

DATASHEET

Kula

Production Switcher Family

SD, HD, 3G and 4K UHD Production Power —
All in One Low-cost Package



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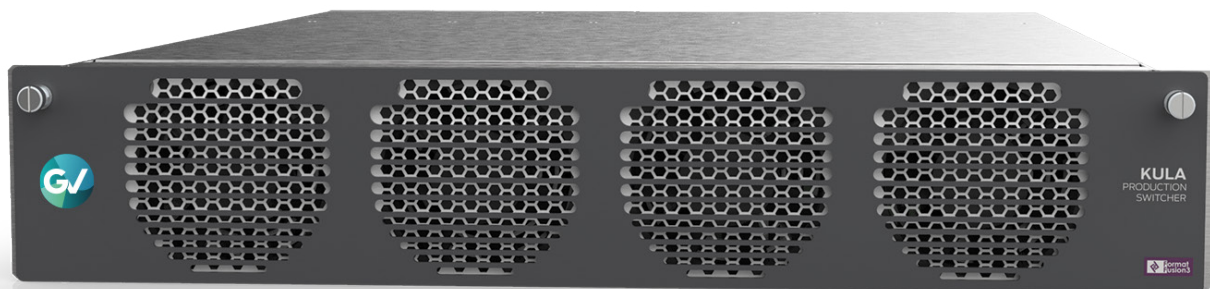
Kula is an entry-level production switcher designed for the professional broadcast and AV markets. It offers a powerful feature set in a compact system for easy installation and operation. Kula is available in several models: as a 1, 2 or 3 M/E switcher, with the capability of operating in SD, HD, 3G/1080p and 4K UHD, as well as a dedicated 12G-SDI or IP version. It has a 2 RU frame and a choice of seven control panels, including a convenient 19-inch wide panel ideal for mobile and flyaway productions. Because it is both highly-featured and cost-effective, Kula opens up a new range of professional-quality content creation options for operators who are required to work with small spaces and small budgets.

Kula from Grass Valley is the most powerful compact switcher in its class, with a revolutionary design for the live production market. Whatever the application — broadcast production, sports, house of worship, entertainment and conference/live events — Kula meets all your production needs with a simple path forward to higher production values.

Available as 1 M/E, 2 M/E or 3 M/E SD/HD/3G models, the 2 M/E version and 3 M/E version also can be switched to 1 M/E 4K UHD mode. Kula also has both a 1 M/E 12G-SDI model and a 2 or 3 M/E Kula IP model for easy entry into production using the latest video formats.

Kula panels are easy to operate with quickly understood graphical OLED buttons and functions that are simple to use for any operator or volunteer. For even more functionality, the Kula panel can be expanded with MAV modules from the Maverik modular control panel. Up to eight MAV modules can be attached to a Kula panel from a range of 15 different types.

Whether your production is intricate or modest, Kula can make any operator confident in their work. The Kula production switcher family offers a robust feature set in a compact system for easy installation and professional quality operations.



