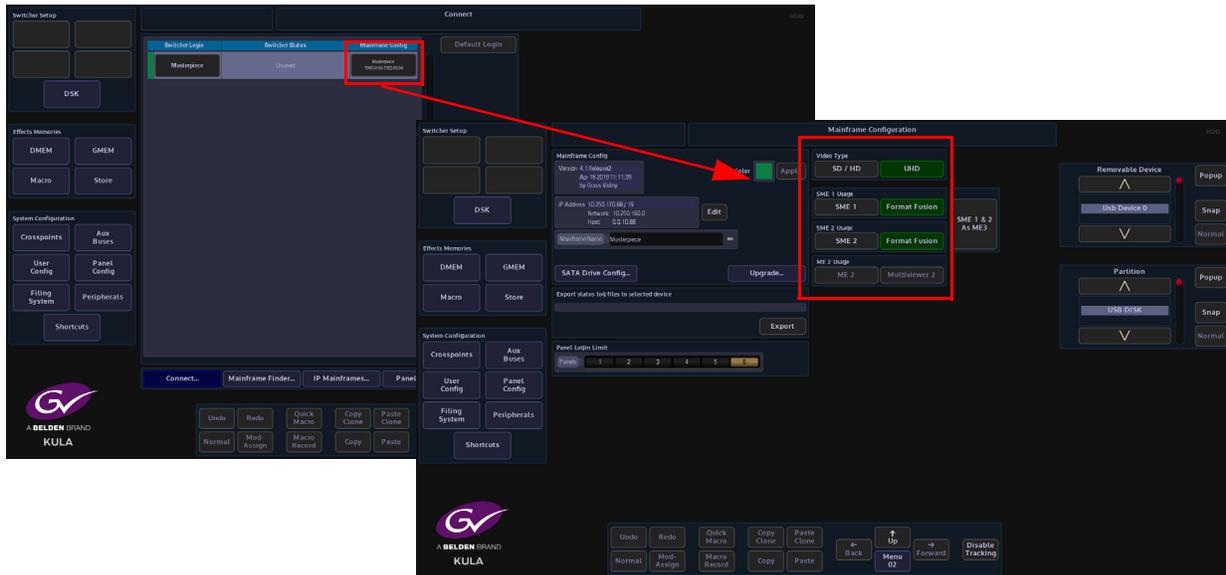
#### Outputs from the Switcher Mainframe

There are 12 outputs from the mainframe, this will allow the user to have 3x - UHD outputs, PGM (programme), PVW (preview) and Clean. Once again, the 4 quadrants of the UHD source have to be connected to consecutive BNCs so that the **Output Setup** menu can be setup correctly. As with the input setup, the UHD quadrants have to be connected in the following order, for example; Output 1 (top left), Output 2 (top right), Output 3 (bottom left) and Output 4 (bottom right), then the next source Output 5, Output 6, Output 7 and Output 8. So, the first quadrant of each UHD source is connected to Output 1, Output 5, Output 9. The first quadrant **cannot** start at Output 2 or Output 6.

## UHD Initial Setup

The first step in enabling UHD is in the “Mainframe Config” menu, in the logged out state in the connect menu.

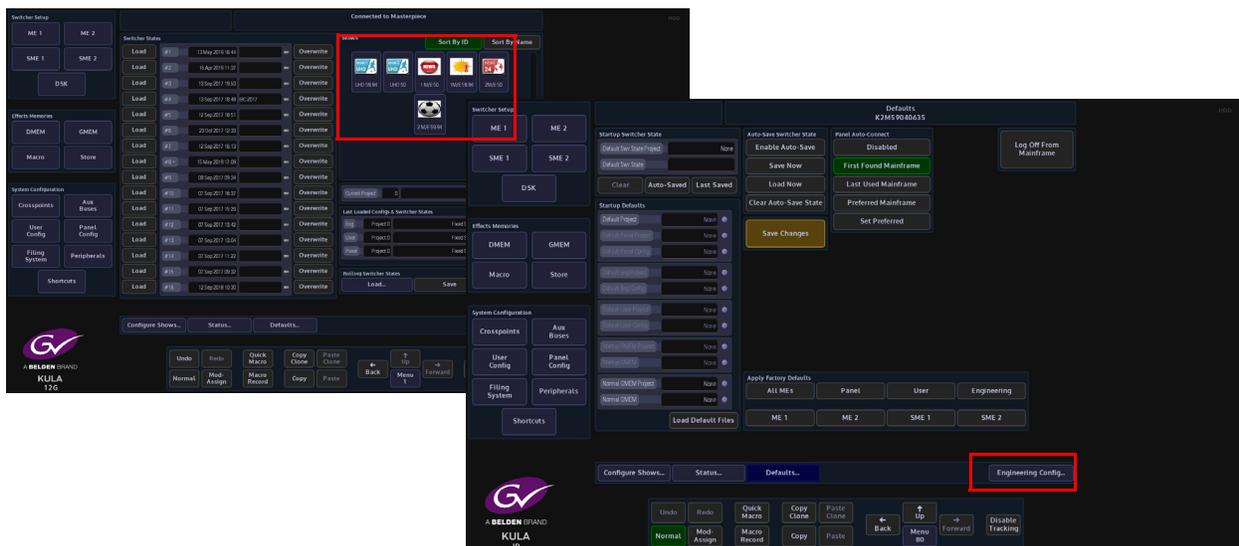
Touching the **{Mainframe Config}** button will open the “Mainframe Configuration” menu.



Touch the **{UHD}** button to select UHD mode, then press the **{Up}** button to go back to the “Connect” menu, then touch the **{Switcher Login}** button to log back into the Kula operational menus.

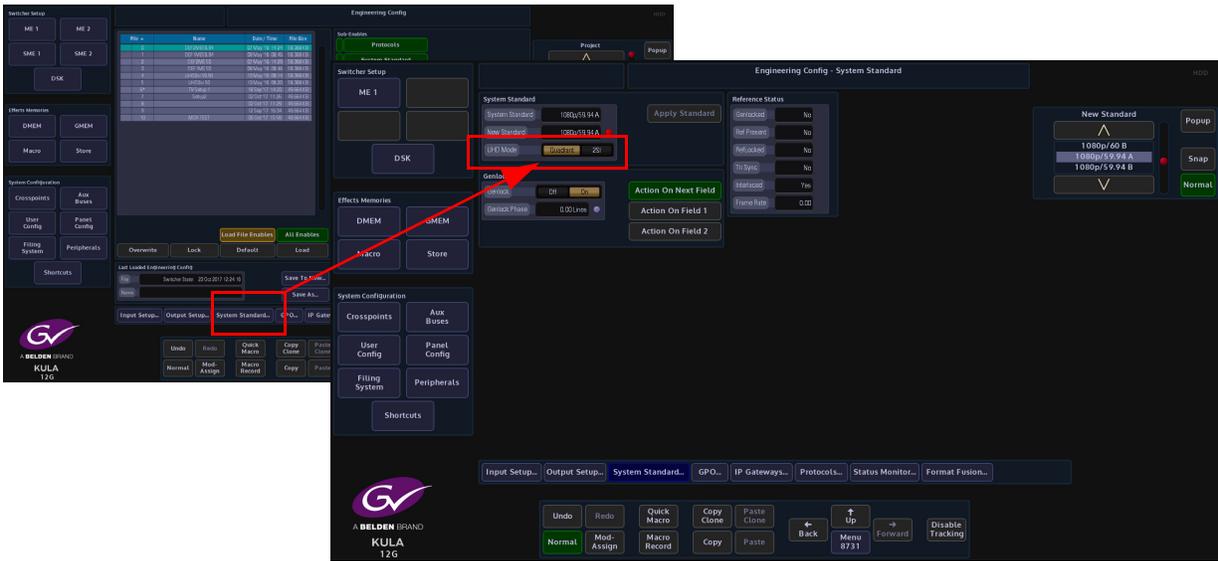
Once back in the “**Connected to Kula Mainframe**” menu, the user has two choices when setting up UHD, either touch one of the presetup **UHD Shows** at the top of the menu and UHD will be setup ready to use or the user can manually setup UHD by following the information through this section.

Touch the **{Defaults...}** button, then in the Defaults menu, touch the **{Engineering Config...}** button.

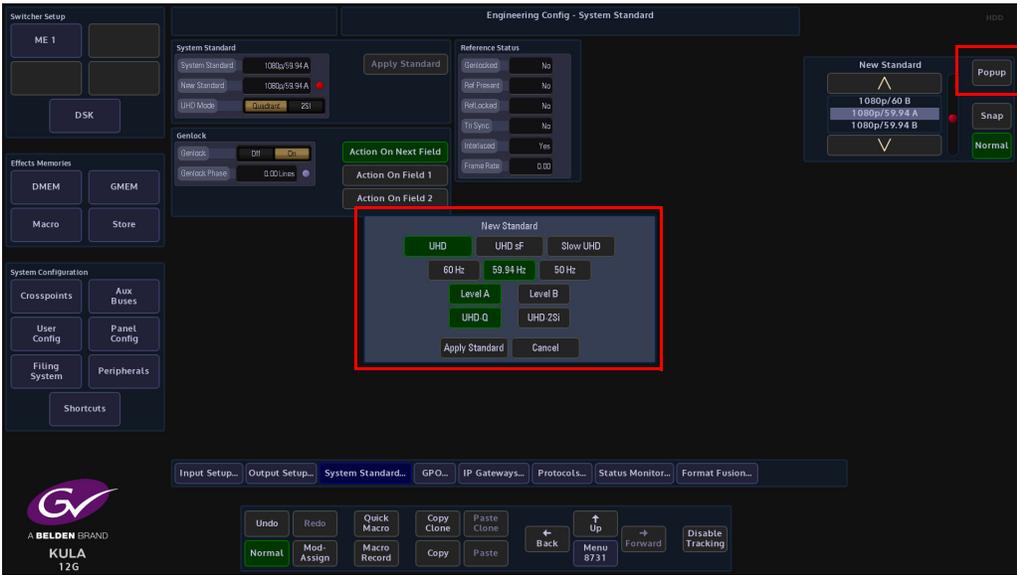


## UHD Engineering Config Setup

The Engineering Config menu is where the user will enable UHD Quad or 2SI mode and setup all the UHD inputs and outputs. In the Engineering Config main menu, touch the **{System Standard...}** button to enter the System Standard menu.



The System Standard menu can be set to “UHD Mode - Quadrant” or “UHD Mode - 2SI”, however the user can choose between the UHD standards by touching the “Popup” button top right to reveal a “New Standard” dialog box. From the dialog box the user can select what type of UHD standard the system is set to, as shown below.



Select between UHD-Q or UHD-2SI, the frequency and the type of UHD required - UHD Segmented Frame or UHD Slow, then press the **{Apply Standard}** button. The next thing to do is to setup the Inputs and Outputs.

## UHD Input Setup

Touch the **{Input Setup...}** button, in this menu the user will setup all the UHD inputs to the mainframe.



As stated at the start of this chapter, in UHD mode, there will be 4x inputs for every UHD source input to the mainframe, which consist of Input 1 (top left), Input 2 (top right), Input 3 (bottom left) and Input 4 (bottom right). Select Input 1, then touch the “**UHD Input**” {Yes} button.

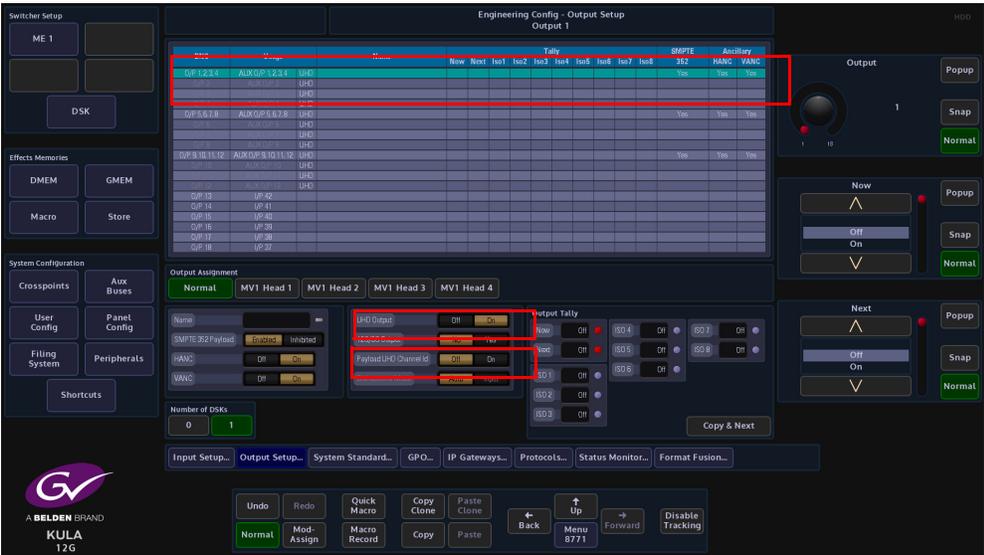
Notice that Inputs 1 to 4 are now ganged together as Input 1 (shown above).

The next input to select is Input 5, then touch the “**UHD Input**” {Yes} button, then inputs 5 to 8 are ganged together. This can be repeated up to another 8 times, allowing ten UHD sources input to the mainframe.

## UHD Output Setup

Setting up the UHD outputs on Kula is very similar to setting up the inputs, where the outputs are grouped in fours.

Touch the **{Output Setup...}** button and the menu will look like the one below. Notice since UHD was selected in the **“Mainframe Config”** menu, extra options are now displayed in the **“Output Setup”** menu.



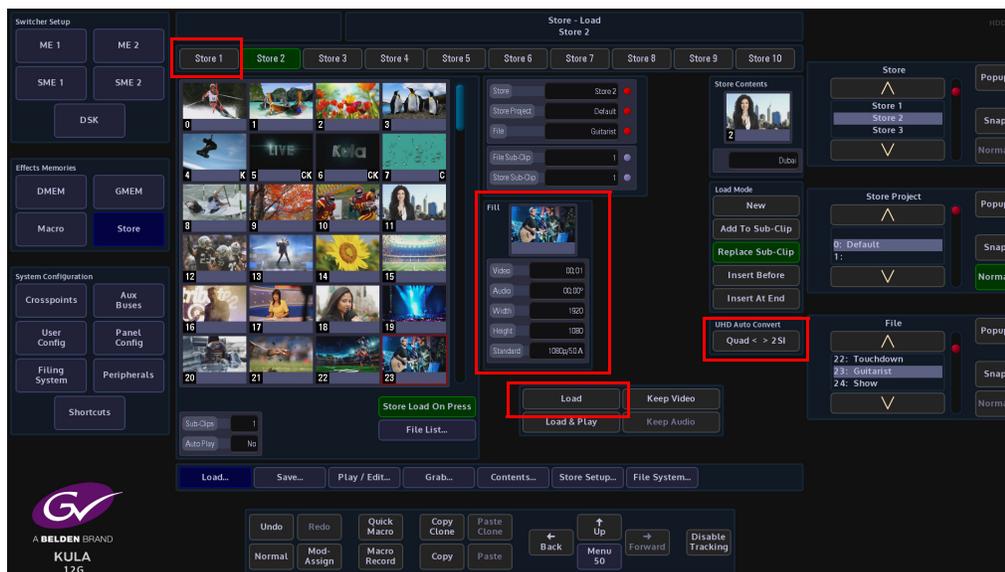
Touch the OP1 row to select it, then set the **“UHD Input”** to **{Yes}**, the first 4 outputs are now ganged together (see below), in the same way as the inputs, so now Outputs 1 to 4 make up the first UHD-quad output.

As can be seen above, the first UHD-quad output has been named PGM, now select Output 5, and turn on **“UHD Output”** and once again outputs 5 to 8 will be ganged, use the **“Name”** parameter to call the second UHD-quad output PVW.

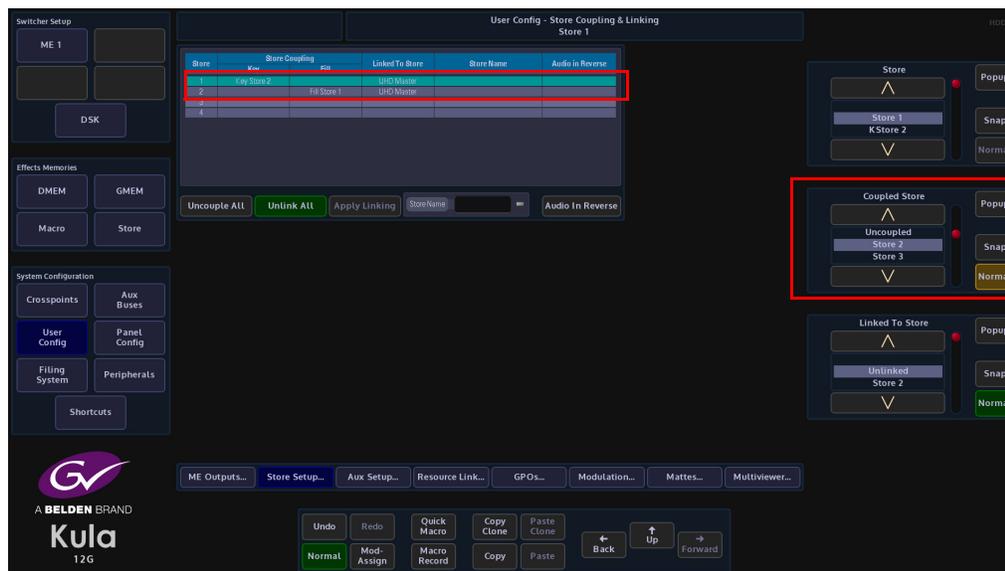
Set the **“Payload UHD Channel ID”** parameter to **“On”**. This parameter adds **“Channel ID data”** when in UHD mode. This provides data, so that downstream external equipment can identify the 4 UHD channels.

## UHD Stores

There are two UHD Stores and two 1080p Stores available to use in the Store menu in UHD mode. With the system set to UHD mode, touch the **{Store}** button to open the “**Store - Load**” menu.



As can be seen in the menu above, there are 4 Stores available to use, Stores 1 & 2 are the UHD Stores, Stores 3 & 4 are the 1080p Stores. To load a UHD still into a Store, select **Store 1** for example and then touch the **{Load}** button. The video standard, aspect ratio, video clip duration and audio clip duration is displayed in the “Fill” area in the center of the menu.



If a UHD Store has Key and Fill layers, then the two layers will need to be coupled. Touch the **{Store Setup...}** button, then select Store 1 in the table and then touch the “**Coupled Store**” parameter, the Key and Fill between Store 1 & 2 is now coupled and ready to key over a background image.

## UHD Transitions and Wipes

Transitions and Wipes in UHD mode, works exactly the same way as using Kula in any other video format. All of the wipe patterns, wipe controls, border fill and border position all work in exactly the same way.



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Note: For further information about setup and using the Transition function, see the “Operator Information” chapter in this manual.

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# 9

## 12G-SDI Setup and Operation

### Overview

Kula 12G-SDI is engineered with a single link 12G-SDI infrastructure. Kula 12G-SDI offers 12G-SDI BNCs for UHD connectivity, as well as 3G BNCs for Quad link signals; HD sources are also available. Whilst using the Kula mainframe in UHD mode, the user is now able to have a single link UHD input or output using the 12Gbps BNC connectors, the system does not have to have Quad link signals anymore.

### Kula 12G-SDI Mainframe Overview

The Kula 12G-SDI mainframe has:

- 40x Inputs, 10x of those inputs are 12G-SDI BNC connectors (silver in color).
- 14 outputs (UHD mode), 3x of those outputs are 12G - SDI Connectors (silver in color).



**A** = Outputs

**B** = In UHD mode these can also be used as outputs.

**C** = Inputs

Kula 12G-SDI features include:

- 1 M/E with 3 Keyers
- UHD functionality
- HD/1080p/1080i and UHD in the same mainframe
- SDI connectivity for 12G sources and 3G sources
- 10 x 12G-SDI inputs / 40 x HD inputs
- FormatFusion3™
- Internal ClipStore

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Note: The "silver" BNCs on the Kula Mainframe shown above, these are the 12G-SDI Inputs and Outputs.

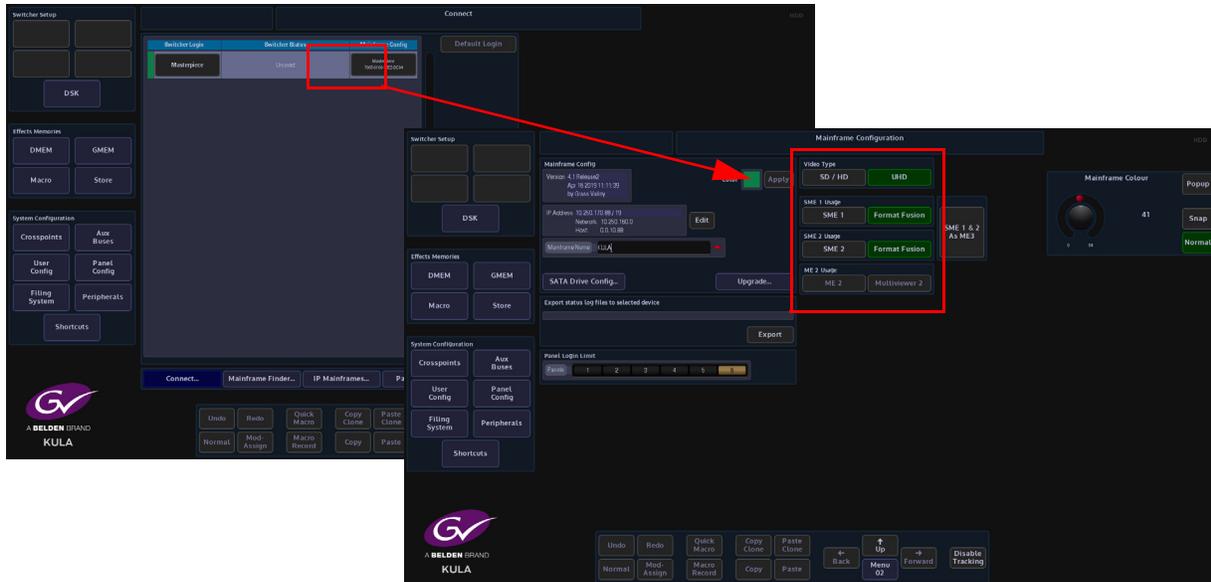
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## Setup

### Set the System up in UHD Mode

As mentioned earlier, to use the 12G-SDI BNCs as UHD inputs and outputs, the mainframe has to be placed into UHD mode.

The first step in enabling UHD mode is to put the GUI into the logged out state in the **“Connect”** menu.



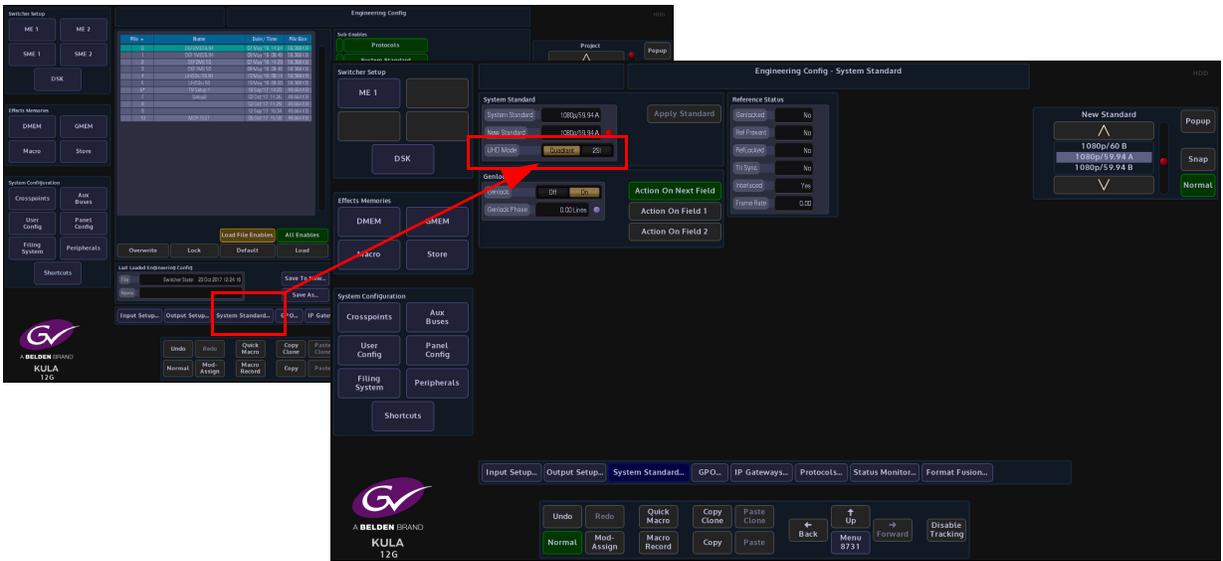
Touching the **{Mainframe Config}** button will open the **“Mainframe Configuration”** menu. In the **“Mainframe Configuration”** menu, touch the **{UHD}** button to select UHD mode, then press the **{Up}** button to go back to the **“Connect”** menu.

Finally, touch the **{Switcher Login}** button to log back into the Kula operational menus.

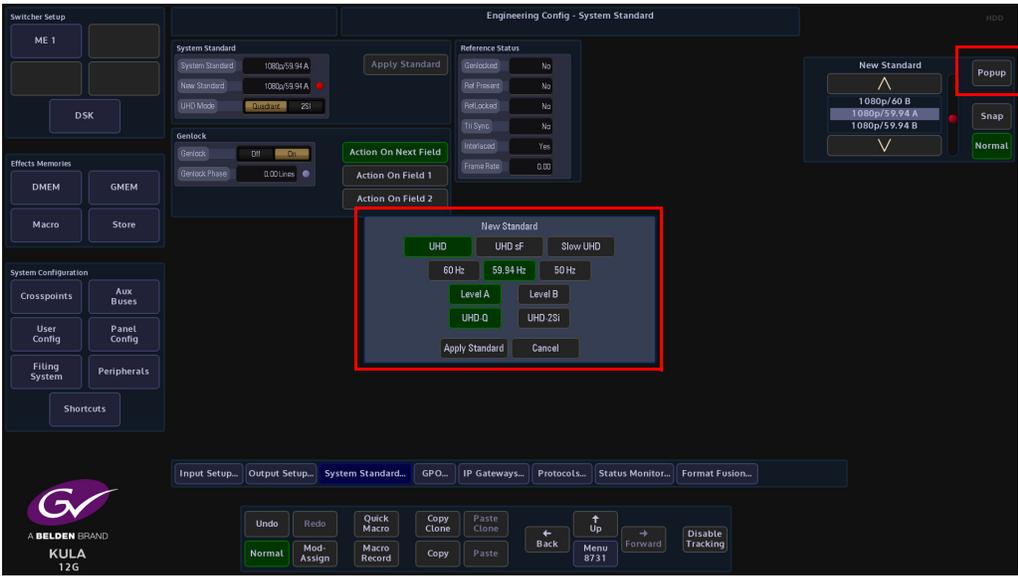
Once back in the **“Connected to Kula Mainframe”** menu, the user has two choices when setting up UHD, either touch one of the preset UHD Shows at the top of the menu and UHD will be setup ready to use or the user can manually setup UHD by following the information through this section.

Touch the **{Defaults...}** button, then in the Defaults menu, touch the **{Engineering Config...}** button. **UHD Engineering Config Setup.**

In the **Engineering Config** main menu, touch the **{System Standard...}** button to enter the System Standard menu.



The System Standard menu can be set to **“UHD Mode - Quadrant”** or **“UHD Mode - 2SI”**, however the user can choose between the UHD standards by touching the **“Popup”** button top right to reveal a **“New Standard”** dialog box. From the dialog box the user can select what type of UHD standard the system is set to, as shown below.



Select between UHD-Q or UHD-2SI, the frequency and the type of UHD required - UHD Segmented Frame or UHD Slow, then press the **{Apply Standard}** button. The next thing to do is to setup the Inputs and Outputs.

### 12G SDI Input Setup

Touch the **{Input Setup...}** button, in this menu the user will setup all the UHD inputs to the mainframe.



As stated at the start of this chapter, in UHD mode, there will be 4x inputs for every UHD source input to the mainframe, which consist of Input 1 (top left), Input 2 (top right), Input 3 (bottom left) and Input 4 (bottom right). Select Input 1, then touch the **“UHD Input” {Yes}** button.

Notice that Inputs 1 to 4 are now ganged together as Input 1 (shown above).

The next input to select is Input 5, then touch the **“UHD Input” {Yes}** button, then inputs 5 to 8 are ganged together. This can be repeated up to another 8 times, allowing ten UHD sources input to the mainframe.

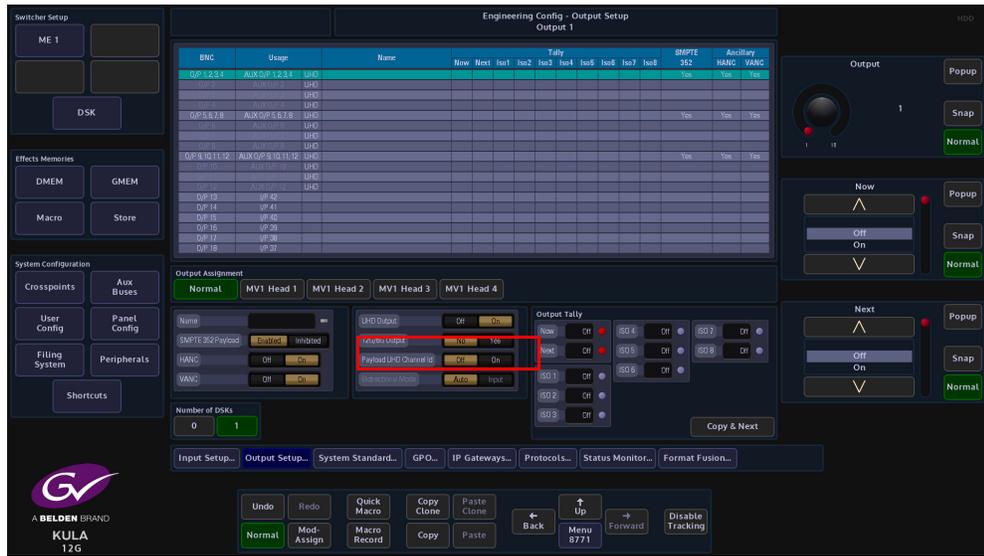
Note: Please note that there are no parameter adjustments in the Input Setup menu for setting up 12G-SDI, it is automatically set once the inputs are set to **“UHD Input”**.

As each UHD input is selected in the inputs table, 12G-SDI sources to the mainframe can now be connected to the following BNC inputs as required: 1, 5, 9, 13, 17, 21, 25, 29, 33 and 40 (the silver color BNCs).

### 12G-SDI Output Setup

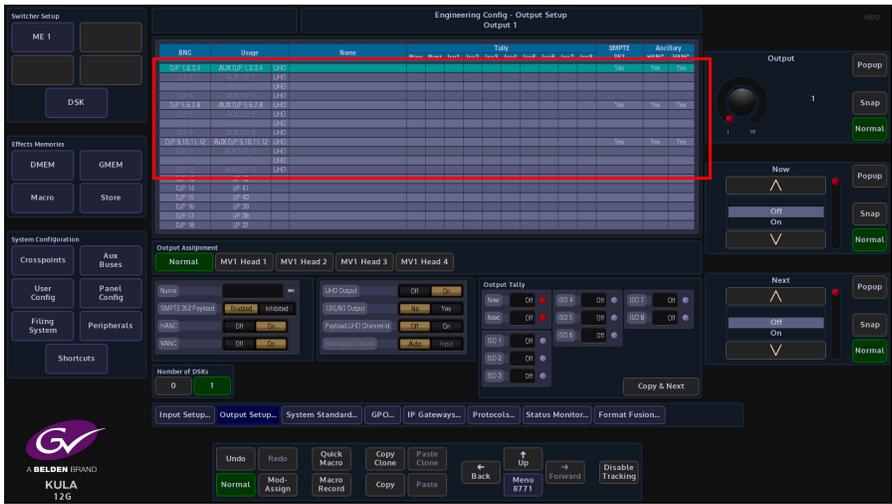
Setting up the UHD outputs on Kula is very similar to setting up the inputs, where the outputs are grouped in fours.

Touch the **{Output Setup...}** button and the menu will look like the one below.



Touch the OP1 row to select it, then set the **“UHD Output”** to **{Yes}**, the first 4 outputs are now ganged together (see below), in the same way as the inputs, so now Outputs 1 to 4 make up the first 12G-SDI output for output BNC 1.

Note: 12G-SDI setup - Notice that there is a parameter control called **“12G Output”** This has to be set to **“Yes”** for each of the 12G-SDI outputs.



Set the **“12G Output”** parameter to **“Yes”** and the first 12G-SDI BNC can be connected to output 1 (silver BNC). As the other outputs are setup as UHD outputs in the outputs table, the 12G Output parameter can be set to **“Yes”** for outputs 1, 5 and 9 (the silver BNCs).



# 10 IP Setup and Operation

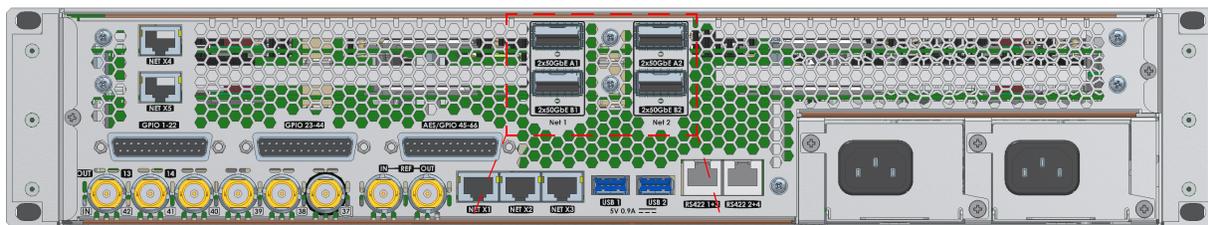
## Overview

Many broadcasters and media organizations have taken the step forward and embraced new IP infrastructures into their production work flows. More are looking to work with real video transport over a 50GbE IP network. Several real-time protocols such as uncompressed SMPTE ST 2022-6, SMPTE ST 2022-7 and VSF TR03/SMPTE ST 2110 now exists to stream and enable intra operability between equipment supporting the master control and playout operations.

Grass Valley, a Belden Brand, has a rich history in helping media organizations deliver content on time, on budget and to the right audience across whatever distribution mechanisms are appropriate. Building on our world firsts in deploying IP solutions technologies we are introducing Kula IP, which is a new market-defining production switcher for the IP environment.

## IP Connectivity

Duplex, signals supported over RTP streams via 2x QSFP 28 (Transceivers QSPF28)  
SMPTE ST 2022-6, SMPTE ST 2022-7, VSFTR-03, VSFTR-04, SMPTE 2110

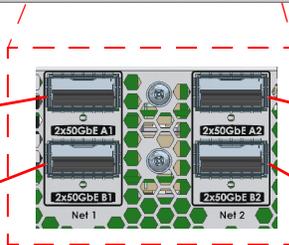


### IP Connector A1 (primary)

Inputs - 1 to 18  
Outputs - 1 to 6

### IP Connector B1 (primary)

Inputs - 19 to 36  
Outputs - 7 to 12



### IP Connector A2 (secondary)

Inputs - 1 to 18  
Outputs - 1 to 6

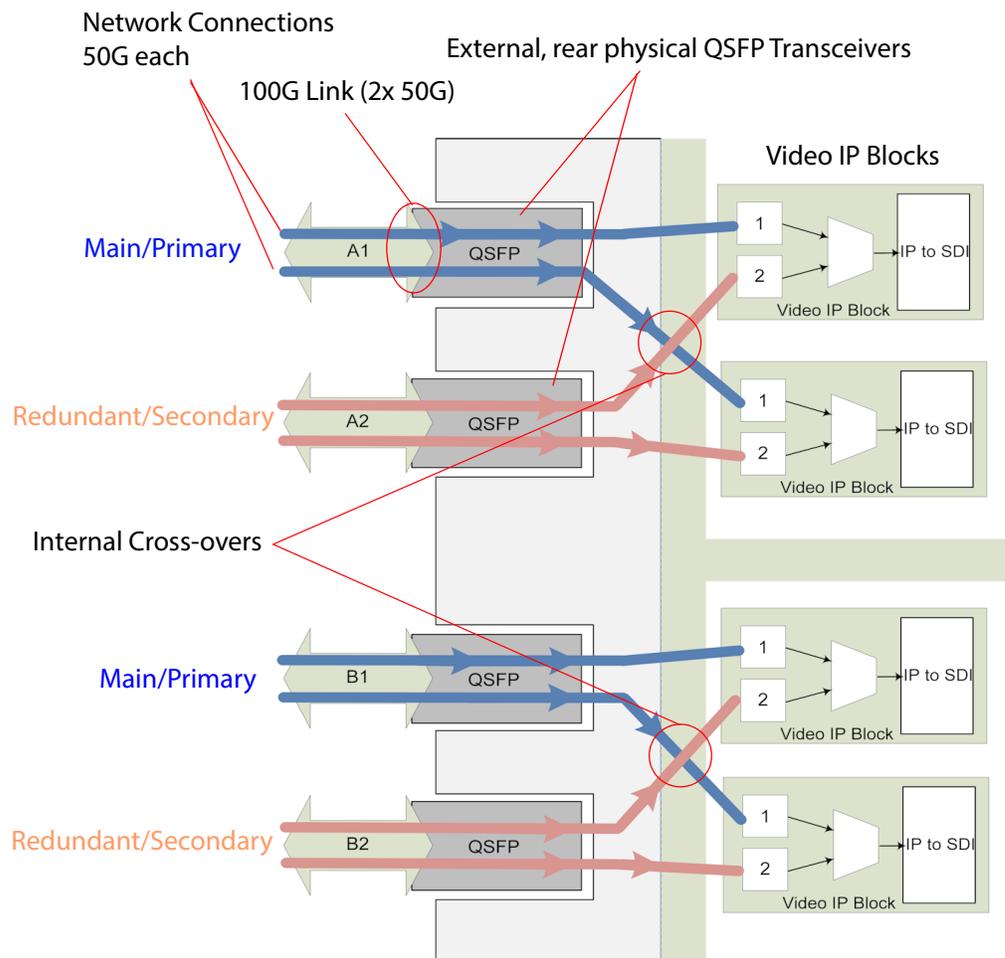
### IP Connector B2 (secondary)

Inputs - 19 to 36  
Outputs - 7 to 12

## IP Architecture

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

### Example of Video IP Blocks



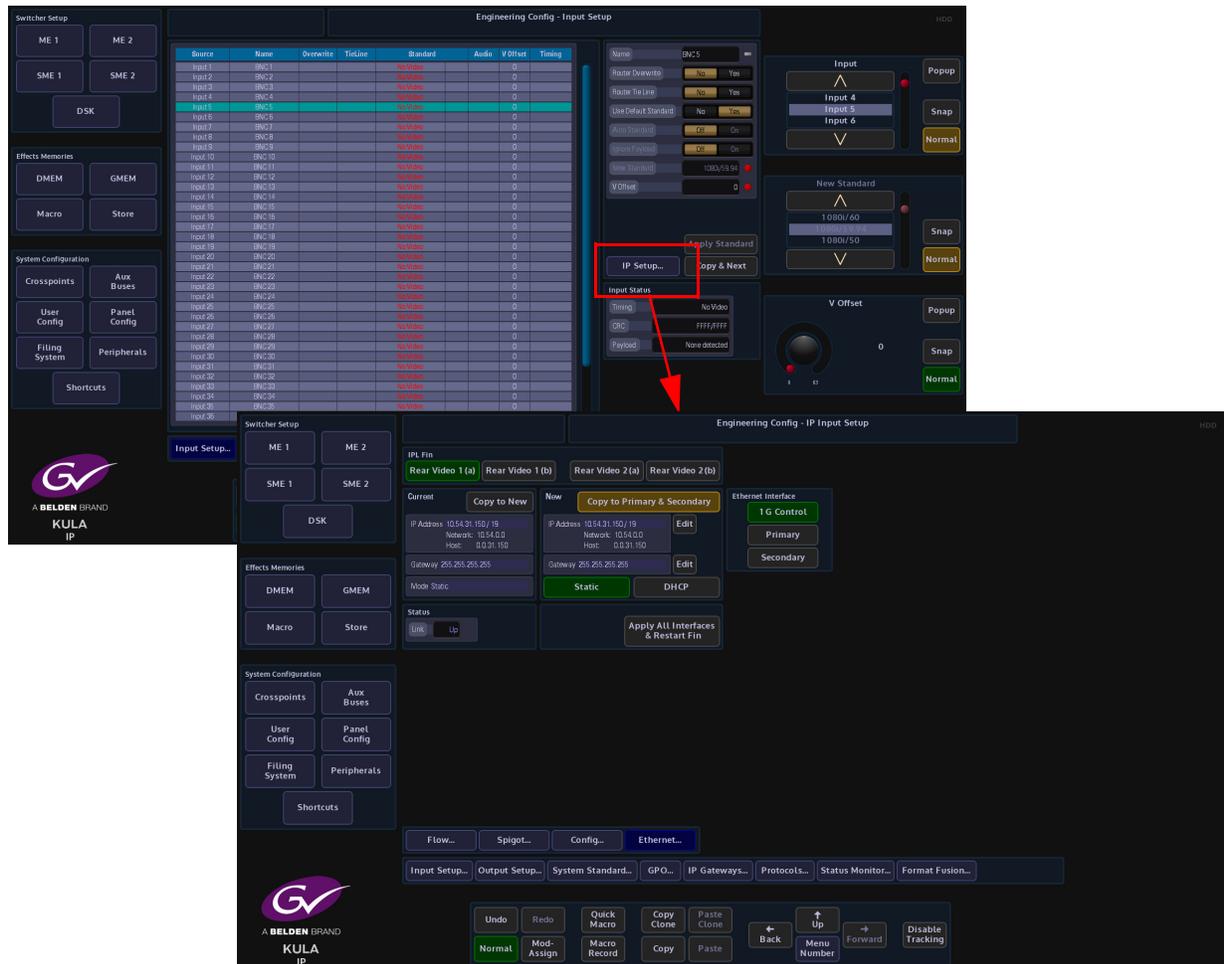
Thus, one rear physical rear media network 'link' feeds two Video IP blocks.

Video input IP streams for inputs 1 to 18 can be carried either in network link 'Link A1', or in 'Link A2', or in both links for redundancy.

The second Video IP card is similarly connected but via 'Link B1' and Link B2', which carry the video IP streams for video inputs 19 to 36.

## IP Input Menus

To get to the IP input menus, in the Input Setup menu, touch the **{IP Setup...}** menu link button.



### Ethernet Menu (above)

At the top of the menu are the IPL Fin selection buttons. These buttons correspond to the IP inputs at the rear of the mainframe.

The **Ethernet** menu is used to setup the IP addresses for the following:

- 1G Control - this is the IP address for the RJ45 network port on the IP Fin
- Primary - this is the QSFP cage number A1/B1
- Secondary - this is QSFP cage number A2/B2

The IP addresses have to be setup for each Ethernet Interface set (1G Control, Primary and Secondary) for each IP Video Rear. Once the IP address has been set for the (as shown above) 1G Control, touch the **{Copy to Primary & Secondary}** will copy the IP information to the Primary and Secondary sets. After using copy, it is necessary to modify the Primary

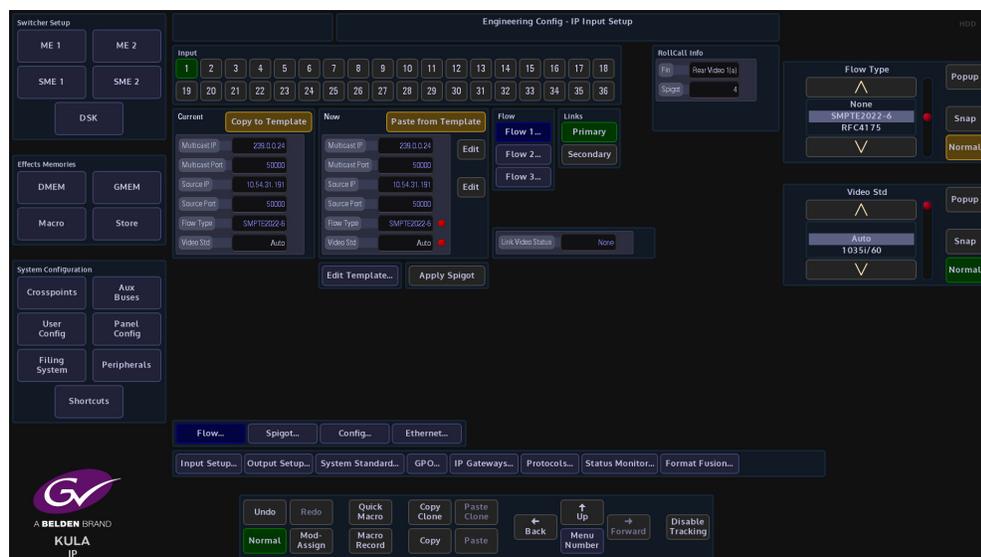
and Secondary IP addresses to make sure that they are different. Typically, these are incremented by 1.

If an existing IP address exists, the user can touch the **{Copy to New}** button and the IP address info will be copied across to the “New” IP address box.

Once the IP addresses are set, touch the **{Apply All Interfaces & Restart Fin}**, this has to be done to restart the IP Fin.

## Flow Menu

The Flow menu allows you to setup each individual “Spigot” IP address, Source IP address. Each Flow needs to have a Multicast IP address and Port as well as the IP address and Port of the source.



The number of Spigots that are available as inputs are restricted to the type of “**Flow Type**” that is selected. This will display the number of inputs available to the selected Fin.

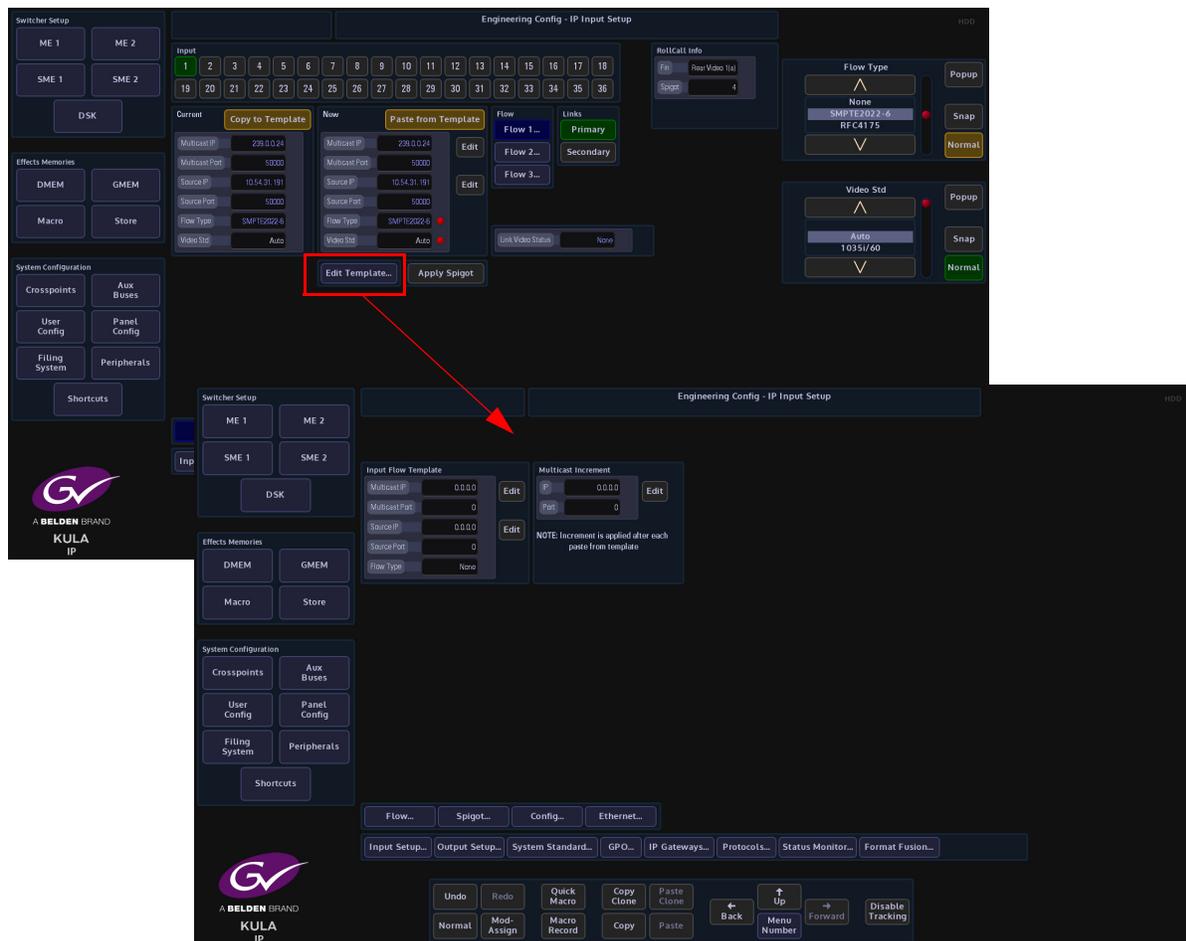
- **Flow 1** - This is used for **Video**
- **Flow 2** - This is used for **Audio**
- **Flow 3** - This is **Metadata**

The “**Links**” “**Primary**” and “**Secondary**” buttons allow separate data to be added for the Primary and Secondary Links.

The IP addresses, Port numbers and Flow Types can be entered manually, but there is a template tool which can be used to speed up the setup process.

Once the information is entered into the “**New**” data field, these settings are set as “**Current**” by touching the **{Apply Spigot}** button.

The IP input Flow Template, allows the user to set the Multicast IP address (this is user specific). The Source IP is the IP address of the incoming source.



When the information is input into the IP Input Flow Template, set the “Multicast Increment” to increment by “1”, the Template tool allows an address or port number to be incremented each time the **{Paste from Template}** button is touched. For example enter the Multicast IP address - 120.14.10.01, then setting the increment to 1, then when the **{Paste from Template}** button is pressed, the Multicast IP address will increment by 1 automatically. This is handy and less time consuming if the user is setting up a lot of spigots.

This has to be done for each Flow for each Spigot.

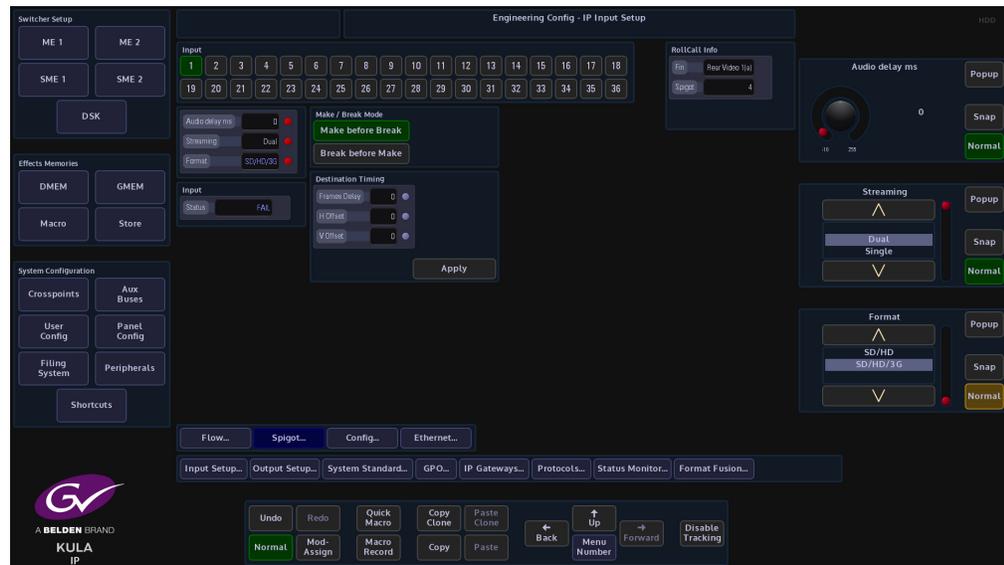
These have to be setup for each spigot.

It is recommended “**Video Standard**” parameter is set to “**Auto**”, which as suggested will automatically select the video standard for the selected spigot.

The “**Link Status**” window displays the incoming video standard.

## Spigot Menu

In the Spigot menu, the user is able to set the video standard for individual Spigots (inputs) using the “**Format**” parameter. By touching one of the Spigots, setting this parameter will allow more or less spigots to be used, depending on the type of format that is selected for the spigot.



The “**Streaming**” parameter will set whether there are “Dual” or “Single” QSFP cages being used on the selected IP Fin.

The “**Audio Delay**” parameter can be adjusted, if for instance the “Lip Sync” is out between audio and video signals.

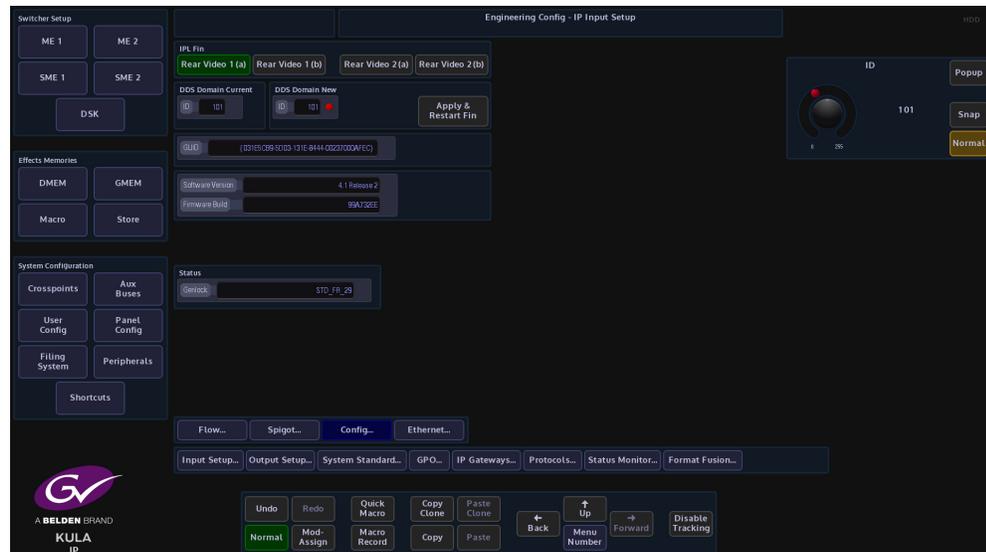
**Make before Break** - this sets up the new flow before breaking the old one. It should be noted that this will use extra bandwidth as the new flow is established.