Key Features

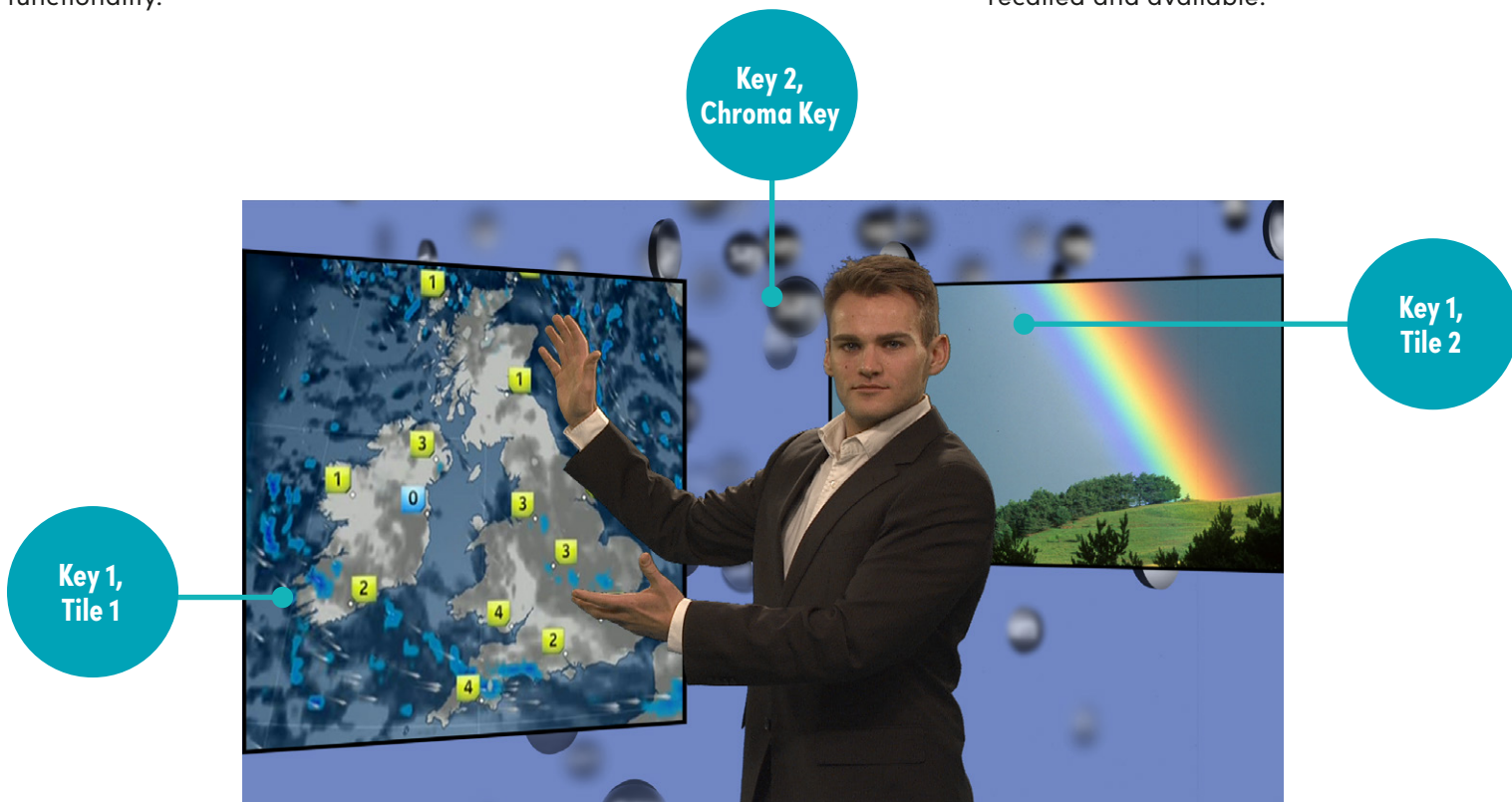
- 1, 2 or 3 M/Es with 4 keyers per M/E
- 1 and 2 M/E systems offer 2 Sub M/Es consisting of A/B mix with 2 keyers and a 2.5D DVE resize engine per Sub M/E
- Up to 32 key layers
- Linear and luma key functionality on each M/E as standard
- High-quality chromakeys on each keyer per M/E and Sub M/E where applicable
- A dedicated animated clip transition on each M/E called a Mav Trans
- Powerful effects dissolve operation for quick and simple creation of high-end effects
- 2D and 2.5D DVE for creative effects
- Four floating DSKs with resize engines and Dual Tile mode to create eight PIPs to be allocated to any M/E or aux output
- Extensive internal clip and still store – 10 output channels with up to 32 GB of storage capacity
- Multiformat production capability as standard including SD/HD/1080p and 4K UHD using FormatFusion3 technology
- Optional FormatFusion4 for seamless HDR productions (4K UHD and HD)
- Large I/O including 6 selectable ports that can be input or output ports for flexibility
- Input and bus frame synchronizers, for synchronizing all inputs
- Internal multiviewer with up to 4 heads and 16 tiles, capable of 8 heads and 28 tiles*1
- Wide range of control panels, expandable with modules from the Maverik modular control range
- The 2 M/E and 3 M/E Kula support 4K UHD at the same specification as the 1 M/E 4K UHD Kula
- The new 3D LUT Translator works with 3D LUT files, enabling Kula to match the HDR look for any production requirement
- Kula supports HD SDI, IP and 12 Gb/s SDI single-link across the different models. For productions from 4K UHD through to HD, Kula is feature rich. Now all that switcher power can be deployed in the new and emerging IP workflows or 12 Gb/s SDI single-link plants without any creative compromise

The Kula M/E: Impressive Effects for Real-time Production

Each of Kula's mix effect (M/E) banks boasts four feature-rich keyers with resize engines that offer Dual Tile mode to create eight key layers per M/E. The Dual Tile mode enables two live video tiles per key to be layered onto the background. Each independent key layer has X – Y positioning, squeeze and zoom functionality.

The M/Es also have a dedicated key + fill animated clip transition called a Mav Trans, along with an A/B background mixer. These impressive features enable you to build stunning effects for your productions. Simple to use, operators can quickly build creative effects for any production.

Adding even more consistency for quality production, operators will find it easy to create and recall effects memories and macros with assignable macro buttons that can include control of external devices. Built using Grass Valley's high-end switcher design and technology, each operator's shows are instantly recalled and available.



*1 Option to reallocate M/E 2 as a second multiviewer with up to 12 tiles across 1-4 heads

Sub M/Es*2

Unique to Kula M/Es is an associated Sub M/E that provides an extra set of resources. Cascading Sub M/Es into the standard M/Es brings a new level in production values. The Sub M/E can be configured for any one of the following options:

- A/B background mix with 2 lin/luma or chroma keyers and a 2.5D DVE
- FormatFusion3
- FormatFusion4
- Full RGB, YUV, and Bleed color correction – ideal for IMAG displays

2.5D DVE Key*3

Kula offers a 2.5D DVE resizer capability on the Sub M/E keyer with X – Y positioning, squeeze, zoom and cropping in addition to perspective.

FormatFusion3 or FormatFusion4*4

Kula's ground-breaking FormatFusion3 option lets you quickly adapt to the I/O requirements called for in different shows by simultaneously synchronizing, processing and manipulating in real time SD, HD, 3G and 4K UHD sources

in the same mainframe, and even the same M/E bank.

FormatFusion4 technology raises the bar again, bringing seamless HDR capabilities to Kula. Kula I/O can independently handle HLG, PQ and S-Log3 for color spaced BT709 SDR and BT2020 HDR for workflows in 4K UHD and HD. The core of the switcher can also be set to the desired EOTF and WCG setting.

With the exception of the dedicated 12G-SDI and IP models, all BNCs on Kula systems accept SD/HD/3G sources. By routing these sources through FormatFusion3, these inputs can be converted to the production output standard for mixing in any M/E. Alternatively, sources, M/E outputs or Sub M/E outputs can be routed to FormatFusion3 engines for conversion to an alternative output standard.

Automatic standard identification further simplifies set up for mixed format environments. FormatFusion3 also provides compensation for the latency inherent in IMAG applications.

A true multiformat video standard system able to meet today's extensive requirements for mid-sized productions, Kula is designed with 3 Gb/s processing at its core to maintain high-quality signals.

DSKs

For channels that need their own branding during simultaneous broadcasting, Kula also offers four floating DSKs that are assignable to any output. The DSKs can offer up to eight key layers with the resize engine's Dual Tile mode. Users can output DSKs downstream of the M/Es or assign each independent DSK to an aux output, which empowers more dynamic productions.

Kula is an extremely versatile production switcher. Whether it's working with the M/Es and Sub M/Es, using the assignable DSKs, or working in multiple standards, Kula promises great functionality and flexibility from production to production.

*2 Available on 1 or 2 M/E systems

*3 Not available when using FormatFusion3

*4 Not available when using Sub M/E keyers



Scalable Input & Output Architecture

While offering a good complement of 36 dedicated input and 12 dedicated output connectors, Kula also provides configuration flexibility through a pool of an additional six bidirectional ports that can be assigned as inputs or outputs as needed on an individual basis, creating I/O configurations ranging from 36x18 to 42x12.

All outputs may also be assigned to route any of the internal sources available to Kula. This includes any outputs supplied by each M/E – PGM, clean, PVW or a selection of outputs and keys. Up to four aux outputs can have their own separate key signal, which is great for multiple outputs to different customers wanting their own branding.