**Break before Make** - this simply breaks the old flow before setting up the new one. This will not result in a clean cut but will not use anymore bandwidth.

## Config Menu

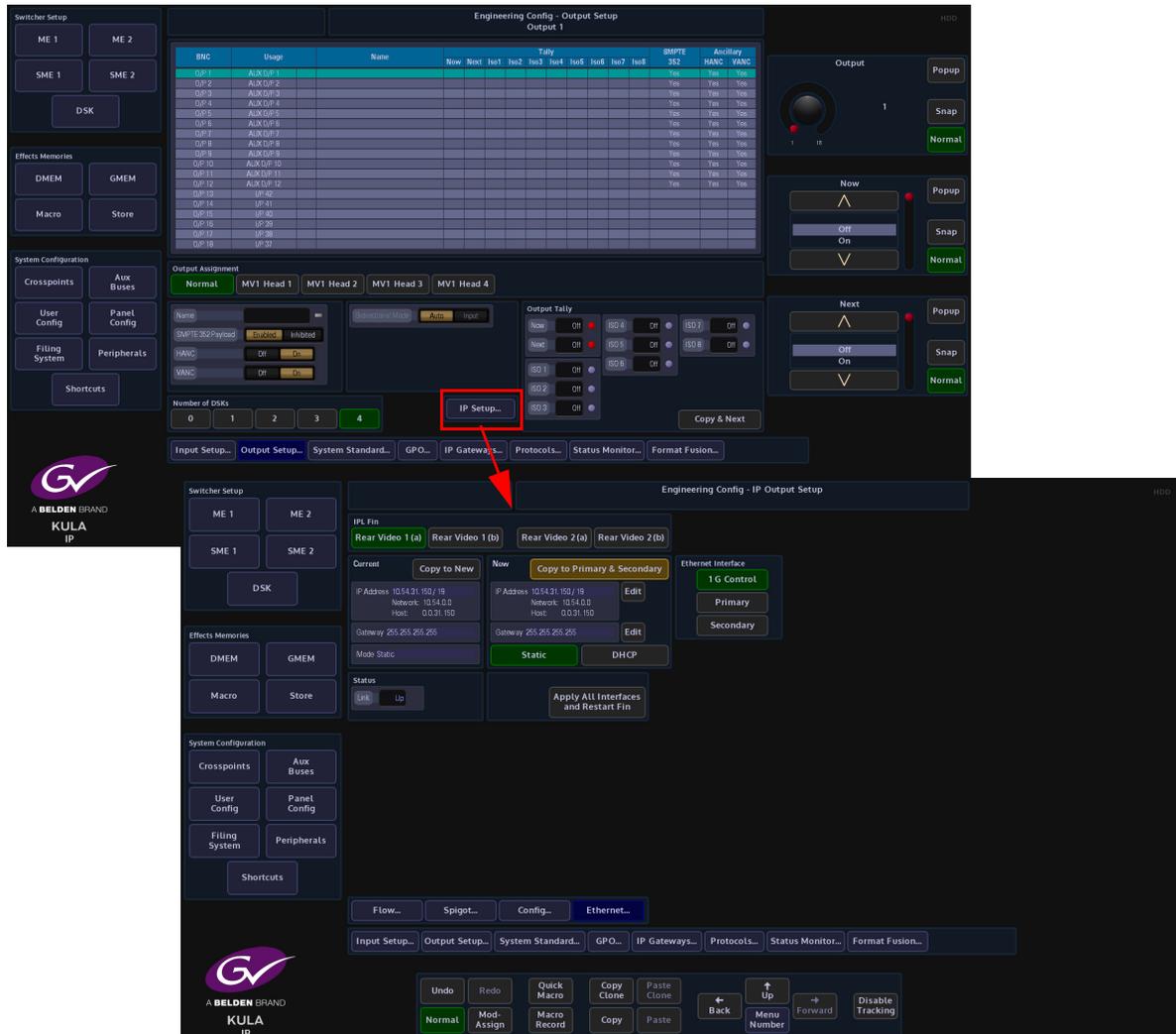
The Config menu only allows the user to change the current “DDS Domain ID”.

Note: The software on the IP Input Fin has to be updated through RollCall directly to the IP Input FIN via the RJ45 Network port.



## IP Output Menus

To get to the IP Setup menus, go to the **“Eng Config - Output Setup”** menu and then touch the **{IP Setup...}** menu link button.



### Ethernet Menu (above)

At the top of the menu are the IPL Fin selection buttons. These buttons correspond to the IP QSFP cages at the rear of the mainframe.

The **Ethernet** menu is used to setup the IP addresses for the following:

- 1G Control - this is the IP address for the RJ45 network port on the IP Fin
- Primary - this is the QSFP cage number A1/B1
- Secondary - this is QSFP cage number A2/B2

The IP addresses have to be setup for each Ethernet Interface set (1G Control, Primary and Secondary) for each IP Video Rear. Once the IP address has been set for the (as shown above) 1G Control, touch the **{Copy to Primary & Secondary}** will copy the IP information to the Primary and Secondary sets. After using copy, it is necessary to modify the Primary and Secondary IP addresses to make sure that they are different. Typically, these are incremented by 1.

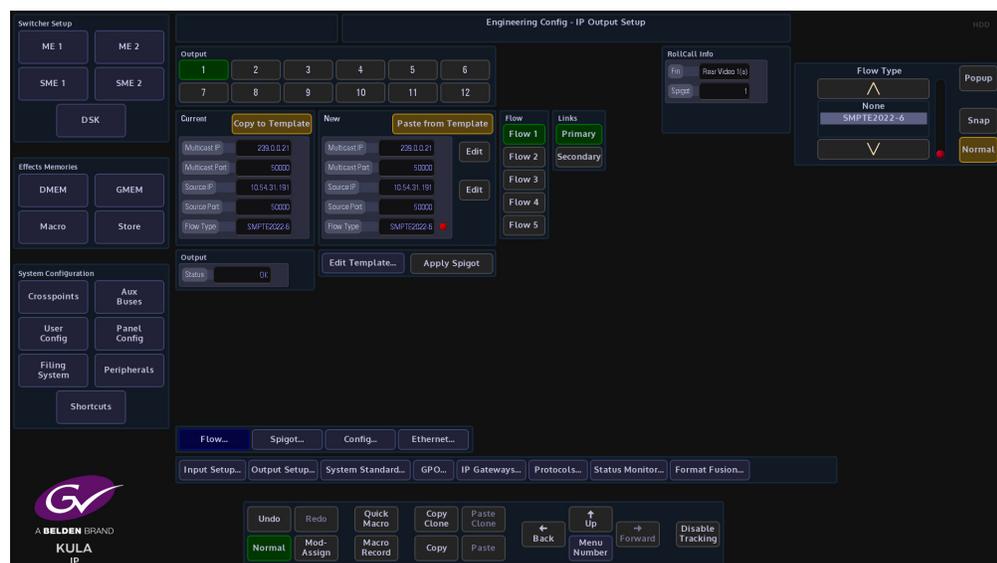
If an existing IP address exists, the user can touch the **{Copy to New}** button and the IP address info will be copied across to the “New” IP address box.

If an existing IP address exists, the user can touch the **{Copy to New}** button and the IP address info will be copied across to the “New” IP address box.

Once the IP addresses for the IP Output Fin are set, touch the **{Apply All Interfaces & Restart}**, this has to be done to restart the IP Output Fin.

## Flow Menu

The Flow menu allows the user to setup each individual “**Spigot**” IP address, Source IP address. Each Flow needs to have a Multicast IP address and Port as well as the IP address and Port of the source.



The number of Spigots that are available as outputs are restricted to the type of “**Flow Type**” that is selected. When selecting a Flow Type settings, refer to the number of channels listed in the “**Number of IP Outputs**” tables, as listed earlier in this section.

The “**Links**” “**Primary**” and “**Secondary**” buttons allow separate data to be added for the Primary and Secondary Links. The IP addresses, Port numbers and Flow Types can be entered manually, but there is a template tool which can be used to speed up the setup process. Once the information is entered into the “**New**” data field, these settings are set as “**Current**” by touching the **{Apply Spigot}**. This has to be done for each Flow for each Spigot

The IP Output Flow Template allows the user to set the Multicast IP address (this is user specific). The Source IP is the IP address of the incoming source.



When the information is input into the IP Output Flow Template, set the “Multicast Increment” to increment by “1”, the Template tool allows an address or port number to be incremented each time the **{Paste from Template}** button is touched. For example enter the Multicast IP address - 120.14.10.01, then setting the increment to 1, then when the **{Paste from Template}** button is pressed, the Multicast IP address will increment by 1 automatically. This is handy and less time consuming if the user is setting up a lot of spigots.

This has to be done for each Flow for each Spigot.

---

Note: The configuration of the Spigot dictates the type of signal carried on each of the Flows.

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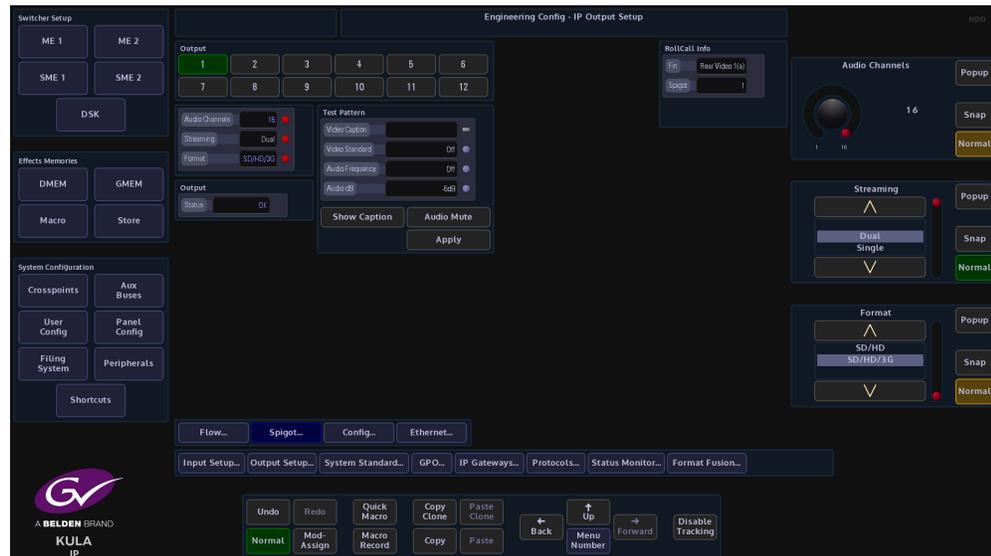
The “Spigot Status” window displays the incoming video standard.

The “Current” and “New” allow the user to copy the Multicast IP address etc. to the “Edit Template” menu from the “Current” area and paste from the “Edit Template” menu to the “New” area.

- **Flow 1** - this is SMPTE 2022-6
- **Flow 2** - this is RFC 4175
- **Flow 3** - this is Audio
- **Flow 4** - This is Metadata

## Spigot Menu

In the Spigot menu, the user is able to set the video standard for individual Spigots using the **"Format"** parameter. Setting this parameter will allow more or less spigots to be used, depending on the type of format that is selected for the spigot.



The **"Streaming"** parameter will set whether there are Dual or Single QSFP cages being used on the selected IP Fin.

The **"Audio Delay"** parameter can be adjusted, if for instance the "Lip Sync" is out between audio and video signals.

The **Test Pattern** attacher is able to output a Color Bar signal test pattern on the selected Spigot.

**Video Caption** - allows the user to place text onto the test pattern.

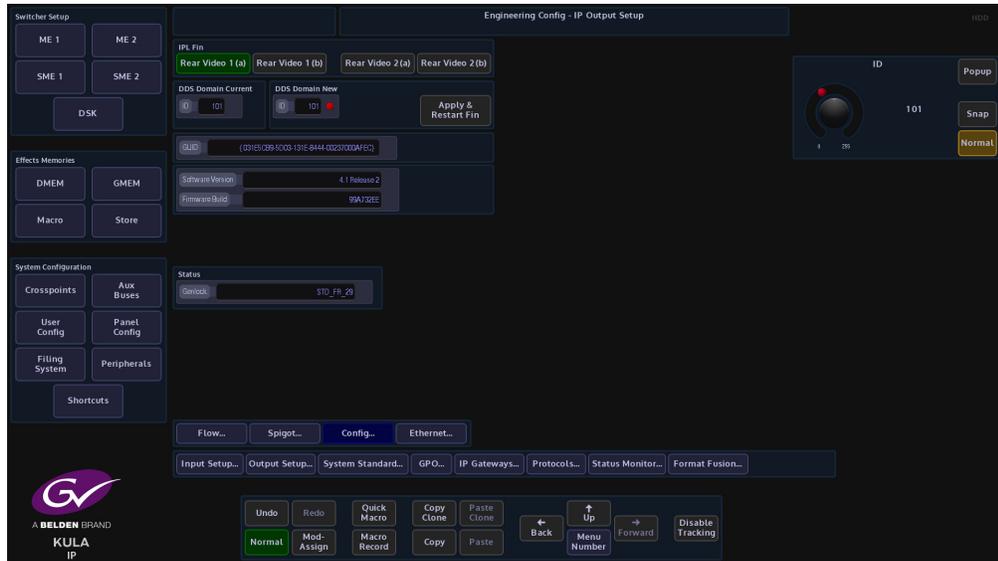
**Video Standard** - allows the user to set the video standard of the test pattern.

**Audio Frequency** - sets the audio frequency of the test signal.

## Config Menu

The Config menu only allows the user to change the current “DDS Domain ID”.

Note: The software on the IP Output Fin has to be updated through RollCall directly to the IP Output FIN via the RJ45 Network port.



# 11

## Operator Information

### Switcher Setup

The Switcher Setup area of Kula is broken down into 3 main areas M/Es, SMEs and DSKs and it is where Transitions, Key Layers and DVE for the three main categories are all setup. For each main category, the setup menus for transitions, Key Layers etc all have a similar look and feel, so it is very easy to move between them and use the control parameters.

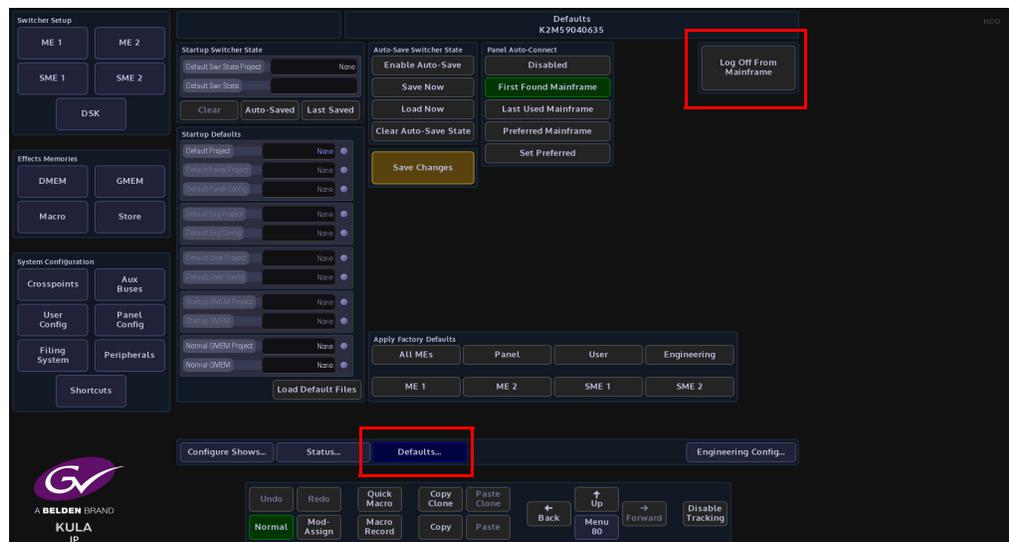
The switcher setup for an M/E will be described in full, so that only differences and slight variances will need to be described for the SMEs and DSKs.

## M/E3 Setup

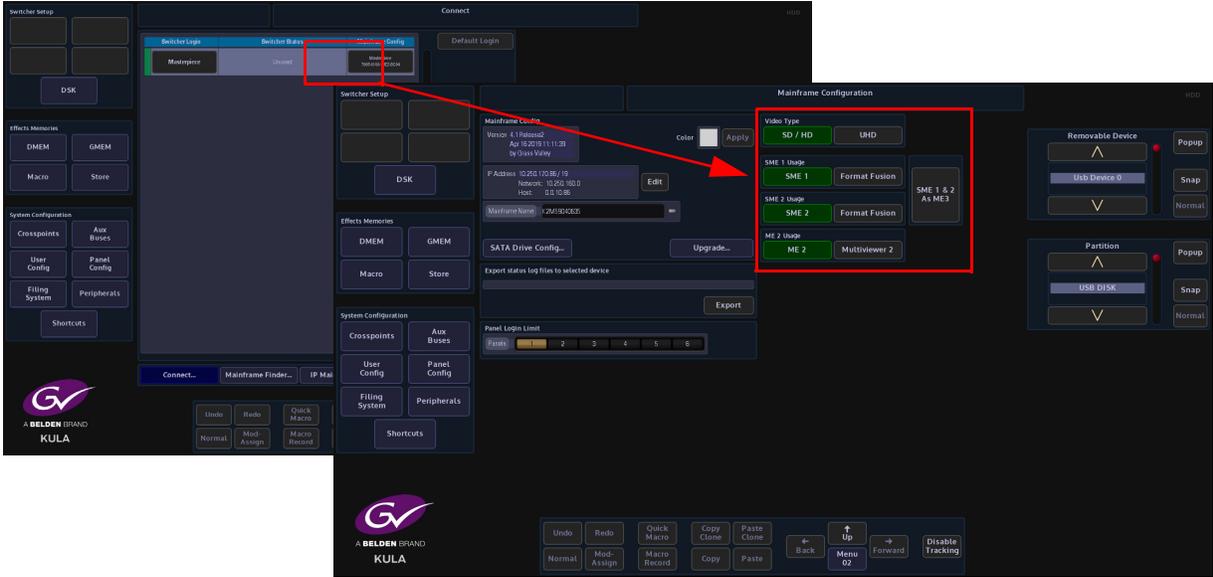
With the release of V2.1r1 (and greater) software, Kula has the ability to be setup as a 3M/E switcher, allowing the user to add a 3rd physical M/E control surface.



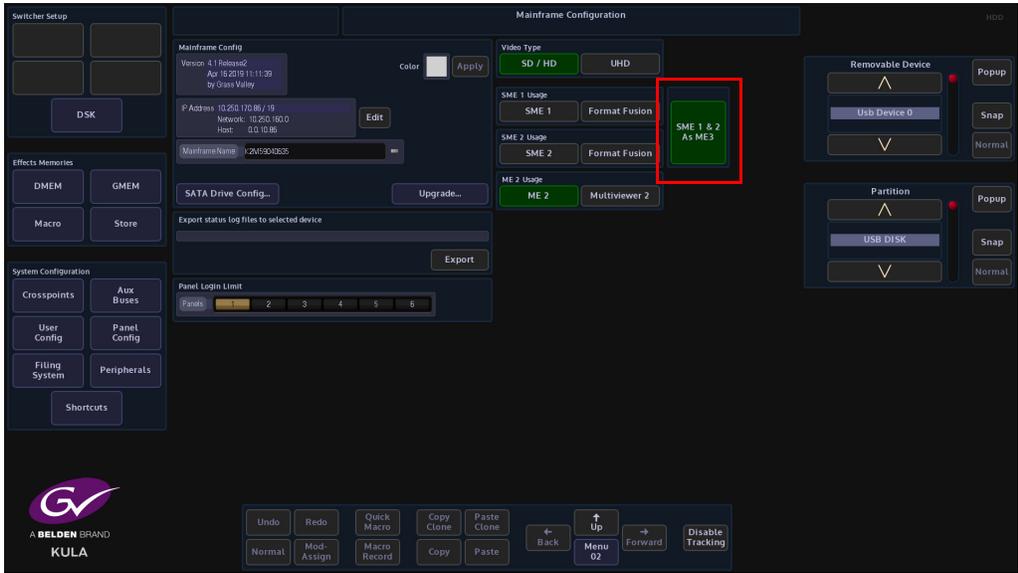
To setup the 3rd M/E, the user will have to log off the switcher by touching the “Up” button, then in the top menu, touch the **{Defaults}** button. In the Defaults menu touch the **{Log Off From Mainframe}** button.



In the **“Connect”** menu, touch the **{Mainframe Config}** button. In the Mainframe Configuration menu, touch the **{SME 1 & 2 As ME3}** button.

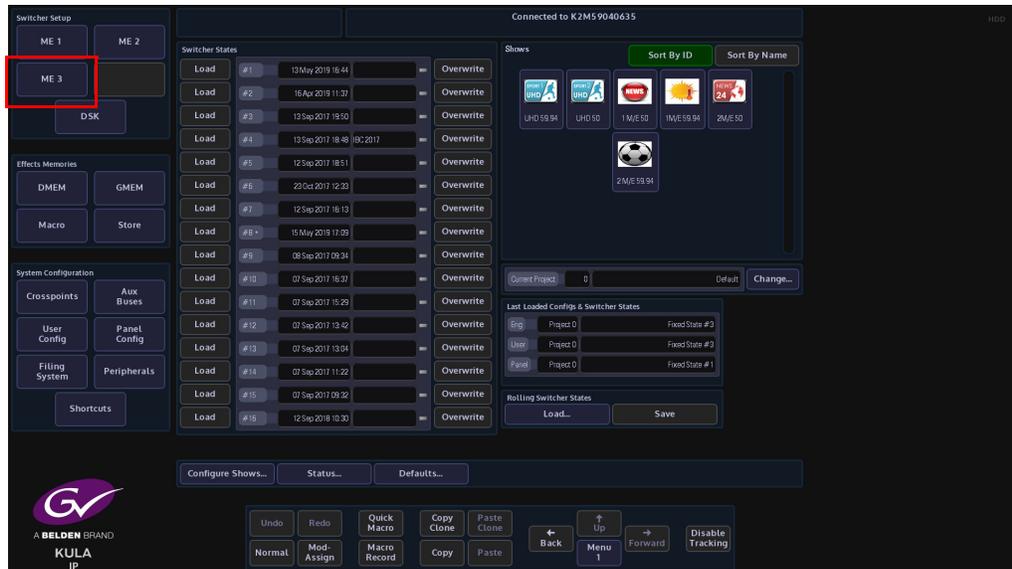


The button will turn green and the SME1 & 2 buttons are now grayed out. SME 1 & 2 have now combined their resources to create a 3rd M/E.

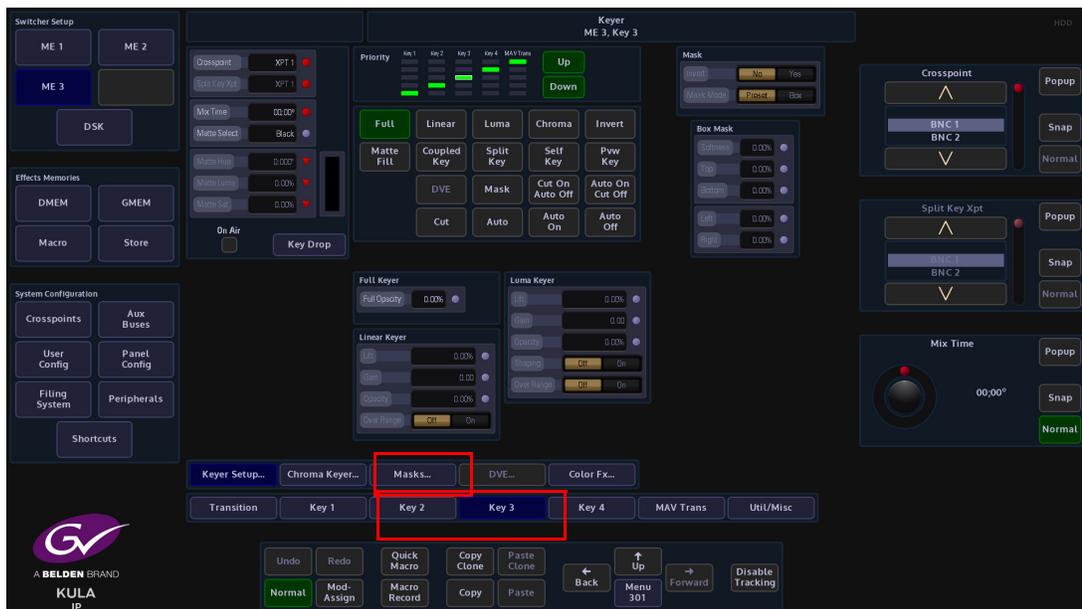


Press the **{Up}** button to go back to the **“Connect”** menu and log back into the switcher.

As mentioned earlier, the resources of SME1 & 2 have been combined. In the “Connected” menu, M/E3 can now be selected and used the same way as M/E1 & 2, with all the same menus as explained later in this chapter.



When using M/E3 in the Keyer menus, note that when using the DVE menu, the DVE functionality is available for Keys 1 & 2 only. Keys 3 & 4 are still available to use with all other Key functions.



# Using the M/E Menus

As can be seen in the menu below, once the user has entered one of the switcher setup menus, all of the sub menus and parameter controls are easily accessed in this menu. In the menu below M/E1 has been selected. If any of the main switcher setup selection buttons are grayed out, this means that it is not selectable.

On entering the M/E1 Switcher Setup menu the first menu selected here is the Transition menu.



## Transitions

The three main types of transition that will be described in this section of the manual. These are:

- Background Transitions
- Key Transitions
- Clip transitions (or MAV Trans)

---

Note: When the system has gone through the startup sequence, each of the transition T-bars need to be calibrated by moving the T-bars from end stop to end stop position.

---

## Setting Basic Transitions

Independent transitions can be set for the Background, for each of the Key Layers and a MAV Trans.

### Basic Background Transitions

In the Transition area on the control surface, press the **[BGND]** and then move the T-bar from end to end and notice that a transition is made between the selected crosspoint sources on the PGM/PVW or background A/B.



### Basic Background Transition with a Wipe

In the Transition area on the control surface, press the **[BGND]** and the **[WIPE]** buttons on and they will light up (notice that the **{Wipe}** and **{Background}** buttons in the menu are also lit green). In the menu, touch the required wipe pattern from the list, then move the T-bar from end to end and notice that a transition is made between the selected crosspoint sources on the PGM/PVW or background A/B.



Rotary Controls  
Wipe Pattern  
Selector

### Basic Key Transitions



Select the Key or Keys in the Transition or in the menu, then in the Transition area or in the menu touch the **{Mix}** button and move the T-bar from end stop to end stop. Notice that the Key Layer will now transition over the A/B background.



If a Wipe transition is required, touch the **{Wipe}** button in the Transition area of the control surface, or in the transition menu, The type of transition wipe required can be selected using the **“Wipe Pattern”** parameter, use the associated rotary control to scroll through the wipe patterns. Move the T-bar from end stop to end stop. Notice that the Key Layer will now transition with a wipe pattern over the A/B background.

## Transition Control Button Functions



### **BGND and KEY 1 to KEY 4**

These five buttons enable the use of a Background or Key Layers' own transition. They can all have their own Wipe, Mix, Matte Mix etc. Any or all of these buttons can be selected as required. The transition for the selected layer(s) is started by pressing the T-bar, AUTO button or CUT button. Pressing any one of these buttons will clear all others. Holding one button down and then pressing any others will make all of those selected active. For Key Layers, this facility allows one or more of the Key Layers to be transitioned, using a different transition for each layer, at the same time as the background transition.

### **MIX**

Selects *Mix* as the main transition, causing bus swap.

### **WIPE**

Selects *Wipe* as the main transition, causing bus swap.

### **CUT**

An immediate "Cut" between the Background or Key sources causing bus swap.

### **AUTO**

Starts an automatic pre-timed transition, using whatever transition types and times have been selected for the layers included in the transition. The transition time for each layer can be different as can any time offsets.

### **T-Bar**

Performs a manual transition using whatever transition types have been selected for the layers included in the transition.

## Transition Parameters

When the **{Transition}** button is touched the initial default Transition menu appears with the main **Transition Time** and **Profile** parameters active, this will allow the user to make basic adjustments to a background or Key transition. The top of the menu indicates which M/E Background or Key the transition wipe will effect, as shown below.



## Wipe Parameters

This will describe the initial default transition menu functions and parameters.

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Note: Transition Time, Profile and Shape parameter are the same for Wipe, Mix and Matte Mix menus.

---

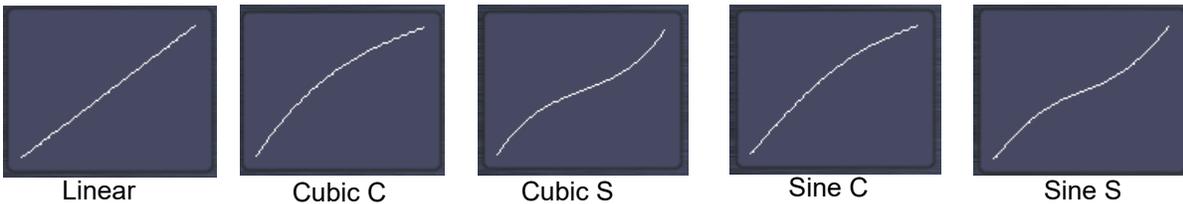
**Transition Time** - This sets the time that it takes for a transition to take place. The user can control the transition time by either using the rotary controls on the control surface to adjust the transition time or touch the **{Popup}** button in the Transition Time parameter and key in the time using the on-screen number pad. Once the transition time is set, press the **[AUTO]** button on the control surface and the transition will take place to the set time.

**Profile** - This parameter control will adjust the curve profile in the display box under the Main heading. Adjusting the curve profile will make the transition speed up or slowdown at a specific time in the transition period.

**Shape** - Selecting one of the Shape options will depict the type of profile curve; this will alter the acceleration rate for a transition.

- **Linear** - constant transition, no change in transition acceleration
- **Cubic C and Sin C** - these profiles are similar to each other, the default transition will have a fast acceleration at the start and slowdown towards the end.
- **Cubic S and Sin S** - these profiles are also similar to each other, the default transition will accelerate at the start slow down towards the mid point and accelerate again.

### Shapes Parameters



Note: The following parameter are the same for Wipe, Mix and Matte Mix menus.



**Wipe Pattern** - Adjust to select the required wipe pattern. There are a number of individual wipe patterns available. The number of available wipe patterns will vary depending on whether the background or Key is selected.

**Softness** - This parameter adjusts the softness of the leading edge or edges of the selected wipe pattern. 0% is the default setting which Shows a hard clean edge and 100% blends the edge into the background making it barely visible until the transition is complete.

**Border** - This turns the border function On/Off

**Border Width** - If a border has been selected for example on a square wipe which starts from the center of the screen, the width of the border in relation to the edge of the wipe can be adjusted.



**Border Fill** - Select the border Fill from either a Matte or one of the two Util Buses, as described in the Mix menu structure.

**Matte Selector** - Select the required Matte from the options or Local Matte. Hue, Luma and Saturation will only affect the Local Matte setting.

**Matte Hue** - sets the actual Matte color. The rotary control operates a 360 degree color wheel where:

- 0 = Red
- 60 = Magenta
- 120 = Blue
- 180 = Cyan
- 240 = Green
- 300 = Yellow

**Matte Luma** - The Luminance or brightness control affects the selected Matte Hue. The parameter adjusts from 0 to 100% where 0% is no luminance or Black and 100% is maximum brightness.

**Matte Sat** - The saturation control affects the selected Matte Hue. The parameter adjusts from 0 to 100% where 0% is no saturation or no color i.e. only shades of Gray and 100% is fully saturated or maximum color.

**Position** - Touch any one of the On/Off buttons in the parameter controls. This will set all the buttons to the On position if they are currently off.

**X Position Y Position** - The wipe start position can be adjusted to start anywhere on-screen by changing the parameters in the X/Y Position attacher box. Touching any of the On/Off buttons will activate all three parameter boxes. Notice that the Red indicators in the parameter boxes are triangles denoting that the parameters can be adjusted using the rotary controls or by using the joystick on the control panel.



**Rotation** - This will rotate the wipe pattern clock-wise or counter clock-wise in increments.

**Aspect Ratio** - Touch the On/Off button to activate the aspect ration function. As the name suggests, this function changes the aspect ratio of a wipe pattern, 0 to -100% will change the vertical ratio and 0 to +100% will adjust the horizontal ratio.

Note: Aspect ratio will only adjust a limited number of the wipe patterns.

When scrolling through the wipe patterns, notice the wipe pattern adjustment indicator box at the bottom of the wipe menu. When a wipe is selected this box will display parameters that denote how the wipe can be adjusted. Touch this box and a set of adjustment parameters will appear on the right of the menu. These are X,Y Position, Rotation and Aspect Ratio, depending on the wipe selected.



## Advanced Wipes

The Advanced Wipe parameters offer additional wipe patterns that are created by combining the main wipe patterns. For example if a straight edge primary wipe is combined with a secondary circle wipe, the resulting wipe edge will now have a bowed effect, as shown in the example below.



In the Advanced Wipes area of the menu, there are 2 parameters; “Modulation Enable” and “Repeats Enable”. The first thing to describe is the Modulation Enable.

### Modulation Parameters

With Modulation Enable turned On, the modulation function enables the user to add different modulation effects to the transition wipe effects.

**Shape** - selects the type of modulation effect

**HAmp** - controls the horizontal amplitude (peak to trough distance) of the modulation

**HFreq** - controls the horizontal frequency (number of peaks per centimeter) of the modulation

**HPhase** - controls the start point of the of the modulation and thus the relative position of the peaks and troughs to the horizontal edge of the wipe

**VAmp** - controls the vertical amplitude (peak to trough distance) of the modulation

**VFreq** - controls the vertical frequency (number of peaks per centimeter) of the modulation

**VPhase** - controls the start point of the of the modulation and thus the relative position of the peaks and troughs to the vertical edge of the wipe.



### Repeats Enable

The Repeats menus will as the name suggests, this will repeat the wipe pattern a user-defined number of times.



Turn the Repeats Enable parameter On

Wipe Repeats - Horizontal/Vertical, this will determine the number of repeated wipe patterns horizontally or vertically.

**Wipe Blocks** - With some wipe patterns that use a block effect, such as wipe shapes 89, 91 for example, adjusting these parameters will add extra horizontal an vertical blocks to the wipe effect.

## Mix

This allows a Background or a Key source to mix during a transition.



## Matte Mix

**Matte Mix Profile** - The Matte Mix Profile is where the output passes through the Matte mix color between the two transition sources. This will cause the transition to go from the first source through a selected matte color to the second source.



**Fill Level** - This is the amount of Matte added to the mix. 100% is the full amount of Matte added.

**Bias** - This adjust the point that the Matte is introduced into the transition i.e. more Matte at the start of the transition and less at the end of the transition, or the other way around.

**Width** - This will override the bias parameter and introduce a full Matt throughout the transition at 100%.

**Fill** - This function selects the type of source that will be used as a Matte. The options range from Matte, Util Bus 1 and 2. The Util Bus Fill is setup in the Util Bus menu. Touch the {Util/Misc} button on the GUI to see which crosspoint the Util Bus's are set to reference.

**Matte Selector** - Select the required Matte from the options Local Matte or MAT 1 to MAT 16.

Hue, Luma and Saturation will only affect the Local Matte setting.

**Matte Hue** - sets the actual Matte color, the rotary control operates a 360 degree color wheel where:

0 = Red

60 = Magenta

120 = Blue

180 = Cyan

240 = Green

300 = Yellow

**Matte Luma** - The Luminance or brightness control affects the selected Matte Hue, the parameter adjusts from 0 to 100% where 0% is no luminance or Black and 100% is maximum brightness.

**Matte Sat** - The saturation control affects the selected Matte Hue, the parameter adjusts from 0 to 100% where 0% is no saturation or no color i.e. only shades of Gray and 100% is fully saturated or maximum color.

## NAM/FAM

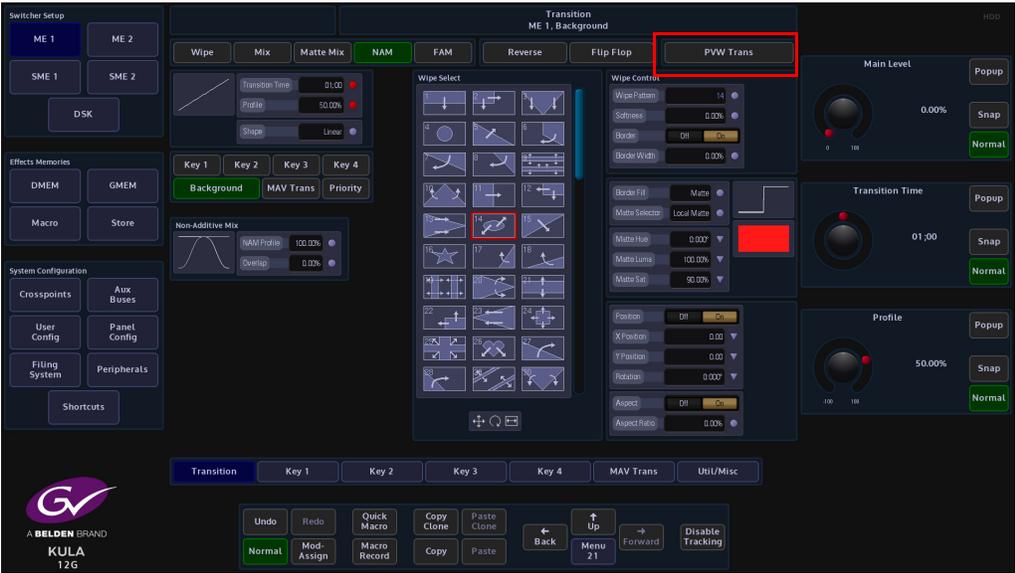
**NAM** - Non-Additive Mix profile, this is where the brighter parts of either source are more prominent than the darker parts during the transition. Thus the brighter parts of the fading out source are apparent for longer than the darker parts. A normal mix will fade out equally across all brightness levels.

**FAM** - Full-Additive Mix profile, this is where the luminance parts of each source are added together so that at the mid point through the transition, the luminance of both sources are at 100%.



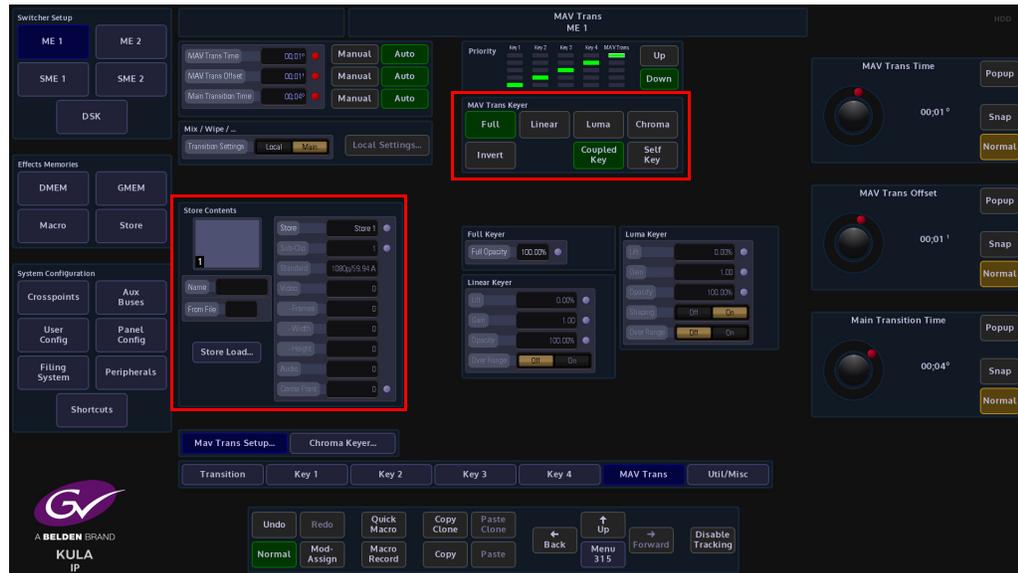
## PVW Trans (Preview Trans)

Allows the next transition to be previewed on the preview monitor without affecting the program output.



## MAV Trans

The MAV Trans function allows a Key transition to be associated with a selected Store from an internal source. As a transition is made between Pgm/Pvw backgrounds, the clip will become part of the transition as an effect.



### Setting up a basic MAV Trans

In the selected M/E touch the “**MAV Trans**” menu link button. The first thing to do is to make sure that the clip that is going to be used has a Key and associated Fill and that the **User Config - Store Setup** menu has a Key/Fill coupling setup for the Stores that the clip will be loaded into.

Once this is done, use the “**Store Contents**” attacher to select the correct clip. The attacher displays the associated information about the selected clip, including the Standard, Video length and format. Then in the MAV Trans menu, select **{Linear}** or **{Luma}**, so that the clip can be Keyed over the Pgm/Pvw background.

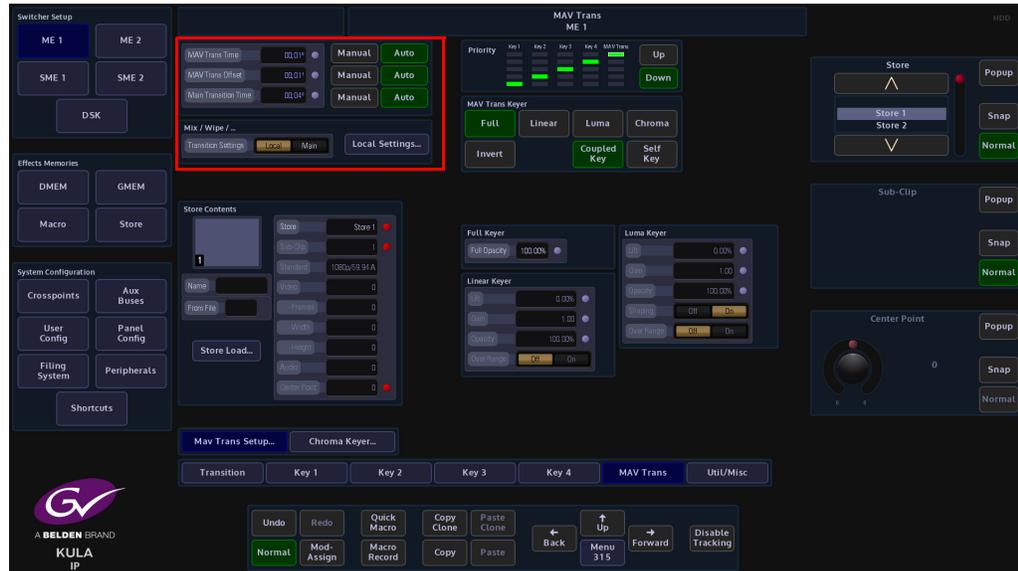
To test the MAV Trans, press the **[MAV TRANS]** button (shown below), and move the T-Bar from end to end. The clip is shown as part of the transition.



PGM/PVW Transition with Clip



Transition time and transition offset by default are set to **{Auto}**, but may need adjusting depending on the timing of the clip in relation to the Pgm/Pvw transition. By switching to **{Manual}**, the user is able to adjust the **MAV Trans Offset** parameter to their own preference so that the clip can be introduced into the transition at a defined point.



If there are Key Layers that have been set as part of the transition, the priority level of the clip in the MAV Trans can be changed using the **{Up}**/**{Down}** buttons in the Priority area of the menu.

A Mix or Wipe can also be introduced as part of the MAV Trans using the Mix/Wipe **{Local Settings}** menu.

Change the "Use Main Trans Settings" parameter to No, then press the **{Settings}** button. The menu will allow the user to select introduce a Mix, Wipe or Matte Mix into the transition



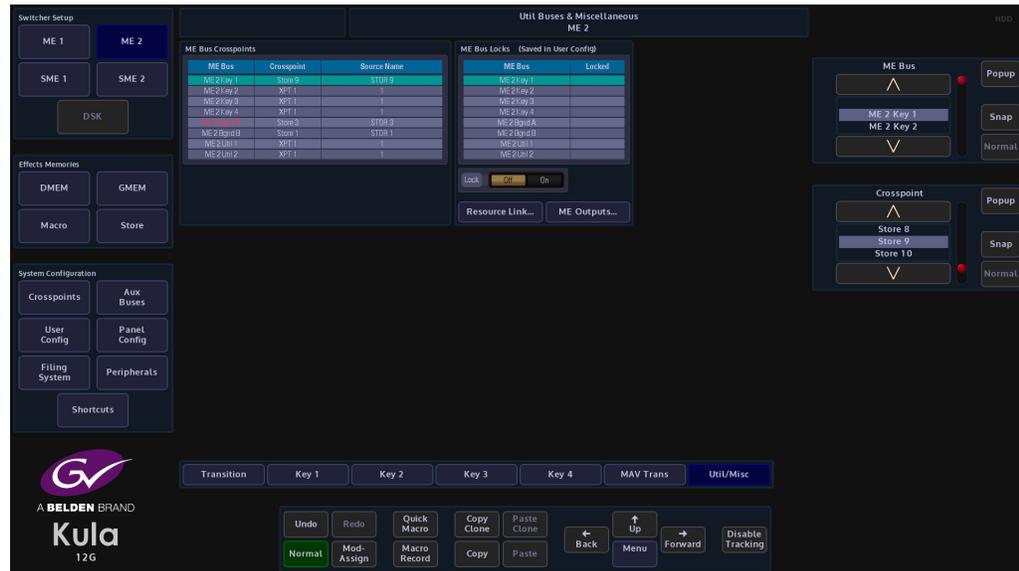
MAV Trans with Circle Wipe and blue Border



The Mix/Wipe transition parameters are the same as explained in the Transition section of this manual.

## Util/Misc

Kula has 2 Util Buses per M/E and SME, which equals up to 8 Util Buses in a 2M/E Kula mainframe. Util Buses are used as Borders, Backgrounds and Masks etc. In this menu, the user can set the sources for the Util Buses



The parameter controls associated with the menu are used to set the sources for the Utility Buses.

The table in the menu displays the crosspoint and the sources currently selected for the Util Buses.

Crosspoint Lock is used to lock crosspoints on selected utility buses so that the crosspoints and sources cannot be changed. Lock All will lock all crosspoints.

Utility Buses are selected on the Control Surface using the "Delegate" toggle buttons. Use the white scroll Up/Down buttons to scroll down to the required Util Bus and then press the OLED button to select.

## Keying

### Keying Theory

Keying is the process of inserting a specific part of one video signal (Key signal) into another video signal (background) to create a third signal. The Key signal has two jobs and may be one signal or two. It has to cut a hole into the background and Fill that hole with a picture, or a matte.

Where two signals are used one, the Key Cut, cuts the hole in the background and the other, the Key Fill, Fills that hole. The Fill has to be shaped to match the hole.

Where one signal is used it both cuts and Fills the hole. This process of Keying with a single signal is known as a self Key or video Key.

There are three types of Keying available with Kula; they are Luma Keying, Linear Keying and Chroma Keying.

### Linear Keying

Linear Keying is used where the Key signal is already Keyed, i.e., the area outside the required video is at black level. It is also used where there are separate Key Cut and Key Fill signals. The Key signal(s), (Cut and Fill) are usually anti-aliased (soft edged) shaped signals created by a character generator or graphics system.

### Luma Keying

Luma Keying is a Keying system that is typically used on sources that are not pre-Keyed, such as those from a camera. The Key Cut signal is generated from the video signal using lift and gain controls. The portions of the signal that is lower in luminance than the lift level cut the hole in the Key Layer.

The Key lift and gain levels are user adjustable.

The Fill may be the same source as the Cut or from a different source, or matte generator.

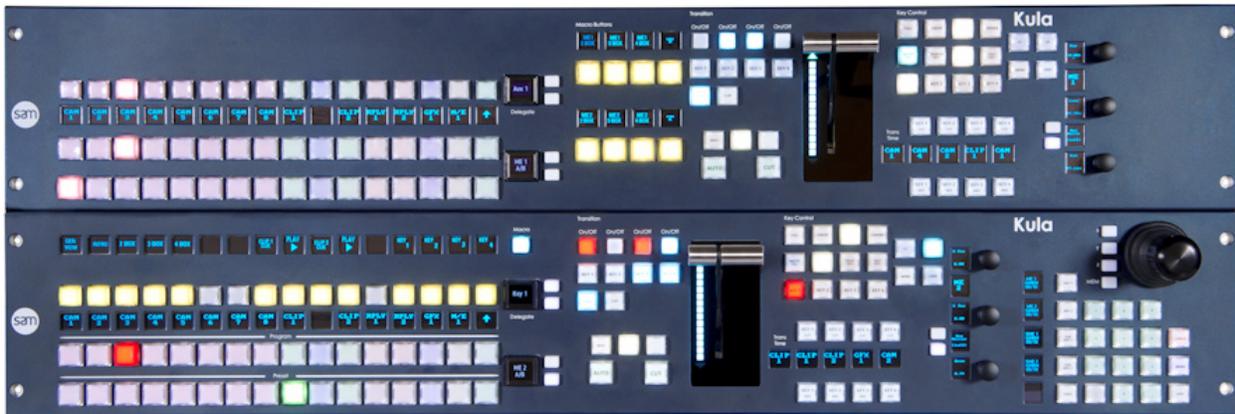
When only one source is used for both Key Fill and Key Cut the Key is called a Self Key or a Video Key.

### Chroma Keying

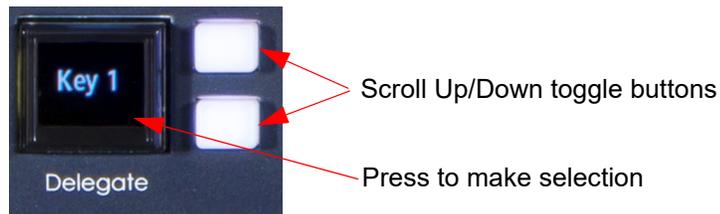
In chroma keying the Key Cut signal is derived from color rather than level. A particular color of a picture is keyed away to the background leaving the other colors visible over the background. The transparent color is user selectable and may be a range of colors or a single color. There are various controls to reduce fringing and other artifacts from appearing in the composite picture.

## Accessing Keys on the Control Surface.

The Kula has 4 Keys per M/E, and 2 Keys per SME. A Key can also be used in “Dual Tile” mode which will create 2 Key Layers from one, meaning that an M/E which originally had 4 Key Layers, in Dual Tile mode now has 8 Key Layers (explained later in this section). There are also 4 DSKs (down stream keys) that can be accessed. This will be discussed later in this section.



Selecting a Key or DSK is very easy. Use the toggle Up/Down delegate buttons next to the OLED button in “**Delegate**” area of the control surface. They allow the user to scroll through the options and then press the OLED button to make the confirmation.



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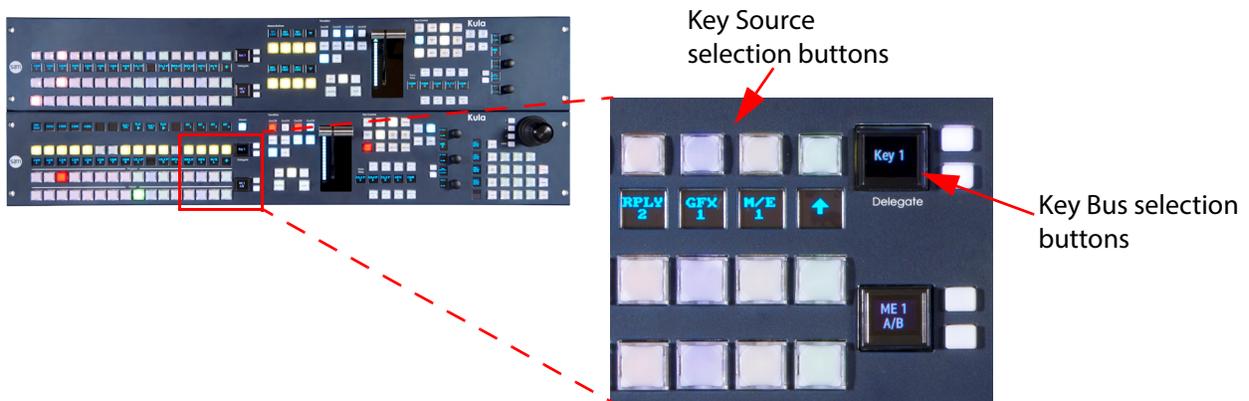
Note: Pressing both of the toggle buttons together will take the Delegate option back to Key 1.

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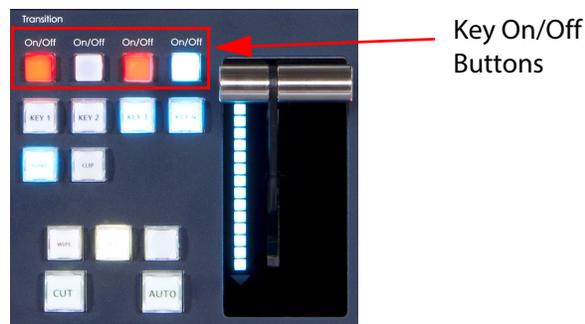
## Placing a Key Layer to an Output

This section of the manual will describe how to place a Key Layer onto a background. Keys 1 to 4 on an M/E are accessed using the “Delegate” control surface, described in the previous section; the Key Bus buttons on the control surface are used to select the required key and the required source is selected using the Key Bus Crosspoint buttons.

Pressing both of the toggle buttons together will take the Delegate option back to Key 1.



The Key Layers can then be cut to the source output using the Transition control area of the control surface.



Placing a Key Layer onto a monitor is done by using the **Key On/Off** buttons shown at the top in the diagram. The buttons toggle On/Off when pressed. With no Key Layer selected the buttons are unlit, when pressed the button will either light white/blue or tallied red. The Key Layer can now be seen on the monitor.