Maximizing Constraints

Kula has been designed to be robust and resilient, ideal for the road. With its 2 RU frame and 19-inch (1 M/E) panel, it is perfect for shipping to challenging sites and working

in space constrained production environments.

With its 2 RU frame and choice of panel sizes, Kula is the ideal choice for flyaway packs, OB vehicles and events/conferences. To stand the rigors of transportation with constant teardown and setup cycles, Kula is built strong in both chassis and panel mechanics.

Productivity

Kula frees operators to focus on creative aspects of a job. Simple operation and easy setup enables operators to work quickly and efficiently, making more time to work on other elements within the live production environment and reducing costly setup times.

The large touchscreen menu provides easily accessible configuration and control without a separate control. Multiviewers, converters, syncs and a ClipStore for audio and video are integrated into the chassis, eliminating setup of support gear.

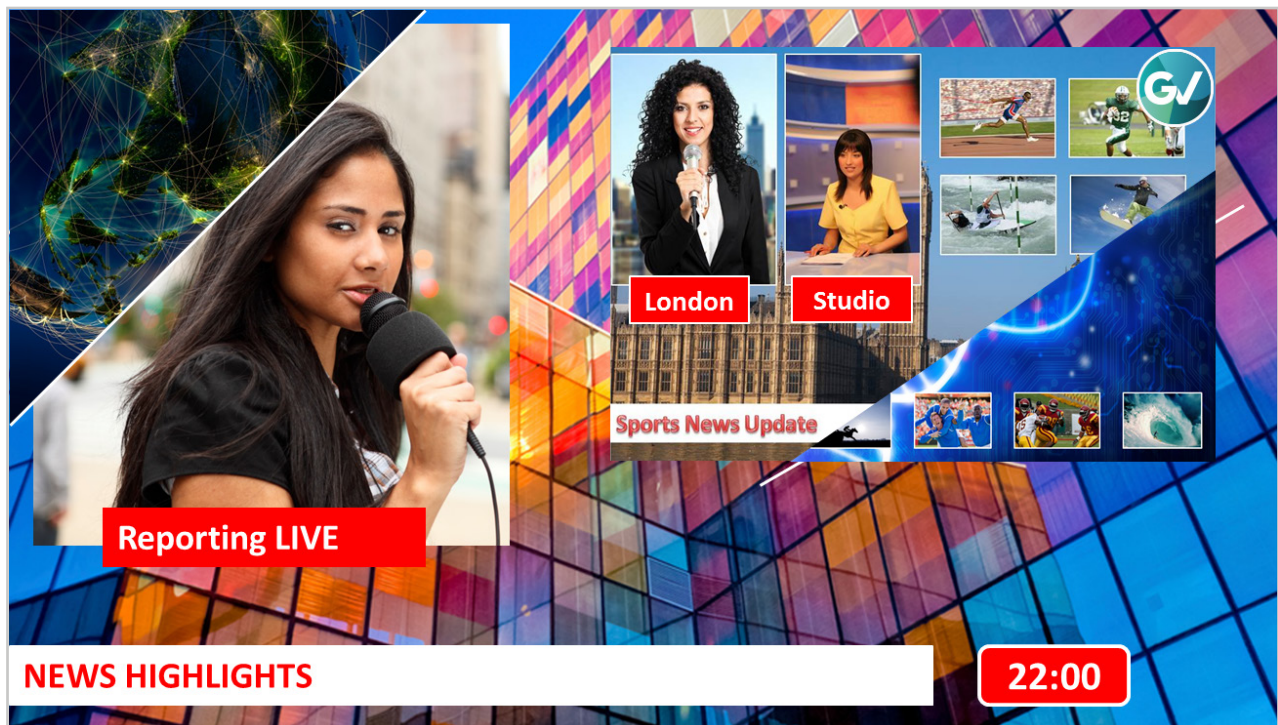
Built-in Multiviewer

A format-independent multiviewer provides great flexibility with preselected, user-defined layouts and is ideal for smaller productions. Also, it's an excellent choice to supplement larger scale production monitoring requirements.

The format-independent multiviewer is a standard feature in the Kula production switcher.

Multiviewer features:

- Up to 8 flexible output heads
- Up to 28 windows
- All external and internal sources selectable to all heads
- Instant preselect layouts
- Clear and follow-through labeling
- Red and green tallies
- Assign to any output
- Customizable layouts
- Memorize and recall layouts as part of a show setup



Cascading M/Es – M/E 1 feeding key layer, outputting on M/E 2

ClipStore

Kula's ClipStore enables playing sequences of key and fill, or video and stills. It provides up to 32 GB of uncompressed HD content available across 10 channels. The ClipStore can play out and record video and key channels. Importing and exporting animations and video is performed via a LAN/WAN, USB device and K-Watch.

K-Watch software runs on a PC. The file conversion process is automatic, and converts from one format into the native Kula .SWS file format. The new K-Manager Pro software takes the converted file and transfers this directly into the relevant project on the Kula frame ready for the operator. The K-Manager Pro software runs on a PC that is networked to a Kula frame.

The ClipStore has a sophisticated editor for both audio and video (fill and key).

- Instant access to any content and selected on any bus
- Holds both audio and video
- Used for animated clip transitions
- On-board clip editor
- Use in any memory or macro recall
- Grab live incoming video or file via USB or network

In 4K UHD mode, the ClipStore operates as a core component of your production offering key and fill, video and still outputs with full 4K UHD resolution.

Comprehensive Integration and Control Capabilities

For a single point of production control, Kula may be operated under Grass Valley Ignite automation. In addition to full support for other Grass Valley devices, Kula also features an extensive protocol list enabling third-party devices including:

- Production servers
- Audio mixers
- Robotic camera control
- Graphics engines
- Tally systems
- Multiviewers

4K UHD Capable

The Kula 1 M/E 4K UHD system is a dedicated 4K UHD switcher for those ready to broadcast exclusively in 4K UHD.

If your production requirements need to be flexible and switch from SD/HD/3G to 4K UHD, then the Kula 2 M/E production switcher is the perfect solution, giving you the flexibility to work in any standard for different productions.

Kula is 4K UHD capable with:

- 6x 4K UHD keyers
- 10x 4K UHD inputs and 3x 4K UHD outputs
- Supports full-screen wipes in 4K UHD
- Native internal ClipStore for 4K UHD animations
- Transparent operation for operators

Kula 12G-SDI

Kula 12G-SDI is engineered with a single link 12G-SDI infrastructure. This means media organizations can focus on the future of their 4K UHD productions using less cabling while supporting their legacy equipment.

Kula 12G-SDI offers exceptional value for money in an entry-level package for either 12G-SDI or 3G/1080p operations. With 1 M/E, three keyers, DVE effects and features adopted from the powerful Kahuna switchers, Kula 12G-SDI offers a strong backbone for the most comprehensive productions.

Kula IP

Kula IP is uniquely positioned for media companies that need full IP I/O yet want a more cost-effective route into the IP domain, maintaining a premium level of production capabilities in a smaller, more efficient form factor.

The Kula IP production switcher provides high-end effects and is available in 2 M/E and 3 M/E models, as well as a 1 M/E 4K UHD model.



Kula is perfect for a broad range of applications:

- Regional news and magazine programs
- In-house production for corporate, government & education
- Entertainment and concerts
- eSports
- Internet production
- Outside/remote broadcast
- Local sports venues
- House of worship
- Conferences and live events
- Flyaway/de-rigs for pop-up productions

4K UHD Capable

The Kula 1 M/E 4K UHD system is a dedicated 4K UHD switcher for those ready to broadcast exclusively in 4K UHD.

If your production requirements need to be flexible and switch from SD/HD/3G to 4K UHD, then the Kula 2 M/E production switcher is the perfect solution, giving you the flexibility to work in any standard for different productions.

Kula is 4K UHD capable with:

- 6x 4K UHD keyers
- 10x 4K UHD inputs and 3x 4K UHD outputs
- Supports full-screen wipes in 4K UHD
- Native internal ClipStore for 4K UHD animations
- Transparent operation for operators

Kula 12G-SDI

Kula 12G-SDI is engineered with a single link 12G-SDI infrastructure. This means media organizations can focus on the future of their 4K UHD productions using less cabling while supporting their legacy equipment.