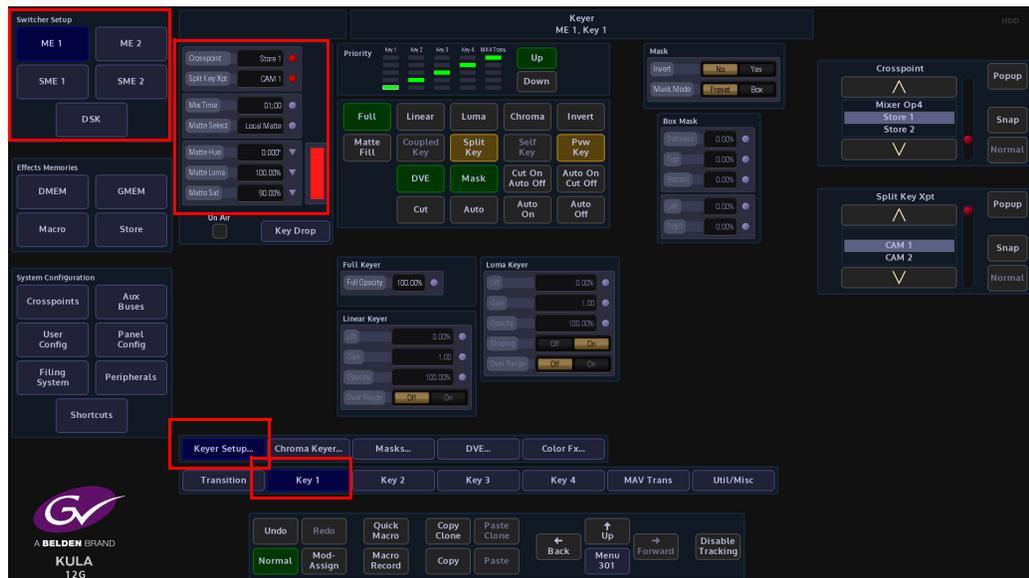
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Note: White = off air, Red = tallied on air and contributing to the programme output.  
The color of the buttons may vary depending on the user-defined color scheme.

---

## Keyer

To get to the Keyer menus, touch and M/E or SME, **{ME 1}** (in this example) button in the top left corner of the menu, then touch one of the **{Key 1 - 4}** buttons at the bottom of the menu to open the Keyer main menu. The first menu to be displayed will be the “Keyer Setup” menu as shown below:



**Crosspoint** - this parameter is used to select the source for the selected Key.

**Split Key Xpt** - this parameter is used to select the Key source when using “Split Key” mode.

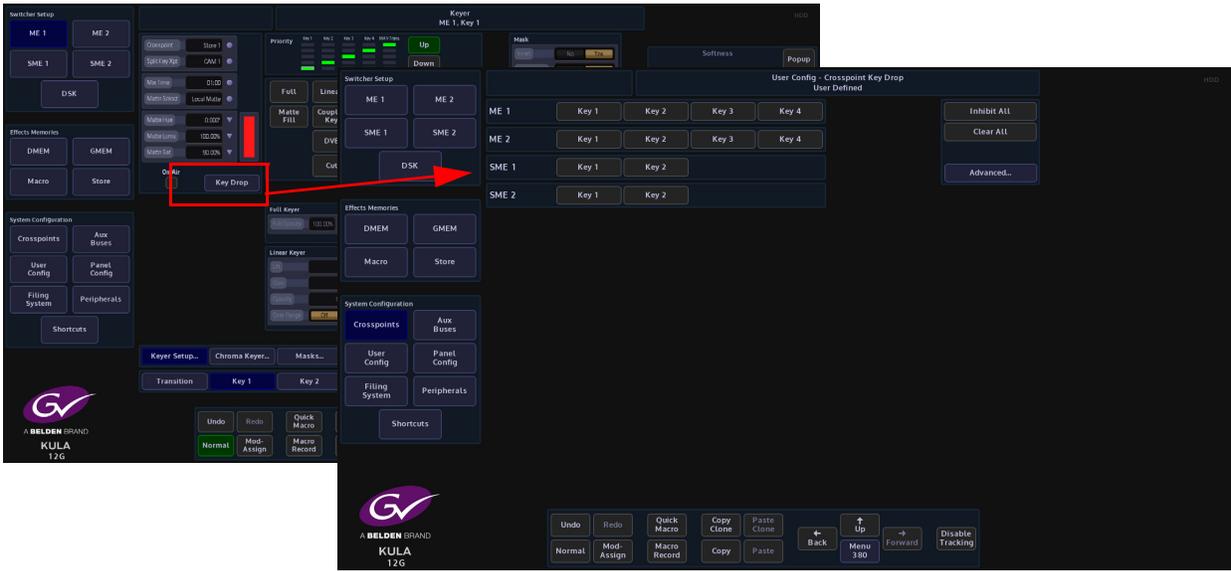
**Mix Time** - sets the time where a Matte-mix source passes through the Matte color before reaching the selected signal.

**Matte Select** - (when “Matte Fill” is selected) selects between Local Matte or Mattes 1 to 16.

**Matte - Hue, Luma Sat** - (when “Matte Fill” is selected) adjusts the color of the Local Matte only. The Local Matte color adjustment is displayed as the color bar next to the parameter controls.

## Key Drop

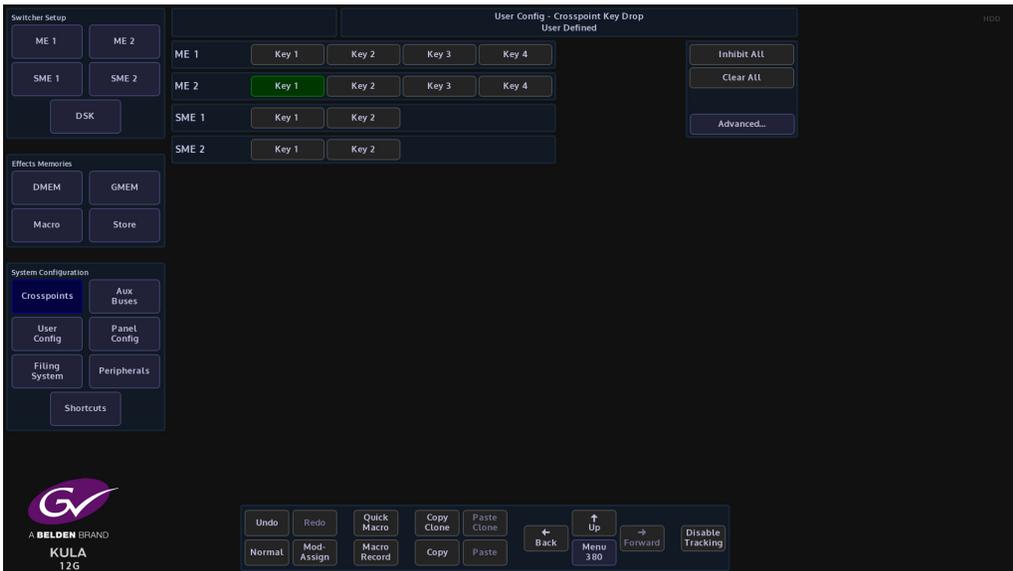
A simple explanation for Key Drop is that it allows the user to automatically switch off (drop) an active Key every time a new source is selected by cutting directly on the Program or Bgnd A Bus of an M/E.



Note: Key Drop menus can also be accessed in the “Crosspoints” menu.

In the M/E - “**Key Setup**” menu, touch the {**Key Drop**} button and the **User Config - Crosspoint Key Drop** menu will open (the Key Drop menu can also be accessed in the “**Crosspoints**” menu).

In this top menu or “simple” menu, the user can select a Key, from the list of available M/Es or SMEs (the selected Key will turn green).

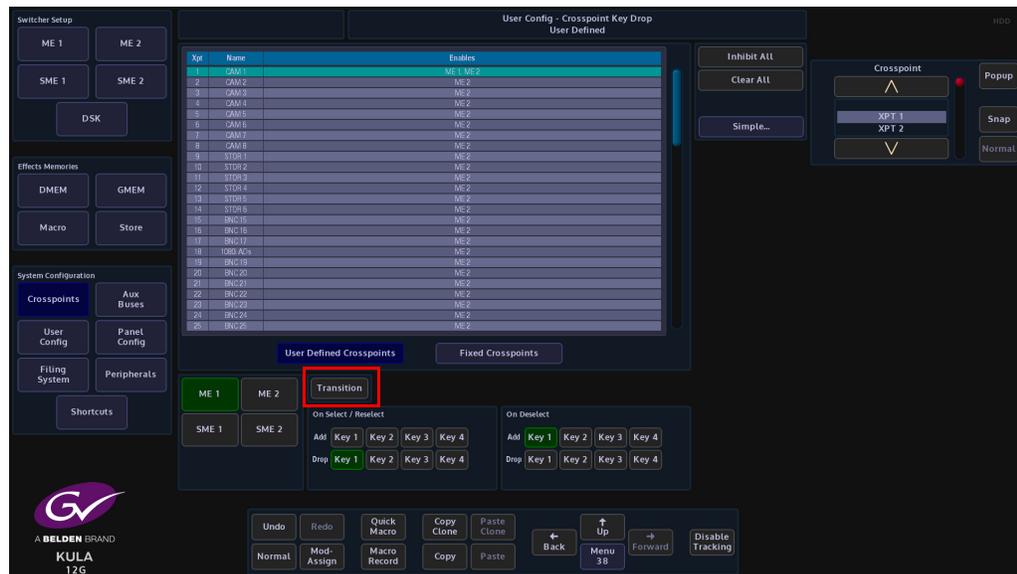


When that Key is selected on the program or Bgnd A Bus, the next Xpt button selected on that Bus will drop the Key. Notice that the Key is now shown on the Preview or Bgnd B Bus. Using the T-bar or **{CUT}**/**{AUTO}** buttons, will place the Key back on the Program or Bgnd A Bus, then next Xpt button pressed will drop the Key again.

**Inhibit All** - when this is lit, no Key Drop functions will be active

**Clear All** - removes all Drop/Add settings from the Simple and Advanced modes

The Advanced menu (touch the **{Advanced}** button) provides a more powerful automatic control of Keyer on/off state which is dependent on the crosspoint selected on the Bgnd A Bus.



This mode provides the user with the ability to have a Keyer active whenever a particular source is on-air by setting rules for every crosspoint and including automatic selection of the In Transition selection to ensure the Keyer state is controlled by the Transition control.

---

Note: Key Drop settings are stored in User Config files

---

By selecting a Keyer on an M/E, that Keyer will always turn off whenever a source is changed by directly cutting on the Program or Bgnd A Bus.

---

Note: If a Keyer has rules set in the Advanced mode, then this will be indicated by a Gold color.

---

The Inhibit All and Clear All functions for Key Drop can also be found on these menu pages. Each source can have rules set to Add or Drop a specific Keyer on each M/E whenever that source is selected on the Program or Bgnd A Bus of that M/E.

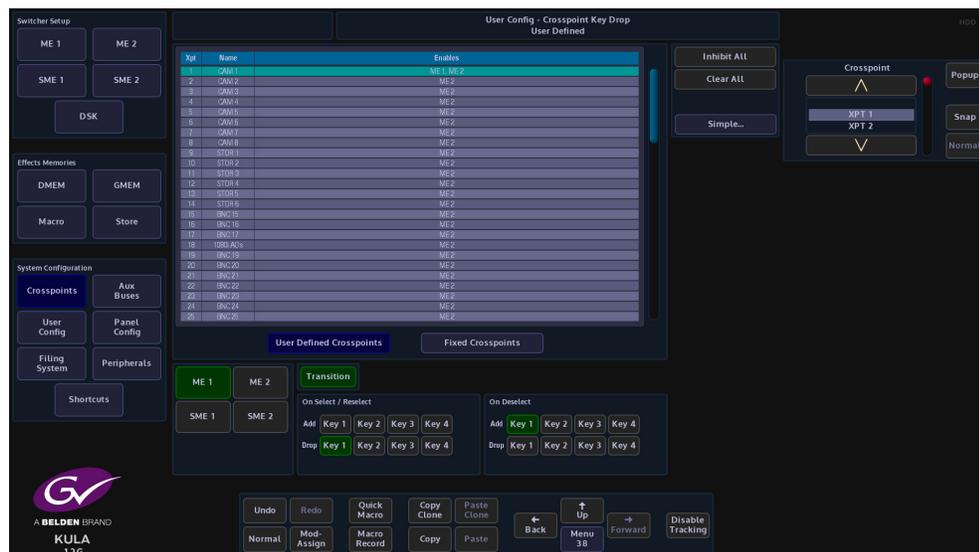
## Transition

By switching on this button, the selected M/E will automatically set the In Transition states for each of the Keyers which have Add/Drop rules applied in the Advanced Mode, depending on which crosspoints are selected on the Bgnd A and B Bus. The In Transition buttons will light in the Alert color to indicate that this In Transition state has automatically been set. The state of other Keyer and background In Transition states will not be changed. The automatically set states can be de-selected by the user before the transition is made.

## Example

The advanced state is extremely useful for situations where the user wants a source always to have a Keyer active, for example a remote source which always has a “GV” bug included in the picture.

Select M/E1 in the menu table. If the remote source is Xpt 1 and the bug is set up on Key 1 on M/E1, the user would need to go into the Advanced menu and select Xpt1 as the crosspoint and M/E1 in the enables.



Touch **{Add} {Key1}** in the “On Select/Reselect” control

Touch **{Key1}** in the On Deselect control

Touch **{Transition}** to light this control.

Every time the remote source is put on the output of ME1 the “GV” bug will be included the picture.

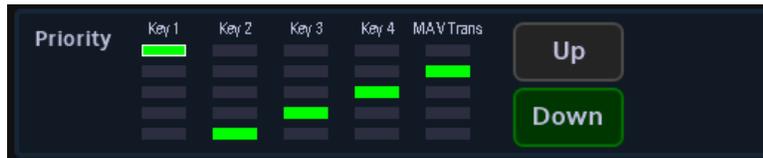
---

Note: Re-selecting a source which is already on the Program or Bgnd A/B Buses will reapply the appropriate In Transition rules. This could be useful if the rules are inadvertently changed, for instance, by adding another Key to the transition.

---

## Key Priority

The “in front” / “behind” position of each of the four Keyers is decided by the Priority control. The Key priority is changed by the **{Up}/{Down}** buttons. Select a Key using the Key On/Off buttons, then as the user presses the Up/Down buttons the green bars will change position, indicating that the selected Key priority has changed.



If a MAV Trans is being used, the priority can also be changed. By default the MAV Trans is always on top.

## Selecting a Type of Key Using Key Control

The type of Keying required is selected by touching one of the menu link buttons in the Keyer.



**Full** - The Fill is a full layer over the background hiding it completely.

**Linear** - Selects a Linear Key.

**Luma**- Selects a Luma Key.

**Chroma** - Selects Chroma Key.

**Invert** - Inverts the Key signal so that the parts, which were Keyed off, become Keyed on and vice versa.

**Coupled key** - (Latching) Uses the Fill and Key sources allocated to the crosspoint.

**Split Key** - (Momentary) Allows the Fill and Key sources to be split across two different crosspoints. The Fill is selected on the Key bus in the normal manner. The Key source is that allocated to the crosspoint selected on the Key bus with the Split Key button pressed and held down. When in Dual Tile Mode the Xpt selection for each tile can either be done using the Split key button or pressing the OLED Bus Select button.

**Self Key** - (Latching) In Coupled Key mode Self Key causes the Key, as well as the Fill, to be derived from the Fill source allocated to the crosspoint, also known as a Video Key. In Split Key mode Video Key causes the Key to be derived from the Fill source of the crosspoint used as the split away.

**Pvw Key** - Previews the Key and Fill individually.

## Other Key Control Functions



**DVE** - This turns on the DVE function. When entering the DVE menu, the DVE function will be enabled.

**Mask** - This enables the Preset Mask option. When entering the Preset Mask function, it will be enabled ready to use.

## Linear and Luma Keying

The Linear and Luma Keyer menus look similar. They each have independent sets of lift level, gain and opacity controls. The exception being the Shaping parameter in the Luma Keyer.



**Lift** - sets the Luma level at which the Key operates.

**Gain** - affects the sharpness of the lift point.

**Opacity** - controls how transparent the Key is.

**Shaping** - stops dark edges appearing around a Keyed source (anti-aliasing).

**Over Range** - Kula expects a video range Key of 64 to 940, the video range Key is used internally throughout the system.

If an external CG Key generator is providing a “full range” external Key of 4 to 1019, this would be classed as technically illegal video.

In this situation, the Over Range parameter can be used to bring the full range of a Key back within the video range Key levels.

When using sources that are not pre-Keyed, such as those from a camera, the Key cut signal is generated from the video signal using lift and gain controls. The portions of the signal that are greater in luminance than the lift level cut the hole in the background.

The Key lift and gain levels are user adjustable. The Fill may be the same source as the Key or from a different source, or matte generator.

---

Note: When only one source is used for both Fill and Key, the Key is sometimes called a Self Key or a Video Key.

---

# Box Mask

Box mask uses a mask shape to mask away the Key Layer revealing the Background layer. In the "Mask" attacher shown in the diagram below, select "Box".



**Invert** - inverts the background through the Key Layer

**Box Mask Mode** - selects between the Preset Masks and the Box Mask

**Softness** - this option softens the outside edge of the Mask

**Top, Bottom, Left, Right** - using the parameters, this function will mask each side of the Key Layer individually. Use the On/Off buttons shown in the parameters to switch the Mask On/Off.

## Chroma Keying

### Chroma Keying Overview

In chroma Keying the Key Cut signal is derived from color rather than level. A particular color of a picture is keyed away to the background leaving the other colors visible over the background. The transparent color is user selectable and may be a range of colors or a single color. There are various controls to reduce fringing and other artifacts from appearing in the composite picture.

Kula has a high quality Chroma Keyer on each Key on each available M/E (not on DSKs).

Chroma Keying can be used in both the Keying of graphics and live pictures. When Keying graphics, the set up of the Chroma Keyer will be quick and straight forward. This is because the Keyed area is easier to control in a 2D environment.

Keying for a live or moving environments is usually more involved and requires additional work as it is more difficult to control color and light.

### Achieving good results

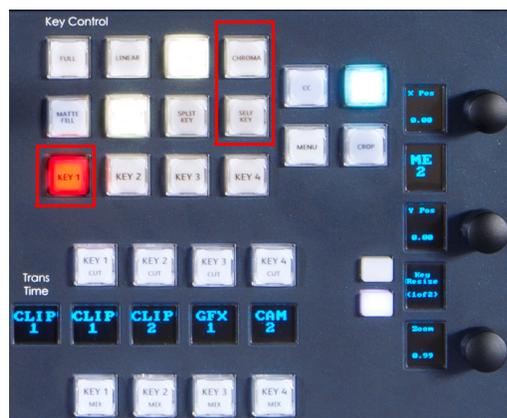
The main factor in setting up a good Chroma Key in a live environment is a well lit Key and subject. The Key (usually Blue or Green screen) should be highly saturated and even in tone. The lighting of the subject should highlight while aiming to limit the amount of Key color (sometimes resulting in 'spill') reflecting onto the subject. The subject should avoid like colors to the Key color to avoid break-up in the fill. In addition, appropriate and consistent camera setup will be important. The user should also ensure that the Chroma Key is set up for any camera movements and changes in picture.

### Using the Chroma Key Menus

To setup the Chroma Key feature quickly and easily, follow the stages listed in the following pages. Before starting to chroma key, ensure that the source material has been loaded into a **Store** and the Store has been selected on the required **Key Bus**. Then on the control surface, select the following:

- The **Key** that has the source material,
- The **{Chroma}** and **{Self Key}** are enabled (for normal keying).

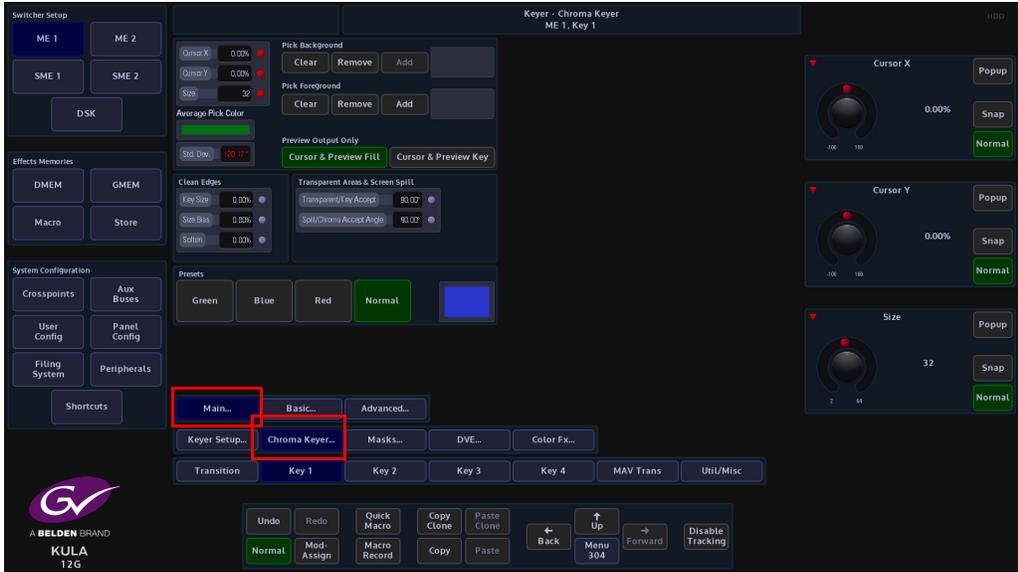
As shown in the diagram below.



### Chroma Keyer - Main Menu

In the Keyer main menu press the **{Chroma Keyer...}** menu link button to enter the Chroma Keyer “Main” menu.

The **Chroma Keyer - Main** menu is the default menu, the chroma Keyer has been designed so that the majority of chroma keying can be accomplished within this menu with just a couple of adjustments. The **Basic** and **Advanced** menus should only need to be used with particularly hard to chroma key source material.



As mentioned earlier, the **Chroma Key - Main** menu is designed to tackle a majority of chroma key source material. Most of the required adjustments to make a very good chroma key can be made in this menu.

The **Green, Blue and Red “Presets”** buttons are where the user should start to chroma key. The presets will achieve a good chroma key for the majority of good quality source material. The Preset controls have been engineered around a number of different chroma key material. The levels are then averaged out to give a good chroma key across the whole range of material used.

At this stage it is a good idea to work through a couple of chroma key examples; describing the setup and parameter adjustments, and then finally describing all the other parameter controls within the chroma key menu structures.

### Example 1

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Note: When starting to setup a chroma key, before making any adjustments, press the {Normal} button to normalize all the parameter controls. This is because the current default GMEM may be a user-defined default GMEM, not a factory default GMEM.

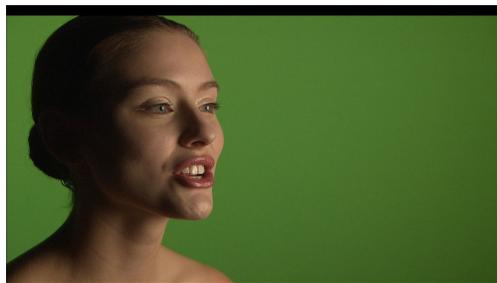
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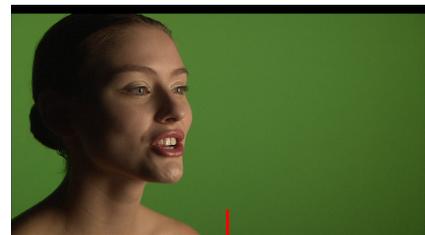
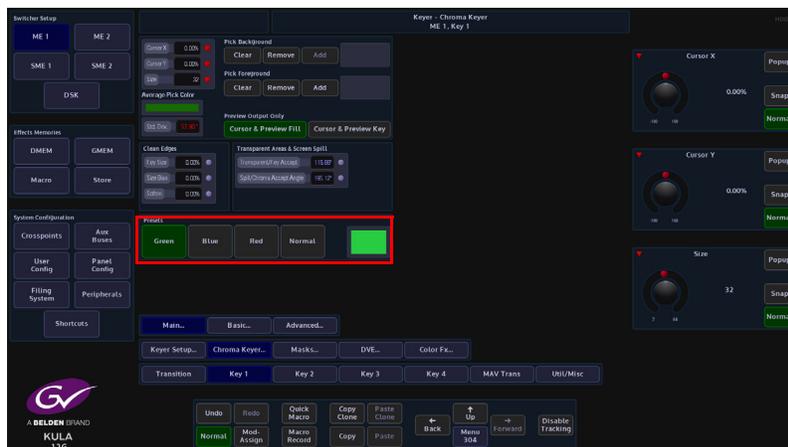
Note: Setup the chroma key on the preview (PVW) monitor so that if necessary, the color picker cursor can be displayed.

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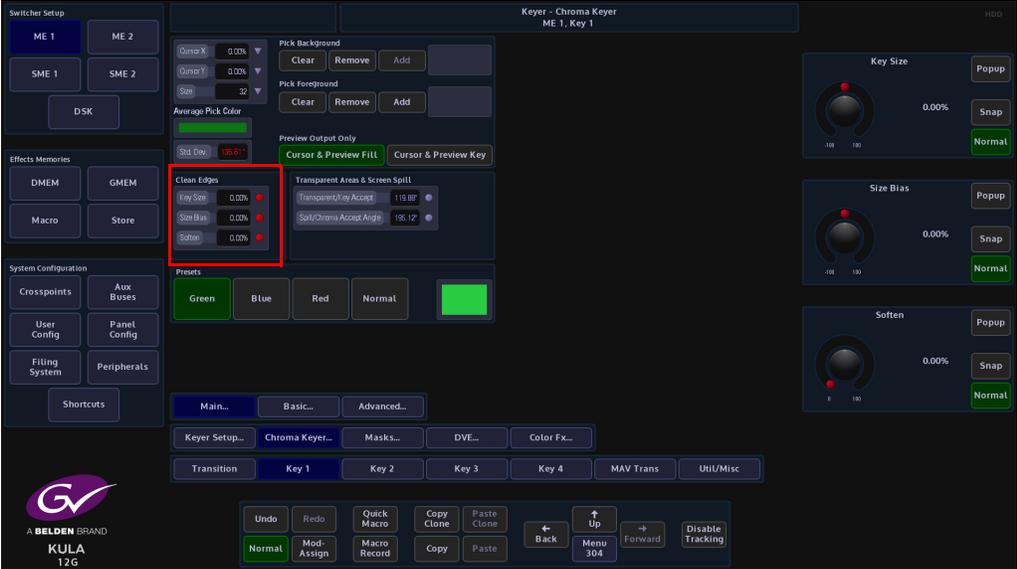
The chroma key source material used is shown below, this will be keyed over a flower field background.



Touch the {Green} Presets button and the source material will be chroma keyed over the selected background.  
It is as easy as that!



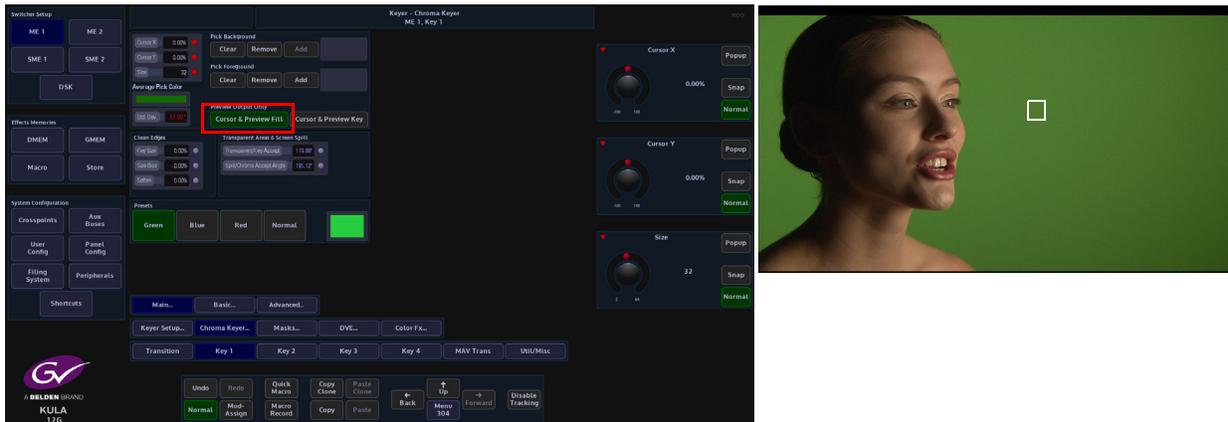
If the subject being chroma keyed has a hard edge (a hard dark/light edge) around it, adjust the **Clean Edge - Key Size** parameter in a negative direction, which will shrink the **Key Size** horizontally in steps as shown in the menu below.



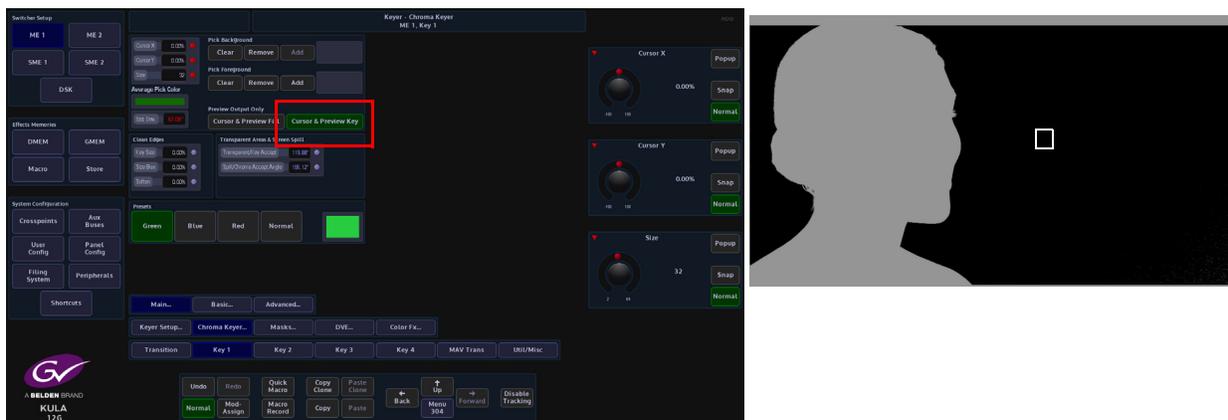
## Example 2

If the Presets Green/ Blue did not achieve the desired result, there is a second method to setup the chroma key using the background color picker.

With the source material on the PVW monitor, press the **{Cursor & Preview Fill}** button. This will bring the chroma picker cursor onto the PVW monitor.



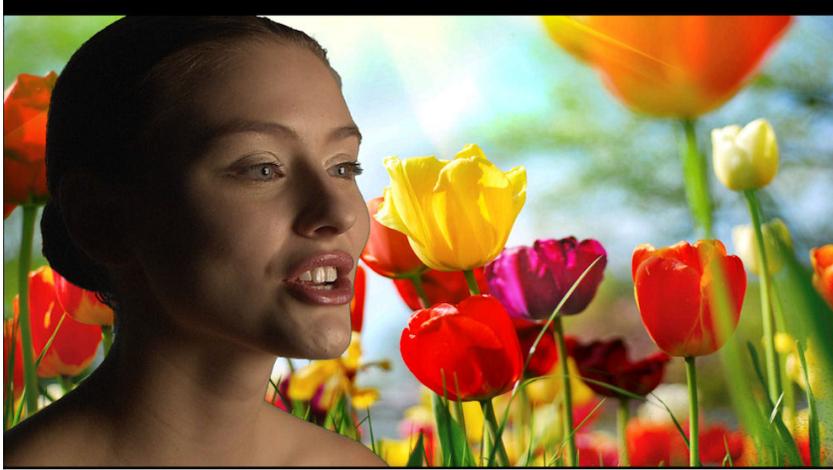
A Chroma Keyer will have a control to select the color, hue, needed to generate the Key. This is the **Background/Foreground Color Picker**. The color picker cursor allows the user to take samples of the Background and Foreground. The color picker is used by the chroma keyer to set the key and chroma acceptance angles. Touch the **Cursor X/Y** attacher and the cursor can be moved around the monitor using the joystick on the control surface. Rotating the top of the joystick will increase/decrease the size of the cursor, allowing a greater or narrower sample area to be taken. Select a section of the green screen background that has an even color and press the **Pick Background - {Add}** button to take a background sample.



Touch the **{Cursor & Preview Key}** button to display the Key signal. If there is any background breaking through into the key signal other than the subject being chroma keyed then move the cursor over the affected area and press the **Pick Background - {Add}** button once again. The key signal will have a clean background.

If the subject being keyed has any breakthrough then a **Foreground Pick** will be needed. Move the cursor over the affected area and touch the **Pick Foreground {Add}** button.

Touch the **{Cursor & Preview Key}** button once again to change the PVW monitor from the Key signal to the chroma key source over the background.

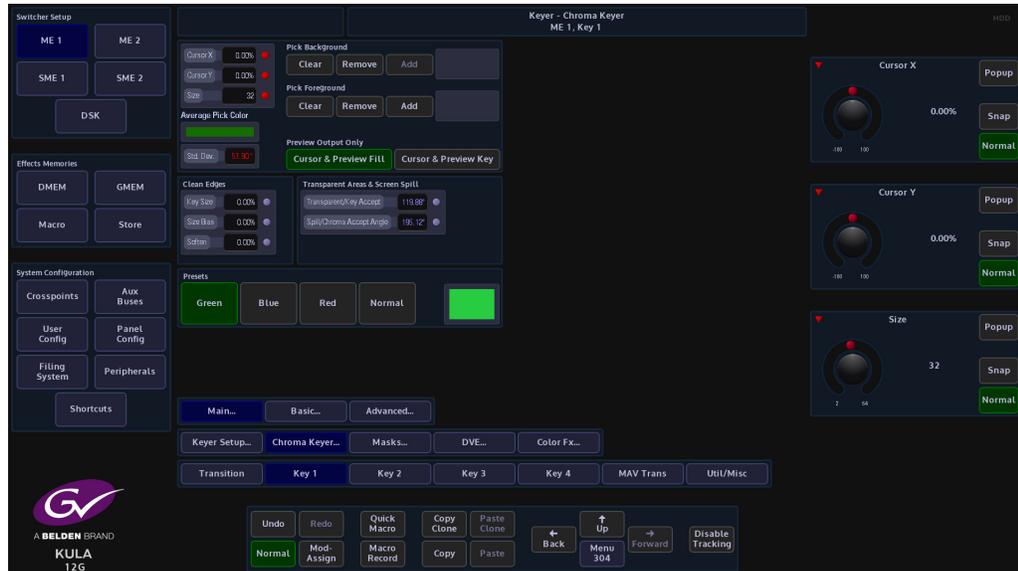


As with example 1, if the subject being chroma keyed has a hard edge (a hard dark/light edge) around it, adjust the **Clean Edge - Key Size** parameter in a negative direction, which will shrink the **Key Size** horizontally in steps.

Only source material that is particularly difficult to chroma key will need further parameter adjustments made on top of what has already been described.

## Chroma Keyer Main Menu

The two examples have shown that with just a few adjustments a good chroma key can be achieved. The next step is to describe the menu functionality in more detail.



**Pick Color** - this sets the Hue, Saturation and Luminance automatically. Key and Chroma Acceptance angles will also be set. Allows the user to select areas of the background and foreground to remove any unwanted breakthrough.

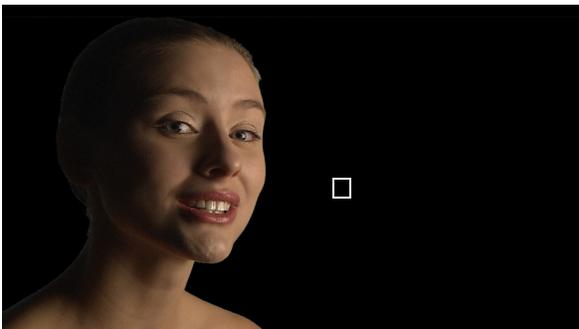
Pick Background and Foreground buttons:

- **Add** - will add the selected area inside the cursor to the color picker
- **Remove** - will remove one color pick at a time from the color pick display
- **Clear** - will clear all color picks from the display

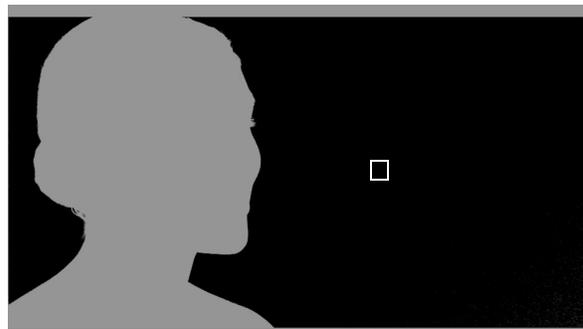
**Preview Output Only:**

**Cursor & Preview Fill** - with the chroma key source on a preview monitor, pressing this button will display the Fill portion of the chroma key without the selected background.

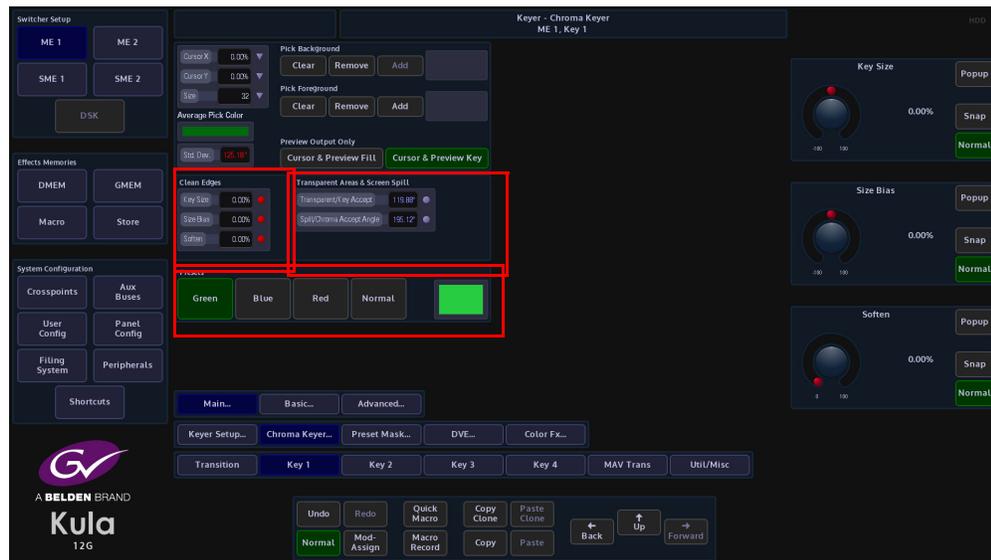
**Cursor & Preview Key** - with the chroma key source on a preview monitor, pressing this button will display the Key portion of the chroma key without the selected background.



Cursor & Preview Fill



Cursor & Preview Key



**Clean Edges** is a key size control. It allows the user to adjust the edge around the material that is being chroma keyed.

**Key Size** - will shrink or grow the key edge horizontally left or right in steps

**Size Bias** - this adjusts which side of the key edge is adjusted

**Soften** - applies a blur to the edge of the key (which edge depends on the Size Bias adjustment).

**Transparent/Key Accept Angle** - if opened wide enough allows foreground objects to become transparent. The lower the accept angle the less transparent the object being keyed is. In this way Key Accept Angle is also a transparency control.

**Spill/Chroma Accept Angle** - if the chroma acceptance angle is set narrow, say 60 degrees. This will remove the backing color from an object being chroma keyed, but the spill will remain on the foreground object. If the angle is increased to 200 degrees then spill on the foreground object is also removed. If too much angle is applied then the foreground object color is incorrect. In this way Chroma Accept Angle is also a spill control.

The **Green and Blue Presets** were designed to quickly chroma key good source material where the green or blue backgrounds are a consistent color and the object being chroma keyed has been taken from a good camera source.

The preset levels have been taken from a number of good quality source material clips and stills and will work with the majority of chroma key material.

If the Green preset button is pressed for example, the Key/Chroma Accept Angles will always be the same for any material being chroma keyed (Key Accept = 119.88 deg and Chroma Accept = 195.12 deg) as shown in the diagram below.

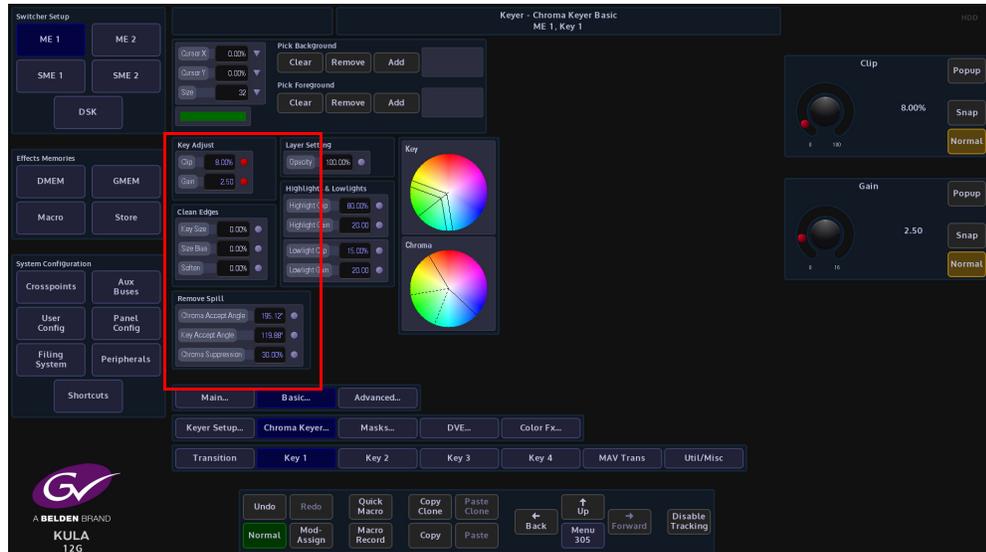
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Note: If any Background/Foreground color picking is done after using the Presets then the default Accept Angles are changed.

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## Chroma Keyer Basic Menu

This menu should be used if the source material is particularly hard to chroma key and requires more precise adjustment.



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Note: The Background/Foreground Picker and Clean Edges menus have the same functionality as in the “Main” menu.

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**Clip** - sets the overall brightness of the Key Layer. Adjust the Clip parameter to fill in any transparency in the background or foreground image.

**Gain** - sets the hardness of the edges between the key and the fill, by adjusting the contrast of the key. It can be used to show or mask fine detail at the edges of the foreground. Setting this too high will lead to hard edges to your key.

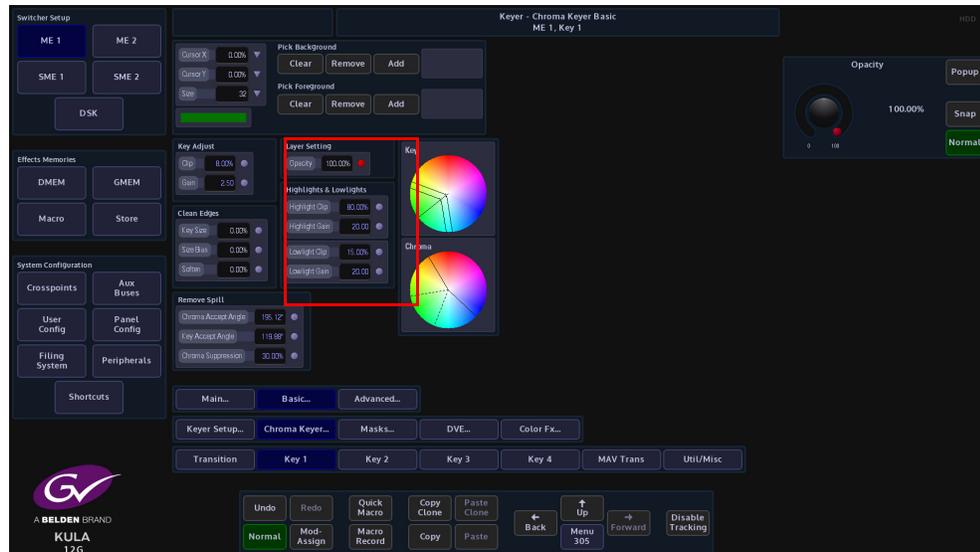
**Chroma Accept Angle** - this defines what colors (outside of the dotted lines in the Chroma clock) are re-mapped towards the colors along the chroma accept angle. It is important that this is at least the width of the Key Accept Angle. Adjust this parameter to remove as much of the spill as possible, however opening this too wide will modify the foreground color (as they are remapped).

**Key Accept Angle** - This sets the angle value of the range of colors to be keyed out. E.g., if it is required to key out green (hue 120) and yellow (hue 60) the Hue control should be set to 90 and the key accept angle to 60, i.e., + & - 30 on the Hue of 90 to give 60 and 120. If this is not set correctly the key window will include not enough or too many colors.

**Chroma Suppression** - sets the amount suppression applied to the unwanted colors in the keyed signal. The Chroma Suppression needs to be set to minimum value with no color in the background. If the image has areas of transparency or semi transparency, touch the Chroma Suppression attacher and adjust the controls for optimum results to remove any residual background color from the image.

**Opacity** - this controls the opacity of the Key.

The **Clip** and **Gain** control of these parameters adjust the clipping level for the blacks (shadows) area of the signal.

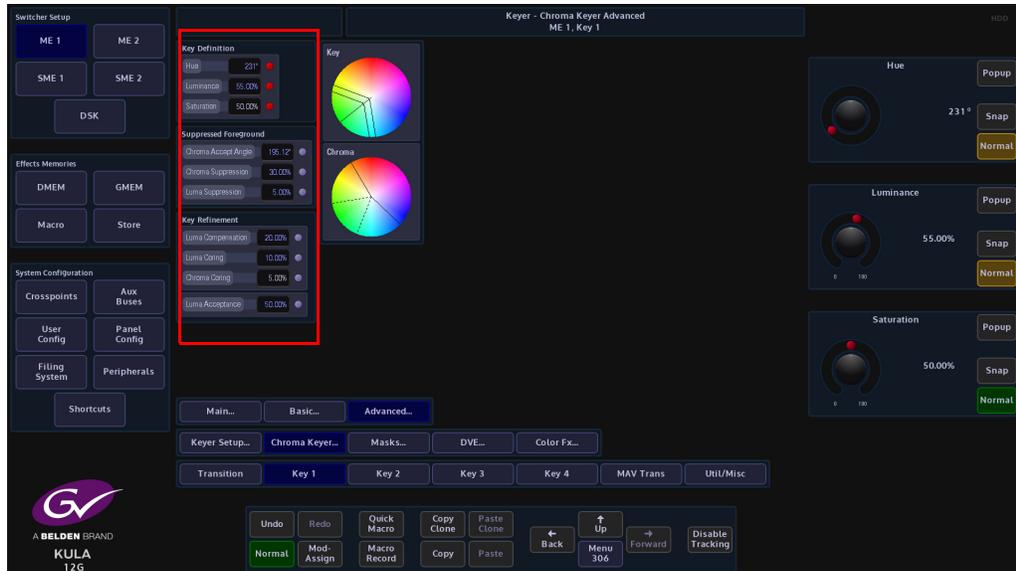


**Highlights** - reduce the main chroma key in areas of bright foreground luma. This is achieved by subtracting the highlight lift from foreground luma and multiplying that by the highlight gain. Multiply this result by the main chroma key and subtract only the positives to the main chroma key again thereby reducing it.

**Lowlights** - reduce the main chroma key in areas of dark foreground luma. This is achieved by subtracting the lowlight lift from foreground luma and multiplying that by the lowlight gain. Multiply this result by the main chroma key and add only the negatives to the main chroma key again thereby reducing it.

## Chroma Key Advanced Menu

Again, this menu would be used for a more advanced setup of a chroma key.



**Hue** - Selects the color to be made transparent by setting it to the appropriate hue angle. If a range of color is required, Hue is set to the center value of the range.

**Luminance** - This sets the luma value of the color to be keyed out.

**Saturation** - This sets the saturation level of the color to be keyed out. If this is not set correctly the colors of the signal showing through the key will not be right.

**Chroma Accept Angle** - this defines what colors (outside of the dotted lines in the Chroma clock) are re-mapped towards the colors along the chroma accept angle. It is important that this is at least the width of the Key Accept Angle. Adjust this parameter to remove as much of the spill as possible, however opening this too wide will modify the foreground color (as they are remapped)

**Chroma Suppression** - this defines the range of colors (within the dotted lines within the chroma clock) that get suppressed to Gray. The Chroma Keyer will de-saturate the spill area to Gray, as it is harder for the eye to recognize compared to a bright Blue or Green halo. Adjust this parameter to reduce the Gray outline and get the best possible results.

**Luma Suppression** - sets the amount of suppression applied to the luma content of the keyed signal.

**Luma Compensation** - is used to adjust the for the level of transparency.

**Luma Coring** - this adjusts the luma level included in the Key signal by modifying the Key acceptance area in relation to the luminance levels.

**Chroma Coring** - this adjusts the colors included in the Key signal by modifying the Key acceptance area in relation to the Hue angle.

## Preset Masks

Preset Masks allow the Key Layer to be masked; they do this by using a pattern to key through to the background layer. There are two Preset Mask options, both are identical in operation and both can be applied to a single Key Layer.



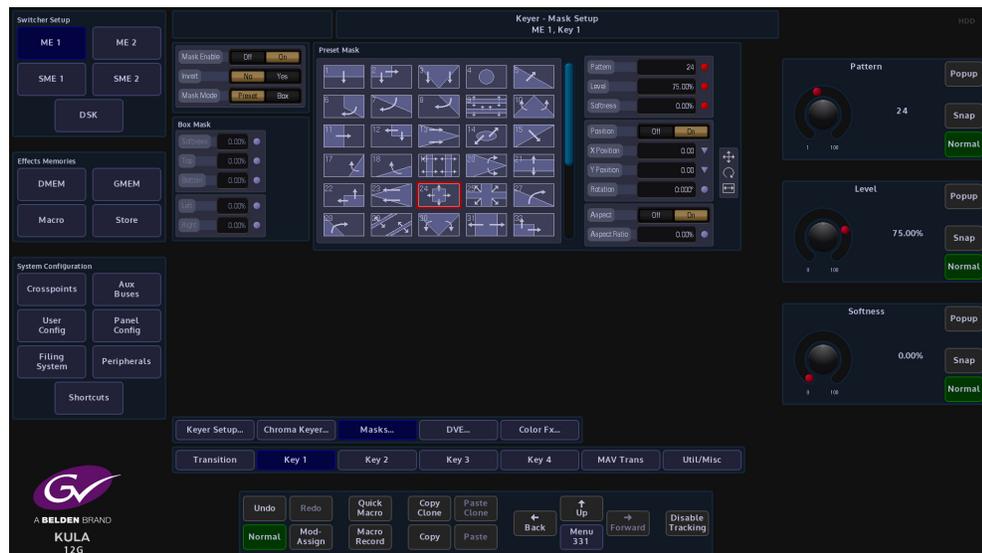
Each mask has arrows identifying which direction the mask will be adjusted using the parameter level controls.

Use the Pattern parameter to select a mask or by touching the appropriate pattern on the GUI, a red square will appear around the mask.



Notice the box directly below the mask menu. When a mask is selected this box will display parameters that denote how the mask can be adjusted. Touch this box and a set of adjustment parameters will appear on the right of the menu.

## Parameter Controls



**Mask Enable** - enables the Preset Mask

**Invert** - inverts the mask leaving the background visible within the preset mask pattern

**Mask Mode** - select between Preset and Box masks.

Preset Mask mode:

**Pattern** - scrolls through the masks available

**Level** - controls the amount of mask wipe

**Softness** - makes the edge of the mask soft

**X Position** - moves the center of certain masks in the horizontal direction

**Y Position** - moves the center of certain masks in the vertical direction

**Rotation** - Rotates certain masks. The rotation parameter displays the rotation in degrees, and the amount of rotations made.

**Aspect Ratio** - varies the aspect ratio of the mask

# DVE

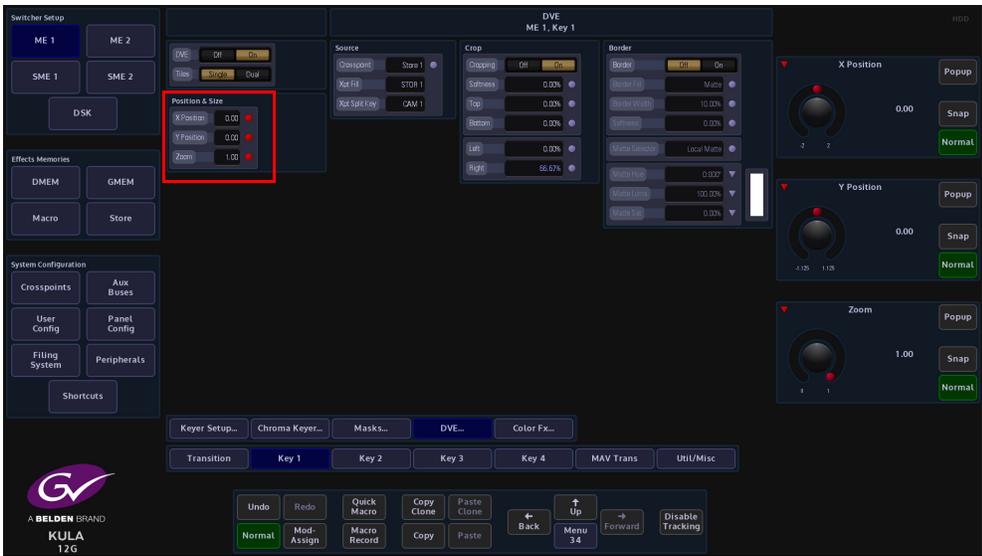
The DVE parameters allow the user to position and size a Key Layer, add a Border around a Key Layer or Crop a Key Layer.

When enabled the DVE can be set to manipulate a Single or Dual Tile (which will be explained later in this section).

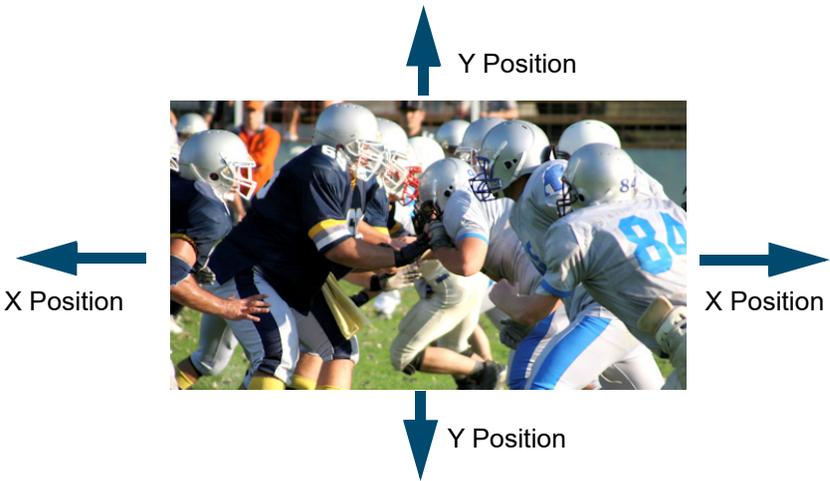
The user can choose which source they wish to manipulate using the **“Crosspoint”** parameter. Touch the Popup button to select Xpt, Matte, M/E output or Stores.

## Position & Size

The **Position & Size** attacher area, allows the user to move a Key Layer around the screen and to zoom in/out.



**X/Y Position** - Parameters are used to move the position of the Key Layer around the monitor screen as shown below.



**Zoom** - Parameter is used to zoom the Key Layer in and out.



### Crop

The crop menu as it suggests allows the user to crop the Key Layer, and also allows the user to apply soft edges.

**Cropping On/Off** - Switches the crop facility On or Off,

**Top, Bottom, Left and Right** - Crops the Fill edges



Original Key Layer



Bottom Crop



Left Crop



Right Crop



Top Crop

## Border

This function allows the user to apply a border and effects around a Key Layer.

**Border On/Off** - Switches the Border On or Off

**Border Fill** - Selects source for the border fill from a Matte selected using the Matte Selector parameters, Util 1 or Util 2

**Border Width** - Adjusts the overall width of the border

**Softness** - Softens the outside edges of the border



Original Key Layer



Border Applied



Changed Border Fill



Border Width Adjusted

The **Matte Selector** and **Hue**, **Luma** and **Sat** parameters are used to adjust the color of the border around a Key Layer when the option is selected in the Border Fill parameter. The user is able to select one of 16 preset Mattes, or create a user-defined color for the border using the Hue, Luma and Sat parameters.

**Matte Selector** - Selects the preset Mattes 1 to 16 or a Local Matte that allows the user to create a their own border color.

**Matte Hue, Luma and Sat** - These parameters allow the user to adjust the Hue, Luma and Saturation levels of the Local Matte. The user is able to create their own unique border color around a Key Layer.

## Dual Tile

This function allows you to take an existing Key Layer and create 2 Tiles (Key Layers) that can be independently resized (Zoom), moved along the XY axis, and cropped.

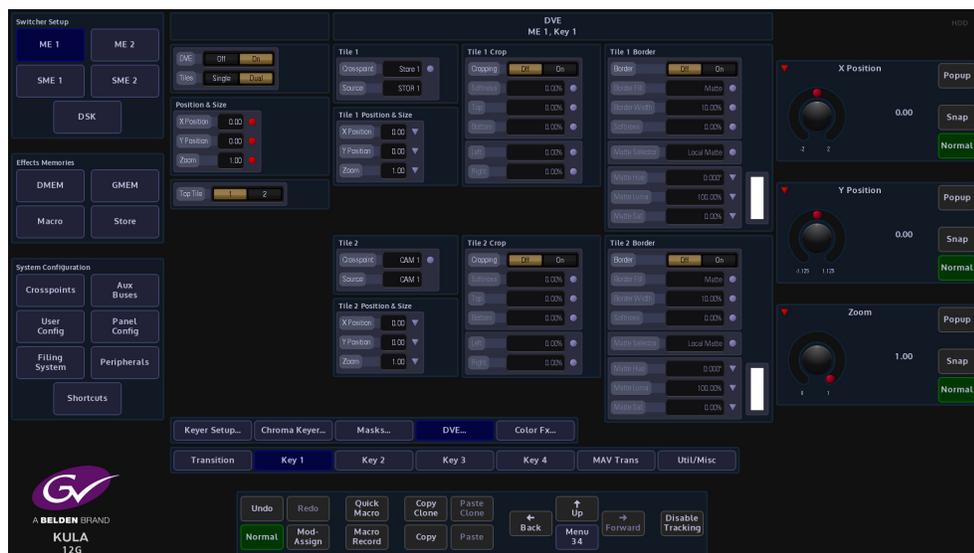
The Dual Tile mode will now give:

4 Keys per M/E that can now be used as 8 Tiles

You will also have 2 Keys per SME. Key1 has dual tile functionality, allowing an SME to now have two tiles.

The Dual Tile mode is easy to setup and easy to use. To use this function, bring a Key Layer onto a monitor and use **“Dual Tile”** On, then select **“Tile 1”** in the Key Control area of the control panel to Zoom down the Key Layer.

Note: When in Dual Tile Mode the Xpt selection for each tile can either be done using the {Split Key} button or pressing the OLED Bus Select button.



M/E1 Key 1 Over a background

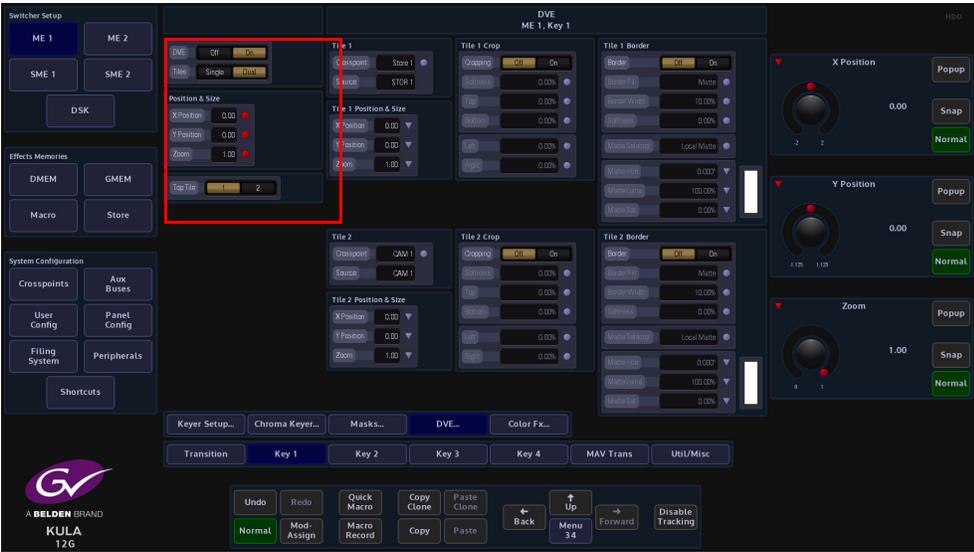
## Dual Tile Menu

With a Key Layer on the monitor, make sure that the “DVE” parameter is turned “On” and then select “Tiles” Dual. Notice that the menu is split in two “Tile One” and “Tile Two”.

Note: At this point you will only be able to see one tile, the other is underneath.

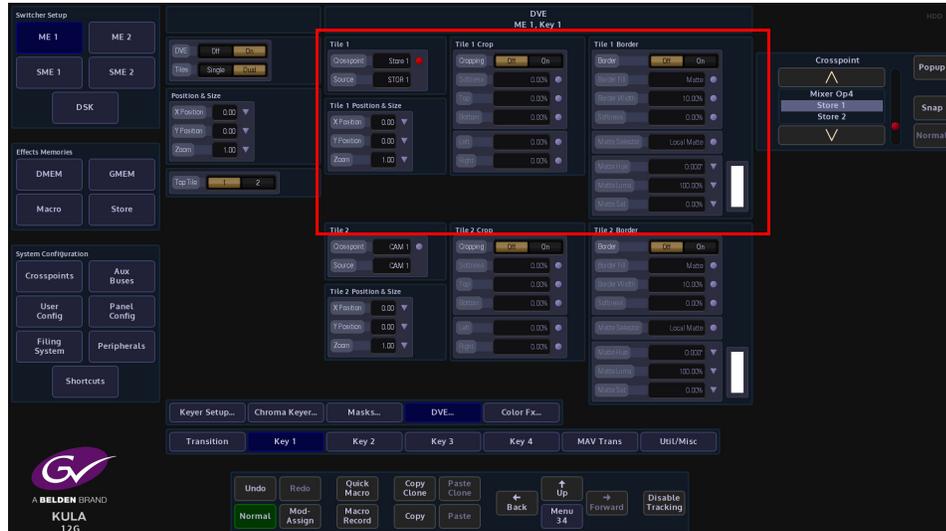
Use the “Top Tile” parameter to swap around the tile priority, the bottom tile becomes the top. The parameter controls for Tiles 1 and 2 are exactly the same. The parameters for Tile 1 will be described in this section.

Use the “Crosspoint” attacher to select the source for Tile 1. This can be a Xpt source, Matte, M/E, or Store.



## Tile 1 Position & Size

The **Position & Size** attacher area, allows the user to move a Key Layer around the screen and to zoom in/out.user-defined

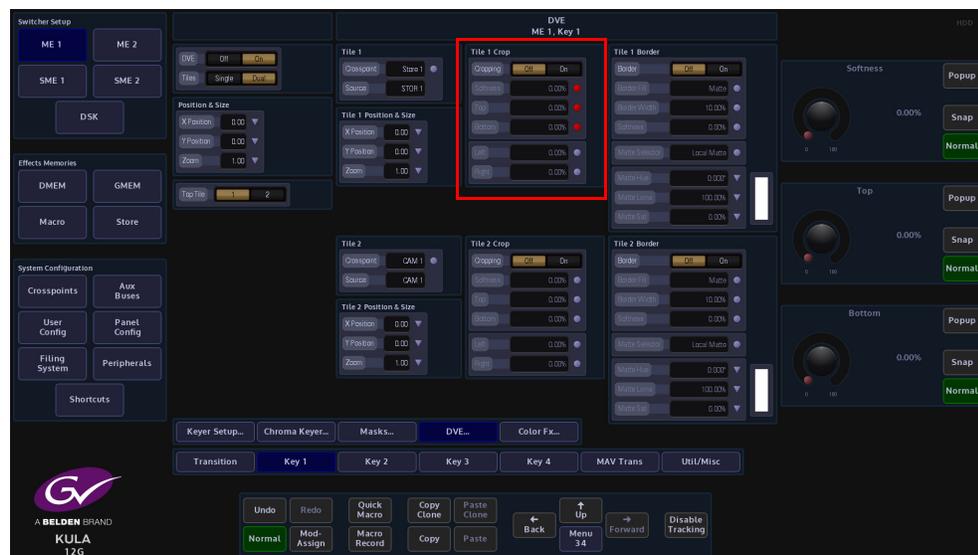


**X/Y Position** - Parameters are used to move the position of the Key Layer around the monitor screen.

**Zoom** - Parameter is used to zoom the Key Layer in and out.

## Tile 1 Crop

The crop menu as it suggests allows the user to crop the Key Layer, and also allows the user to apply soft edges.

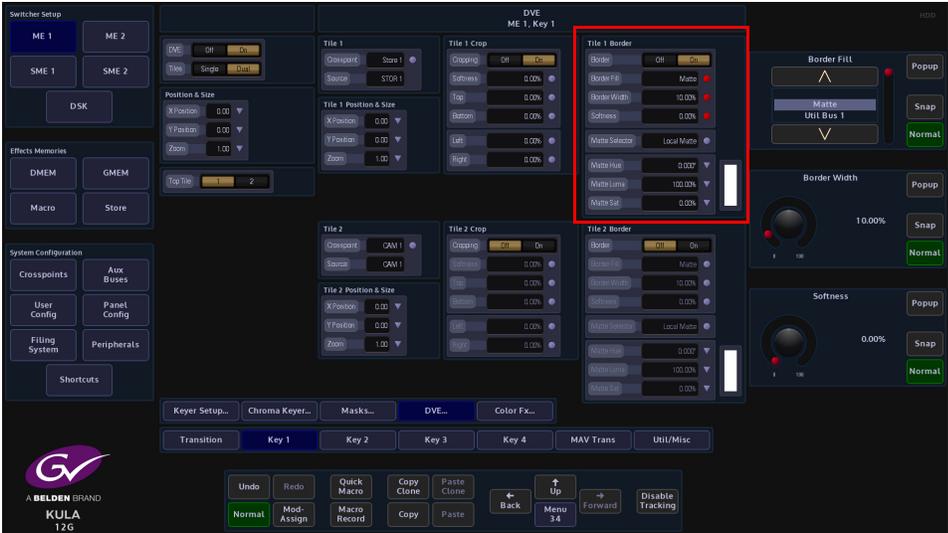


**Cropping On/Off** - Switches the crop facility On or Off, press the On/Off buttons in the parameter control area of the menu.

**Top, Bottom, Left and Right** - Crops the Fill edges

### Tile 1 Border

This function allows the user to apply a border and effects around a Key Layer.



**Border On/Off** - Switches the Border On or Off

**Border Fill** - Selects source for the border fill from a Matte selected using the Matte Selector parameters, Util 1/Util 2.

**Border Width** - Adjusts the overall width of the border

**Softness** - Softens the outside edges of the border

The **Matte Selector** and **Hue, Luma** and **Sat** parameters are used to adjust the color of the border around a Key Layer when the option is selected in the Border Fill parameter. The user is able to select one of 16 preset Mattes, or create a user-defined color for the border using the Hue, Luma and Sat parameters.

**Matte Selector** - Selects the preset Mattes 1 to 16 or a Local Matte that allows the user to create a their own border color.

**Matte Hue, Luma and Sat** - These parametes allow the user to adjust the Hue, Luma and Saturation levels of the Local Matte, the user is able to create their own unique border color around a Key Layer.

### Moving the two tiles so that both can be seen

The two tiles are controlled using the Tile Position & Size parameters. Using the XY parameters for Tile 1, the tile will move as expected and move away from Tile 2.



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Note: If you use the "Main" Position & Size; XY or Zoom parameters, both of the tiles will move together.

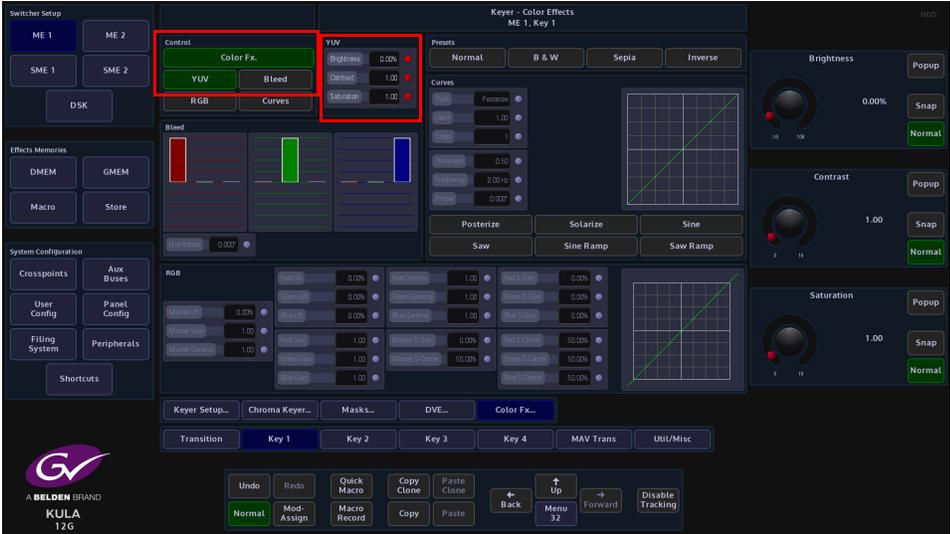
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# Color Correction - Key Bus

Key Bus color correction allows the user to color correct a selected Key. To use Color Correction, touch the **{Color FX...}** menu link button.



In the Color Effects menu, make sure that the **"Color Fx"** button is selected, from here the user can select the type of color correction required.



## YUV

Touch the **{YUV}** button to enable the parameter controls. Touch the **YUV Control** attacher and by changing the parameters, the Brightness, Contrast and Saturation of the channel can be adjusted.

Brightness default value is 0.00%, and the range is from -10% to 100%

Contrast default value is 1.00%, and the range is from -0% to 16%

Saturation default value is 1.00%, and the range is from -0% to 16%

As each of the above are adjusted notice that the percentage of adjustment is shown in the YUV attacher.

## Bleed

Color bleed is a situation where a single color will over power the other colors in the RGB signal. By using the bleed function the stronger color can be softened to make the color output more natural, or adjusted to suit a specific need.



The initial menu has a default state where a single adjustment for each parameter menu is active; this will allow the adjustment of the main RGB bleed parameters:

- Red into Red
- Green into Green
- Blue into Blue

Touch one of the Bleed color blocks to enable all the options for that color. This will allow a detailed adjustment for each of the R, G and B bleed settings. The adjustments are measured on a -100% to a +100% scale. Each parameter menu will adjust a single color, i.e. red into red, green into red and blue into red. These changes are also reflected graphically in the RGB bar graphs above the parameter sets.

## RGB

Touch the “RGB” button to enable the parameter controls. The initial menu is set to a default condition, which Shows the Master adjustment parameters. This will give an adjustment of Master Lift, Gain and Gamma. Each of these adjustments will alter all three elements of the RGB signal at the same time.



When one of the master parameters is altered, notice that the RGB curve profile changes in the graph situated center of the menu.

Touching one of the attachers allows a more accurate adjustment to the RGB components where the:

**RGB Lift** - parameters adjust the images Black Level, working on Black or shadow areas.

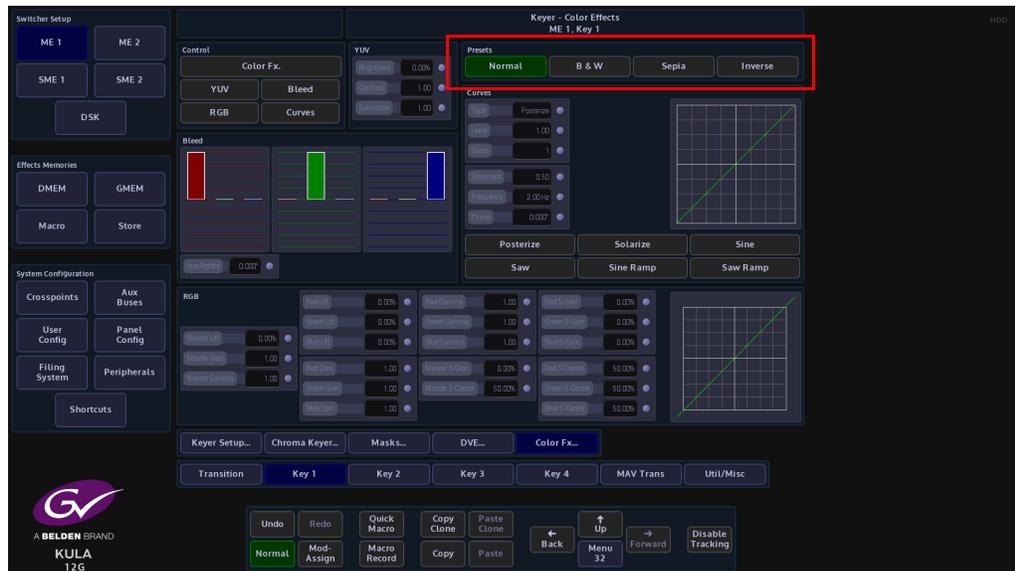
**RGB Gamma** - parameters adjust the levels between dark/shadow and the mid tones, where the mid tones become brighter or darker; depending on the adjustment made.

**RGB Gain** - parameters control the White level or highlights, where brighter colors become brighter or darker; depending on the adjustment made.

**RGB S Gain and S Center** - the parameters adjust the gain mid tone levels of the S curve and the center point levels of the s curve.

## Presets

Presets allow the user to quickly select commonly used preset color options for the crosspoint source, or quickly revert back to the original input source color levels.



**Normal** - Is the original color levels of the input source; without any color correction adjustments.

**B & W** - Sets the chroma saturation to zero removing the chroma content, making the signal black and white.

**Sepia** - Sets the chroma saturation to zero removing the chroma content, then adds positive portions of Red and Green and a negative portion of Blue to make-up a sepia appearance.

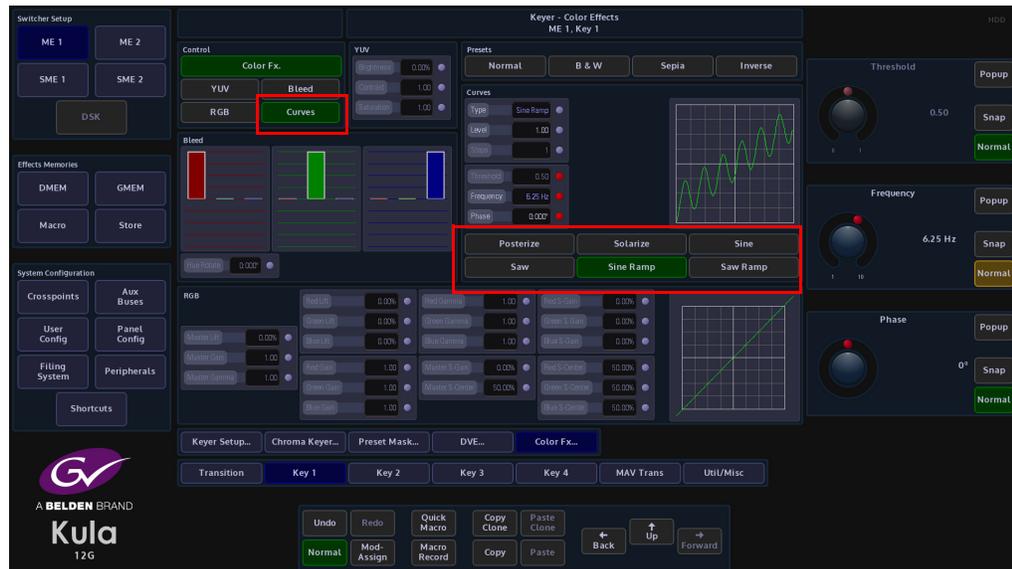
**Inverse** - Inverts the video signal making the picture a negative of its correct colors.

If the **Normal** preset option is selected, then all color correction controls are Grayed out preventing any adjustments. This is to make sure that the original crosspoint source can be recalled.

If **B&W**, **Sepia** and **Inverse** are selected, the preset levels can all be color corrected.

## Curves

The Curves function is used to artistic type effect to the selected Key Bus. The user can select preset effects such as Solarize and Posterize, and then adjust them to give a user-defined effect.



The user can select from 6 Preset Curve options by touching the button or use the **Type** parameter to select from a list of options.

Touch the top attacher, the **Level** parameter changes the level of effect on the selected channel, from a normal looking source to an extreme manipulation effect with full effect.

The **Type** parameter as mentioned above selects the type of Curve effect.

When the **Steps** parameter is adjusted, the more steps there are in an effect, the less extreme the effect will appear.

In the bottom attacher there are 3 parameters that can be used to modify a selected preset curve, not all of the parameters work with all of the preset curves.

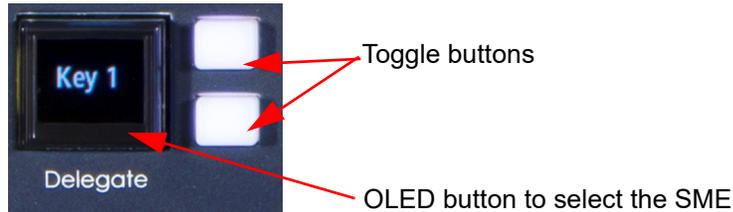
**Threshold** is used to change the shadow and highlight values of the selected preset curve,

**Frequency** determines the number repeated occurrences are applied to the effect. The

final parameter is **Phase**, this adjusts the effect starting point within the Step cycle.

## SME Setup

SME or Sub M/E in simple terms is another form of M/E with slightly less functionality and depending on the system purchased, there will 1 or 2 SMEs available to use. Delegating an SME on the control surface is done in the same way as delegating an M/E, using the toggle buttons to step through the M/Es and SME, and the OLED button to select the SME.



An SME has 2 Keys, one with DVE functionality, so it also has “Dual Tile” functionality as well, and one without.

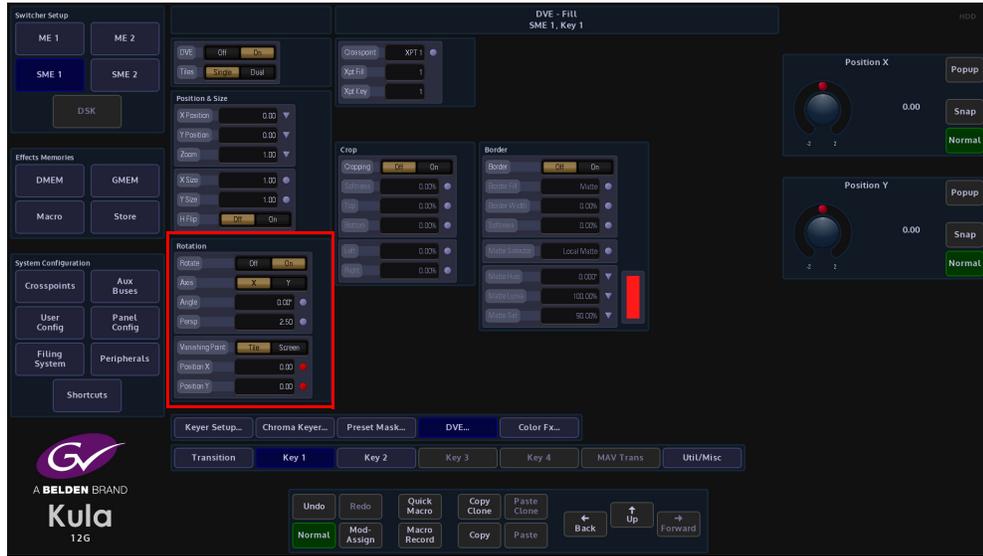
SME Keys have all the same menu structure for Background and Key Transitions, Key Setup, Chroma Keyer, Preset Masks and DVE (Key 1 only) as a full M/E.

*For an explanation about the parameter controls, please see the M/E Setup section at the start of this chapter.*



## SME - Key 1 DVE Rotation

There is one function that Key 1 on an SME has that is different to the M/E Keys. This is called "Rotation". The parameters will rotate a Key Layer on an X/Y axis, change the angle, adjust perspective and move the vanishing point of the Key Layer.



Some examples of the DVE Rotation effects on a Key Layer.



Angle Rotate X (positive)



Angle Rotate Y (positive)



Angle Rotate X (negative)



**Angle** - this adjusts the movement of the Key Layer in a positive or negative way on an X or Y axis

**Rotate** - this selects the X or Y axis for the angle adjustment

**Perspective** - this will move the perspective point on the Key Layer

**Vanishing Point** - in **Tile** mode, the vanishing point is placed on the center of the Key Layer, so the dimensions of the Key Layer will always be the same wherever it is placed in the viewing area. Selecting **Screen** will give a more true 3D DVE effect and will naturally distort the Key Layer as it is moved around the viewing area.

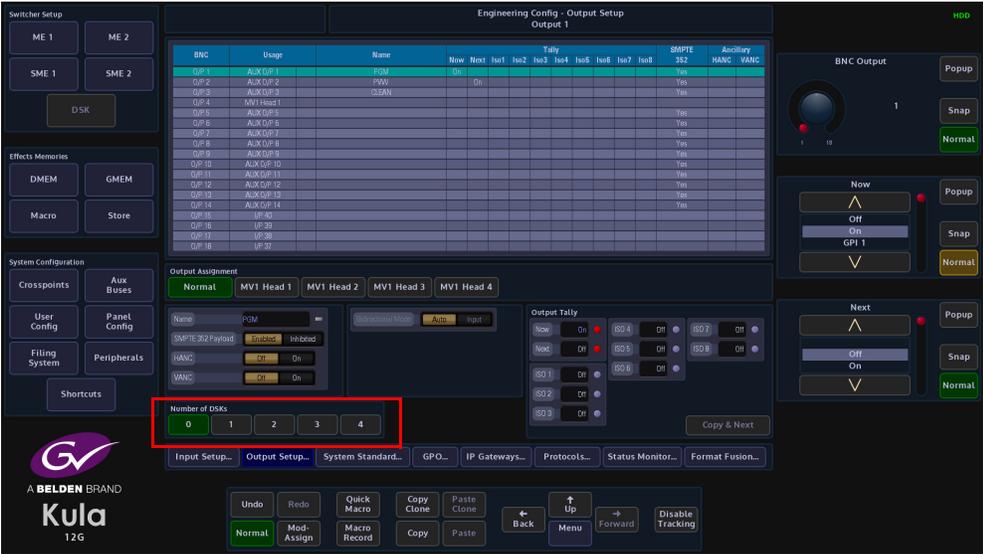
**Position X/Y** - this affects the sheering of the Key Layer, by giving the effect of moving the camera position.

# DSK

Down Stream Keys (DSK) are an extra 4 Key Layers that can be used. In general, logos and text are generated by DSK. This function allows you to keep Key or text displayed while switching sources on the background.

## DSK Setup

There are 4 DSKs available to use on Kula. By default 1 DSK is available to use immediately. The others are switched on in the **Engineering Config - Output Setup** menu.



When the user select DSK 2 - 4 this will change the 6 Bi-direction Inputs/Outputs into Inputs only. Outputs 13 to 18 are the "Bi-directional" Inputs/Outputs. By default, they are outputs but when using the DSK selection buttons, the following happens:

**Selecting 2 DSKs** - Makes O/P 17/18 into Inputs (2M/E mainframe I/P 37 and I/P 38) (1M/E mainframe I/P 19 and I/P 20).

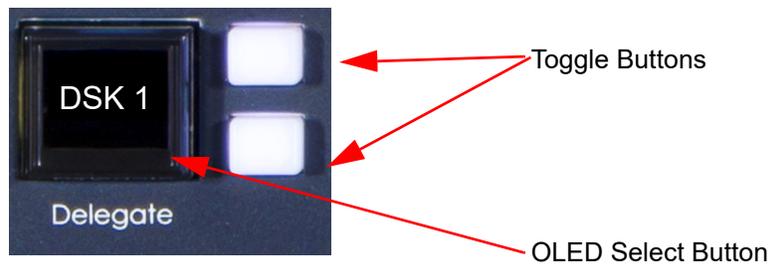
**Selecting 3 DSKs** - Makes O/P 15, 16, 17 and 18 into Inputs (2M/E mainframe I/P 37, 38, 39 and 40) (1M/E mainframe I/P 19, 20, 21 and 22).

**Selecting 4 DSKs** - Makes O/P 13, 14, 15, 16, 17 and 18 into Inputs (2M/E mainframe I/P 37, 38, 39, 40, 41 and 42) (1M/E mainframe I/P 19, 20, 21, 22, 23 and 24).

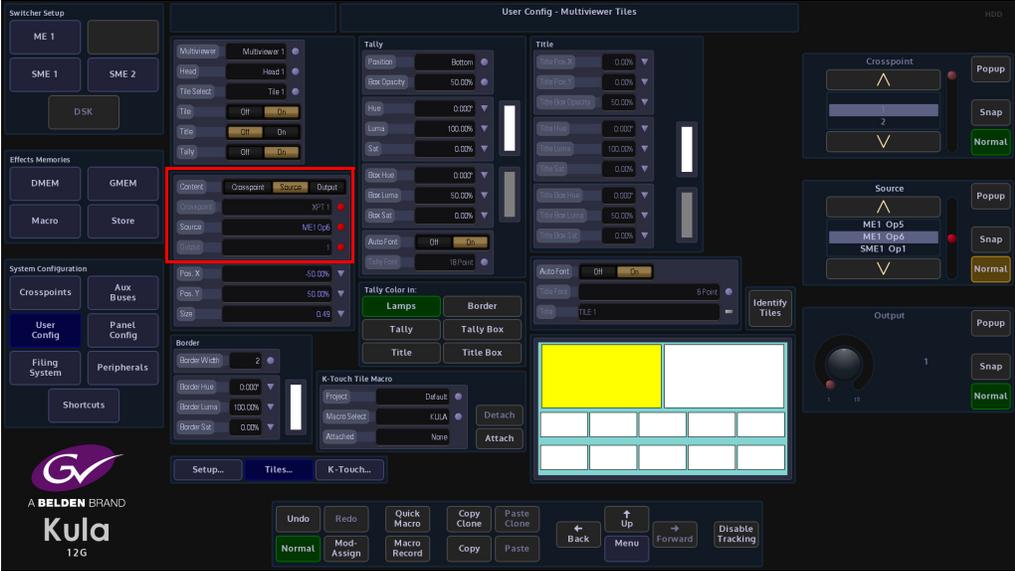
Once the DSKs have been selected, the user then has to switch them on in the User Config - Aux Output Setup menu.



In the menu above, DSK1 has been switched On, on the Preview Output. The next thing to do is to select DSK 1 on the control surface. This is done using the “**Delegate**” toggle buttons to scroll down to DSK1 and then press the OLED button to select the DSK.



Once the source is selected on the DSK crosspoint Bus, the DSK can be viewed in two ways; directly on the (in this example) Preview output, or on the preview output on the Multiviewer, which will have to be set to “Output” in the following way:

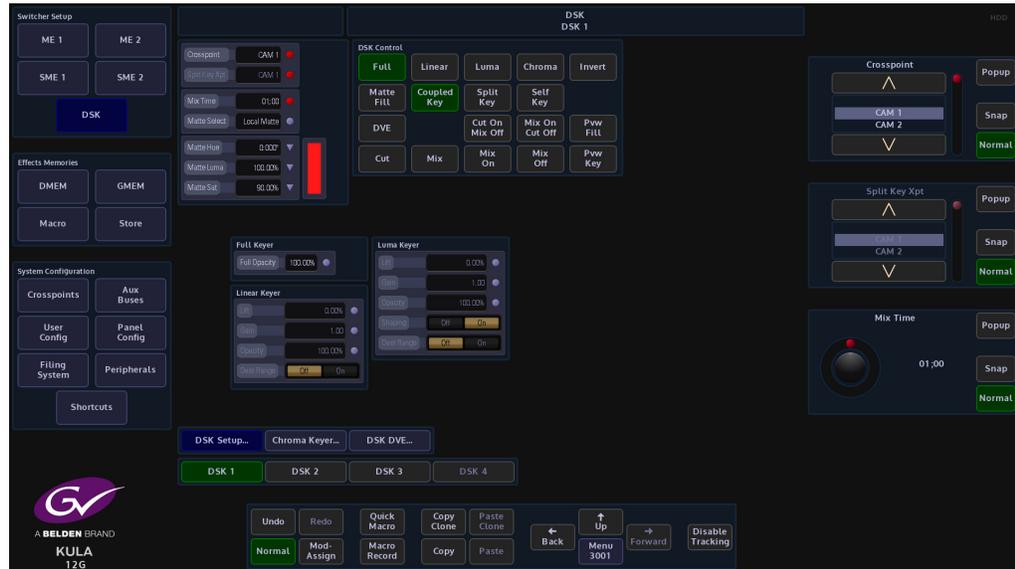


In the **User Config - Multiviewer Tiles** menu, switch the “**Content**” parameter to Output, then use the “**Output**” parameter popup to select the output (BNC) that the preview output is routed to.

## DSK Setup Menu

### Linear and Luma DSK

The Linear and Luma DSK menus look similar. They each have independent sets of lift level, gain and opacity controls. The exception being the Shaping parameter in the Luma DSK.



**Full** - The Fill is a full layer over the background hiding it completely.

**Linear** - Selects a linear DSK.

**Luma**- Selects a luma DSK.

**Lift** - sets the luma level at which the Key operates.

**Gain** - affects the sharpness of the lift point.

**Opacity** - controls how transparent the DSK is.

**Shaping** - stops dark edges appearing around a Keyed source (anti-aliasing).

**Over Range** - Kula expects a video range Key of 64 to 940. The video range Key is used internally throughout the system.

If an external CG Key generator is providing a "full range" external DSK of 4 to 1019, this would be classed as technically illegal video.

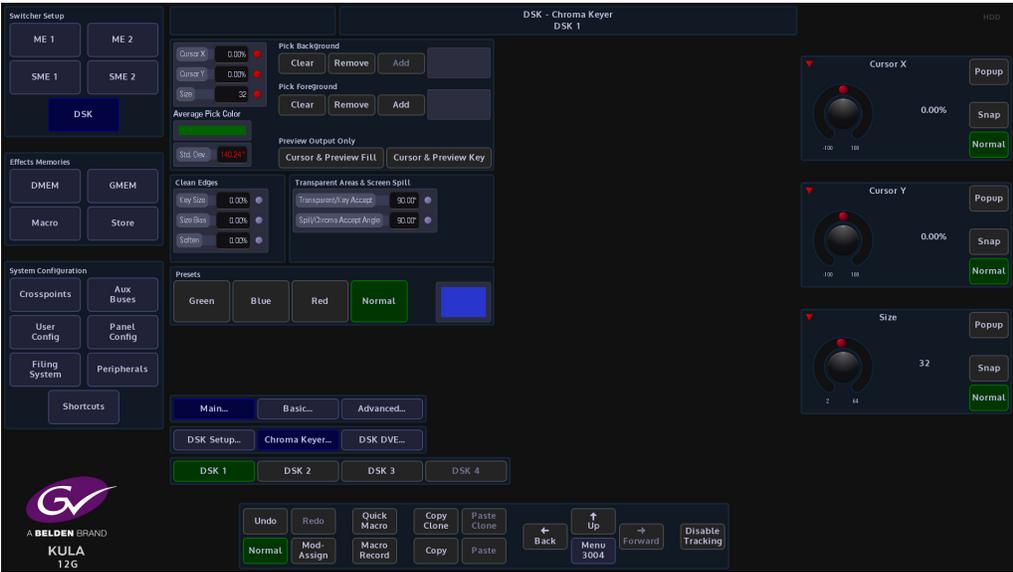
In this situation, the Over Range parameter can be used to bring the full range of a Key back within the video range DSK levels.

When using sources that are not pre-Keyed, such as those from a camera, the DSK cut signal is generated from the video signal using lift and gain controls. The portions of the signal that are greater in luminance than the lift level cut the hole in the background.

The DSK lift and gain levels are user adjustable. The Fill may be the same source as the Key or from a different source, or matte generator.

## DSK Chroma Keyer

The DSK Chroma Keyer function works in exactly the same way as the “Chroma Keyer” explained earlier in this chapter. Please read the full Chroma Keyer section of this chapter.



## DSK DVE

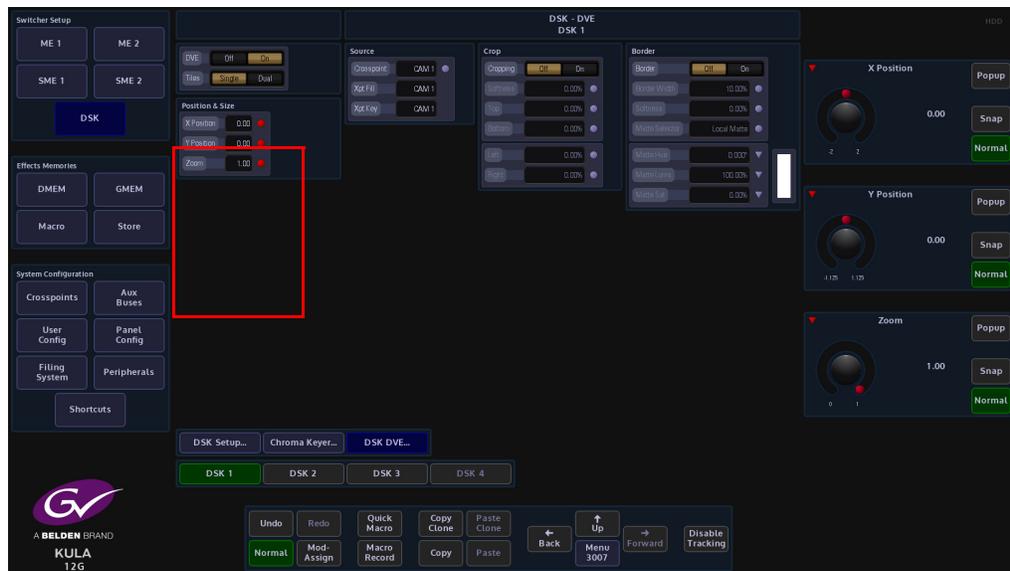
The DVE parameters allow the user to position and size a DSK layer, add a Border around a DSK layer or Crop a Key Layer.

When enabled the DVE can be set to manipulate a Single or Dual Tile (which will be explained later in this section).

The user can choose which source they wish to manipulate using the “Crosspoint” parameter. Touch the Popup button to select Xpt, Matte, M/E output or Stores.

## Position & Size

The **Position & Size** attacher area, allows the user to move a Key Layer around the screen and to zoom in/out.

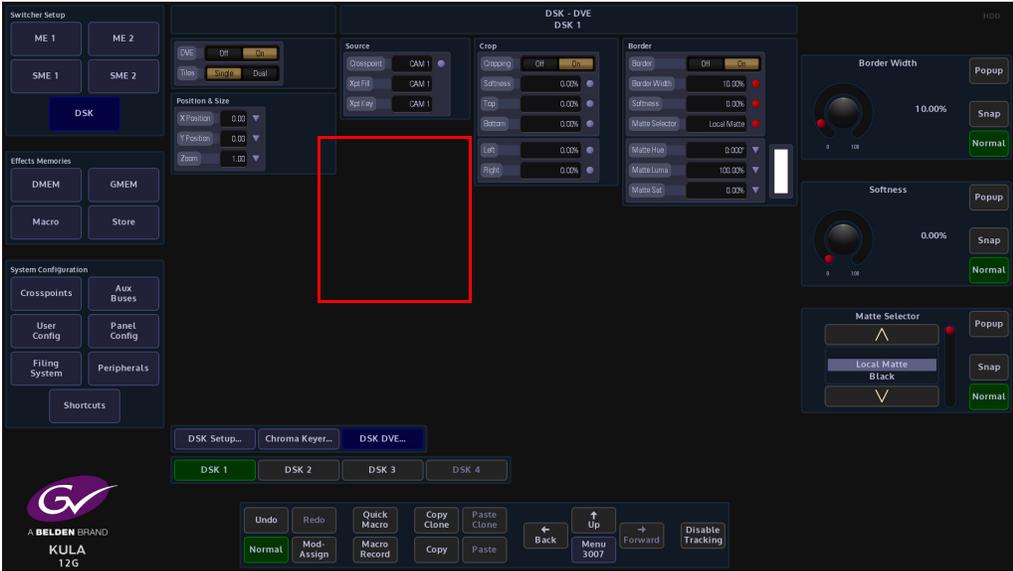


**X/Y Position** - Parameters are used to move the position of the DSK layer around the monitor screen as shown above.

**Zoom** - Parameter is used to zoom the DSK layer in and out.

## Crop

The crop menu as it suggests allows the user to crop the DSK layer, and also allows the user to apply soft edges.

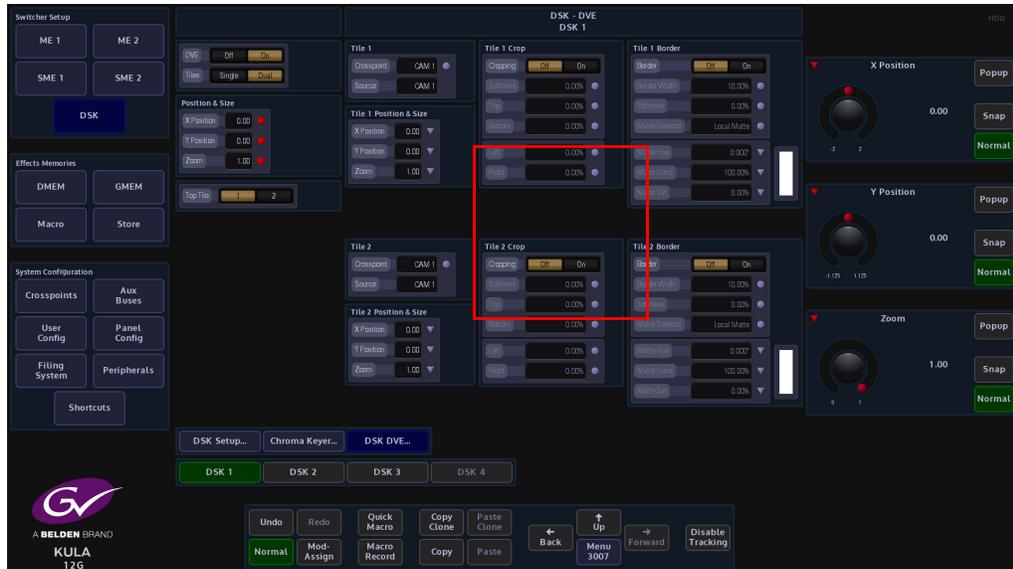


**Cropping On/Off** - Switches the crop facility On or Off. Press the On/Off buttons in the parameter control area of the menu.

**Top, Bottom, Left and Right** - Crops the Fill edges

## Border

This function allows the user to apply a border and effects around a DSK layer.



**Border On/Off** - Switches the Border On or Off

**Border Fill** - Selects source for the border fill from a Matte selected using the Matte Selector parameters, Util 1 or Util 2.

**Border Width** - Adjusts the overall width of the border

**Softness** - Softens the outside edges of the border

The **Matte Selector** and **Hue**, **Luma** and **Sat** parameters are used to adjust the color of the border around a DSK layer when the option is selected in the Border Fill parameter. The user is able to select one of 16 preset Mattes, or create a user-defined color for the border using the Hue, Luma and Sat parameters.

**Matte Selector** - Selects the preset Mattes 1 to 16 or a Local Matte that allows the user to create their own border color.

**Matte Hue, Luma and Sat** - These parameters allow the user to adjust the Hue, Luma and Saturation levels of the Local Matte. The user is able to create their own unique border color around a DSK layer.

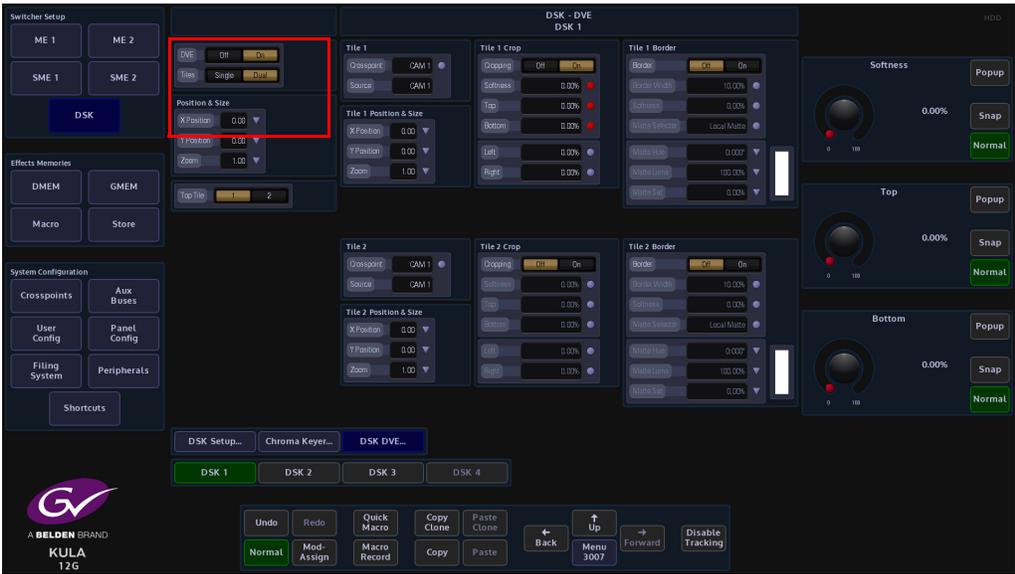
# Dual Tile

This function allows you to take an existing DSK layer and create 2 Tiles (DSK Layers) that can be independently resized (Zoom), moved along the XY axis, and cropped.

The Dual Tile mode will now give:

2 DSK Tiles per DSK that can now be used as a total of 4 DSK Tiles.

The Dual Tile mode is easy to setup and easy to use. To use this function, bring a Key Layer onto a monitor and use **“Dual Tile”** On, then select **“Tile 1”** in the menu to Zoom down the DSK.



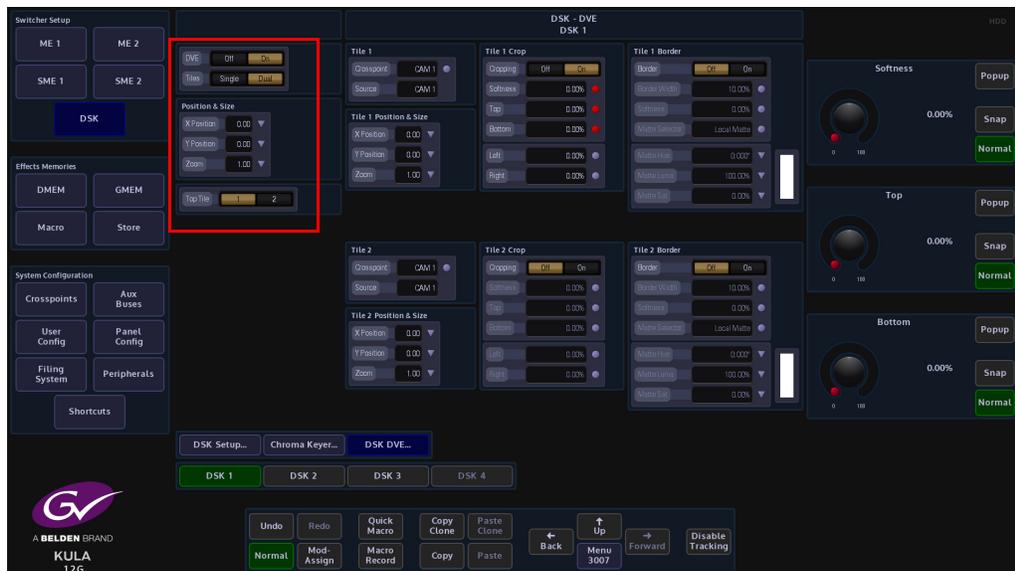
## Dual Tile Menu

With a DSK layer on the monitor, make sure that the “**DVE**” parameter is turned “**On**”, and then select “**Tiles**” Dual.

Note: At this point you will only be able to see one tile, the other is underneath.

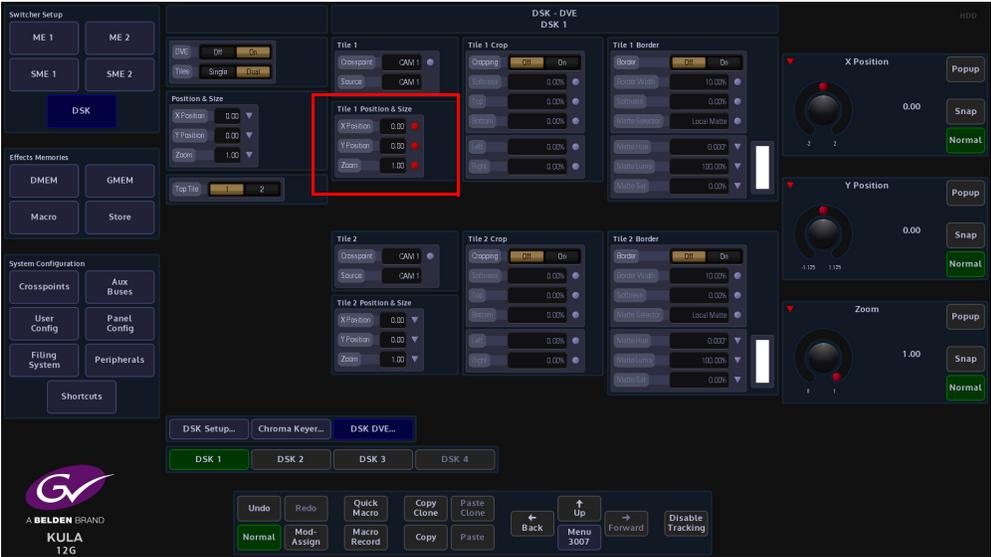
Use the “**Top Tile**” parameter to swap around the tile priority. The bottom tile becomes the top. The parameter controls for Tiles 1 and 2 are exactly the same, to the parameters for Tile 1 will be described in this section.

Use the “**Crosspoint**” attacher to select the source for Tile 1. This can be a Xpt source, Matte, M/E, or Store.



### Tile 1 Position & Size

The **Position & Size** attacher allows the user to move a DSK layer around the screen and to zoom in/out.



**X/Y Position** - Parameters are used to move the position of the DSK layer around the monitor screen.

**Zoom** - Parameter is used to zoom the Key Layer in and out.

### Tile 1 Crop

The crop menu as it suggests allows the user to crop the DSK layer, and also allows the user to apply soft edges.

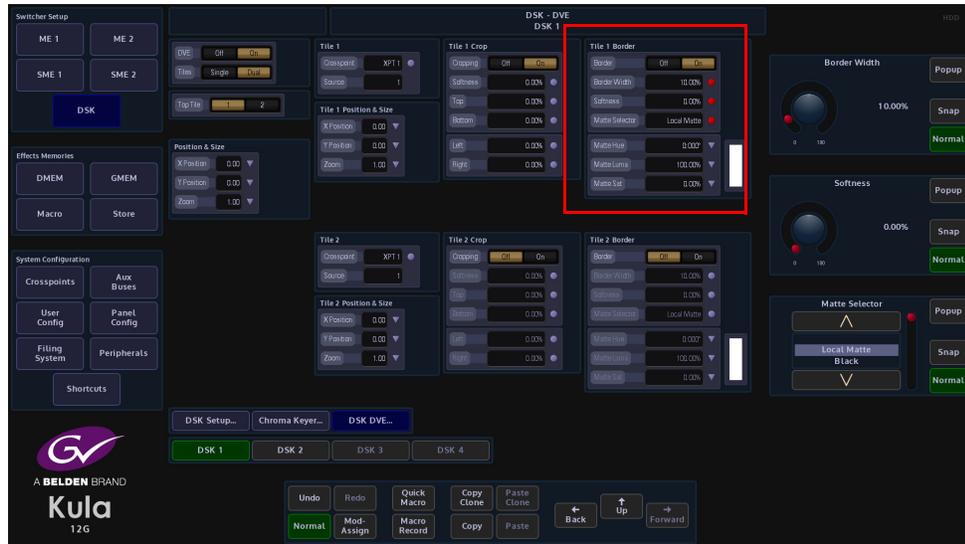


**Cropping On/Off** - Switches the crop facility On or Off. Press the On/Off buttons in the parameter control area of the menu.

**Top, Bottom, Left and Right** - Crops the Fill edges

### Tile 1 Border

This function allows the user to apply a border and effects around a DSK layer.



**Border On/Off** - Switches the Border On or Off

**Border Fill** - Selects source for the border fill from a Matte selected using the Matte Selector parameters, Util 1/Util 2.

**Border Width** - Adjusts the overall width of the border

**Softness** - Softens the outside edges of the border

The **Matte Selector** and **Hue, Luma** and **Sat** parameters are used to adjust the color of the border around a DSK layer when the option is selected in the Border Fill parameter. The user is able to select one of 16 preset Mattes, or create a user-defined color for the border using the Hue, Luma and Sat parameters.

**Matte Selector** - Selects the preset Mattes 1 to 16 or a Local Matte that allows the user to create their own border color.