Kula 12G-SDI offers exceptional value for money in an entry-level package for either 12G-SDI or 3G/1080p operations. With 1 M/E, three keyers, DVE effects and features adopted from the powerful Kahuna switchers, Kula 12G-SDI offers a strong backbone for the most comprehensive productions.

Kula IP

Kula IP is uniquely positioned for media companies that need full IP I/O yet want a more cost-effective route into the IP domain, maintaining a premium level of production capabilities in a smaller, more efficient form factor.

The Kula IP production switcher provides high-end effects and is available in 2 M/E and 3 M/E models, as well as a 1 M/E 4K UHD model.

Features	Kula 3 M/E HD/4K*1	Kula 2 M/E HD/SD/4K*1	Kula 1 M/E 4K UHD	Kula 1 M/E
Inputs	36	36	10	18
Outputs	12 assignable	12 assignable	3	6 assignable
Bidirectional inputs/outputs	6 – Create I/O combinations ranging from 36x18 to 42x12*3	6 – Create I/O combinations ranging from 36x18 to 42x12*3	2 – HD or 1080p	6 – Create I/O combinations ranging from 18x12 to 24x6
Total M/E key layers	32	32	6x 4K UHD	20
DSKs	4 floating (8 key layers)	4 floating (8 key layers)	1x 4K UHD DSK	4 floating (8 key layers)
2D DVE	24x 2D	24x 2D	6	16x 2D
2.5D DVE	2x 2.5 DVE	2x 2.5 DVE on Sub M/E keys	0	2x 2.5 DVE on Sub M/E keys
Sub M/E capability	0	2x Sub M/Es*2 with 2 keyers each	0	1x Sub M/E*2 with 2 keyers
FormatFusion3/4 & frame synchronizer	0	8	2	4
ClipStore output	10 channels 16 GB	10 channels 16 GB	4 channels 16 GB	10 channels 16 GB
Multiviewer	Up to 4 heads/16 tiles	Up to 4 heads/16 tiles. Option to reallocate M/E 2 as a 2nd multiviewer with up to 12 tiles across 1-4 heads	N/A	Up to 4 heads/16 tiles
4K quad link	Yes	Yes	Yes	N/A
4K 2SI	Yes	Yes	Yes	N/A

*1 2 M/E and 3 M/E SD/HD/3G versions also operate as a 1 M/E 4K UHD specification production switcher.

*2 Sub M/Es available if FormatFusion3 or FormatFusion4 is not being utilized.