**Matte Hue, Luma and Sat** - These parameters allow the user to adjust the Hue, Luma and Saturation levels of the Local Matte. The user is able to create their own unique border color around a Key Layer.

### Moving the two tiles so that both can be seen

The two tiles are DSK controlled using the Tile Position & Size parameters. Using the XY parameters for Tile 1, the tile will move as expected and move away from Tile 2.

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Note: If you use the "Main" Position & Size; XY or Zoom parameters, both of the tiles will move together.

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# 12 Effects Memories

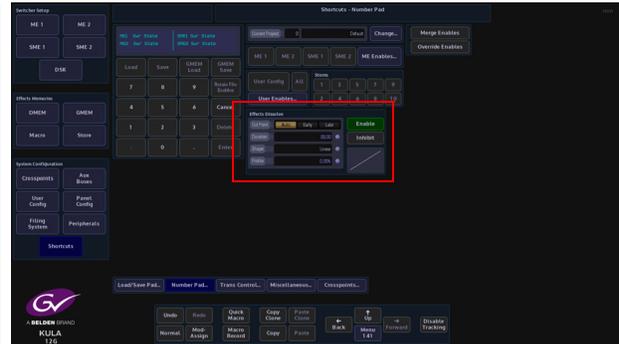
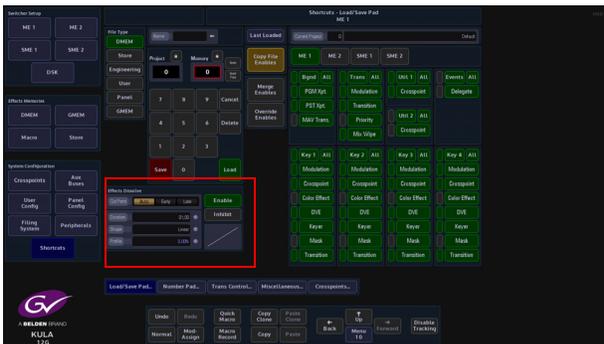
## Effects Dissolve

The Dissolve function gives a means of providing a smooth transition from one memory state to another by interpolating any variable values (i.e. size, position, border width, etc.). Any state-change variables (e.g. button pushes) can be set to change at the start or end of the dissolve and provides a simple way of creating a two key-frame effect.

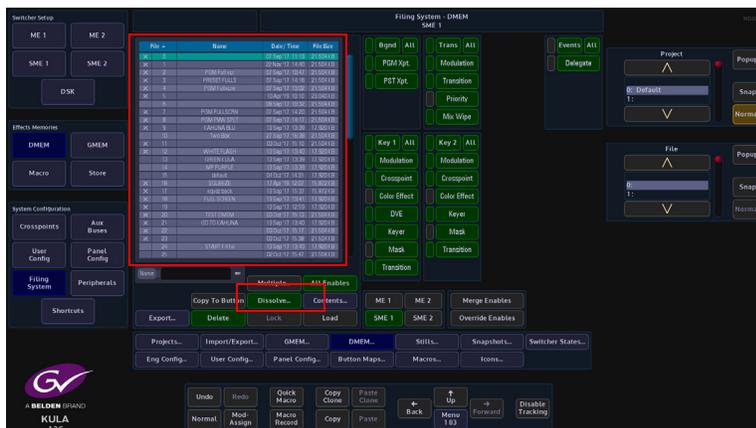
The Effects Dissolve function can be used on Global Memories (GMEM), ME Memories (DMEM), DVE Memories, Snapshots and User Config. memories.

An Effects Dissolve can be applied to an existing saved memory, or to a memory file as it is saved with a new effect, using the **“Shortcuts”** menu. Editing an existing memory file in the Filing System (e.g. GMEM, DMEM and Snapshot). The effects that can be made are only limited to the creativity of the user.

Used when creating a Dissolve Effect



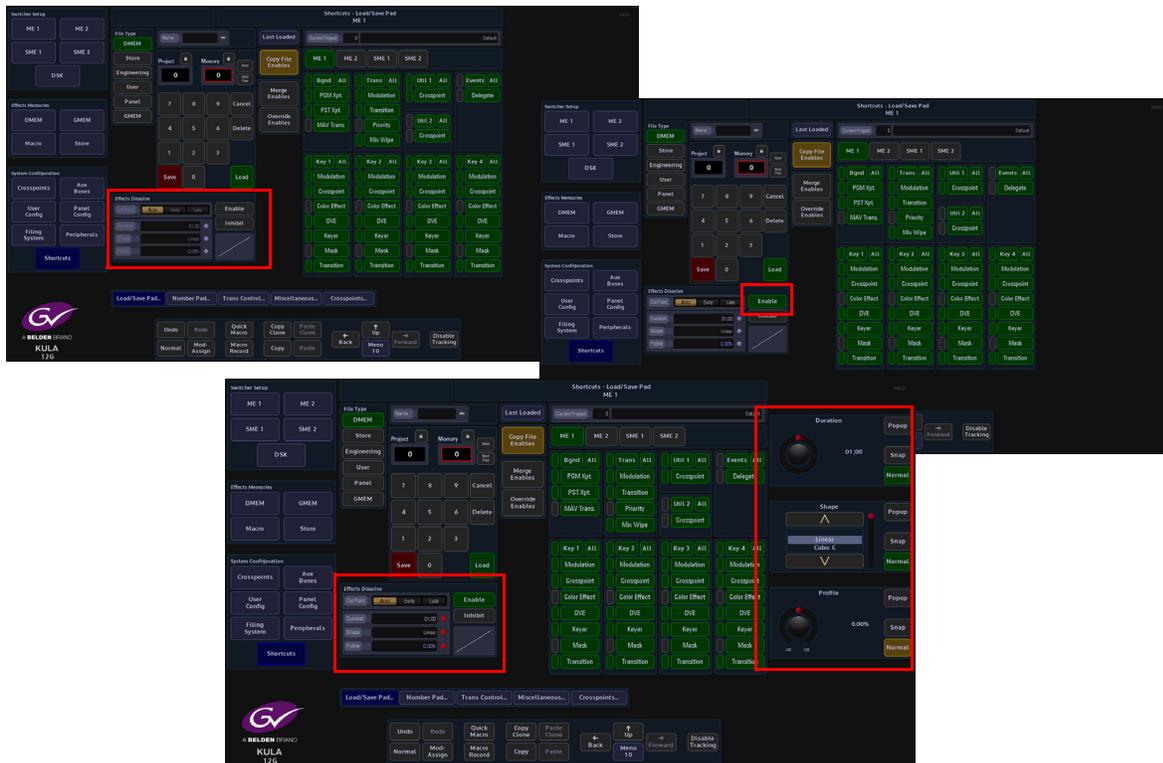
The menus above are in the “Shortcuts” menu  
You can use either to create a Dissolve effect



Filing System used when editing an existing file to create a Dissolve Effect

## Saving an Effects Dissolve with a DMEM

This example explains how to save a Dissolve effect with a DMEM, but the same Dissolve effect can be saved with a GMEM.



Create an effect; for example a one box key layer On then Off. Touch the “Effects Dissolve” **{Enable}** button, then touch the “M/E” or “SME” button. The user can now adjust the Effects Dissolve Duration, Shape and Profile by touching the Effects Dissolve attacher, then use the parameter meter controls on the right. Give the DMEM a number, then press the **{Save}** button to save the DMEM

When the DMEM is recalled, the dissolve effect will dissolve the Key layer on and off. The DMEM load sequence can then be recorded to a Macro and attached to one of the Macro buttons on the control surface.

As the Dissolve Effect runs, the top corner of the menu (marked in the menu above), will display a Dissolve “percentage”. The percentage number from will run from 0% to 100% for each dissolve effect created. A **{Stop}** button next to the percentage number, cause the current running dissolve effect to stop.

### **Dissolve Effects Parameter Controls**

#### **Cut Point**

**Auto** - the switcher determines the most useful point for state-change variables to be changed, i.e. at the start or end of the dissolve. States which are switching on will change at the start of the dissolve and those which are switching off will change at the end of the dissolve.

**Early** - Changes the state of all state-change variables at the start of the dissolve

**Late** - Changes the state of all state-change variables at the end of the dissolve

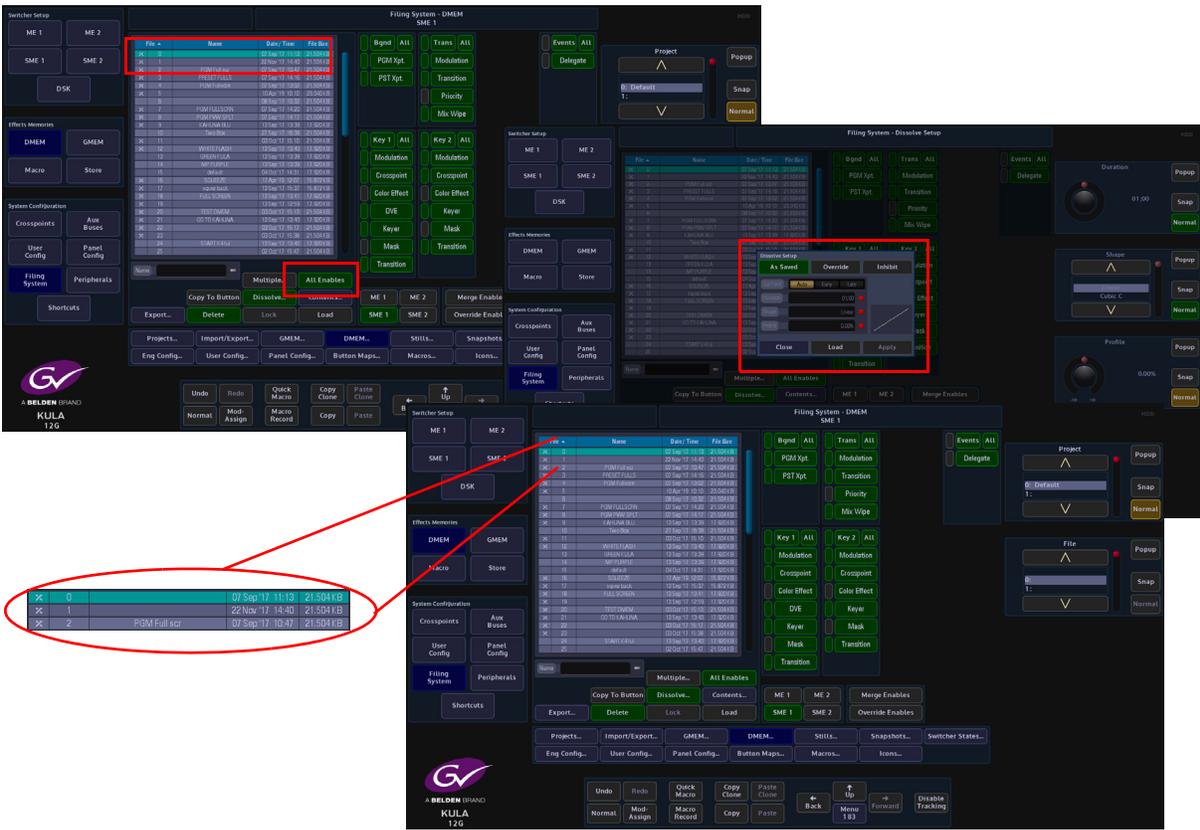
**Duration** - Sets the overall duration of the dissolve

**Shape** - Controls the shape of the chosen dissolve profile

**Profile** - Sets the profile of the dissolve path allowing a linear change or smooth acceleration / deceleration (among other options). A graphical illustration of the dissolve path is shown at the bottom of the pop-up and shows the selected shape and profile.

**Applying a Dissolve Effect to an existing DMEM**

If a dissolve is required on a memory which has not already been set as a dissolve, this can be achieved by switching on the Dissolve button.



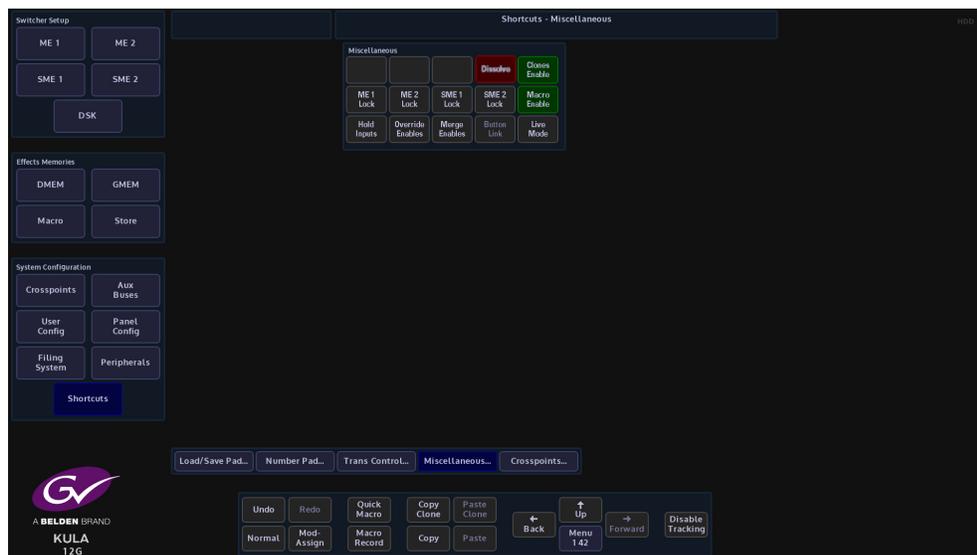
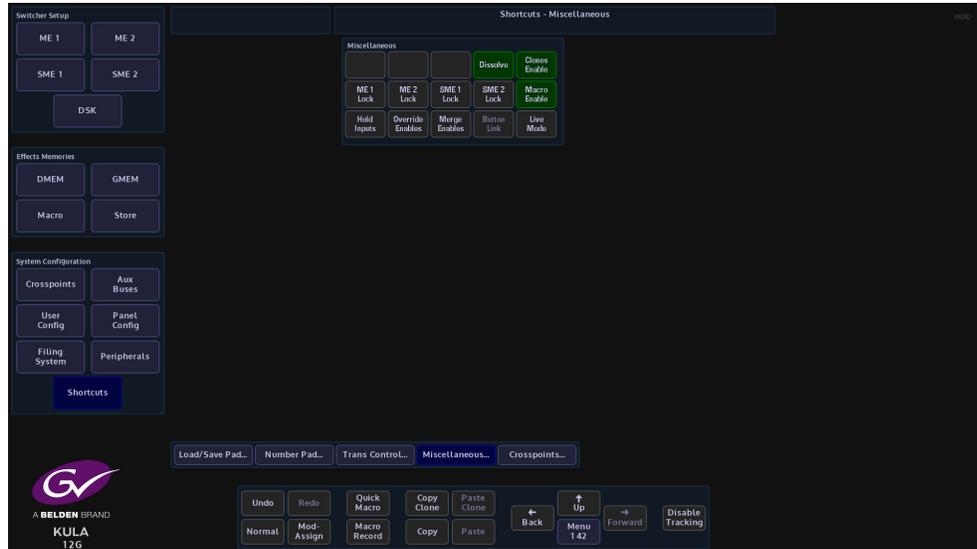
Select an existing DMEM from the file list, then touch the **{Dissolve}** button. The Effects Dissolve dialog box will appear, so that the user can set the type of effect required. When finished, touch the **{Apply}** button.

Notice that the file now has an "X" next to the DMEM number to signify that it has a dissolve effect applied.

# Effects Memories

## Effects Dissolve

If a Dissolve is not wanted, but the file has been saved with on, this can temporarily be inhibited during a load by touching and holding the “Dissolve” button in the “Shortcuts” menu, it changes to a red the **“alert”** color.



# DMEM's

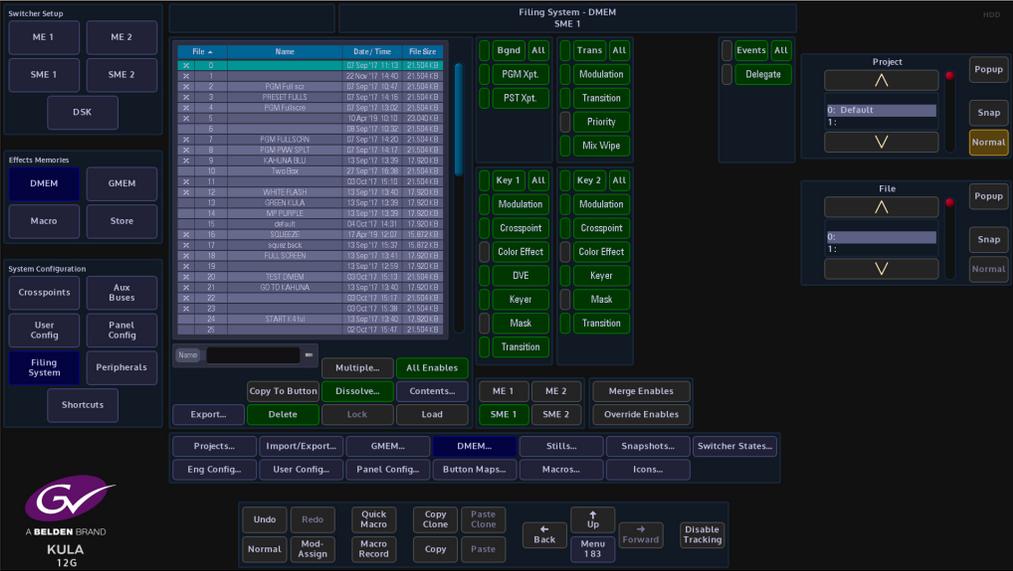
## What is a DMEM

A DMEM or Dynamic Memory, saves set-up information related to a single M/E, which may contain information such as:

- Bus set-up (Crosspoints, Keyers, Wipes, Transitions)
- Color Effects
- Key Layer Priorities
- Masks, Crops, Borders

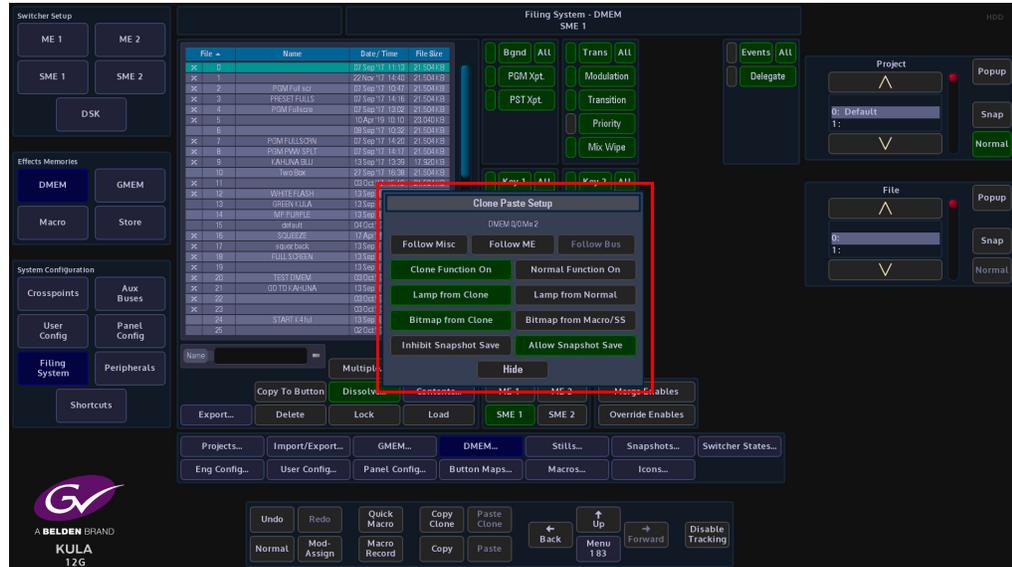
DMEM's are Stored within a user-defined Project. The user can save up to 1000 DMEM's within a single Project.

With the defined Project selected, the **Filing System** menu allows the user to enter the DMEM filing system where the user is able to Load or Delete selected DMEM's, Export DMEM's to external memory devices or view detailed contents within the DMEM.



From this menu, the user can also create an **“Effects Dissolve”** as described in the previous section.

Another feature in the DMEM menu is “**Copy To Button**” this allows the user to assign a DMEM Load button to a user defined button on the control surface. I gives the access to a DMEM “Quick Load” function for the selected DMEM in the table in the DMEM menu.



Touch the {**Copy To Button**}, the button and the {**Paste Clone**} button will flash green indicating that the button info is ready to be copied to a button. A dialog box is displayed with button options when pasting to a button on the control surface.

### Active Functions

**Clone Function** - switches the clone function On/Off

**Normal Function**- switches the normal function of a button On/Off.

These can be selected together so that both functions are active.

### Lamp From:

**Clone** - will set the button lamp to light up the same as the cloned function, i.e. if live to air the button will turn Red.

**Normal** - switches the lamp between its normal Green color and the Red cloned color

### Bitmap From:

**Clone** - displays a bitmap from the cloned function

**Macro/SS** - by default, a User Function Button would be blank normally, however the button can also have a bitmap from a macro or snap shot.

### Snapshot Save:

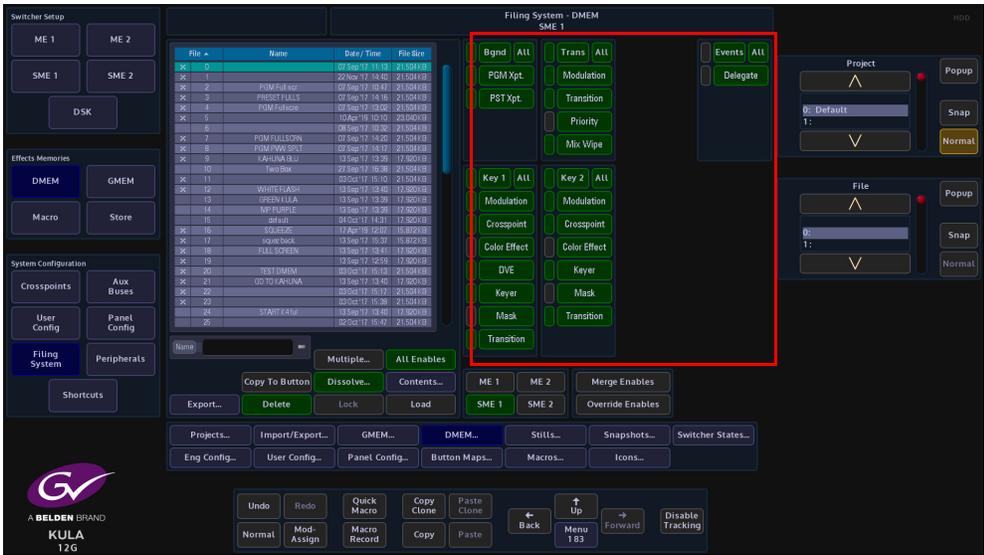
**Inhibit** - inhibits the user function buttons ability to record a snapshot.

**Allow** - allows a user function button to save a snapshot

## Enables

The “**Enables**” list of buttons, to the right of the files table, allows the user to select or de-select functions that can be loaded with a file.

If the tab next to the enables button is green, this means that the function was included when the file was originally saved. If the tab is gray, the function is not included when the file was originally saved. If an enabled function is selected (green), when the config is saved, the function will be included in the saved config.



## GMEM's

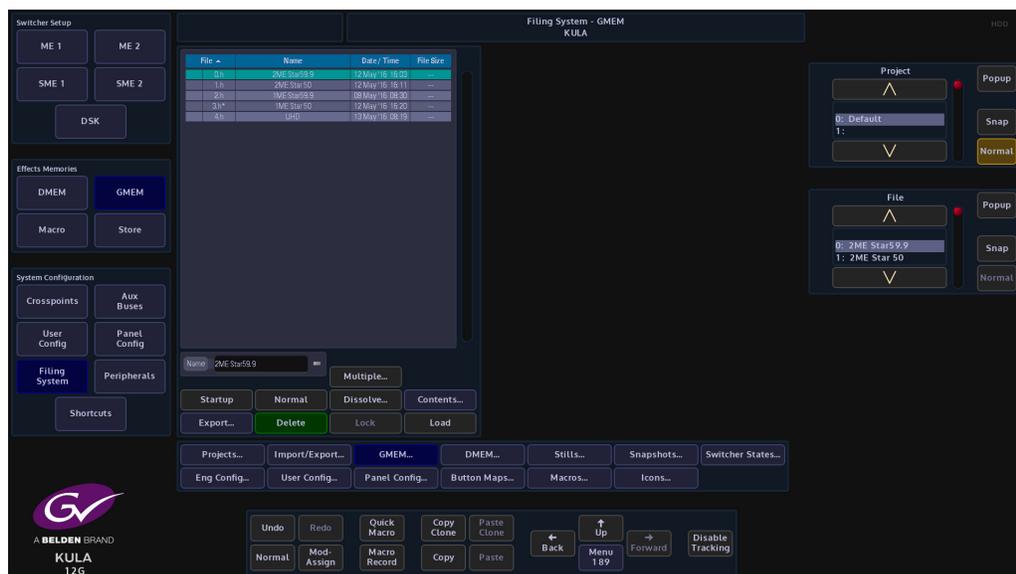
### What is a GMEM

A GMEM or Global Memory will save set-up information relating to multiple M/E's. A GMEM saves all the same information as DMEM's with the added ability to save Stores and Configurations:

- Bus set-up (Crosspoints, Keyers, Wipes, Transitions)
- Color Effects
- Key Layer Priorities
- Masks, Crops, Borders
- Stores
- User Config

A GMEM can save all of the above as a complete snapshot of the entire system setup.

GMEM's are saved within a user-defined Project, which can be viewed in the **Filing System** menu allowing the user to enter the GMEM filing system where the user is able to Load or Delete selected GMEM's, Export GMEM's to external memory devices or view detailed contents within the GMEM.

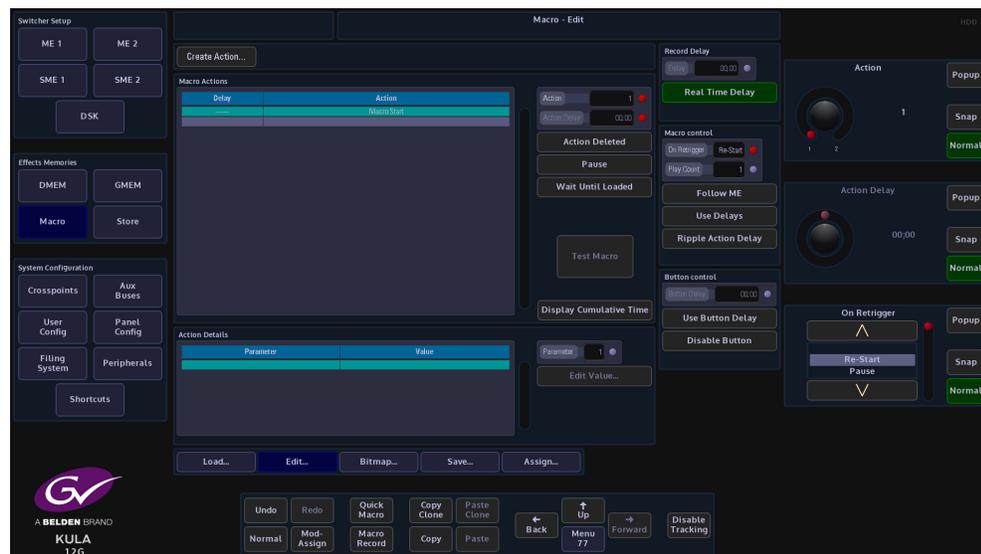


## Macros

Macros can be assigned to any button on the control surface. When macros are assigned to the Macro Buttons on the control surface they can have an associated “bitmap” added to an mnemonic display.

Kula macros are recorded in real time. This means that macros record functions behind buttons, rather than just the button press. This allows creation of simple multi-button operations to complex effects and transitions, which include; Pbus, GPOs, DMEM, and GMEM loading, clip playing and VDCP.

### Setting Up Macros



Macros are saved in **Filing System - Macros**, which in-turn are saved into Projects in the **Filing System**. The buttons functions are assigned within the Panel Config. Although the macros themselves are run and activated in the mainframe the buttons are associated with the Panel Config.

As mentioned earlier, macros are recorded as a sequence of button presses in real time, which in turn are translated into a sequence of actions. The delay between these functions (button presses) can be tested and edited once the recording is completed. Once a macro is running if it is run a second time halfway through the macro run sequence, it will instantly start from the beginning.

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Note: A Menu Operation is not recorded as a macro but any direct action within menus will be (e.g. a Pbus trigger).

---

## Macro Record



Macro Ready to Record

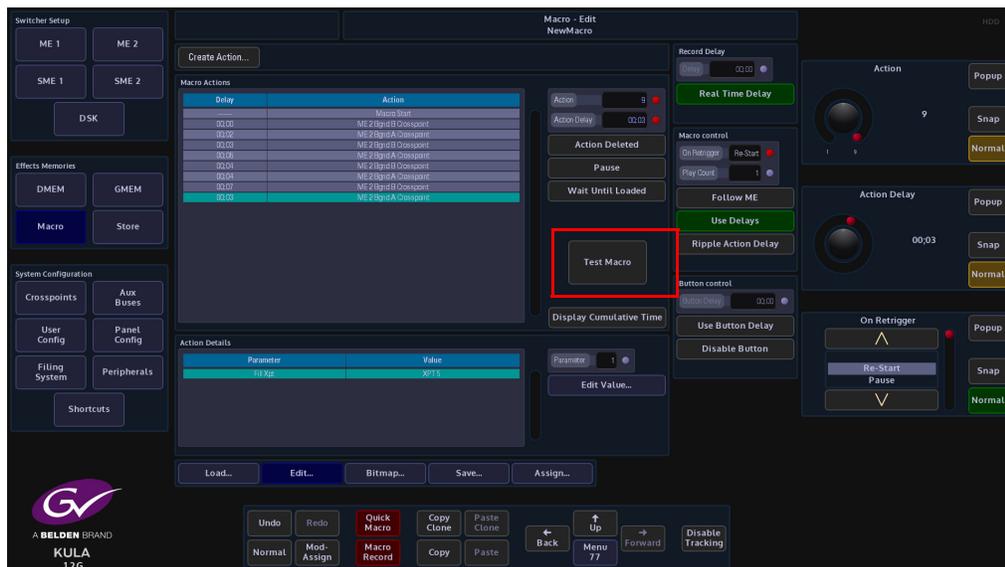


Macro Recording



Macro Paused

To start recording a macro press **{Macro Record}** button on the GUI panel. This button will now go Green indicating a macro is ready to start recording. The macro recording and button delays will only be activated after the first function (button press) has been entered. Once the macro recording has started the **{Macro Record}** button will go Red. While recording a macro different menus on the GUI can be entered to gain access to any menu-related functions. Once the macro is completed press the **{Macro Record}** button again and this will end the macro and the button to an unlit state.



The button press sequence that was recorded in the macro is displayed in the Macro Actions table (shown above). Press the **{Test Macro}** button to test the macro just recorded.

## Pausing a Macro Record Sequence

A Macro can be paused once a record sequence has started. Whilst a Macro is being recorded the **{Macro Record}** button is Red. Press and hold the **{Macro Record}** button and it will turn Orange indicating that it is Paused. At this point the Button Delay timer is also paused.

Press the **{Macro Record}** button once. The button will turn Red and the record process will start once again.

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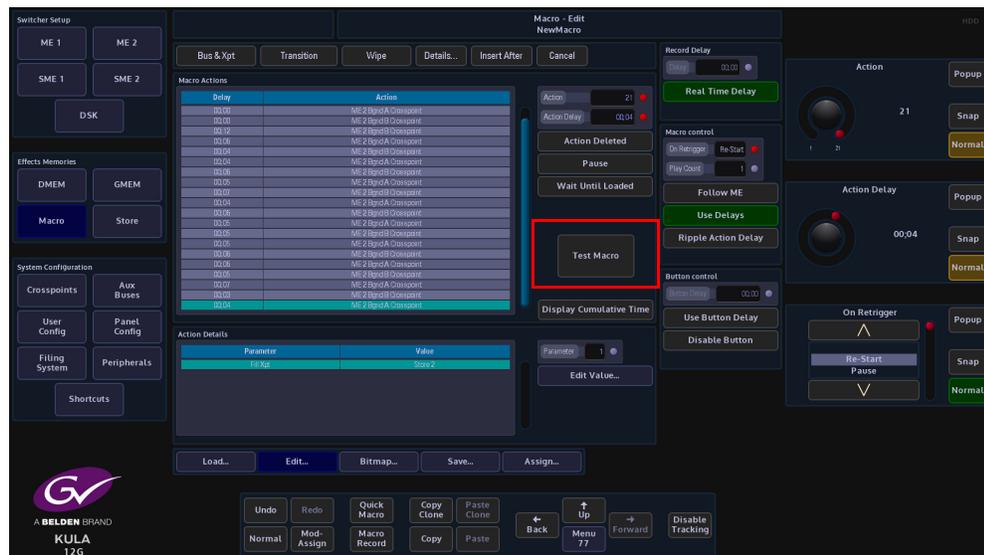
Note: While a macro is paused, Kula can still run multiple other macros at the same time

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### Appending more Macro Actions to a Macro Sequence

Additional macro actions can be added to a previously recorded macro sequence. In the **{Edit...}** menu, move the highlight bar to the position above where the action is going to be inserted, and then press and hold the **{Macro Record}** button. Again the button will turn Red and the record sequence will start. When finished press the **{Macro Record}** button again to stop recording, and the macro sequence will be added below the highlight bar.

## Macro Test and Edit



### Test Macro

Once the macro has been recorded, to test and edit the actions, press the **[MACRO]** button on the GUI to enter the **Macro - Edit** menu. If a macro has just been recorded, the functions/actions that have just been recorded are displayed in the **Macro Actions** table. To replay/test a macro, press the **{Test Macro}** button.

### Pause Macro

A macro action sequence can be paused at any selected point. There are two ways to do this. Either use the Action parameter to select a specific point in the action sequence and press **{Pause}**, or press the **{Test Macro}** button to run the macro sequence and then press **{Pause}**, at the required point. The next time the **Test Macro** is run, the macro will pause when it reaches the chosen point.

### Wait Until Loaded

**Wait Until Loaded** function will make the macro pause until the file operation is complete. 'Wait' can only be turned on for file operations. Waiting macros which get a re-trigger will behave exactly as if they were paused (i.e. they will stop waiting).

### Ripple Action Delay

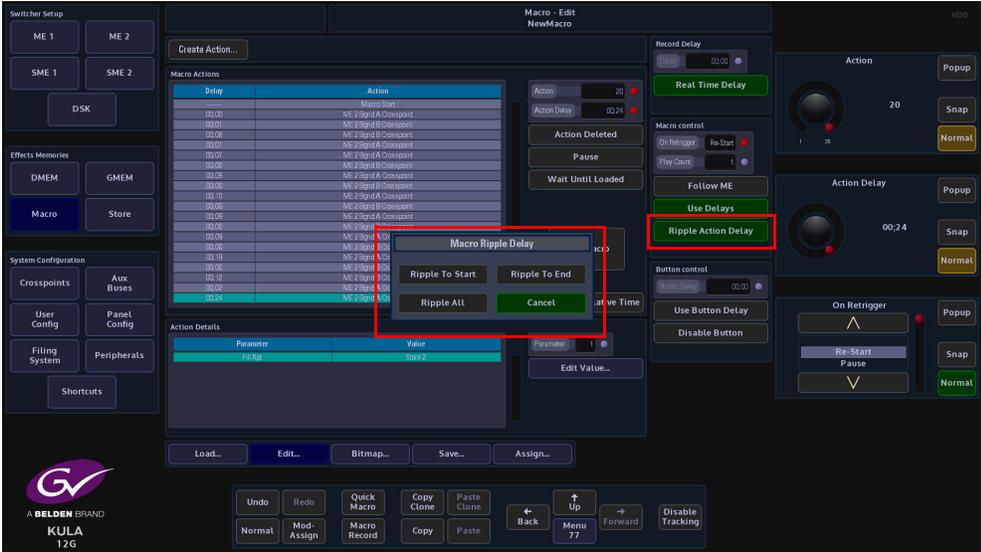
Allows an **Action Delay** that has been set, to be “Rippled” through all Actions in the table from that point onwards.

Pressing the **{Ripple Delay}** button will pop up a Macro Ripple Delay dialog box.

**Ripple To Start** button will ripple the current Ripple delay value to all previous Actions up as far as the first Action in the table

**Ripple To End** button will ripple a delay from current action to all Actions until the last action

**Ripple All** button will set all Actions to current delay, and Cancel will cancel the Ripple delay request.

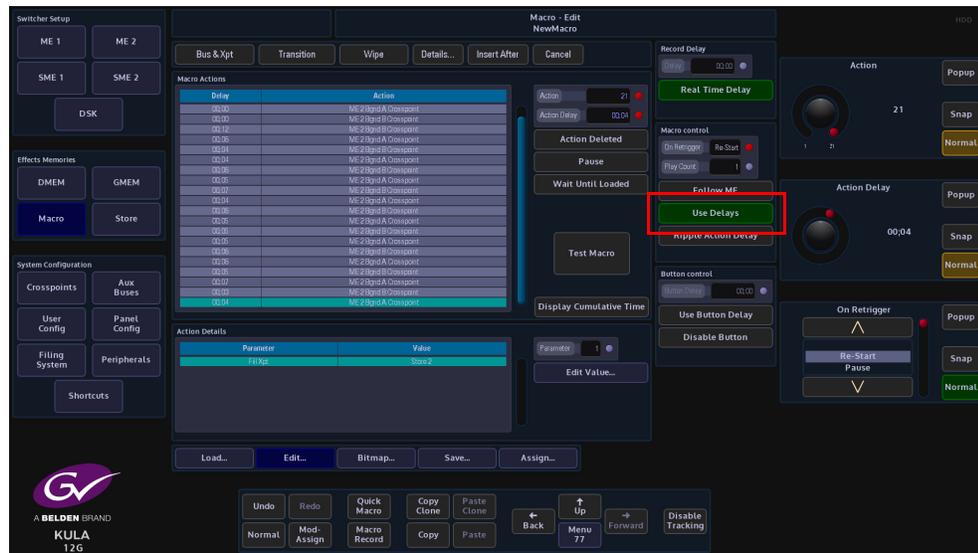


## Attacher and Parameter Controls

**Use Delays** - this function turns the real-time button press delays On or Off.

**Follow ME** - this function will overwrite the M/E upon which the macro had been saved, and instead will assign itself to the ME that is selected in the Dynamic Mix Effect area.

This means that a macro that mixes Key 2 on, that had been saved using M/E1 Key 2, can be used on M/E2 Key 2 as long as M/E2 is selected.



**Action Deleted** - this will delete a selected Macro Action.

**Use Button Delay** - this will allow a delay to be added to the Normal function of the button, so the macro will act and then the Normal function will take place.

**Disable Button** - this option will disable a button's original function and only allow the button to enable the macro that is assigned to it.



## Offline Macro Editor

The offline macro editor is a clear, simple and quick way to create new macros or edit existing macros whilst the production switcher control surface is being used to produce a show.

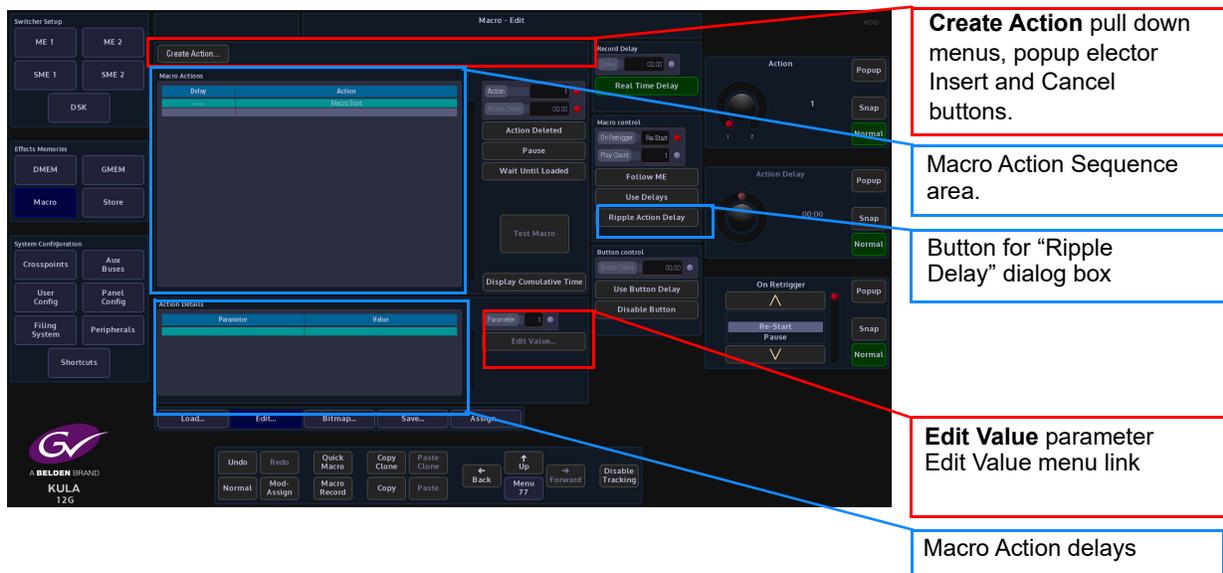
The offline macro editor has an intuitive menu structure with all the elements at hand to build the most complicated macros, without having to go through other menus or having to record button presses on the control surface, all within one menu.

Once a macro has been created, the delay between the macro actions, pauses and ripple delay can be edited then tested.

## Offline Macro Edit Menu

As mentioned above, the Macro Edit menu is the only menu that the user needs to use to create new macros or edit existing menus offline (while the control surface is being used). The diagram below highlights the main offline macro editor functions in red.

These buttons will be explained in detail while working through the Macro functions.

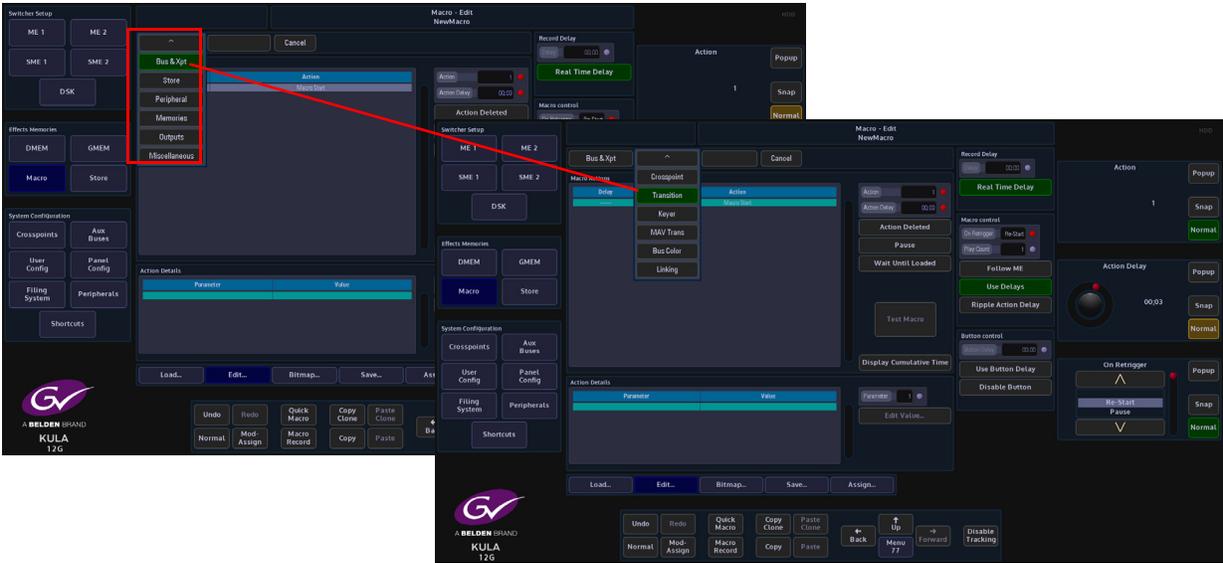


### Creating a Macro “Offline”

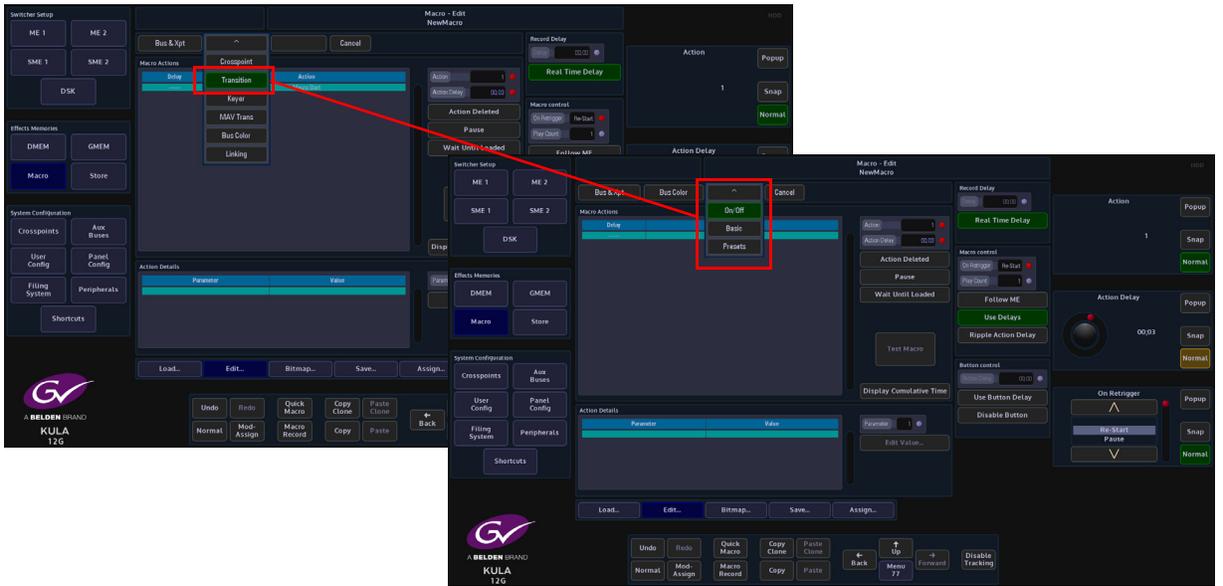
The following example will go through the steps of making an “Offline” macro for a simple wipe transition.

Open the Macro Edit menu, then touch the “Create Action” drop down menu, the menu will go dark and 6 options will appear; Bus & Xpt, Store, Peripheral, Effects, Options and Miscellaneous. These will be the base for all offline macros.

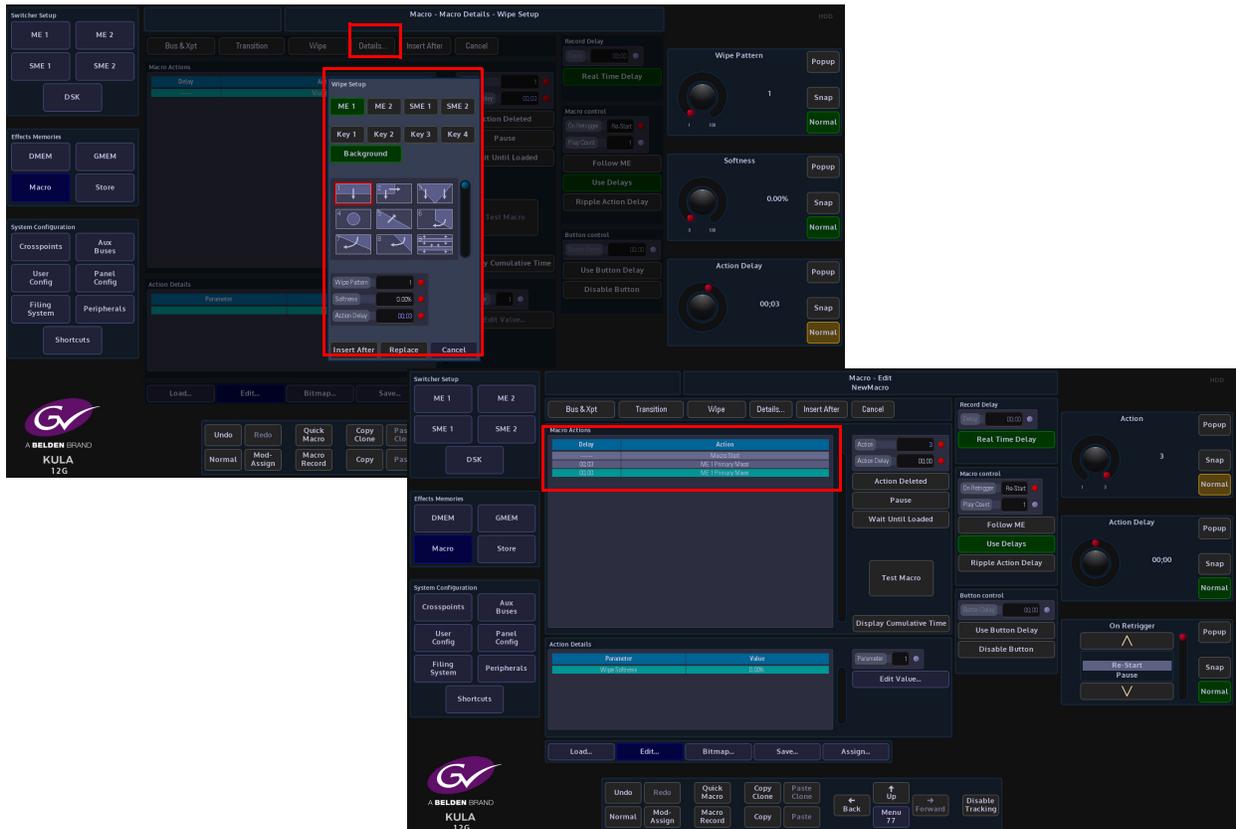
Touch the **{Create Action}** button to start creating a new macro.



Select **Bus & Xpt - Transition - Wipe**, the menu will return to the Macro Edit main menu.



Touch the **{Details}** button and a dialog box will open with “Wipe Setup” options (the dialog box options will depend on the type of macro action being inserted). Select the M/E for the transition, then select if the transition will be a Key or Bgnd transition wipe, and then select the type of wipe from the wipe table. Finally touch **{Insert After}** to insert the action. The action can now be seen with the macro information in the **“Macro Action”** table below.

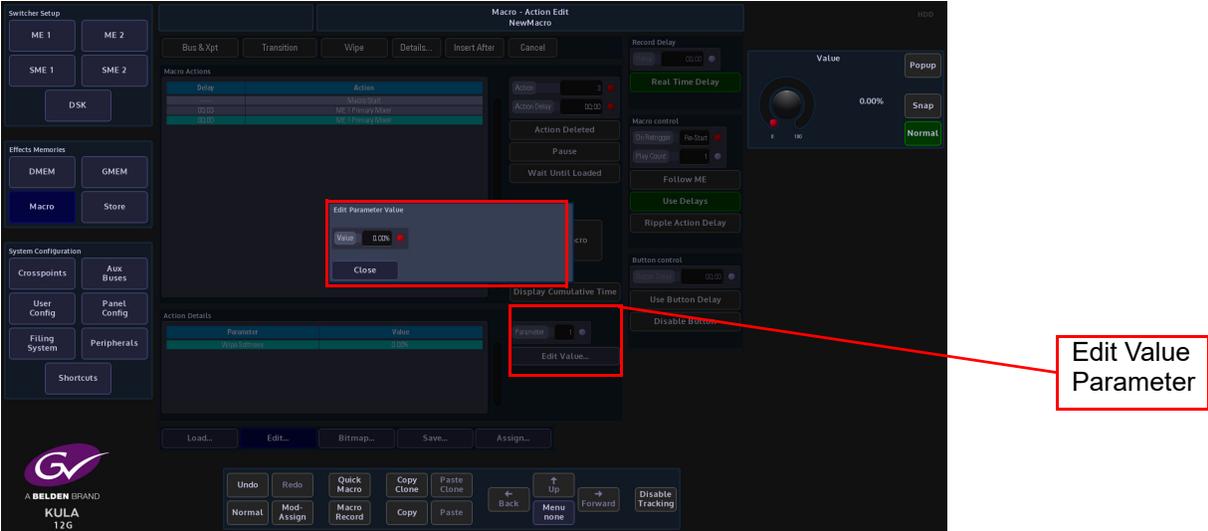


Remember to **“Save”** the macro when done.

Note: Actions can be inserted into an existing macro using the same method. Just by selecting where the new action is going to be inserted then using the “Create” offline macro editor to create a new action and insert it into the existing macro.

### Edit an existing Macro using the Using Value Parameter

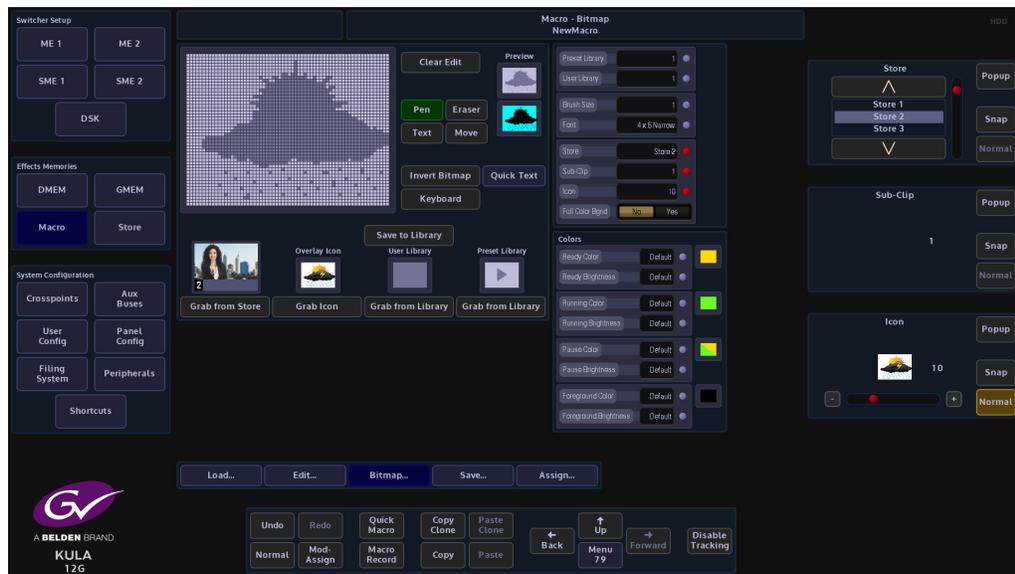
To edit an existing macro, the “Edit Value” parameter allows the user to change the value of a recorded action, this means that the user can select an action in the recorded macro list and use the **“Edit Value”** parameter to change the action of the macro. For example, if a background crosspoint button was pressed as the macro action, the user can use the **“Edit Value”** parameter to change the action to a different background crosspoint.



## Bitmap

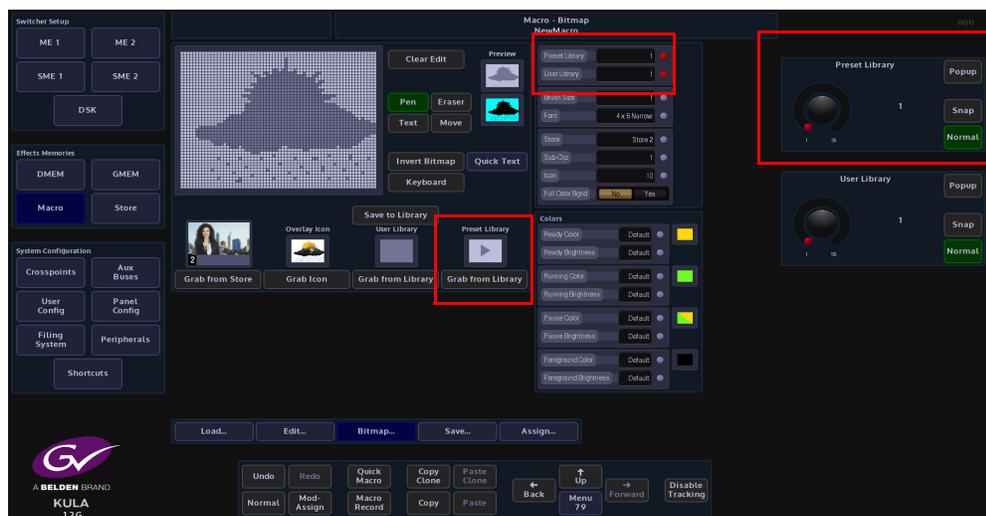
If a macro is going to be assigned to a macro button mnemonic display on the Kula control surface, on a MAV-UFBPAD module or on a MAV-AUTO module, a bitmap can be generated that can be associated with the recorded macro and displayed in the mnemonic display above the macro button or on an OLED button.

In the macro main menu, touch the **{Bitmap...}** menu link button.



A bitmap can be derived from several places within the Macro Bitmap menu. The first areas are the **Preset Library** and the **User Library**.

The Preset Library has a range of pre-installed icons. Touch the **“Preset Library”** attacher and then use the **“Preset Library”** parameter to scroll through the icons.

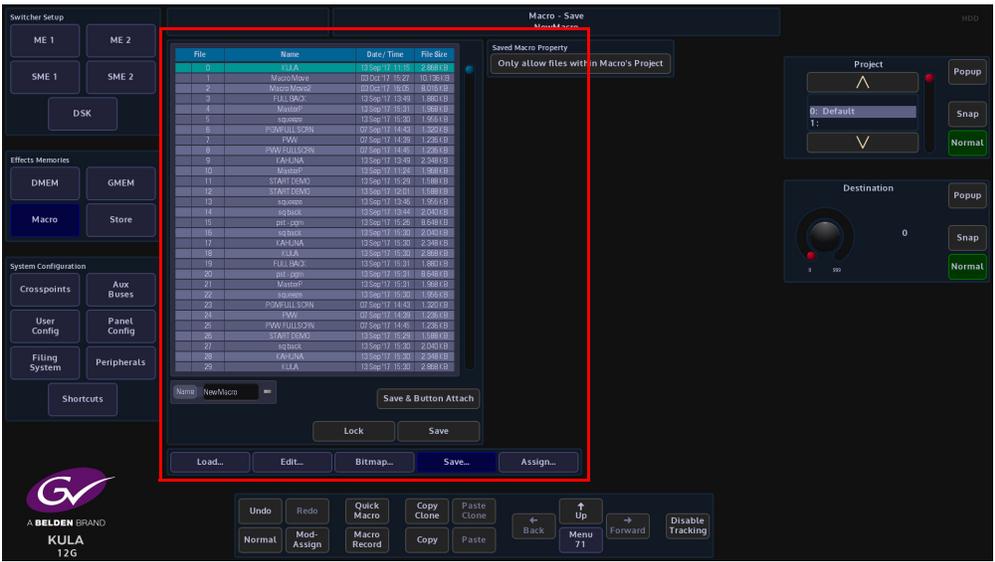


As the user scrolls through the icons, when the required one is found, touch the **{Grab from Library}** button under the icon. The selected icon will now be displayed in the grid.

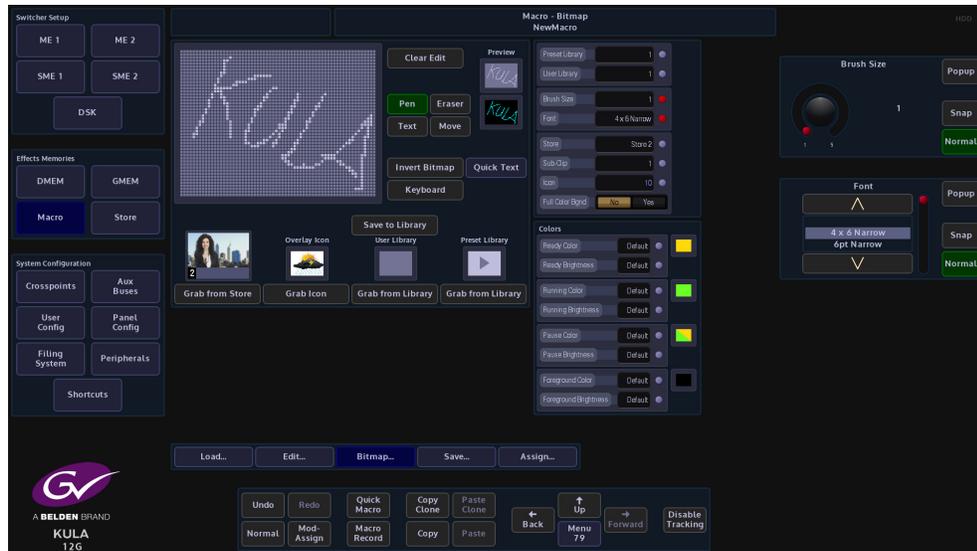
Once the icon has been selected, the user needs to save the icon with the already saved macro, so that it can be attached to the mnemonic display or OLED button. Touch the **{Assign...}** menu link button and the selected icon is displayed just above the menu link buttons (see below left). Touch the icon and the **"Macro-Load"** menu is displayed. This is only for associating the icon with the macro.



Touch the **{Save...}** menu link button and the **Macro - Save** menu is displayed. Touch to select the required macro in the table and touch the **{Save}** button, a dialog box will appear asking the user if they wish to overwrite the saved macro, touch **{Yes, Overwrite}**. The icon is now displayed in the mnemonic display or OLED button.



The User Library is basically the same as the Preset Library in the way that it is used, the only difference is that the icon library will have been created by the user. The user can create their own icon using the “Pen” function or “Text” function.



Scroll through the list of icons in the User Library using the parameter control and then touch **{Grab from Library}**. The icon can be attached to a mnemonic display or OLED button in the same way as described above.

The “**Brush Size**” parameter is used to adjust the line thickness when creating an icon for the User Library. Touch the **{Pen}** button, then touch the grid area and the user can now start creating their own icons.

Touch the **{Clear Edit}** button to clear the grid and start again.

As displayed in the menu above, the two hand drawn names have different thickness brush sizes. By touching **{Save to Library}** will save the created icon to the User library.

To create an icon, select **Pen** from the **Draw Mode** parameter and the user can create their own icons by drawing in the large grid area. To delete any mistakes in the grid, select **Eraser** in the **Draw Mode** parameter and rub out the mistake in the grid.

When happy with the icon press the **{Save to Library}** button and the icon will be saved to the User Library.

The **Text** function allows the user to type letters into the grid area using the on-screen keyboard.

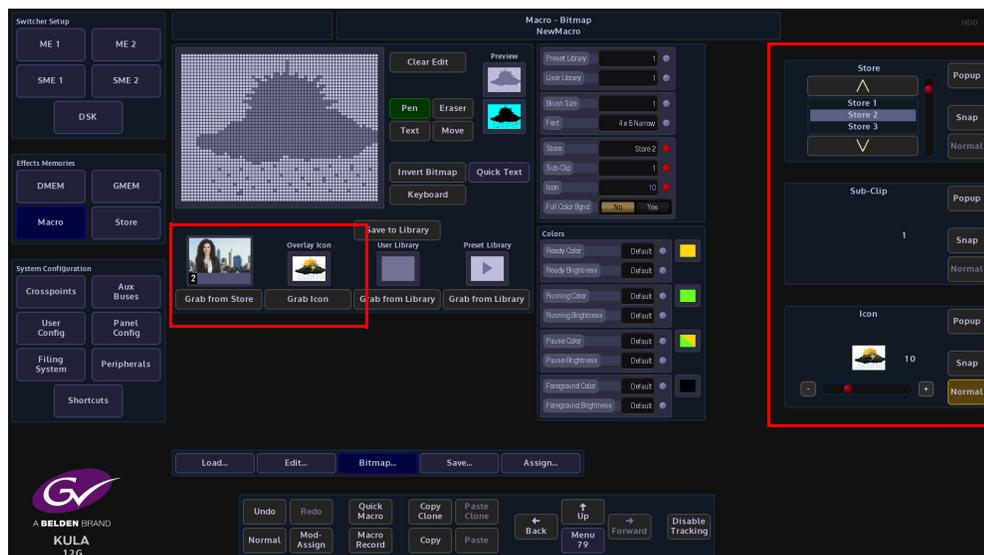
The **Font** parameter gives the user a selection of font choices when typing text using the on-screen keyboard. Touch the {Text} button and a cursor is displayed in the grid. The cursor can be moved to the required position in the grid by simply touching the cursor with a finger then sliding it around the grid.



Touch the **{Keyboard}** button to display the on-screen keyboard and type text into the grid. If the text is not in the correct position in the grid touch the **{Move}** button and use a finger to slide the text around the grid to the correct position.

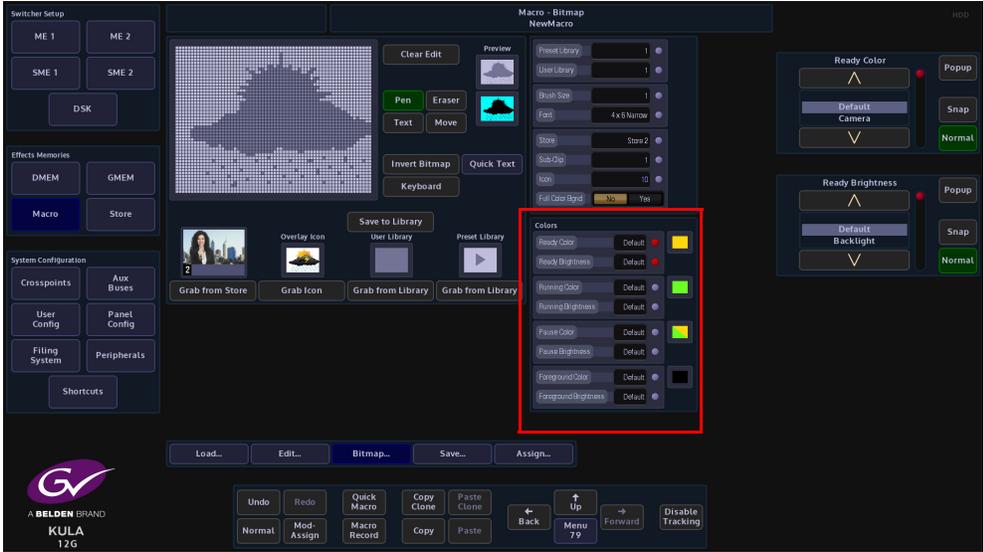


The **"Store"** attacher is used to select an internal Store or a Sub-Clip. This allows the user to grab the image from the store and use it as an icon. In this attacher, the user can also select an Icon from the icon library.



Use the **"Store"**, **"Sub-Clip"** or **"Icon"** parameters to select an image and then touch the **{Grab from}** button to place the image into the grid. If the grabbed image is going to be used in a mnemonic display, set the **"Full Color Bgnd"** to **"No"** because the mnemonics are mono color. Set to **"Yes"** if the image is going to be used for an OLED button.

The “**Colors**” attachers change the color and brightness of the macro buttons on the control surface.



The “**Ready**”, “**Running**” and “**Pause**” parameters allows the user to change the default color of the buttons after they have been attached to a macro. The “**Brightness**” parameters are also used to change the brightness of the different states of the macro buttons.

The “**Foreground**” Color and Brightness parameters are used to change the default state of an OLED button.

## Quick Text

Entering text into the bitmap grid can take a little time to get the text into the correct position with the right font size. The “Quick Text” menu allows you to quickly place text into the gray bitmap square and whilst typing, the text automatically size itself within the boundaries of the bitmap grid.

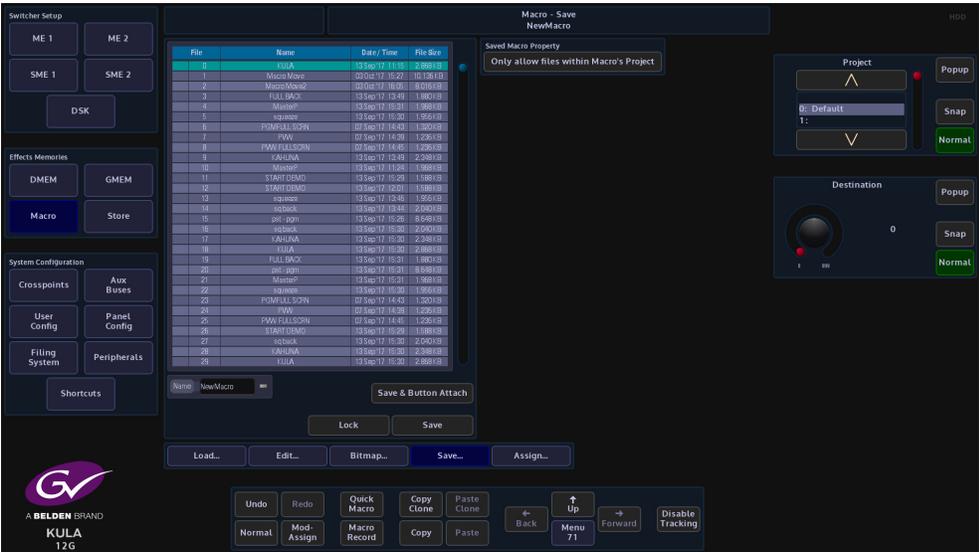


Touch the **{Quick Text}** button and the “Quick Text” menu will be displayed. Turn the “**Auto Font Size**” parameter to “**On**” and then start typing the text with the on-screen keyboard. As more text characters are added the font will auto size itself the size of the quick text box grid. Text can also be aligned more accurately using the “Alignment” buttons. After finishing entering the text, touch the **{Apply}** button.

### Saving a Macro

Once the macro has been setup, configured and a bitmap has been chosen, the next step is to “Save” the macro.

Press the **{Save...}** menu link button to enter the Macro - Save menu, then using the parameter controls, select a **Current Project** and a **Destination** within the **Macro Save** table.



A Name and Description of the macro can also be added by touching the Red attacher button twice, and entering the required name and description using the on-screen or USB keyboard.

Finally, press **{Save}** and the macro will be saved to the Hard Disk along with any associated Bitmap, Store image or Icon image.

If the user then assigns the macro to a button, the bitmap image from the grid is also assigned to the button.

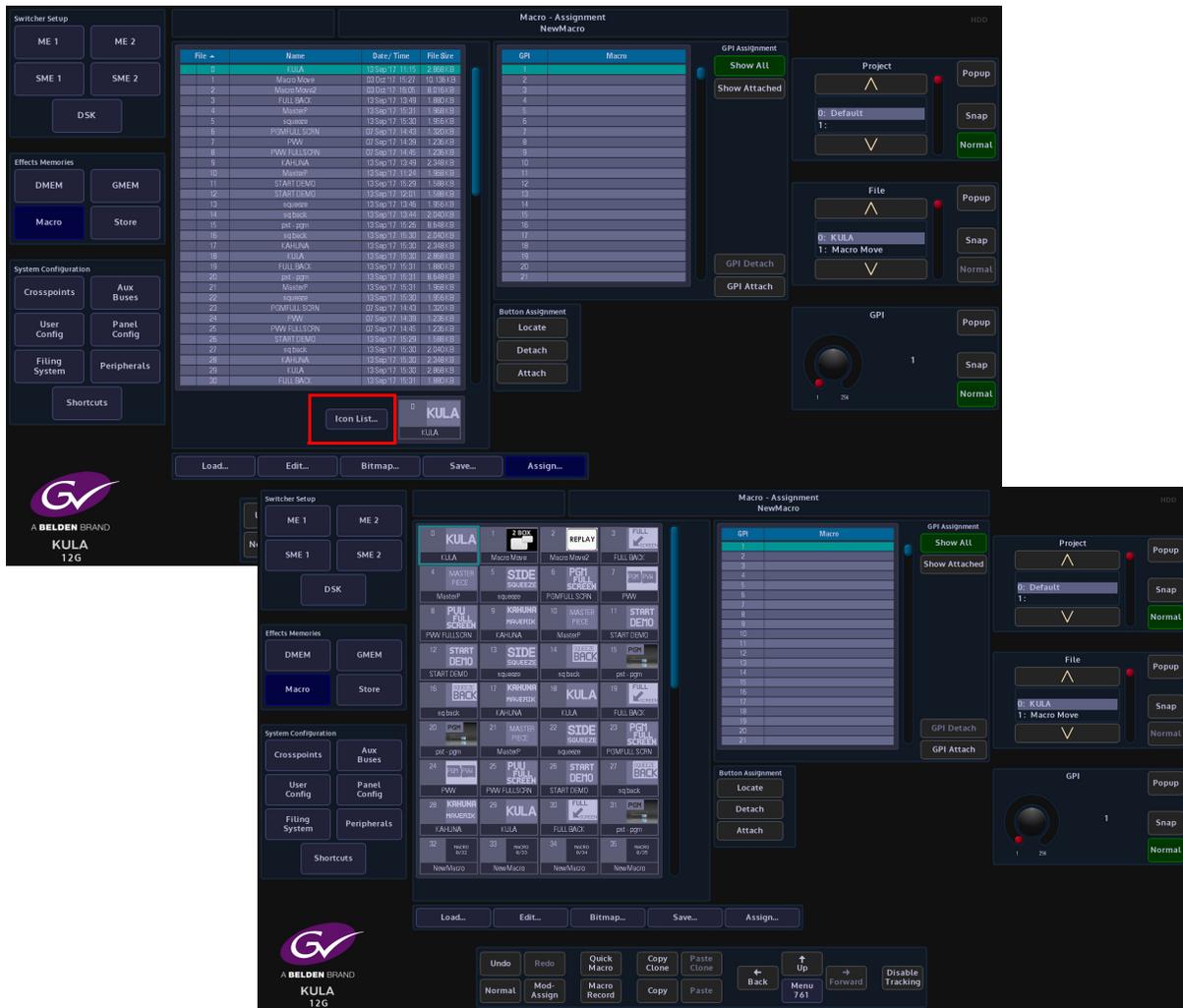
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Note: Up to 1000 macros can be saved in a single Project.

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## Assigning Macros to buttons

Press the **{Assign...}** menu link button. The Macro Assignment menu will then open. This menu has a table that displays a list of macro's that are saved within Projects.



Touching the **{Icon List...}** to attach a macro to a button on the control surface, first select a Project using the Current Project parameter and then select a macro within that Project.

Press the Button Assignment **{Attach}** button and the button will go Red. All the control surface buttons will now go out ready for the user to select a button; buttons with macros already assigned will go Green. If the selected macro is already assigned to a button it will be lit Red.

Note: The same macro can be assigned to as many buttons as required.

Press the button on the control surface where the selected macro is going to be attached. The panel will return to the normal configuration and the macro will be attached to the button.

To detach a macro from a button on the control surface, press the **{Detach}** button. Once again the button will go Red. The control surface lights will go green for buttons with macros attached and any button which has the currently selected macro in the table will be lit Red. Press the button you want to detach the macro from. The control surface will now return to its normal configuration. The **{Detach}** button in the menu will go Gray and the macro will no longer be associated with that button.

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Note: The macro is not deleted the from the Project, just removed from the button it was attached to.

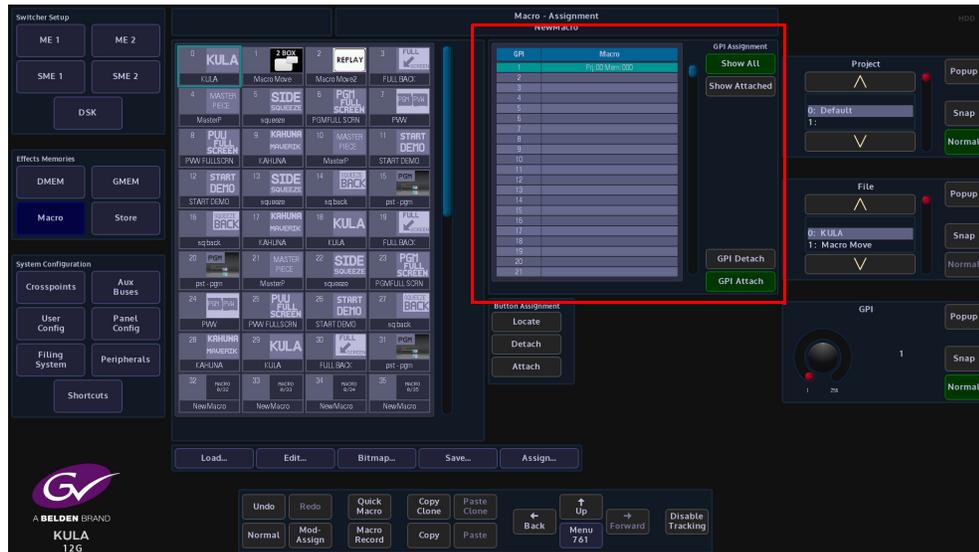
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To find out which macros are attached to buttons, press the **{Locate}** button on the GUI. Any button on the panel with a macro associated with it will either be lit Green or Red as described above.

Pressing a button on the control surface which has a macro attached will highlight the macro in the table. This will work in reverse as well. To find the particular macro, touch on it in the macro table, then press the **{Locate}** button. Any button with that macro attached will light Green.

## GPI Assignment

This function allows an external device to control a saved macro. The GPI parameter control selects the GPI pin that the external device is connected to. The selected GPI pin and attached macro are displayed in a table in the GPI Assignment area.

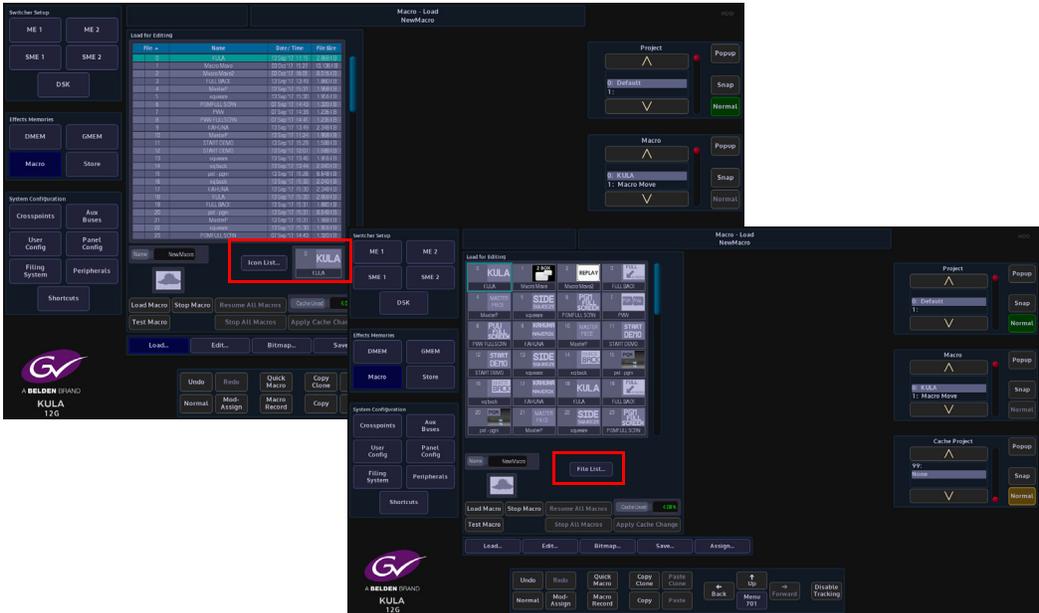


To attach a macro to a GPI pin, select the macro in the macro file table, and then use the GPI parameter to select the required GPI. Once the correct GPI pin has been selected, press the **{GPI Attach}** button to attach the external device to the macro. The table next to the Attach/Detach buttons displays the GPI pin and the attached macro.

To Detach a macro from a GPI, select the GPI/Macro in the table and then press the **{GPI Detach}** button. This will detach the GPI pin from the external device.

## Macro Load

The macro load menu will load a Macro into the active buffer ready to use. The macro can then be attached to a button on the control surface.



There are two ways to view the saved macros:

- As a list of macros in a table
- As a list of Icons that have been attached to the macro

Select a **Project** using the Project parameter control. Notice that if a Project has any macros attached they are listed in the Load for Editing table.

Once a Project has been selected, a macro can then be selected using the Macro parameter control. The Project and the macro are also listed in the Name/Description information bars below the table.

**{Load Macro}** - will load the selected macro into a buffer ready to use once attached to a button on the control surface.

**{Test Macro}** - will run the macro function.

**{Stop All Macros}** - will stop all running macros.

**{Resume All Macros}** - when a macro is running this button lights Orange. If a macro has had a pause inserted, the macro will run until it reaches the pause and will stop. The Resume All Macros button will flash along with the **{Test Macro}** button. Press the Resume All Macros button to start the macro running once again.

If a macro has a bitmap associated with it, this will be displayed in the Gray bitmap display next to the Test Macro button.

**Cache Used** is an indicator to show how much memory is used.

**Apply Cache Change** - will apply any change to the Cache Project number.

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Note: If it is updated as the parameter is changed many files would load/unload as each Project was passed!

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## Stores

Stores are one of the most important functions within a Kula system. They are used as internal sources and are globally available throughout the system for Crosspoints, Keys, Util buses and Auxes etc. Stores are comprised of **Still** images or **Clips** of video and **Audio** files called **ClipTrax™**. The Stills, Clips and Audio that can be either imported into the mainframe via the Filing System menu, or “grabbed” into the internal memory from any source connected to the up to 36 inputs to the Kula mainframe. Stills and Clips and Audio are individual files that are saved into user-defined Projects. Up to 1000 stills and clip files can be saved into each Project.

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Note: When loading video clips into Stores, Kula will automatically allocate the correct amount of time (memory) to the Store to allow the clip to play once loaded, up to the maximum amount of memory in the mainframe. The amount of video storage available will also be affected by the type of video standard set by the user.

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Before still images, video clips or audio can be imported into the Kula mainframe, the files have to be processed through a software application called **K-Manager**; which converts the original file format into the Kula native.sws format.

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Note: K-Manager is a free software application that comes as an accessory with a new system, or can be downloaded from the Grass Valley website (see the contact details at the rear of this manual).

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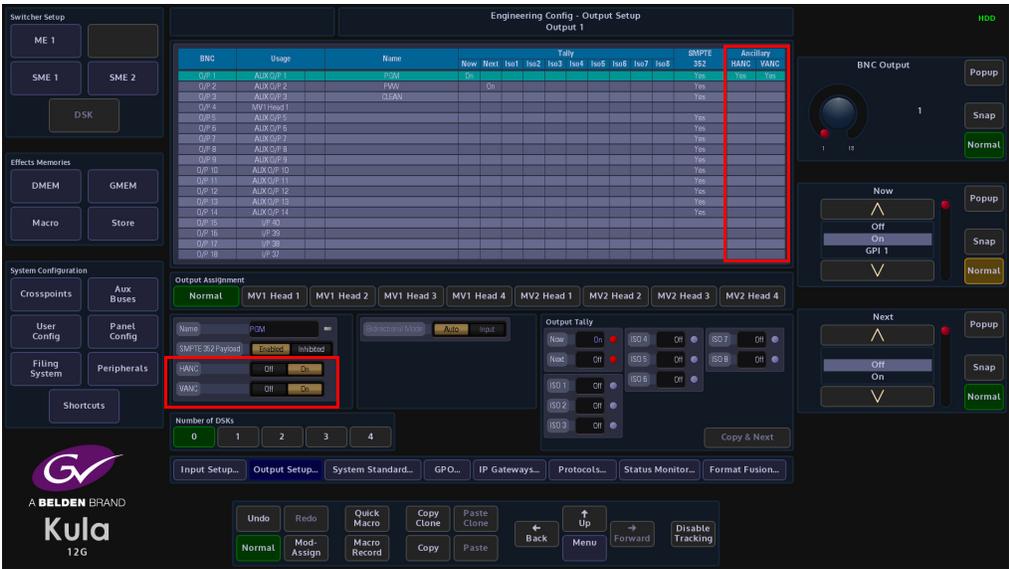
### ClipTrax™ - overview

A unique feature to Kula is that the Stores functionality is now capable of storing audio as well as video, the Audio Store function is known as “ClipTrax “. The audio and video data in an individual Store are kept in separate areas of memory and can be manipulated independently of each other (described later in this section).

ClipTrax can be used in several scenarios:

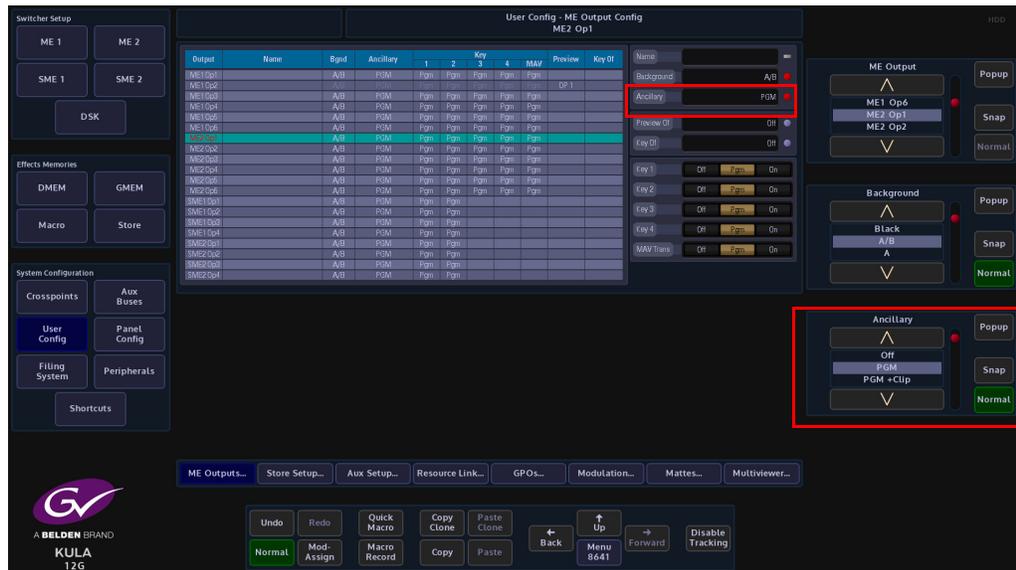
- Pre-rendered flying key clips for MAVTrans transitions.
- Audio accompaniment on a general background

Audio can be output to any of the up to 12 outputs as “Embedded Audio” this is setup in the **Eng Config - Output Setup**, where the user turns the “HANC/VANC” function On for an output to pass audio.



**User Config - ME Outputs** menu, where the user enables Ancillary on an M/E Output by output basis. The user has a number of options for the Ancillary data. Please read the **User Config - ME Outputs** section of this manual.

## Effects Memories Stores



The audio information is output as AES 8 channel audio with video, which is output as SDI. The ancillary audio can also be passed via the Store functionality, which is the ClipTrax option, the embedded ClipTrax audio can then be passed to the mainframe outputs.

The audio or audio and video can be grabbed from an imported Clip, and then placed in one of the available Stores. Here the audio and video can be manipulated separately to build a clip or the audio can be combined with video in another Store to build a clip.

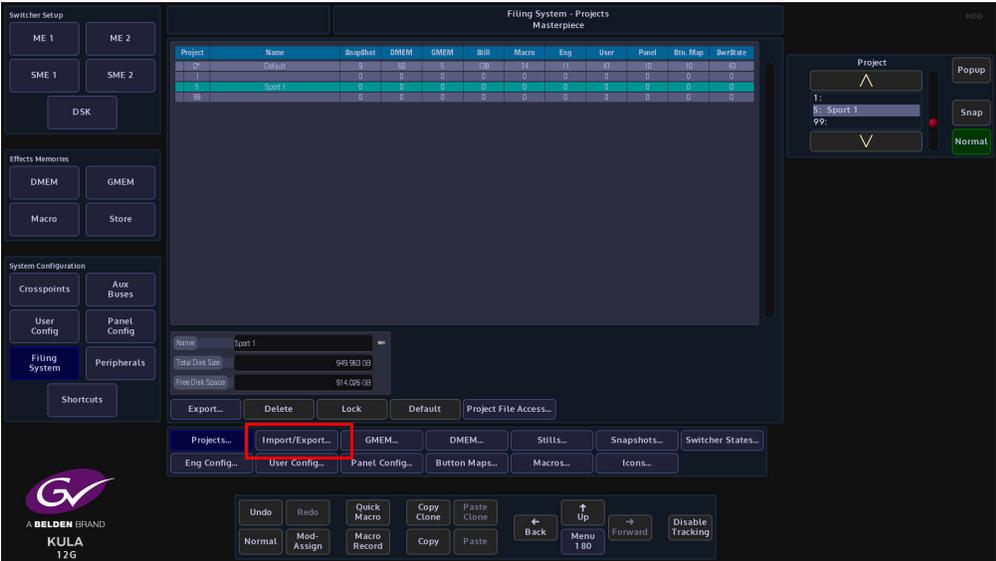
Audio can be imported using the Filing System Import/Export option, from a memory device, and placing the imported audio into a Project.

If imported using a memory device, the file format must be a.WAV file with the following rules applied: 48kHz, 24 bit, that can contain up to 8 channels of audio.

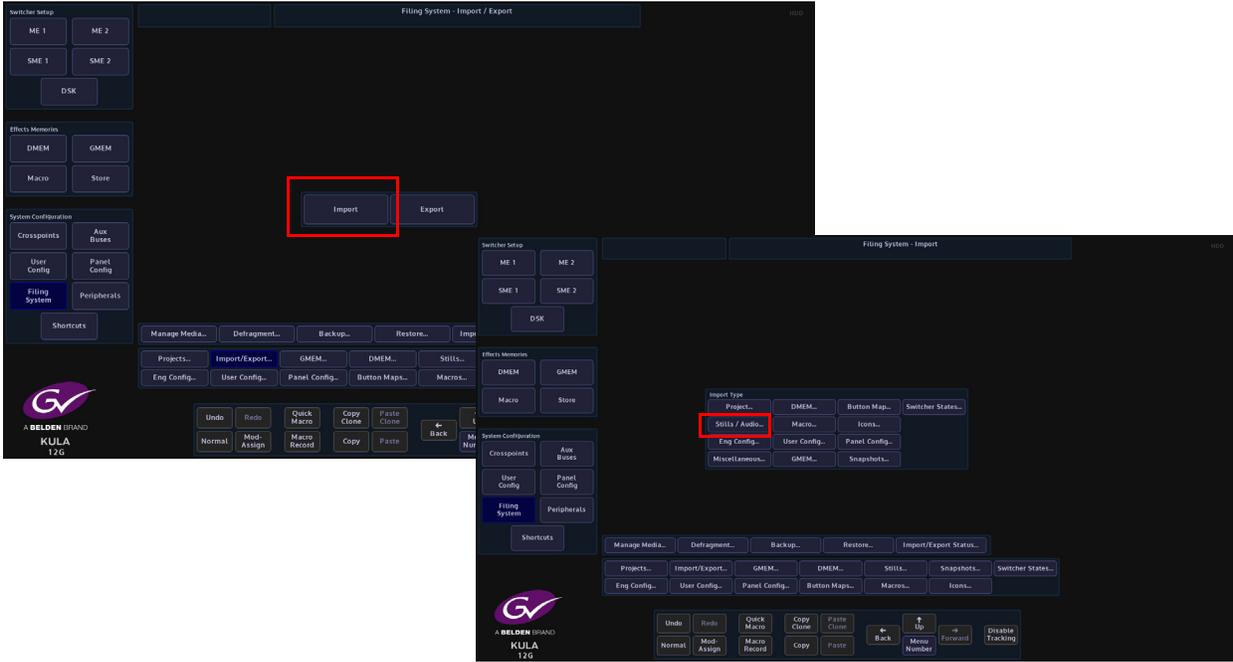
The files can be can loaded or saved maintaining the Audio or Video in a Clip.

### Importing Stills and Clips

It is important to understand how to get Stills and Clips into the Kula mainframe before using the Stores menus. As mentioned earlier, Stills and Clips can be imported into the mainframe via the **Filing Sys** menu; through one of the USB ports on the mainframe. To do this, connect the hard disk drive or memory device to the mainframe and then press the **{Filing System}** button on the GUI.



Press the **{Import/Export...}** button and then in the Import button area, press the **{Stills...}** button.



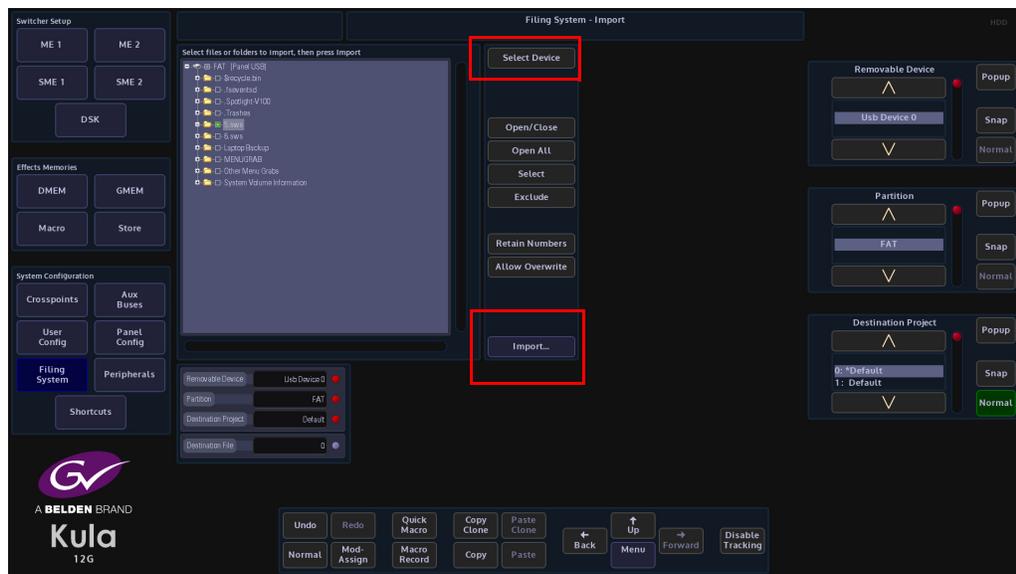
Use the **Removable Device** parameter to select the memory device containing the stills or clips and press the **{Select Device}** button. The contents of the memory device will be displayed in the gray area, left hand side of the menu. Use the **Destination Project** and **Destination File** parameters to select where the files will be imported to.

Using the **Selector** parameter and **{Open/Close}** button, navigate to the files that are going to be imported. Again use the **Selector** parameter and the **{Select}** button to select the required files and then press **{Import...}**.

The files will now be imported to the selected Project destination ready to use.

Going back into the filing system main menu, the imported files can be found in the **{Stills...}** menu as shown below.

In this menu a new name and description can be given to a selected file using the on-screen keyboard.



## Store Load

The **Store Load** menu as the name suggests is where **Stills** and **Clips** are loaded into Stores.

To get to the **Stores** menu, in the Home menu, press the **{Stores}** menu link button from the list of **Global** functions.

The first menu that will appear is the **Store - Load** menu.



To get to all of the other Stores function menus, press the menu link button in the top bar area of the menu and a list of Store menus will appear.

The Store Load menu displays the stills and clips along the top of the menu, that are contained within the currently selected Project, File and Project information, displays the Key and Fill information and details relating to the currently selected still or clip.

## Using Store Load

When the user imports Stills and Clips files into a Kula mainframe, they are all imported into Projects. To find the stills and clip files, use the **Project** parameter to scroll through the Projects. Notice that when scrolling through the list of Projects, the stills, clips and audio file “mini pics” change to reflect what is in each Project.

Note: Notice that there is a number in the bottom left corner of the minipic. This is the.sws number given to the still or clip when converting it in the K-Manager software.



In the **Store Load** main menu, the Stills, Clips and Audio Clips are sequenced in numerical order. This number appears on the bottom left of the mini pic starting with 0 and ending at 999 depending on the number given to the still or clip in the K-Manager software.

The minipic is generated from a still or the center frame of a Clip. The bottom right hand corner will display “C” if the image is a Clip.



A “K” in the bottom right corner indicates that the Still or Clip has a Key saved with it. The Key will be loaded into the Coupled Store. A “CK” identifies the clip as having a Key associated, and would be used when keying over a background. A speaker in the top right corner signifies that the Store contains audio content.

The two minipics in the middle of the menu depict the currently selected Still, Clip, Audio file or Fill and Key portions of the file.



Notice in the diagram above that the Fill portion of the file is on the left and the Key portion is on the right. Below the minipics, the parameter information displays the details of the currently selected still or clip file.

## Loading a Still or Clip into a Store

Touch the Store that the Still or Clip file is going to load into. If **{Store Load On Press}** is selected, then the still/clip will automatically load in to the selected store. If **{Store Load On Press}** is not selected then, after selecting the still/clip touch the **{Load}** button to load the image into the selected Store.

When loading a clip into a Store, the Load button will light up green and stay lit until the clip is loaded. The process may take a few seconds depending on the size of the clip, especially if the clip is in a 1080p video format and a few seconds long.



When selecting a clip, press **{Load}** and the clip will load into the Store and play for the duration of the clip.

If the original Fill Store is an audio only file, and the user wants to keep the audio content as part of a new Still or Clip, by pressing the **{Keep Audio}** button the audio content will remain as part of the new Fill Store. This could be used for example in a Clip Transition.

This option is the same when an audio file is loaded and the “Keep **Video**” function is used.

---

Note: This function will only work when the Load Mode parameter is set to Replace Sub-Clip (as described below) the Keep Video and Keep Audio buttons will be grayed out if Load Mode is on any other setting.

---

## Load Mode Parameter

**New** - Allows the user to load new stills and clips into a Store.

---

Note: Any stills or clips in the selected Store will be over written.

---

**Add To Sub-Clip** - This will send a still or clip to the Sub-Clip folder of a selected Store, each time a still or clip is selected by touching the miniclip or pressing **{Load}** the still or clip will

be sent to selected Store as a sub-clip. In the Append To Sub-Clip mode, if a different still or clip is loaded into sub-clips, the original still/clip will be over written.

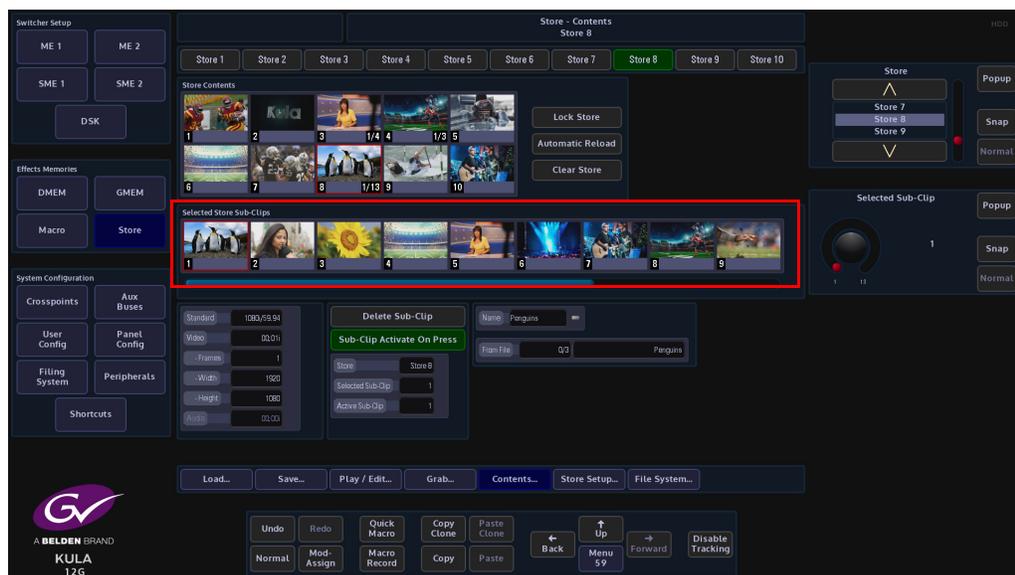
**Replace Sub-Clip** - This will replace a still/clip in the selected Store Sub-Clip.

**Insert Before** - If a number of stills/clips have been loaded into the **Sub-Clip** folder, using the **Store Sub-Clip** parameter to move to a defined point within the sub-clip line-up, a still/clip can be instead before the selected still/clip in the sub-clip line-up.

**Insert At End** - Allows the user to insert a still/clip at the end of the Sub-Clip lineup, to the point at where the sub-clip folder is full.

## Sub-Clips

Sub-Clips is a function that allows up to 31 stills and clips to be loaded into a single Store. This allows quick and easy access to stills and clips without having to load each Store when it is needed.



## Creating Sub-Clips

As mentioned earlier, Sub-Clips are multiple stills and clips that have been loaded into a single Store. Sub-Clips are created in the **Store Load** menu, using the **Load Mode** parameter.

Use the **Project** parameter to select where the stills and clips that will fill the sub-clip Store will come from.

Use the **Delegate** menu to select a Store that will contain the sub-clips, then use the menu expander in the **Load Mode** parameter set to "**Append To Sub-Clip**" to start entering stills/clips.

Touch a minipic from the selected Project and it will be added as the 1st sub-clip in the selected Store. Look at the **Store Sub-Clip** parameter and it will have "1" highlighted. Set the **Load Mode** parameter to "Insert At End" and then each minipic that is touched will load a still/clip into the Store as a sub-clip.

Up to 31 stills/clips can be entered into sub-clips for each Store. In the Store Contents

menu, the Store that contains the sub-clips will have the number of stills/clips loaded at the bottom right of the minipic (as shown above in the right hand side menu).

To see the Sub-Clips that were just loaded, enter the **Store - Contents** menu. The selected Store that contains the sub-clips should have a yellow box around the Store. Use the top rotary control to scroll through the loaded the sub-clips.

Next, enter the **Contents** menu, then using the "**Selected Sub-Clip**" parameter to scroll through the list of sub-clips. Information regarding the video standard, length of clip etc. is displayed in the left side of the menu.

The loaded sub-clips are displayed along the bottom of the menu. The user can use Sub-Clip parameter to scroll through them or use their finger to slide the list horizontally left/right to get to the desired sub-clip.

On the Kula control surface, if the crosspoint that the Store containing the sub-clips is selected, then what ever sub-clip is selected will be displayed on a monitor.

Delete Sub-Clip - will delete the selected sub-clip still/clip out of the Store

**Clear Store** - will clear all sub-clips out of the selected Store.

**Automatic Reload** - when set to Yes this causes the still or clip to be automatically reloaded from the hard disk whenever the original file location is updated. If the Store contains something that was grabbed rather than loaded, then this has no affect.

**Lock Store** - will lock the Store down and not allow any sub-clips to be deleted from or any changes made to the selected Store.

### Store Play/Edit

This menu allows the user to play or edit a selected clip.  
Touch the **{Play/Edit}** menu link button to open the **Store Play/Edit** main menu (as shown below).

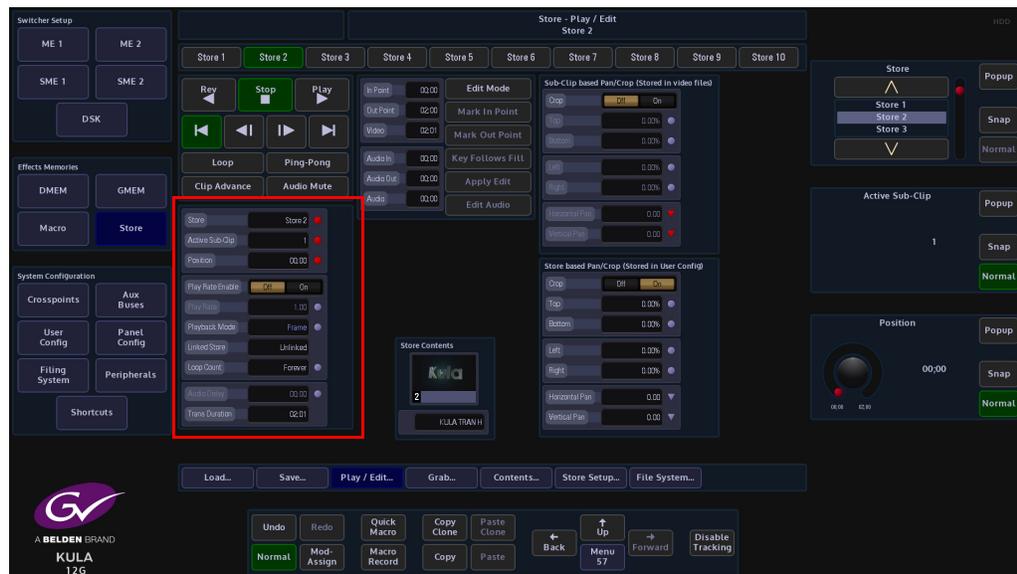


### Transport Controls



- 1. Play/Rev - plays a clip forwards and in reverse at standard speed
  - 2. Stop - stops a clip
  - 3. Steps to Start or End - steps to the end or the start of the clip
  - 4. Frame Step - steps a clip forward and backward by one frame
- Loop** - will make the file loop from start to finish indefinitely.
- Ping-Pong** - will make the file run from start to finish then finish back to the start again constantly.
- Clip Advance** - will automatically go to the next clip in the Store when the previous clip is finished playing.
- Audio Mute** - will mute any audio that a clip may contain when playing a clip

## Parameter Controls



**Active Sub-Clips** - this displays the number of sub-clips within the selected Store.

**Position** - displays the current run time of the selected clip

**Play Rate** - this can be used increase or decrease the play rate of a clip. It has to be "Enabled" for this function to work. The default is set to "1.00" which is normal speed.

**Playback Mode** - The user has the option to play back Clips in **Field** or **Frame** mode, or **Field 1 Only** or **Field 2 Only** using the **Playback Mode** parameter control.

This feature can be used if a Clip is made from a sequence of individual Stills. If each Still is a Frame in duration the user can Play/Position the Still and in the Stop state, both fields (Full resolution) will be displayed. If the material is Field-based then in Frame mode the user will risk seeing flickering images from two different fields.

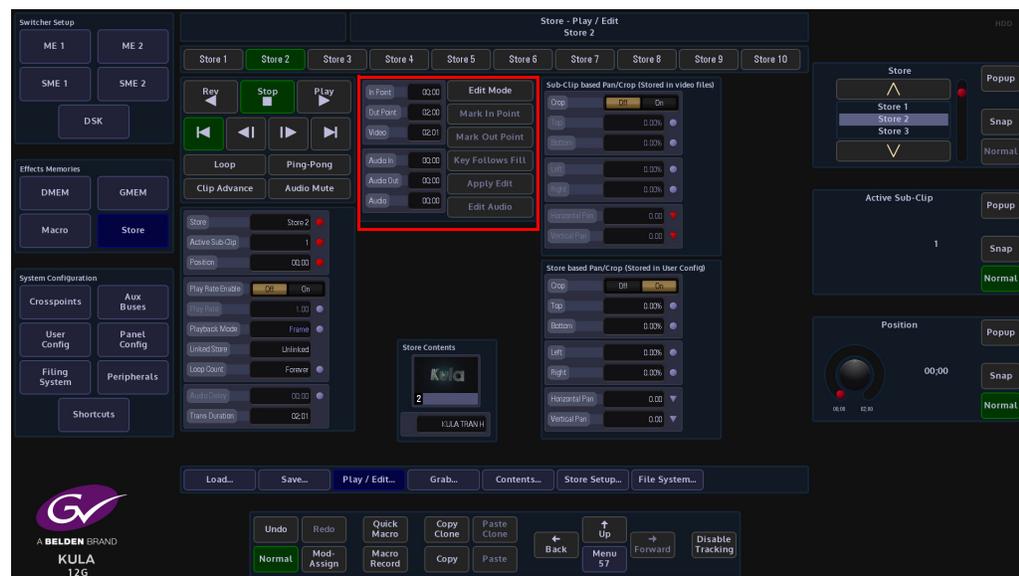
**Loop Count** - this parameter selects how many times a clip is played back in a loop. When set to "0" the clip will play until stopped. The parameter can be adjusted from 1 to 100 loop counts.

**Audio Delay** - if the audio needs to start later than the video, the Audio Delay parameter can be adjusted.

When set to 0% (default) the audio and video will start at the same time, +100% the audio will start after the video finishes. -100% the video starts after the audio has finished.

**Trans Duration**- this parameter displays the current Transition Duration time. The user is able to use this information when setting up an audio/video clip to be used in a clip transition.

## Using Edit Mode



Press the **{Edit Mode}** button, then using the **Position** parameter control, the user can setup “in” and “out” points on the Audio/Video Clip.

Position the start point of the Clip as required and then press the **{Mark In Point}**. “In Point” button. A numeric keypad is displayed that allows the user to enter a time. It is the method for the **{Mark Out Point}**.

Press the **{Apply Edit}** button and the changes will be applied to the selected clip

Come out of **Edit Mode** by pressing the **{Edit Mode}** button. When the **{Play}** button is pressed, the Clip will only Play, Loop or Ping-Pong, from the set In Point and set Out Point. This new Clip can now be saved.

**Follows Fill** - If editing a clip that has an associated Key signal, Key Follows Fill is will also mark the selected In and Out Points for the Key signal in the coupled Key Store.

**Edit Audio** - this allows the user to edit and audio clip in the same way as editing a video clip as described above.

## Store - Contents

The **Store - Contents** menu Shows a set of mini pics of stills and clips that are currently loaded into Stores.

Touch the **{Contents}** menu link button to open the **Contents** main menu (as shown below).



Note: For Clips, the mini pic will show the center frame of the Clip.

The menu is only used to display the stills, clips, audio files and sub-clips which have been loaded into each Store.

If a Store has sub-clips loaded, the top rotary control can be used to scroll through the sub-clips.

In the **Store - Load** menu, press the **{Contents...}** button, this menu will show further information about a selected still or clip.

**Sub-Clips** - If a Store contains Sub-Clips, the bottom right of a minipic will display the number of stills/clips contained within the Store and the Sub-Clips parameter will also display the number of stills/clips contained within the Store.

**Standard** - displays the video standard of the selected clip

**Video** - displays the length of the selected clip

**Frames** - displays the length of a Clip

**Width & Height** - displays the number of horizontal and vertical pixels (aspect ratio)

**Audio** - displays the length of the selected audio file

**Name** - is the short name given to the selected still, clip or audio file. The name is user definable and can be changed using a USB keyboard. Touch the keyboard symbol and a cursor will flash in the Name box, enter a name and press the return key on the keyboard.

**Delete Sub-Clip** - will delete a selected sub-clip from the selected Store

**Lock Store** - this will set a lock on the selected Store in the **Store Contents** menu. The Store will display a padlock symbol top right corner of the mini pic (shown above). If the user tries to change the Store once it is locked, a dialog box will appear with options.

**Automatic Reload** - when set to Yes this causes the still or clip to be automatically reloaded from the hard disk whenever the original file location is updated. If the Store contains something that was grabbed rather than loaded, then this has no affect.

**Clear Store** - will clear all contents for the selected Store including all sub-clips

## Store - Grab

Another option to generate a Still or Clip is the **Store - Grab** option; this allows the user to grab images, video or audio clips from a Crosspoint, M/E Output, Matte or from another Store.

Touch the menu link button in the menu bar to display the list of **Store Menus**, then touch the **{Grab}** button to open the **Grab** main menu (as shown below).



## Taking a Grab

This example is taking a grab using the most simple method. Using the **Grab Crosspoint** parameter (or pop-up selector), select the required still or video source that contains the images or video content, then using the **Grab To Store** parameter, select the Store into which the grabbed information will be placed and press the **{Grab Video}** button. If the information that is grabbed is coupled with another Store for a Key, the Grab function will grab the Key as defined in the crosspoint mapping into the coupled Store. The minipic at the bottom of the menu will display what is currently grabbed, which will be a still, or the center frame of a clip.

## Grab Options

**Single Frame** - used to grab a single frame into the Store on press.

**Latching Grab** - this will latch the grab function and allow the grabbing of Clips. This option is best used with the Stop When Full to end the grabbing once the Store is full i.e. once all the available frames in the Store have been used.

Latching Grab is best used for grabbing Video or Audio files. Pressing the **{Grab Video}** button, which turns the button green, then pressing latching grab for the required grab time will grab video only. Pressing the **{Grab Audio}** button, which turns the button green, then pressing latching grab for the required grab time will grab will Audio only. With both buttons green, Video and Audio will be grabbed.

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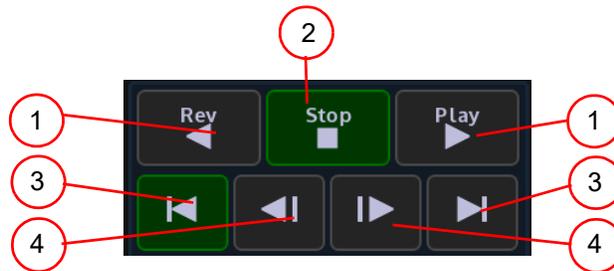
Note: This is part of the ClipTrax function. Grab Mode has to be set to "Replace Sub-Clip" for this function to work.

---

**Grab** - This will continue to grab while the button is pressed. This will also respect the Stop When Full.

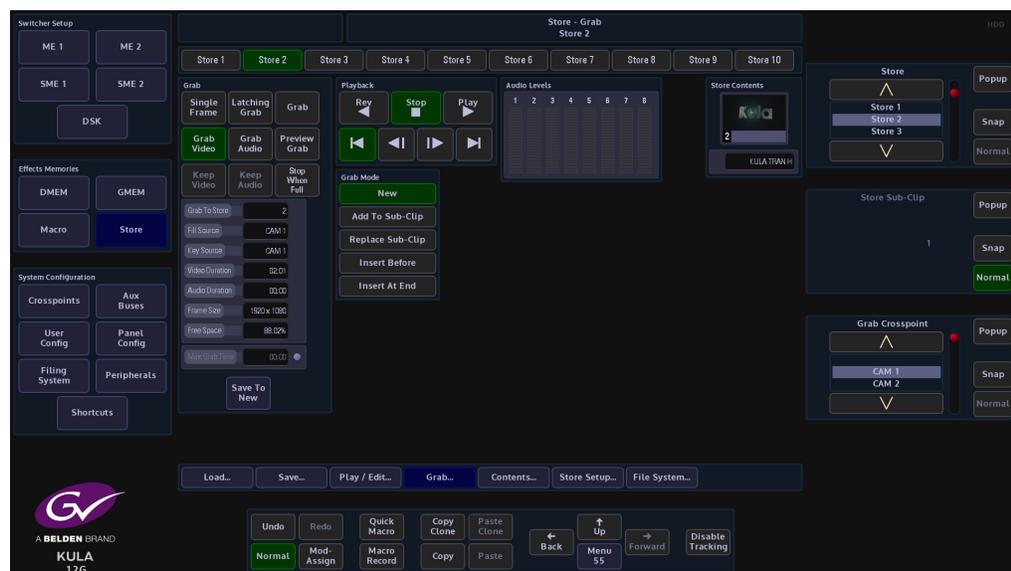
**Preview Grab** - This will place a preview of the grabbed image or video into the minipic at the bottom of the screen.

## Playback Transport Controls



1. **Play/Rev** - plays a clip forwards and in reverse at standard speed
2. **Stop** - stops a clip
3. **Steps to Start or End** - steps to the end or the start of the clip
4. **Frame Step** - steps a clip forward and backward by one frame

## Grab Mode Parameter



**New** - Allows the user to grab new stills and clips into a Store.

---

Note: Any stills or clips in the selected Store will be over written.

---

**Append To Sub-Clip** - This will send a grabbed still or clip to the Sub-Clip folder of a selected Store, each time a still or clip is selected by touching the miniclip or pressing **{Load}** the still or clip will be sent to selected Store as a sub-clip. In the Append To Sub-Clip mode, if a different still or clip is loaded into sub-clips, the original still/clip will be over written.

**Replace Sub-Clip** - This will replace a still/clip grab in the selected Store Sub-Clip.

**Insert Before** - If a number of stills/clips have been grabbed into the **Sub-Clip** folder, using the **Store Sub-Clip** parameter to move to a defined point within the sub-clip line-up, a still/clip can be inserted before the selected still/clip in the sub-clip line-up.

**Insert At End** - Allows the user to insert a grabbed still/clip at the end of the Sub-Clip lineup, to the point at where the sub-clip folder is full.

### Grab Parameters



**Grab Store** - the Store the video/audio grab will be saved in.

**Grab Crosspoint** - displays the source the Video/Audio is taken from.

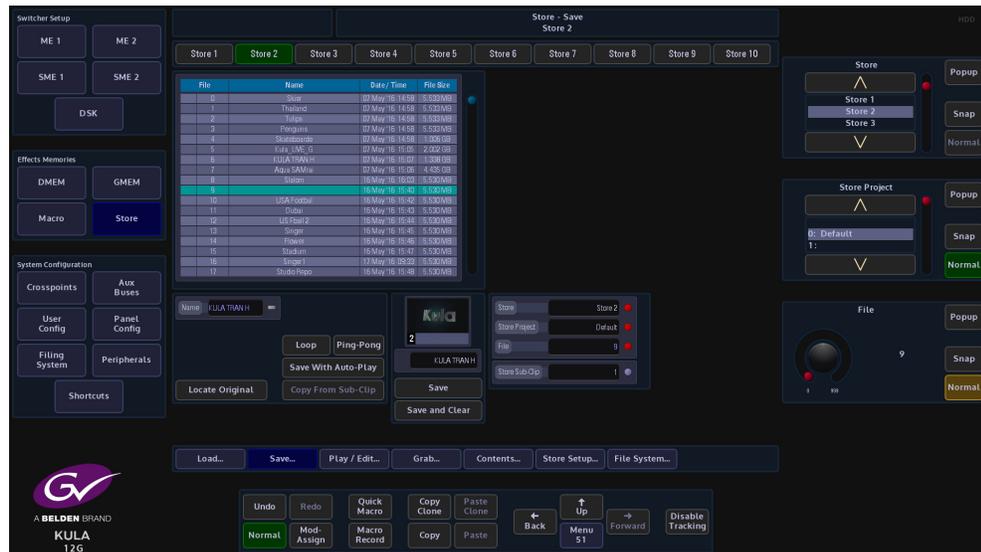
**Video Duration** - length of the video clip

**Audio Duration** - length of the audio clip

**Free Space** - the amount of memory left in the system

## Store - Save

As the menu suggests this is where stills and clips are saved into Files and Projects.  
Touch the **{Save}** menu button to open the **Save** main menu (as shown below).



This menu will show a mini pic of the Store that is about to be saved (as shown above right).  
Use the **Current Project** parameter to select the Project. Select the file number using the control **File** parameter to select where the still or clip will be saved.  
Determine if the file is going to be saved with **Save With Auto Play** - On or Off.  
A name can be given to the file. Once the selections have been made, press the Gray Save button to save the file.

Using the **Store Sub-Clip** parameter, the user is able to select stills and clips within selected Stores, as the **Sub-Clip** parameter is adjusted the individual stills and clips are displayed in the minipic.

## Store Setup

The **“Store Setup”** menu link button is a short cut to the **“User Config - Store Setup”** menu.

## Filing System

The **“Filing System”** menu link button is a short cut to the **“Filing System”** main menu.

# 13

## Initial Setup Menus

### Log into the System and Set Up a User Account

Kula is a Project driven system where the user is able to create 98 individual Projects to Store and save their work and the user-defined setup of the system. All Shows are made up from Projects and Config files. On logging into the Kula system, the first menu to appear will be the **Connected to.....** menu. This menu allows the user to create up to 1000 Shows.

The screenshot displays the Kula 12G software interface. The main window is titled 'Connected to Masterpiece'. On the left, there are several menu sections: 'Switcher Setup' (ME 1, ME 2, SME 1, SME 2, DSK), 'Effects Memories' (DMEM, GMEM, Macro, Store), and 'System Configuration' (Crosspoints, Aux Buses, User Config, Panel Config, Filling System, Peripherals, Shortcuts). The central area contains a 'Switcher States' table with columns for Load, ID, Date, and Overwrite. Below this is a 'Shows' section with a grid of icons representing different shows, including 'UHO 58 94', 'UHO 58', '1 ME 10', '1 ME 58 94', '2 ME 58 94', and '2 ME 58 94'. A 'Current Project' dropdown is set to '0'. Below the shows grid is a 'Last Loaded Configs & Switcher States' section with fields for Eng, User, Panel, and Fixed State. At the bottom, there are buttons for 'Configure Shows...', 'Status...', and 'Defaults...'. A toolbar at the very bottom includes 'Undo', 'Redo', 'Quick Macro', 'Copy Clone', 'Paste Clone', 'Macro Record', 'Copy', 'Paste', 'Back', 'Menu', 'Forward', and 'Disable Tracking'. Four red arrows point from text boxes to specific elements in the interface: one to the 'Shows' grid, one to the '1 ME 10' icon, one to the 'Last Loaded Configs & Switcher States' section, and one to the 'Overwrite' column in the 'Switcher States' table.

Project associated with current show

Show Files green signifies current selected Show

Config Files being used in Current Show

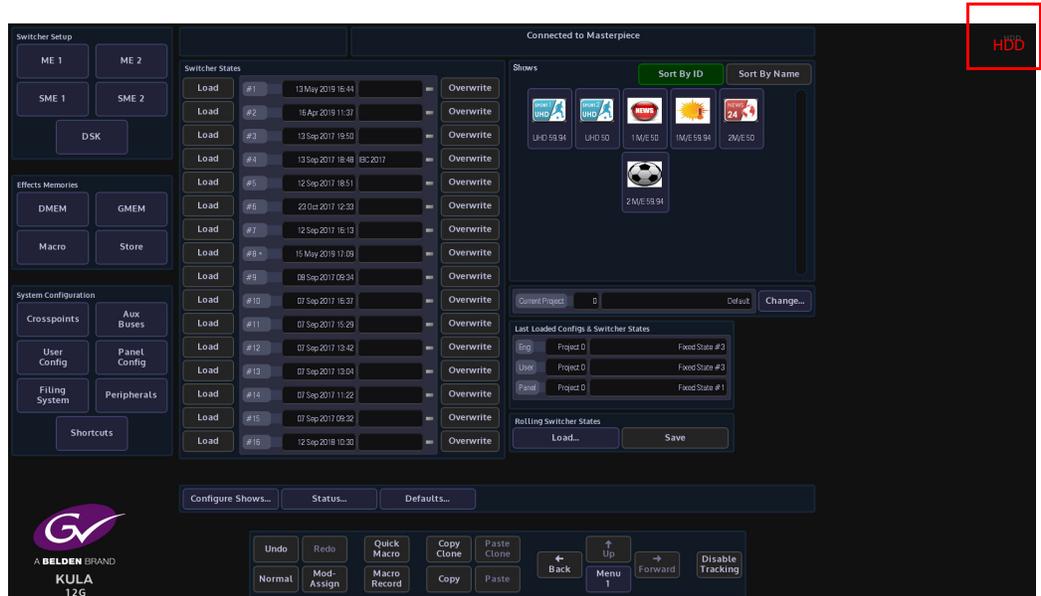
Switcher State load and Overwrite

## Initial Setup Menus

Log into the System and Set Up a User Account

### Hard Disk Activity Indicator

The “Hard Disk Drive” activity indicator is a visual indicator for the status of the hard disk drive. The indicator (always displayed in the top right corner of the menu) will flash from time to time depending on the type of activity happening.



There are three different states indicated with the “HDD” symbol:

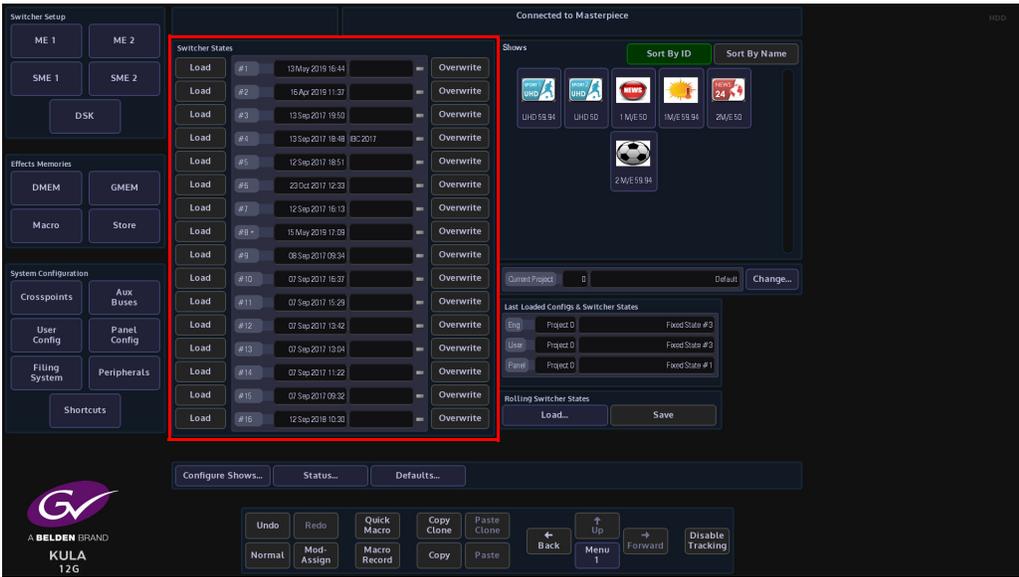
Red **HDD** = the hard disk is being written to

Green **HDD** = the hard disk is reading

Orange **HDD** = the hard disk is mounting

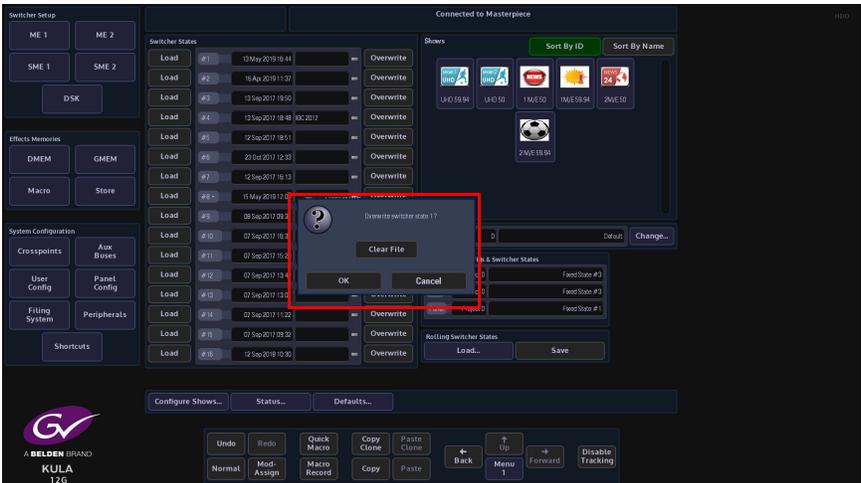
## Switcher States

The fastest way to save the current system setup state is done by using the “**Switcher States**” {**Overwrite**} option. Touch the “**Up**” button to get to the “**Connected to...**” menu and the Switcher States table is displayed in the center of the menu.



The table of 16 fixed Switcher States are used as a one button press “**Save and Load Everything**” function that can be written to an unlimited number of times. Switcher State - Overwrite allows the user to save the current “**Switcher State**” at different points in time. This is very useful as you may want to keep the current original saved state, but may also want to add a newly created DMEMs or add Stores etc, which can be saved in one of the Switcher State slots.

This is done by pressing the {**Overwrite**} button. The date and time that the Switcher State was saved (overwritten) is displayed in the list. By touching the boxed area next to the time and date, a name can be given to the Switcher State using an on-screen keyboard. Touch {**Load**} button to load the saved Switcher State.



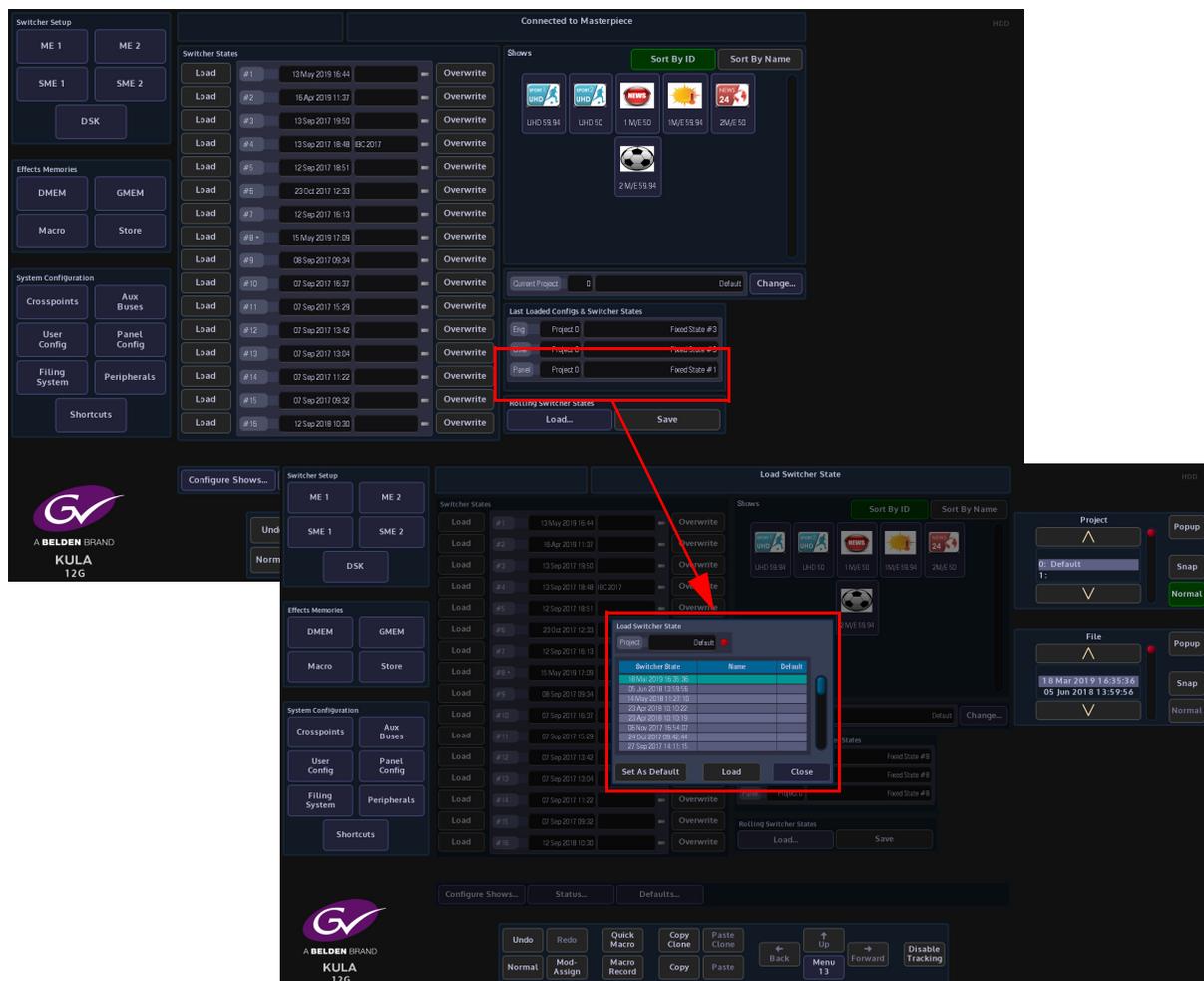
## Initial Setup Menus

Log into the System and Set Up a User Account

When overwriting an already saved switcher state, a dialog box will be displayed, touch **“OK”** to proceed. **Caution!** - If you press the **{Clear File}** button, the switcher state will be erased.

## Rolling Switcher States

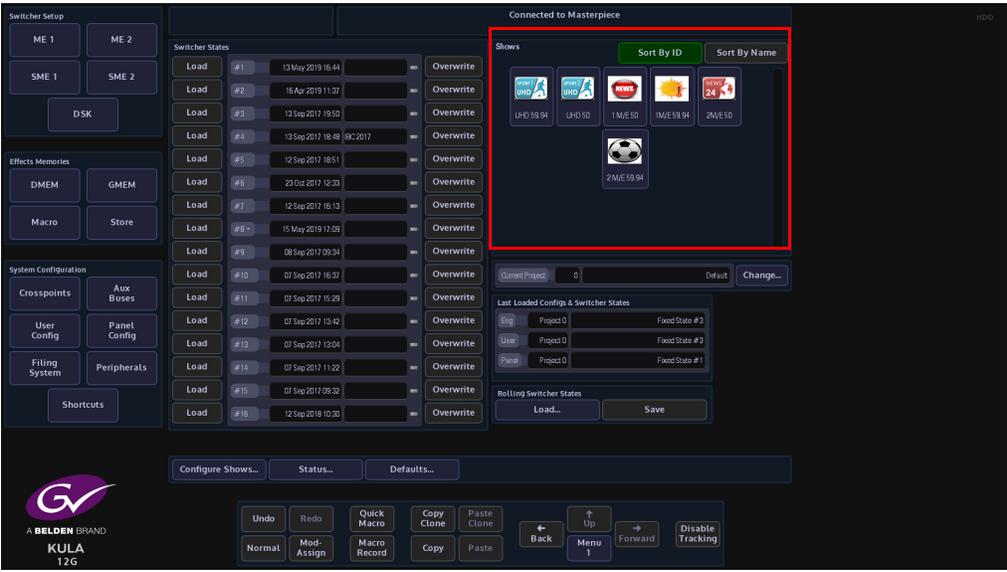
Rolling Switcher States is the method of quickly saving the overall state of the system. This allows the user to save up to 100 Switcher States in to a **“Rolling List”** of saved states, which will keep rolling over after 100 states have been saved. The **“Rolling Switcher State”** function is different to the Switcher State Overwrite mentioned above, because when the user touches the **“Load”** button, the menu will change to display a list of saved states and the option to change or select a Project. You can also set any one of the switcher states as the default startup state.



Each time the **{Save}** button is pressed a switcher state is saved into the rolling list.

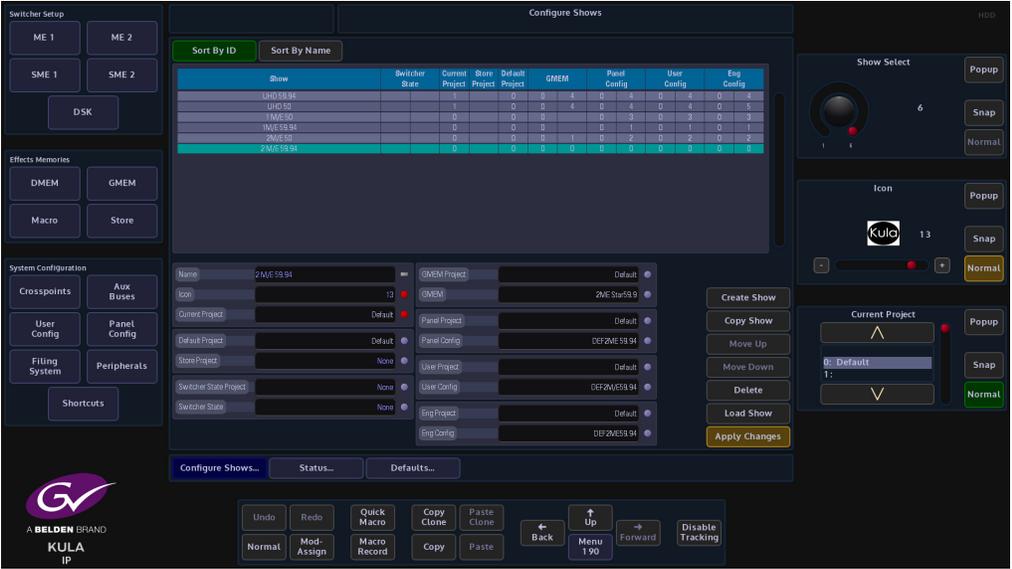
## Shows

Shows are user defined system setup states, used to instantly recall a switcher setup. As an example, shows can be useful when a multiple number of sports or news events are broadcast from an OB truck or studio. The user can quickly identify the setup required by the show icon. To help the user get Kula up and running quickly, Kula comes pre-configured with a number of Shows.



## Creating and Configuring Shows

Press the **{Configure Shows...}** button to enter the Configure Shows menu.



Press the **{Create Show}** button and a new show will be added to the top of the table. The show can be moved down the show order by pressing the **{Move Down}** button.

Use the parameter controls to select the Projects, Configs and GMEM's as required from the attachers in the menu.

---

Note: If there are no Projects, Configs or GMEM's already setup, they can be added to a show at any point later when created. See the section "Projects" for more information about creating Projects.

---

If an **Icon** is required for easy recognition of the show, use the parameter controls to scroll through the icons and finally when happy with the show setup press the **{Apply Changes}** button.

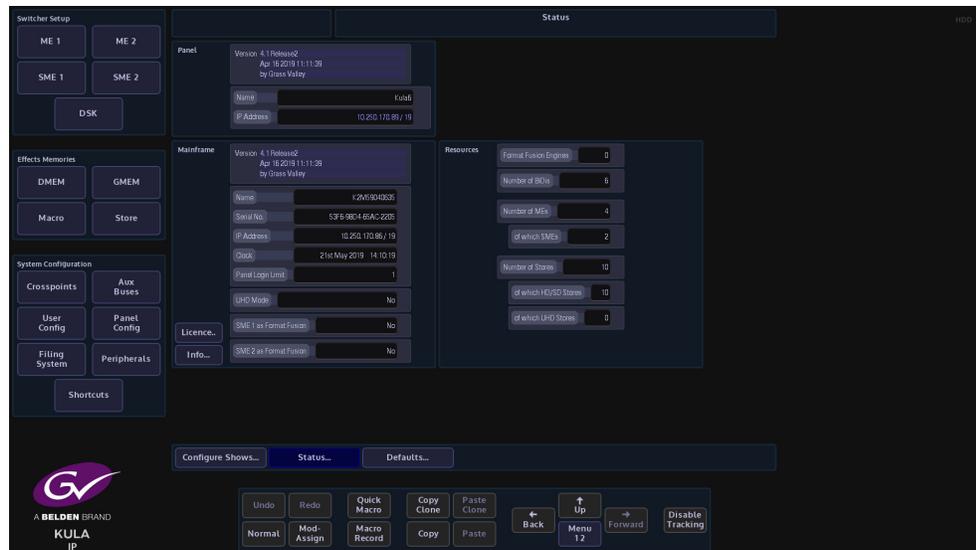
To Delete a show, use the **Show Select** parameter to select the show and then press the **{Delete}** button.

To Load a show, again use the Show Select parameter to select the show and then press the **{Load Show}** button.

A show has now been created and will be displayed along with other Shows at the top of the **Connected to** menu. To load a show in this menu, touch the show icon and a dialog box will appear asking the user if they want to load the show.

## Status

In the **Connected** menu, press the **{Status...}** button to get to the **Status** menu.



This menu displays the current status of a Kula system. The information includes:

- The GUI Panel and Mainframe software versions
- User defined names for the Panel and Mainframe
- Mainframe Serial Number
- IP address of the Panel and the Mainframe
- Panel Login Limit
- It also displays information related to the software version.

The status menu also displays the current state of the system which includes:

- UHD Mode Yes/No
- SME1/2 as SME or set as Format Fusion

The menu also displays at a glance the **currently set "Resources"** available to the user.

The **{Licence...}** menu link button will display the licencing information

The **{Info...}** menu link button will display information relating to the specific software release is shown in the **Status - Upgrade Information** menu.

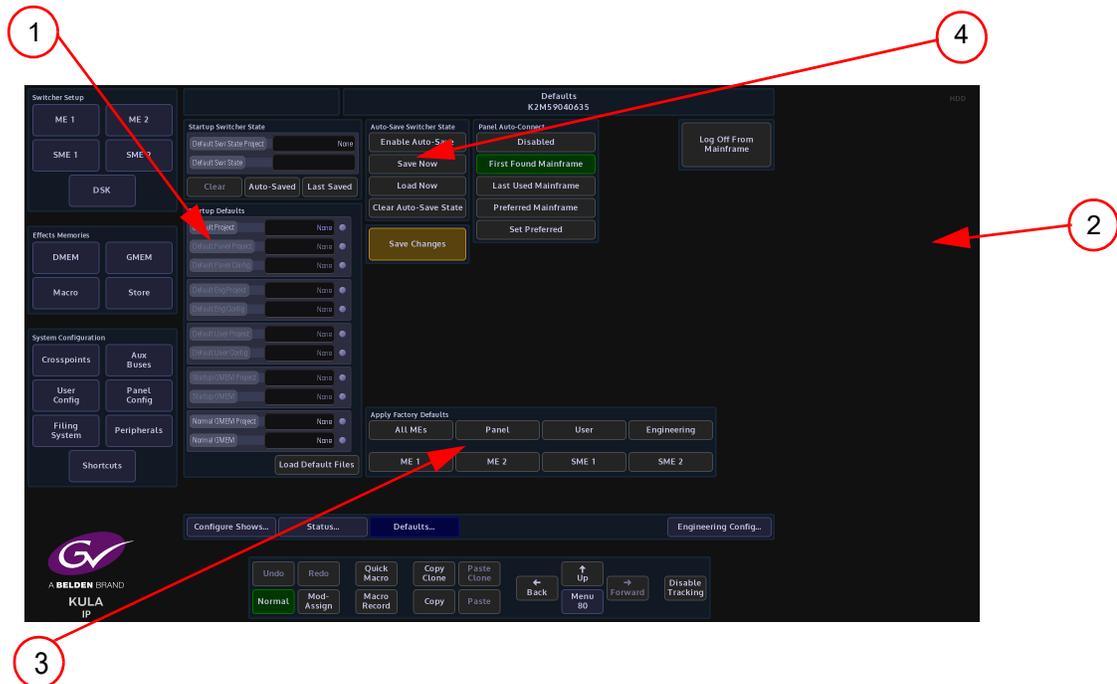
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Note: Press the [UP] button on the GUI to get back to the Connect menu.

---

## Defaults

The Defaults menu is used to load pre-saved Projects, GMEM's and Configs, which dictate the way the mainframe starts up after power-up and log-in. In this menu, the mainframe may also be reset to a default configuration state.



On the left hand side of the screen under the Startup Defaults heading (1) there are three attacher boxes. Touch an attacher to reveal the parameter controls associated with the selected functions (2).

Touch the top attacher box to change the Default Project, Default Panel Project and Default Panel Config. The next attacher down is the Default User Project/Config and Default I/O Project and Config. Touch the bottom attacher to change the startup GMEM's.

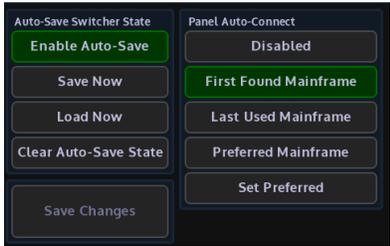
After making changes to the startup default parameters, press the **{Load Defaults}** button to load the new startup settings, then press the **{Save Changes}** action button to save the new Startup Defaults.

The Startup GMEM loads when the mainframe is powered up  
Normal GMEM is used when any GMEM is set to use normal values when saved.

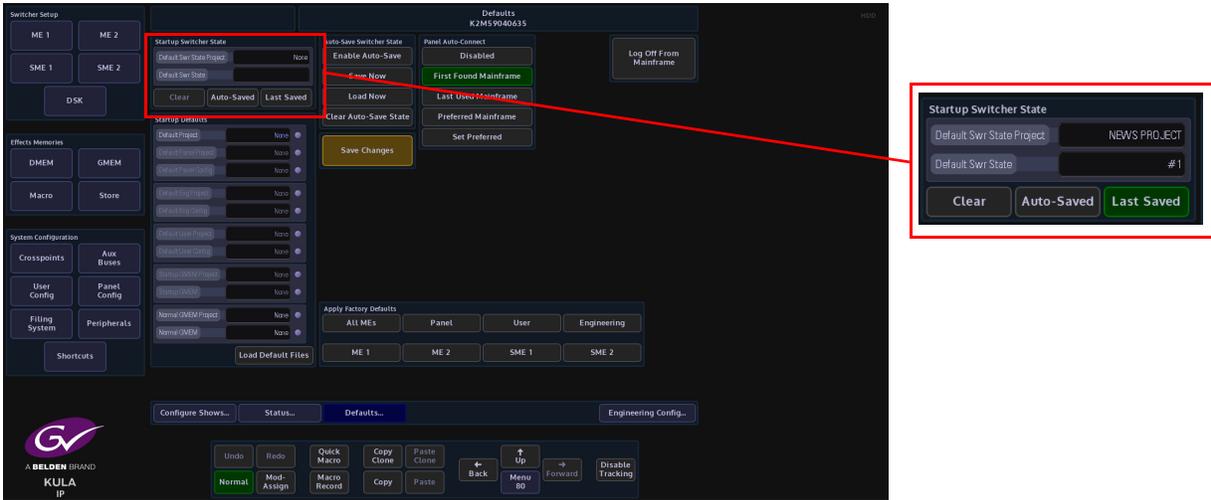
Pressing one of the menu buttons in the **Apply Factory Defaults** box (3), will cause the system to be reset to a factory reset configuration.

Pressing one of the Apply Factory Defaults buttons will not erase the startup files Stored in mainframe hard drive, it will only step out of the default startup files that are currently loaded. The pre-saved startup GMEM/Config files may be accessed at any time.

In the center of the screen is the Panel Auto-Connect box (4), from here the system can be set to automatically connect to a preferred mainframe each time the system is switched on and boots up. Press the **{Preferred Mainframe}** button, the next time the system is switched on, at boot up, the system will go straight to the Connected to menu. The **{Last Mainframe}** button sets the mainframe to start up as the last mainframe that the system was being used as. Press the **{Disabled}** button to disable these functions.



When the **Startup Switcher State - Auto Saved** is enabled, it periodically performs an auto-save of the systems state. Auto-save state is effectively like an extra switcher state which is saved outside the normal file system area.



If the system is accidentally turned off part way through saving a new state, there are two copies of the switcher state Main data to avoid complete loss. The auto-save state is made up of the logical switcher state, plus another state for each control panel. When **"Auto Saved"** is enabled in the **"Defaults"** menu (as shown above), the mainframe will save a new copy of its state thirty seconds after a significant change occurs, for example; a parameter is modified, a file is loaded, a panel logs out etc. Similarly, a control panel will save a new copy of its state thirty seconds after a significant panel change occurs, for example; a delegate is changed, a button map is loaded/unloaded, a panel config file is loaded etc. The control surface also saves its state before logging out..

## Initial Setup Menus

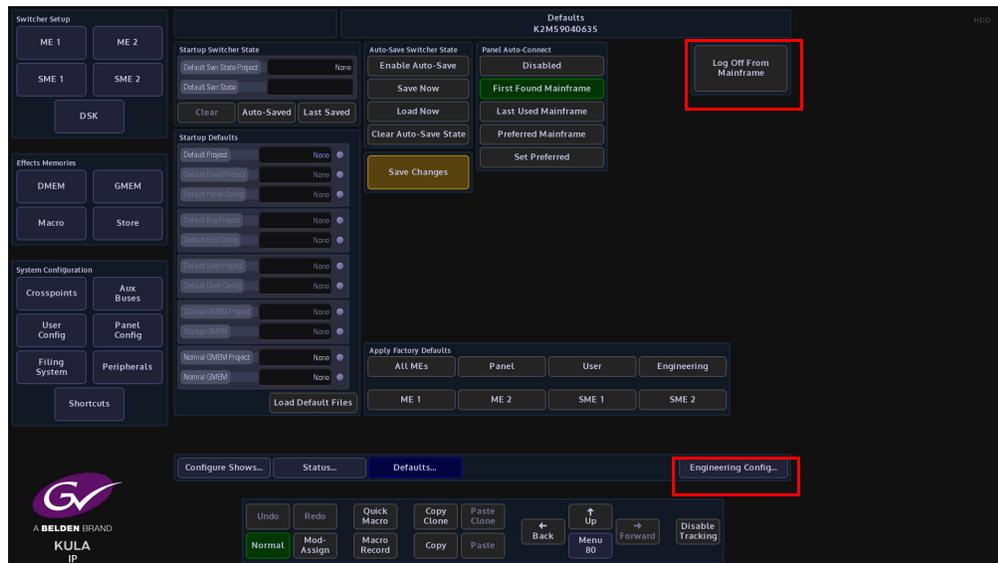
### Log into the System and Set Up a User Account

## Log Off

Pressing the **{Log Off From Mainframe}** button, a prompt message will then appear asking the user if they actually do wish to Log Off.

This is a safety mechanism designed to stop the user from accidentally logging off without saving their settings.

After log off, the **“Connect”** menu will appear.



In this menu, the user can also access the **“Engineering Config”** menu.

# 14

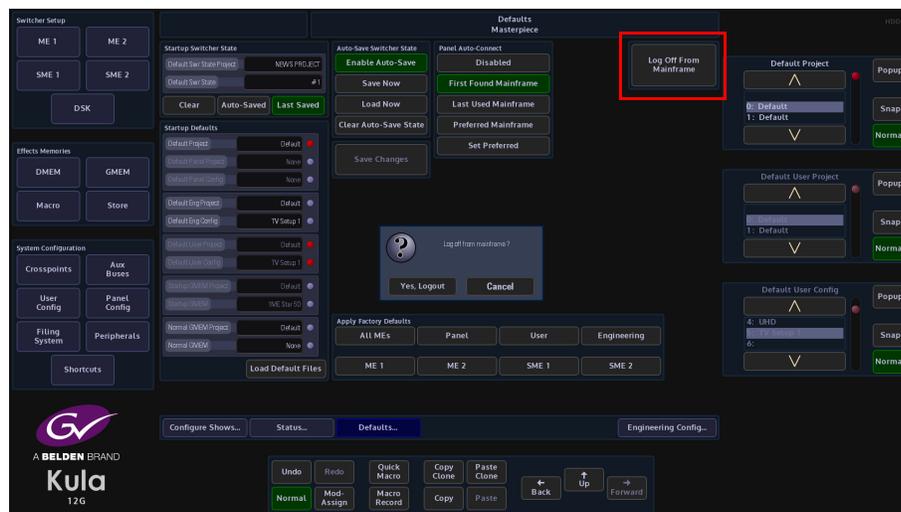
## Maintenance & System Management

### Log Off - Mainframe Configuration

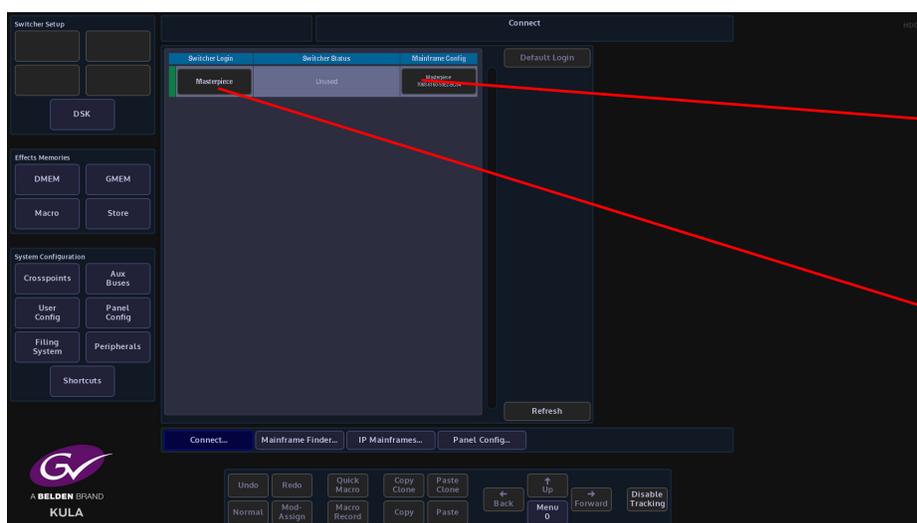
Pressing the **{Log Off From Mainframe}** button, a prompt message will then appear asking the user if they actually do wish to Log Off.

This is a safety mechanism designed to stop the user from accidentally logging off without saving their settings.

After log off, the **"Connect"** menu will be displayed.



The **Switcher Login** column will show the mainframe the user can log into. **Switcher Status** column will have the given name of the Switcher.



Mainframe Config button displays Name given to the mainframe. Mainframe serial number

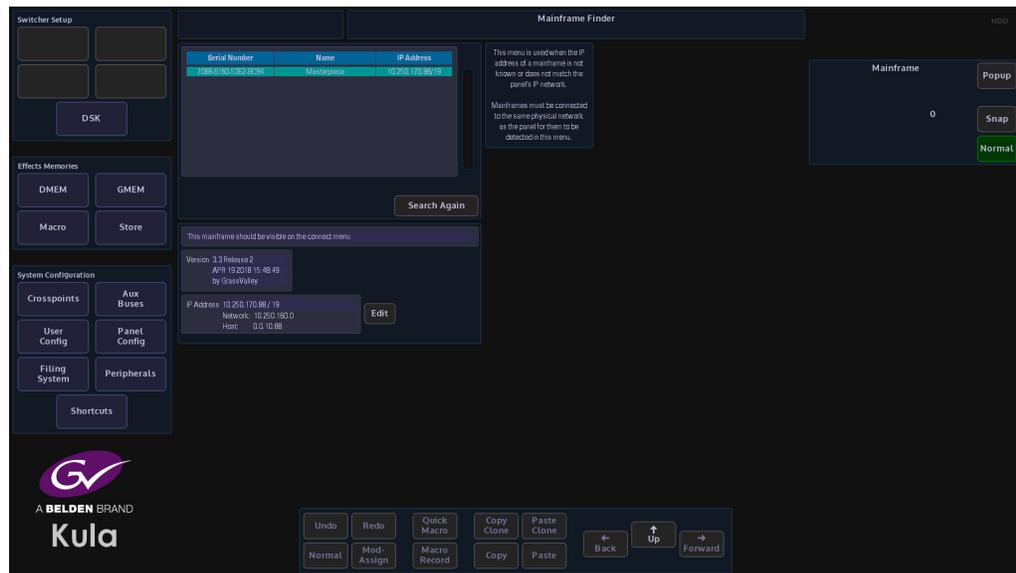
Switcher button displays the name of the switcher/s

The **Default Login** button allows a panel to log in “Exclusively” and will prevent any other panel(s) logging into that switcher. To log in exclusively, select the **{Default Login}** button, top right on the GUI Login.

If a panel is already logged into a switcher you cannot then log into it exclusively.

The **Refresh** button allows the user to refresh the display if other mainframes have been connected whilst the mainframe is being used. Press the **{Refresh}** button and the system will search for any other mainframes.

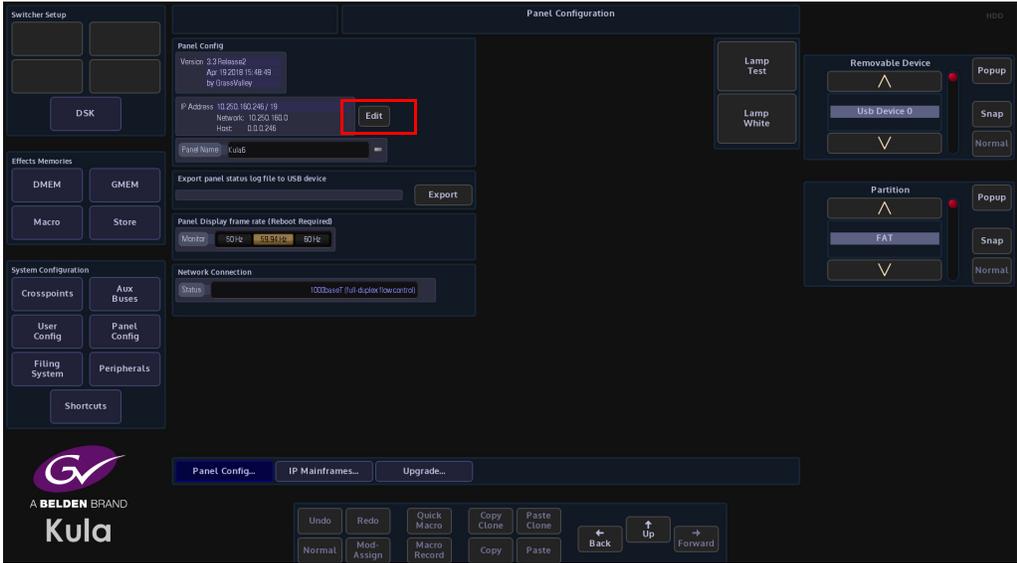
The **Mainframe Finder** menu, The “Mainframe Finder” menu is used to find mainframes when the IP addresses of the mainframes and the control surface do not match.



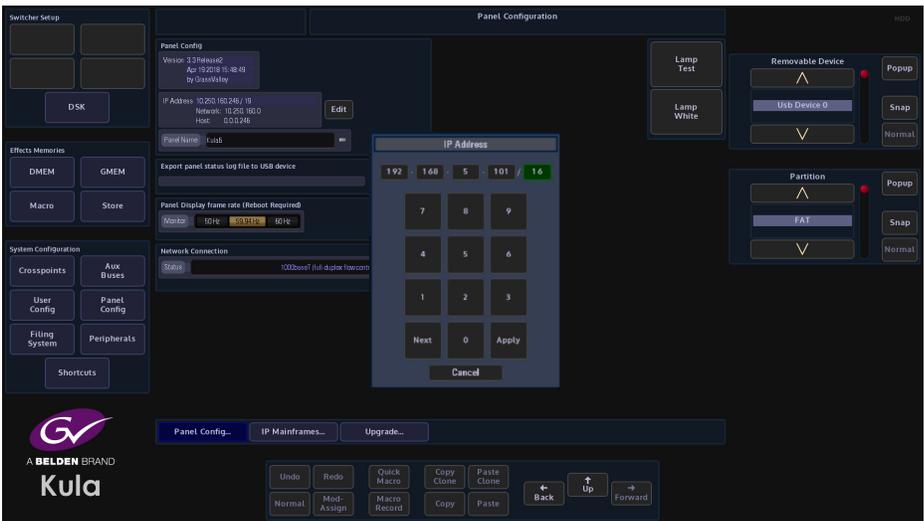
## Panel Configuration

In the “**Connect**” menu, touch the **{Panel Config...}** button, this will enter the “Panel Configuration” menu, showing the current software version, IP Address and the given Panel name as shown below.

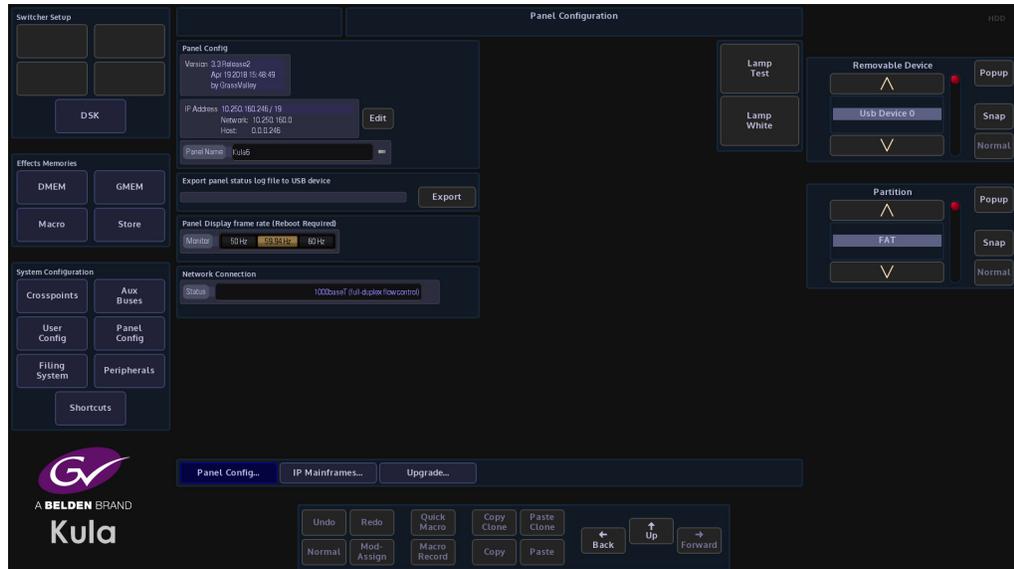
The software for the panel is usually upgraded when the mainframe software is upgraded in the **Mainframe Configuration - Upgrade** menu, but using the **Panel Configuration - Upgrade** menu, the user is also able to upgrade just the Panel software allowing the panel to be used with a mainframe that is running a different version of software that is on the same network.



To change the IP Address of the panel, touch the **{Edit}** button and an IP Address entry number pad will be displayed. Enter the required IP address and then when done, touch the **{Apply}** button. The IP address of the panel is now updated.

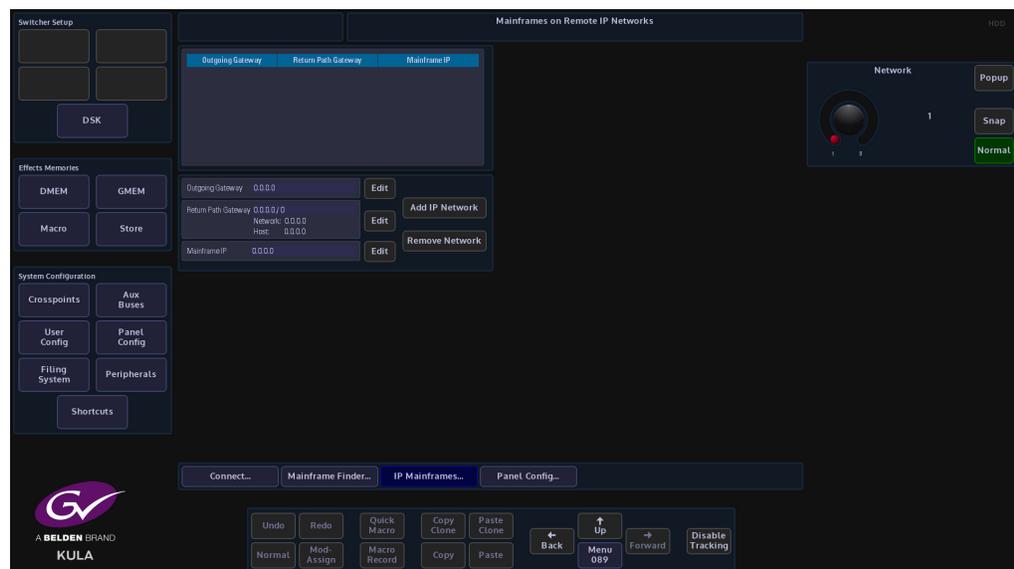


The “**Panel Display Frame Rate**” parameter allows the user to set the frame rate to 50Hz, 59.94Hz and 60Hz. After setting the frame rate, a re-boot of the system is required.



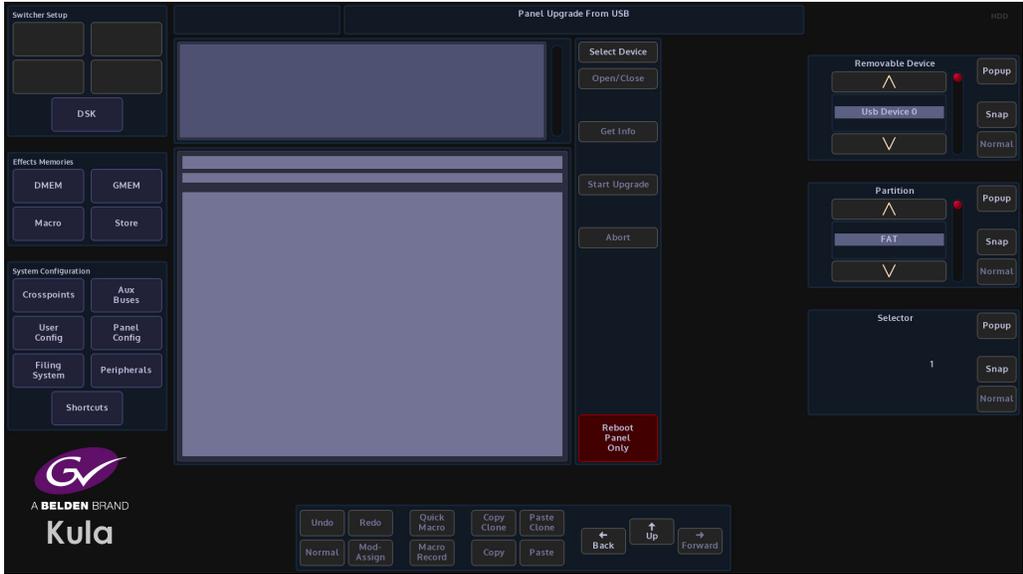
## IP Mainframes

The {**IP Mainframes**} menu is used to connect to other mainframes on a network. If a mainframe is on a different VLAN or on a totally different network, the user has to know the “**Outgoing Gateway**” of the facility they are working in, the “**IP address**” of the mainframe they wish to connect to and the “**Return Path Gateway**”. All these parameters have to be entered before being able to connect to the mainframe.



### Upgrade (Panel Only)

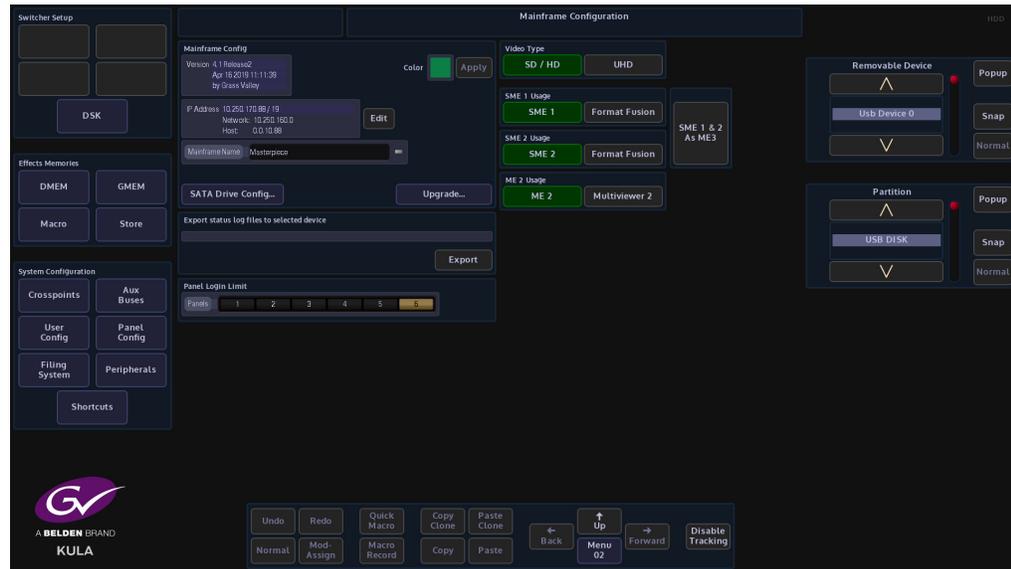
Press the **{Upgrade...}** button to enter the **Panel Upgrade From USB** menu. This menu works in exactly the same way as the **Mainframe & Panel Upgrade** menu, where the user inserts a USB memory device into one of USB ports on the mainframe or control surface, then presses the **{Select Device}** button. All the information on the memory device will be displayed as a filing system top left of the menu. Multiple versions of software can be Stored on the memory device, so the user needs to select the required version using the **Selector** parameter control.



Next press the **{Get Info}** button and information related to the selected software from the file will be displayed in the information area. When happy that the correct software has been selected, press the **{Start Upgrade}** button. The software will take a few minutes to upgrade the panel. When finished press the **{Reboot Panel Only}** button. The panel software upgrade is now complete.

## Mainframe Configuration

Touch the “**Mainframe Config**” button to enter the **Mainframe - Configuration** menu. This menu displays the current version of software the mainframe is running, the current IP address, and the user is also able to give the mainframe a unique name.



A new IP Address can be given to the mainframe by touching **{Edit}** button next to IP address. A dialog box will appear allowing you to enter the new address. When done touch the **{Apply}** button and the IP address is updated.

Also, in this menu, you can set the type of video standard you want the system to run; SD/HD or UHD (UHD mode), select 4 or 8 channels of FormatFusion<sup>TM</sup>, add a second Multiviewer or create a 3rd M/E.

### Export

This will **Export Status Log Files** – in the unlikely event that the system should fail in any way, this function allows critical data relating to a possible problem to be downloaded onto a USB memory device in the form of a (.txt) file. Touch the Export status log files attacher, then place the memory device into one of the USB ports on the mainframe, select the memory device using the **Removable Device** parameter.

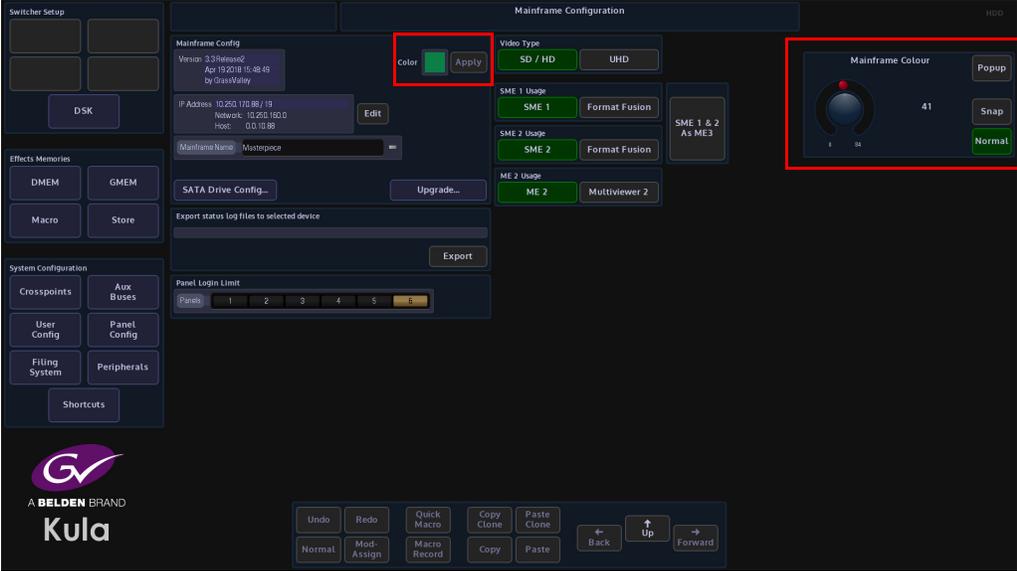
If the memory device is partitioned, select the partition that the log files are to be Stored in and finally press the **{Export}** button.

### Panel Login Limit

This limits the number of Control Surfaces that can be connected and logged into the mainframe. The maximum number of control surfaces allowed to login is 6, but only 1 of the 6 control surface can be used at a time, or else there will be conflicts.

### Mainframe Color

The **Mainframe Color** parameter allows the user to set an identifying color for each Kula listed in the “**Switcher Login**” in the “**Connect**” menu.



Touch the color swatch and the “**Mainframe Color**” parameter will appear on the right. The user has 85 different colors to select from. When a color is selected, touch the **{Apply}** button to apply the color to the switcher.

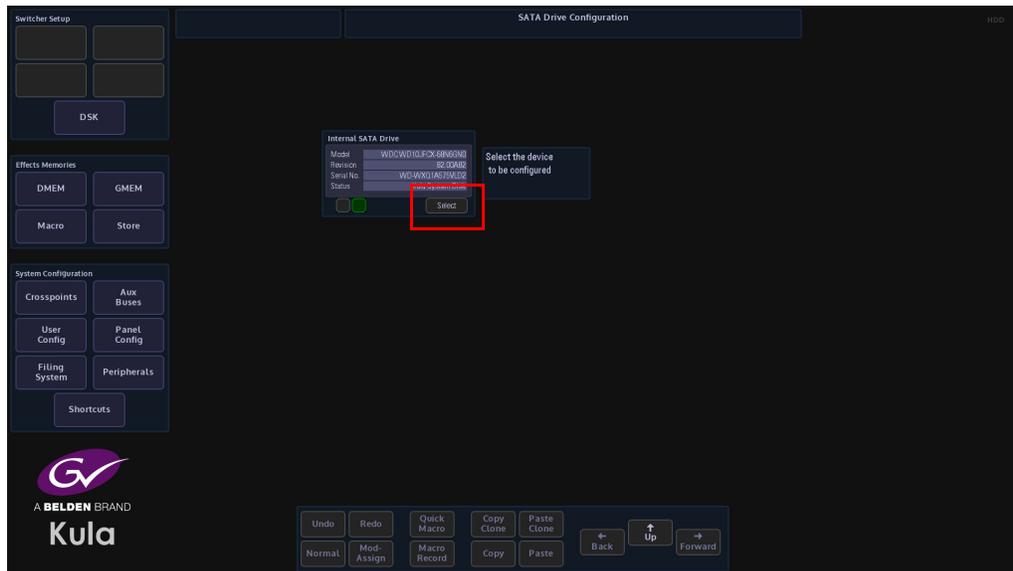
## SATA Drive Config

The SATA Drive config is used format the internal hard disk drive.  
Touch the **{SATA Drive Config...}** menu link button to enter the SATA Drive Configuration menu.

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Note: **WARNING!** Caution is needed. This menu is used to format the internal disk drive!

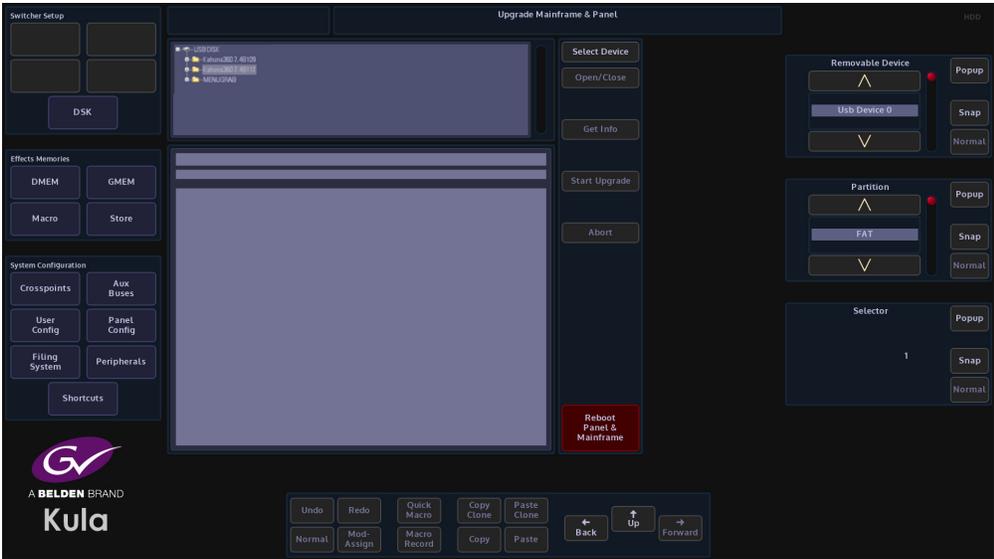
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To format the internal disk drive, touch the **{Select}** button and a button will appear allowing the user to format the system disk.

## Upgrade

This menu is used to upgrade the Mainframe and the Panel at the same time.



### How to Upgrade the System Software

To upgrade the software insert a USB memory device into one of the USB ports on the mainframe or the USB port on the underside of the control surface. Next touch the **{Select Device}** button. All the information on the memory device will be displayed as a file list, displayed top left of the menu. Multiple versions of software can be Stored on the memory device, so the user needs to carefully select the required version using the **Selector** parameter control. Touching the "+" next to the software folder will expand out the folder and display the contents.

Next, touch the **{Get Info}** button and information related to the selected software will be displayed in the information area. When the correct software has been selected, touch the **{Start Upgrade}** button.

The software will take a few minutes to upgrade the system. When finished the user is prompted to **Reboot Panel & Mainframe**, touch the **{Reboot Panel & Mainframe}** button and the system will reboot.

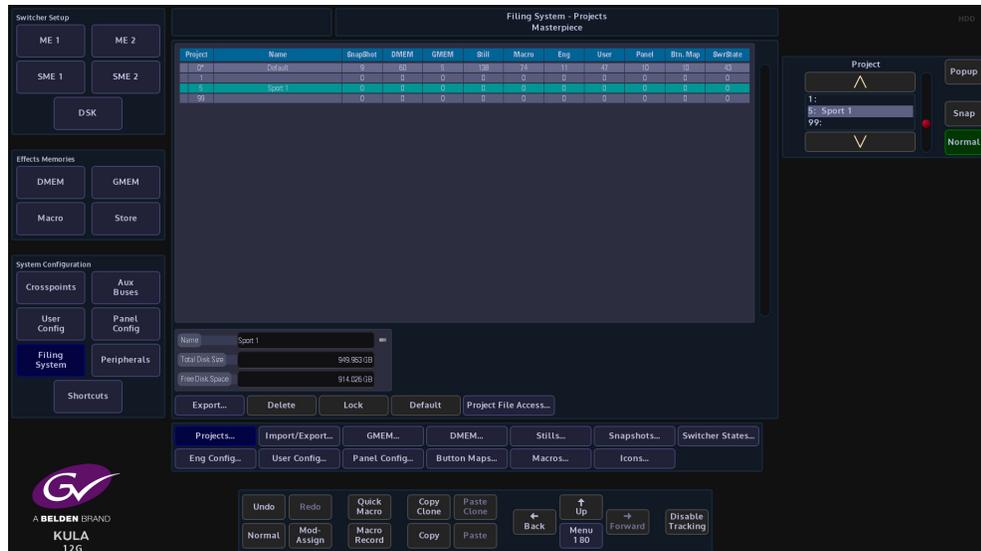
The system software upgrade is now complete.

## Filing System

The filing system is as it suggests a menu where all the Projects, Configs, DMEM/GMEM, Stills, Macros etc. are Stored.

This menu also has an extensive Import/Export facility which also includes Media Management options.

To enter the Filing System menu press **[FILING SYS]** button on the GUI. The menu below will appear.

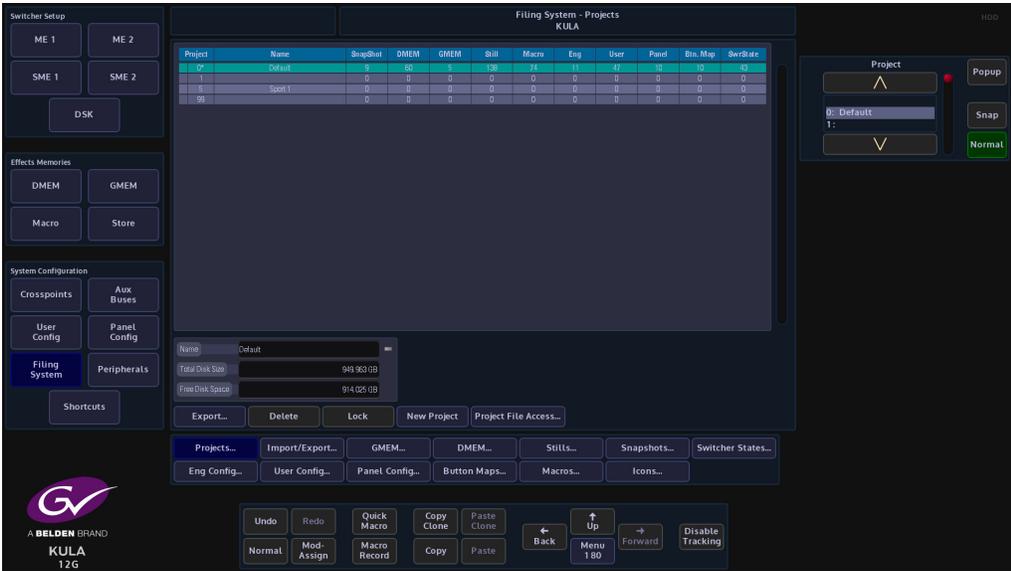


All the menus are straightforward, easy to use and are accessed, updated and deleted in a similar way.

# Projects

## Using Projects

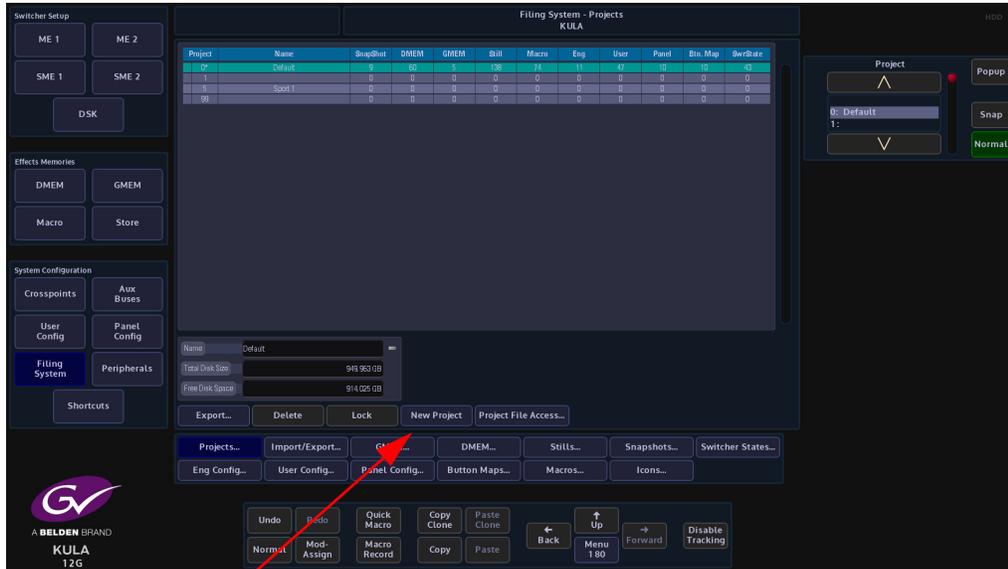
As stated earlier Kula is a Project based system where all DMEM's, GMEM's, Panel Configs, Stills, Macros and other files are Stored into individual user-defined Projects. To get to the Projects menu touch the **{Filing System}** button on the GUI and the first menu that will appear will be the Projects menu.



As you can see from the diagram above, Projects are in number order in the table. It also allows the user to see what number can be chosen for a new Project i.e. any number that is not in the table. The columns depict the user-defined name given to the Project and the number of DMEM's, GMEM's, Panel Configs, Stills, Macros and other files saved within that Project.

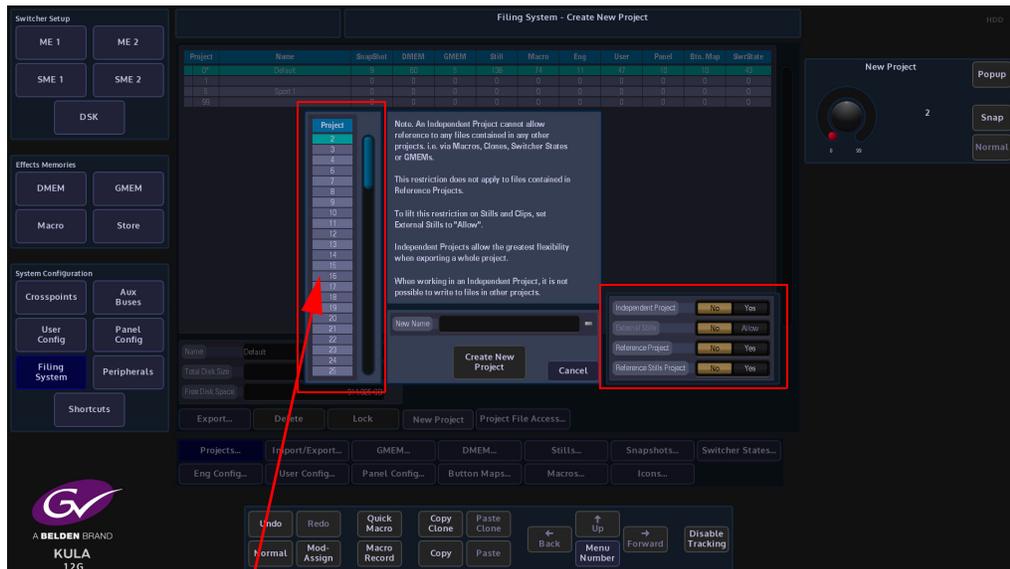
## How to create a new Project

To create a new Project, touch the **{New Project...}** button (shown below). A new menu popup will be displayed with a number of options to select.



New Project button

The menu popup allows the user to select what type of project they want to create. First, select an unused project number by touching one in the list on the left of the popup.



Project Number

There are two types of project that you can create in the filing system; one is a project that references files such as stills, configs and other files from other projects. The other type of project is called an **"Independent Project"** this will only reference files saved with the

independent project, basically a stand-alone project with its own files. The advantage of an independent project is that it is easily transferable to another Kahuna system. Use the popup parameters (below) to select the type of project you want to create. If “No” is selected in all the parameters then you can create a project that references files from other projects in the system.



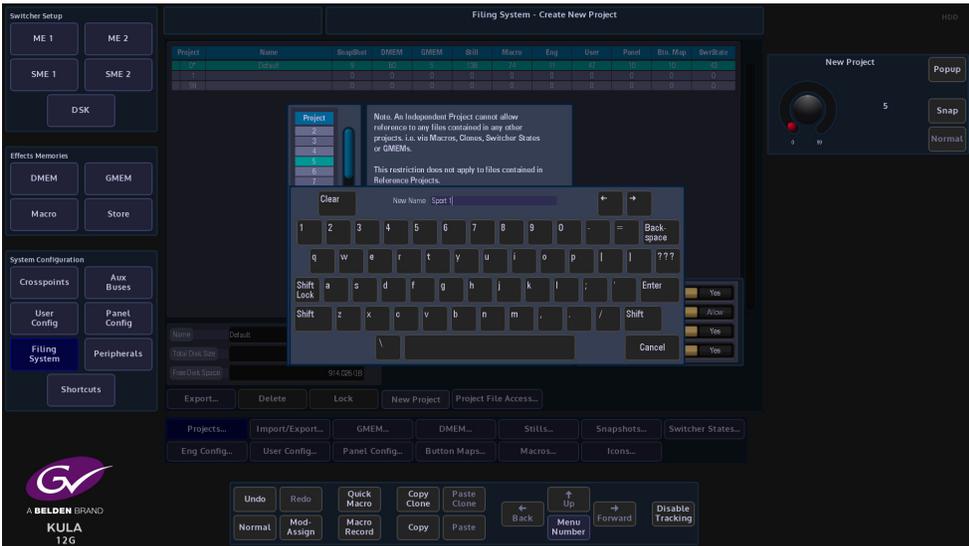
**Independent Project** - “Yes” will create an independent project.

**External Stills** - “Yes” will allow you to reference stills from other Kahuna systems on a network.

**Reference Project** - “Yes” will allow files to be referenced from other projects on the system.

**Reference Stills Project** - “Yes” will allow stills from other projects to be referenced.

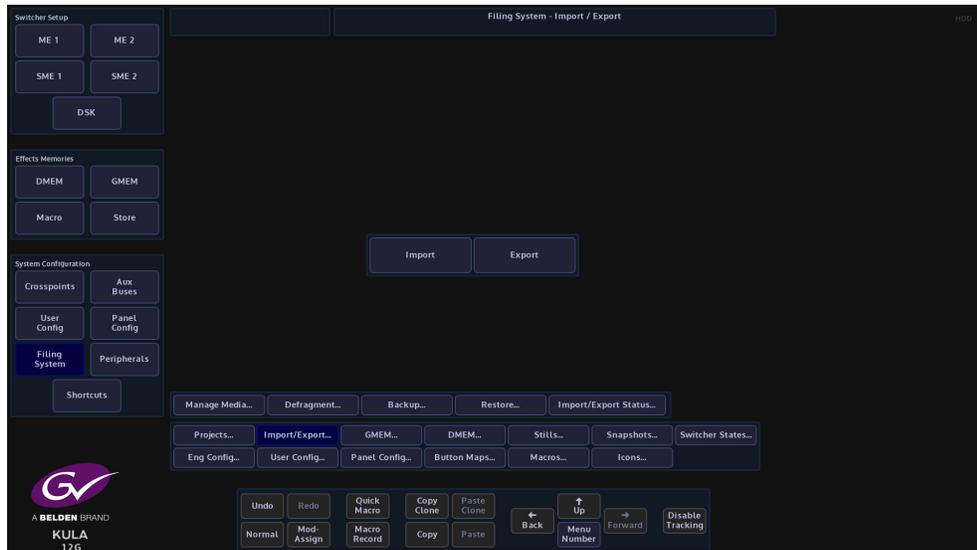
Once you have selected the type of project you want to create, you can add a name by touching the “**New Name**” parameter. A keyboard will be displayed allowing you to type in a name. Touch **{Enter}** when done.



When done, touch the **{Create New Project}** button, and a new project is added to the table in the main project menu.

## Export a Project

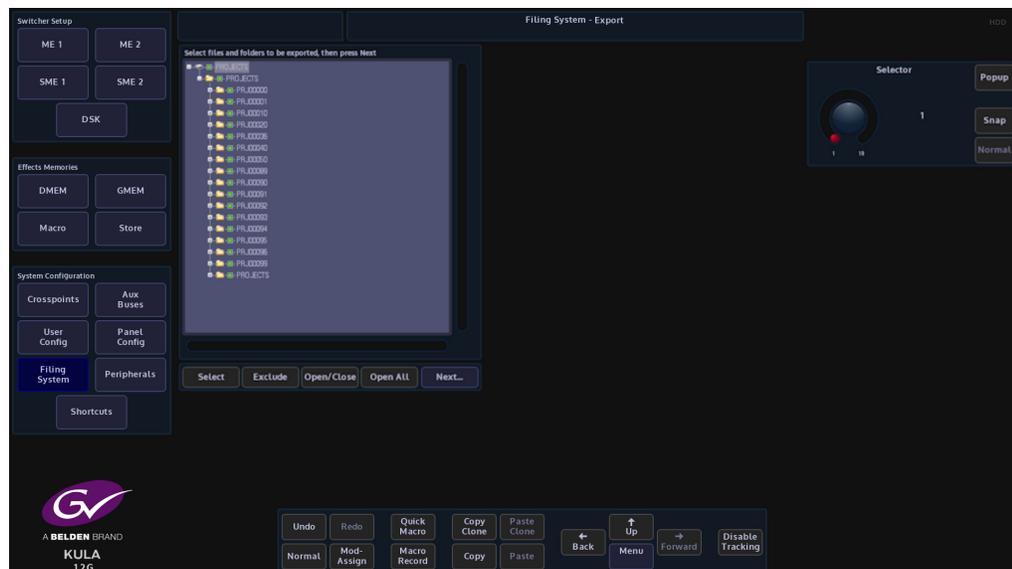
The Export menu allows the user to export selected or all Projects to an external hard drive or memory device. Press the **{Import/Export...}** button, then press the **{Export}** button.



Use the Selector parameter to scroll down to the required Project and press **{Select}**. Selected Projects will have a small Green square next to the Project number.

Pressing the **{Exclude}** button will exclude the selected Project from being exported, the Project number will have a small Red square next to the Project number.

Pressing the **{Open/Close}** button will expand the contents of the selected Project, allowing individual files within a Project to be selected.

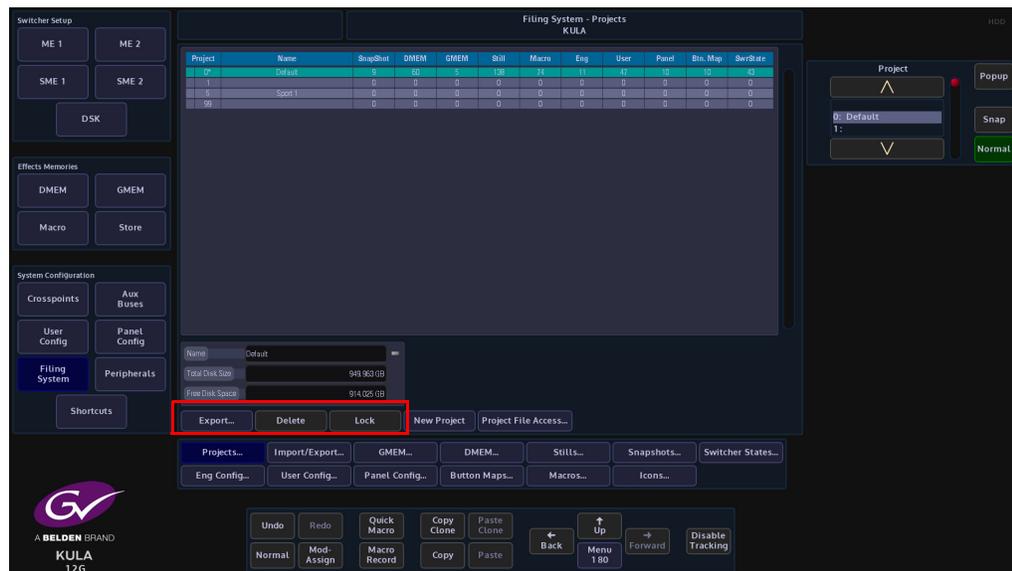


Press **{Next}** and a menu will open that allows the user to select a device to export the Project or Project file to. Use the Destination Device parameter to select the memory device

and press {Select Device}. The menu will now display the contents of the device. Select a folder where the Project information will be exported to, or press the {**New Folder**} and a **New Folder** will be created on the memory device. Press the {**Rename**} button and the on-screen keyboard will appear allowing the user to give the "New Folder" a name. Finally, press {**Start**} and the selected Project information will be placed on the memory device.

## Delete a Project

To delete a Project, select a Project using the Current Project parameter control then press {**Delete**}. A message will appear requesting confirmation of deletion.



## Project Locking

Each Project can now be locked to prevent files from being written and deleted. This is indicated by the Padlock symbol next to the Project.

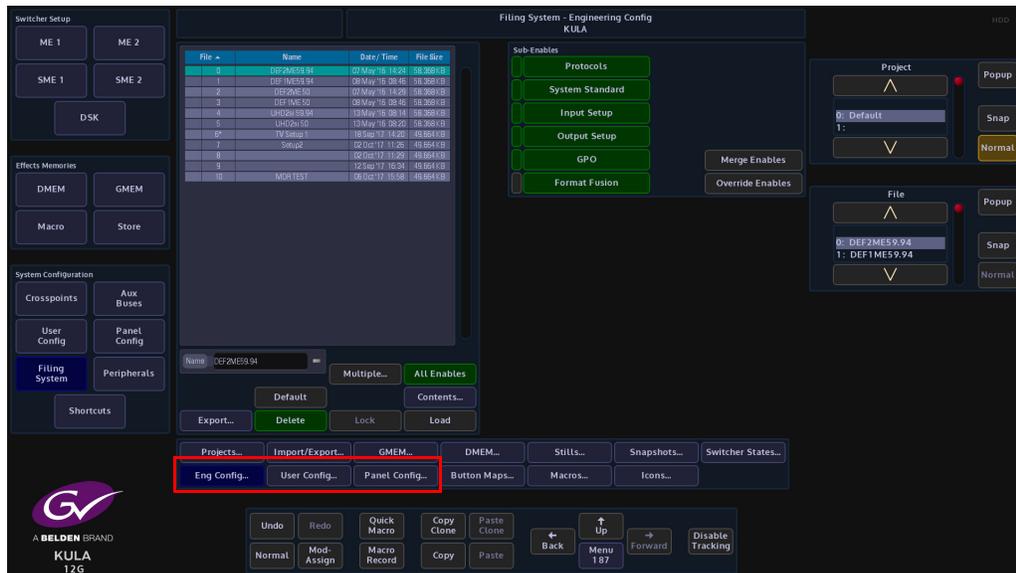
### Default Project

Pressing the {**Default**} button will change the default Project from being Project 0 to being a user-defined default Project.

## Filing System - Config Filing System

The Eng Config, User Config, I/O Config and Panel Config menus all have exactly the same functionality, so for this example the Eng Config will be used.

Note: The Eng, User and Panel Configs are saved within their own menus. The Filing System menu is used to Export, Delete, Load, set Enables and make Default.



## Overview

All Config files can be saved into a default Project or into a user-defined Project. Config files are saved within their own Config main menu, meaning that if a specific Eng Config setup is created by a user before the file can be saved, the user has to go into the Eng Config menu.

Press the **{Save As...}** button. Select a Project from the **Current Project** parameter, this is where the Eng Config setup is recalled from. Use the **Destination** parameter to create a new Eng Config file position, give the file a name and description and finally press the **{Save}** button.

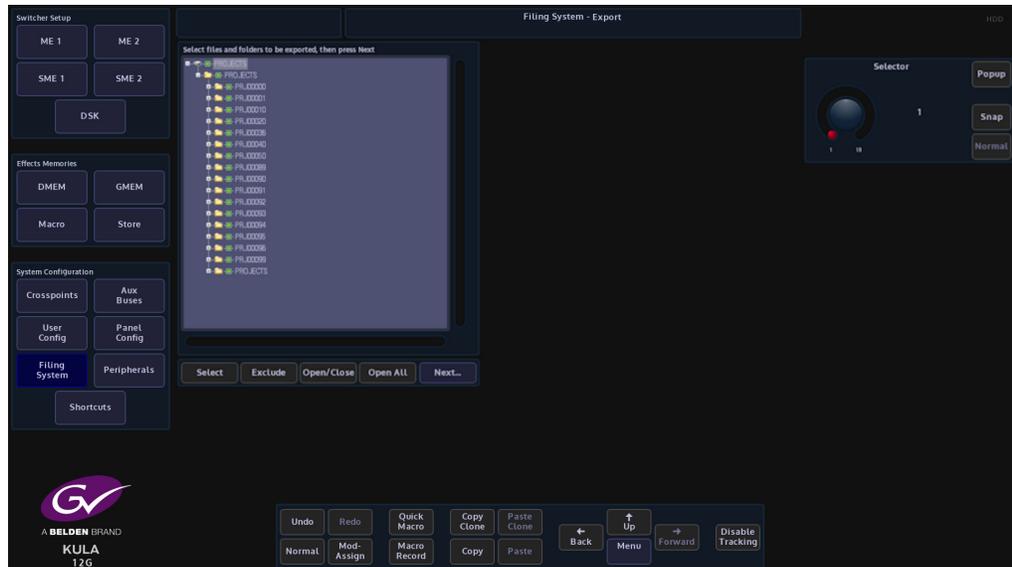
Currently selected Project

Currently selected File

Config Options

## Export

The Export menu allows the user to export selected or all Eng Configs within a selected Project to an external hard drive or memory device. Press the **{Export}** button. Use the Selector parameter to scroll down to the required Project and press **{Select}**. Selected Projects will have a small Green square next to the Project number. Press **{Open/Close}** to expand, select the ENGSETUP folder and press **{Open/Close}** again to expand the engineering setup folder which will now display the individual Eng Config files. Scroll down to the required file and press **{Select}**.



Pressing the **{Exclude}** button will exclude the selected Project/file from being exported. The Project number will have a small Red square next to the Project/file number.

Pressing the **{Open/Close}** button will expand the contents of the selected Project, allowing individual Eng Config files within a Project to be selected.

Press **{Next}** and a menu will open that allows the user to select a device to export the Project or Eng Config file to.

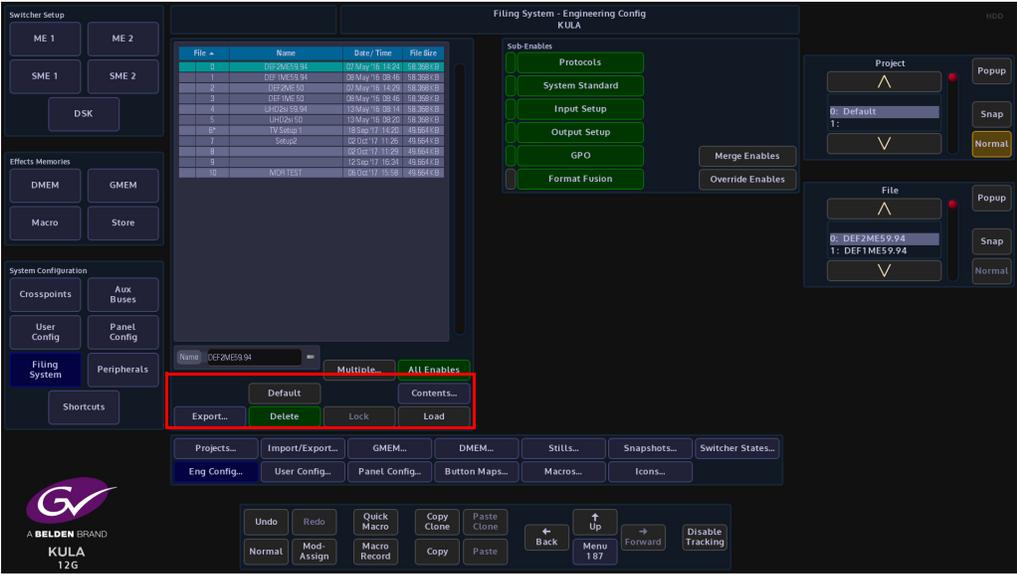
Use the Destination Device parameter to select the memory device and press **{Select Device}**. The menu will now display the contents of the device.

Select a folder where the eng config file/s will be exported to, or press the **{New Folder}** and a **New Folder** will be created on the memory device. Press the **{Rename}** button and the on-screen keyboard will appear allowing the user to give the "New Folder" a name.

Finally, press **{Start}** and the selected information will be placed on the memory device.

### Delete an Engineering Config File

To delete an Engineering Config, use the File parameter to select the Eng Config file, then press **{Delete}**. A dialog box will appear asking if the user wishes to Continue or Cancel.



### Engineering Config File Locking

Each engineering config file can be locked to prevent files from being over-written or deleted. This is indicated by the Padlock symbol next to the file.

### Default Engineering Config File

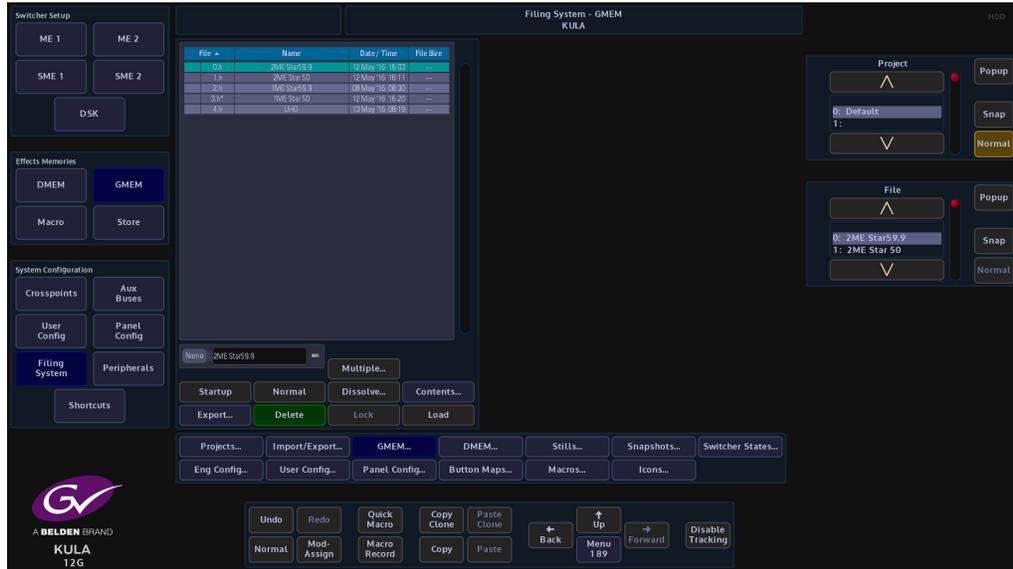
Pressing the **{Default}** button the user is able to change the default Eng Config to a user-defined default Eng Config. When the system is re-booted or switched back on, the selected Default Eng Config file will start along with all the other default Configuration files.

### Load Engineering Config File

The **{Load}** button is used to load a selected Engineering Config File.

## Filing System - GMEM, DMEM, Stills, Snapshots, Button Maps, Macros and Icons

The following explanation is an example of how to use the GMEM, DMEM, Macros and Stills menus. As stated previously, these menus basically all work in the same way, there is only a slight variation in options for GMEM's and Macros.



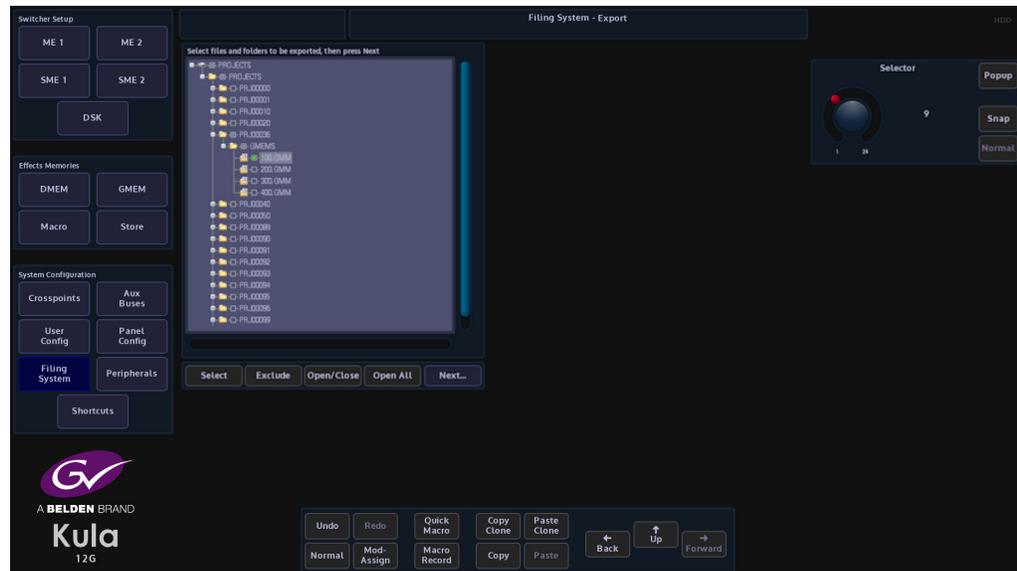
## GMEM Export

The Export menu allows the user to export selected or all GMEM's within a selected Project to an external hard drive or memory device. Press the **{Export}** button.

Use the **Selector** parameter to scroll down to the required Project and press **{Select}**.

Selected Projects will have a small Green square next to the Project number. Press **{Open/Close}** to expand, select the Project folder and press **{Open/Close}** again to expand the GMEM folder which will now display the individual files within the GMEM.

Scroll down to the required file and press **{Select}**.



Pressing the **{Exclude}** button will exclude the selected Project/file from being exported. The Project number will have a small Red square next to the Project/file number.

Pressing the **{Open/Close}** button will expand the contents of the selected Project, allowing individual GMEM files within a Project to be selected.

Press **{Next}** and a menu will open that allows the user to select a device to export the Project or GMEM file to.

Use the **Destination Device** parameter to select the memory device and press **{Select Device}**. The menu will now display the contents of the device.

Select a folder where the GMEM file or files will be exported to, or press the **{New Folder}** and a **New Folder** will be created on the memory device. Press the **{Rename}** button and the on-screen keyboard will appear allowing the user to give the "New Folder" a name.

Finally, press **{Start}** and the selected information will be placed on the memory device.

## Delete GMEM

To delete a GMEM/s, use the **File** parameter to select the GMEM, then press **{Delete}**. A dialog box will appear asking if the user wishes to Continue or Cancel.

## Lock GMEM

Each GMEM can be locked to prevent them from being over-written or deleted. This is indicated by the Pad Lock symbol next to the GMEM.

### **Normal**

This will assign the selected GMEM as the GMEM that sets the "Normal" values for all parameters in Kula.

### **Startup**

This will set a user-defined GMEM to a startup state, for instance, if the Kula mainframe is rebooted when a software update has taken place, the mainframe will startup in the user-defined "Startup" GMEM state i.e. with resize parameters set to 0.00 they will start up at 0.00, or if the GMEM includes resize measurements that start up at 5.369 then it will start up in that state

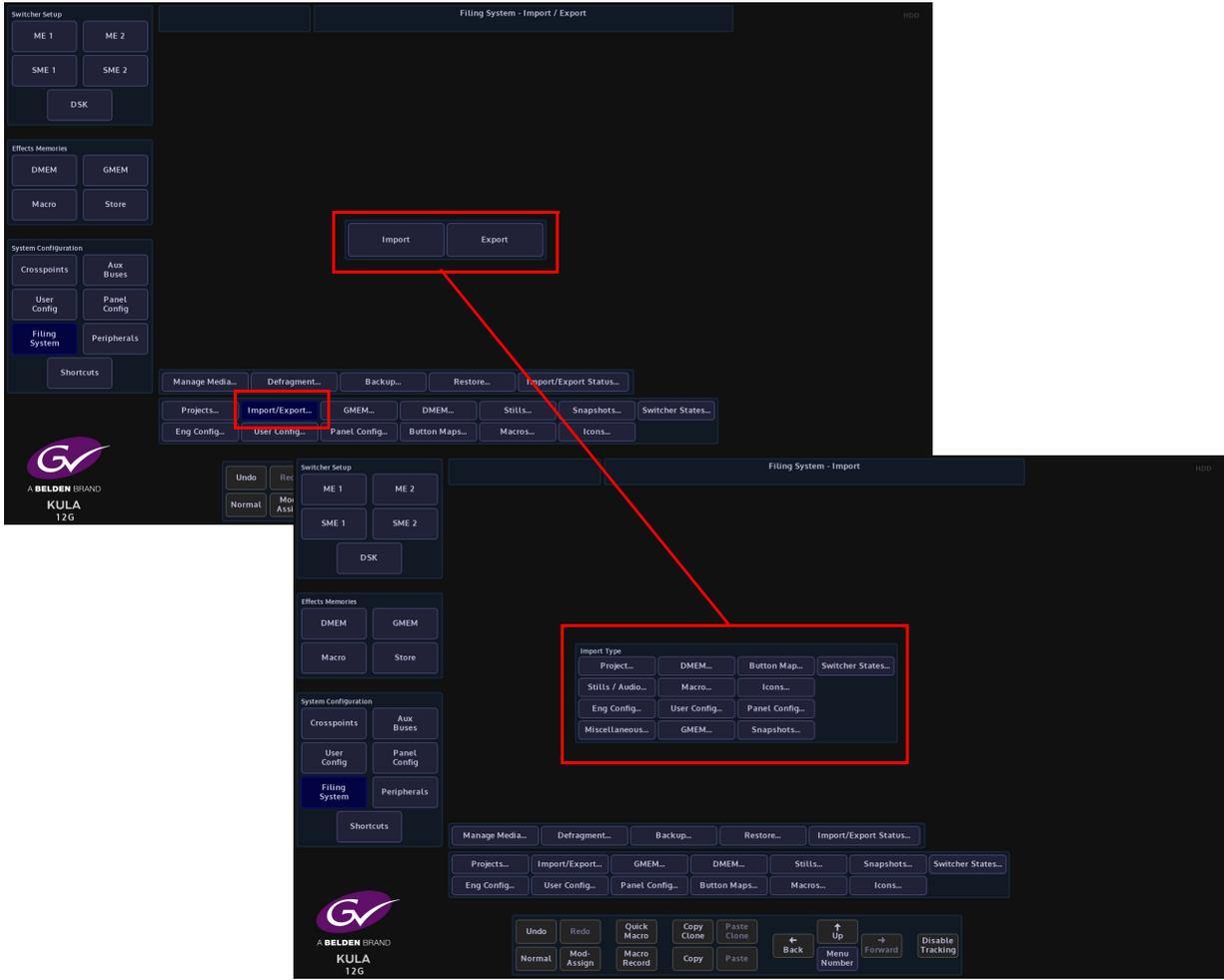
### **Load GMEM**

The **{Load}** button is used to load a selected GMEM.

## Import/Export

This menu is used to import/export Projects, Stills, GMEMs, Macros and Configurations from a USB memory device.

Kula can import 98 Projects, and 1000 (0 - 999) Configs, Stills, Clips, Macros etc into each Project.



The Import and Export menus all work in the same way where the user will select Project or individual files to import or export. The menu displays a familiar folder structure which is easy to navigate and use.

## Importing

Importing Files/Projects into the Kula is a similar process to exporting as explained on the previous pages. The import process is done via one menu. The example below describes importing Stills.

Press the **{Import/Export...}** button and then in the Import button area, press the **{Stills...}** button.

Use the **Removable Device** parameter to select the memory device containing the stills or clips and press the **{Select Device}** button. The contents of the memory device will be displayed in the gray area, left hand side of the menu. Use the **Destination Project** and **Destination File** parameters to select where the files will be imported to.

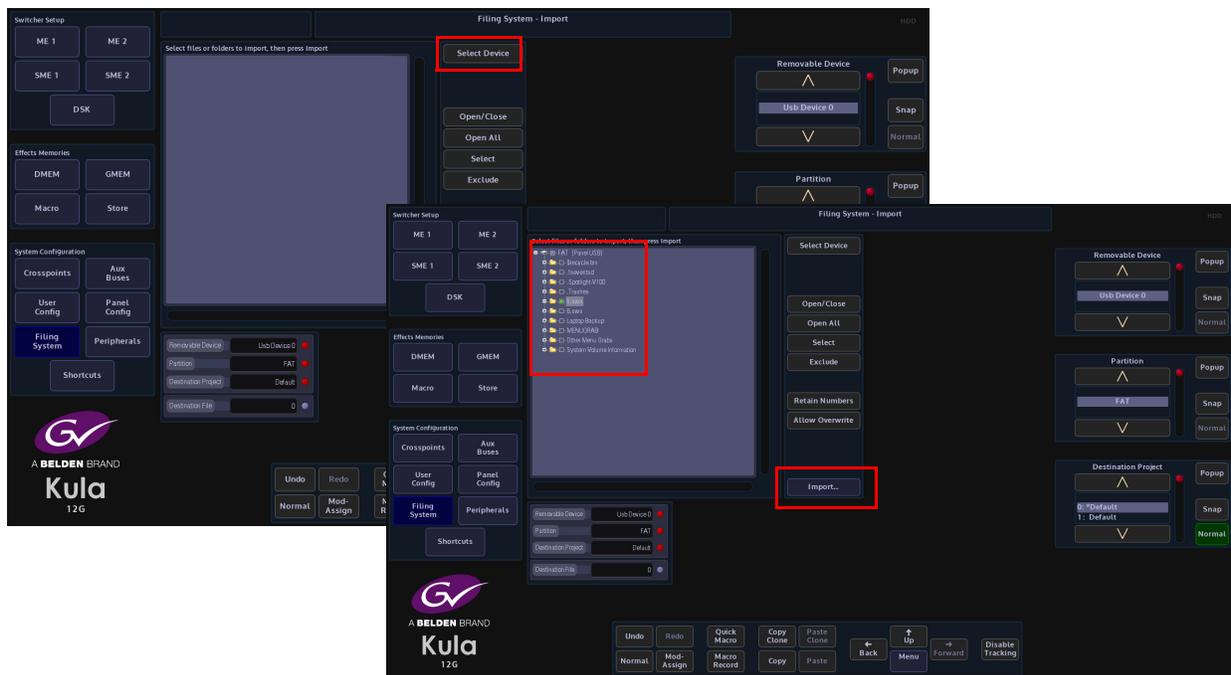
Using the **Selector** parameter and **{Open/Close}** button, navigate to the files that are going to be imported. Again use the **Selector** parameter and the **{Select}** button to select the required files and then press **{Import...}**.

The files will now be imported to the selected Project destination ready to use.

Going back into the filing system main menu, the imported files can be found in the **{Stills...}** menu as shown below.

In this menu a new name can be given to a selected file using the on-screen keyboard.

Use the **Removable Device** parameter to select the memory device, press the **{Select Device}** button and the information on the memory device will be displayed in the menu. Use the **Selector** parameter to scroll through the folders on the memory device until the required folder is reached. Press the **{Open/Close}** button to expand the folder and use the **Selector** parameter to scroll to the required file. Use the same method to select multiple files in a folder.



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Note: Projects, GMEMs, DMEMs, Stills and Clips or any type of file that is numbered can retain their numbers by pressing the **{Retain Numbers}** button.

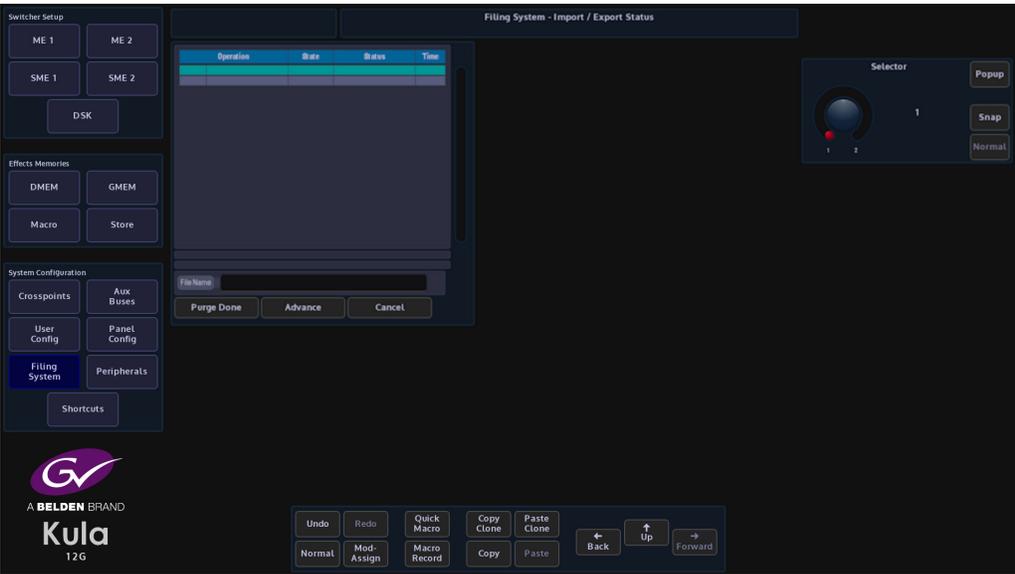
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Use the **Destination Project** and **Destination File** parameters to select where the files will be imported to, and then press **{Import}**.

The selected information will now be imported into the Kula mainframe. As with the Export menu an **Import Status** menu will be displayed.

## Import / Export Status

This will as the menu suggests, allow the user to check up on the status of any files being imported or exported.



If a file is being imported/exported accidentally and it is not required, scroll to the file with the **Selector** parameter and press the **{Purge Done}** button. The file will be deleted from the list.

The **{Advance}** button will advance the import/export process to the next selected file to be imported/exported.





## **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](http://www.grassvalley.com)).

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

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