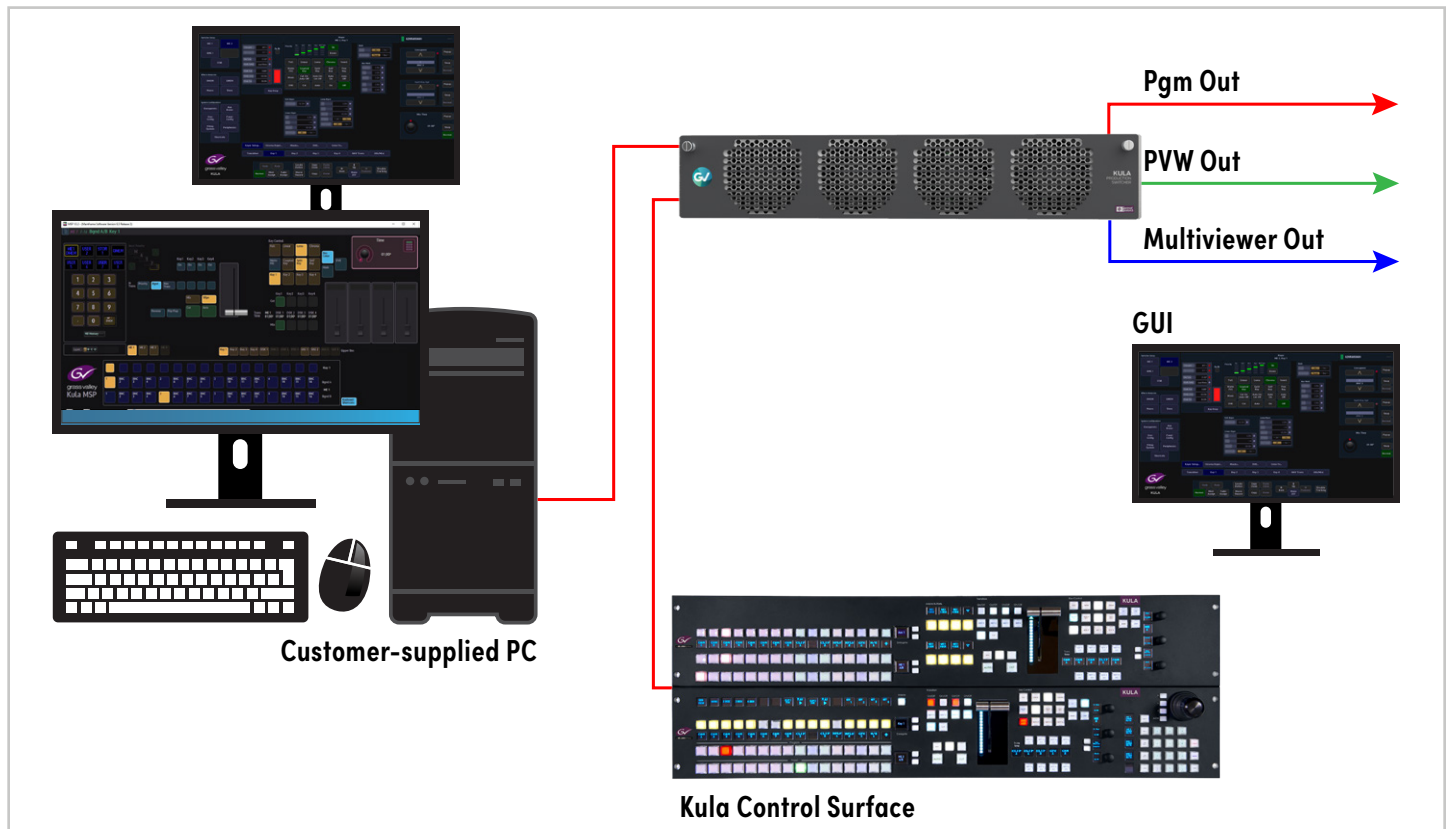
*3 In 1 M/E 4K UHD specification there are 2 bidirectional HD/1080p inputs/outputs.

MSP Overview

The MSP is an optional 1 M/E Soft Panel GUI with an integrated version of the Grass Valley Kula switcher menu application that provides direct control of switching crosspoints and the ability to recall effects and macros. An optional customized PC keyboard will be available soon that can be included for users who like quick cut and mix action from a hard-button interface. The MSP can be used as a standalone control panel, an adjunct to a main panel providing a second control surface in a suite, or as the only control surface for a second suite.

- Control any M/E of an attached switcher frame
- Familiar interface and easy transition to MSP software, which runs on a user-supplied standard PC
- The MSP software is included with the switcher application software
- Purchasing the option provides a software license that enables the interface in the video processor frame
- A license file enables users to access an unlimited number of applications associated with a video processor frame

Example of MSP Used in a Studio or OB



MSP can be used as in conjunction with a physical control surface or as standalone GUIs and control surfaces.

MSP Software Tools

K-Watch

K-Watch is an application that runs on the MSP platform and will be included with every MSP application. K-Watch is a powerful conversion tool based on the FFMPEG library, enabling graphics of almost any commonly used file type to be converted to the Kula file format. As a standalone PC application, K-Watch allows the user to convert clips and stills to Kula's .SWS file type and then manually transfer them to the required Kula frame.

K-Manager Pro

With the K-Manager Pro option on a Kula frame, these converted files can be automatically uploaded to your frame via the network, completely automating the graphics loading process. The graphics can simply be loaded into multiple watch folders on your networked PC and the converted files will be uploaded to the required Kula frames on the network.

Clip Preview

The Clip Preview application is part of the K-Manager Pro option and enables any video file (including .SWS files) to be previewed on the local PC before they are sent to the Kula frames using one of the Watch services. The preview tool not only allows preview of clips with audio, it also enables trimming of in and out points before the clip is uploaded.

K-Mirror

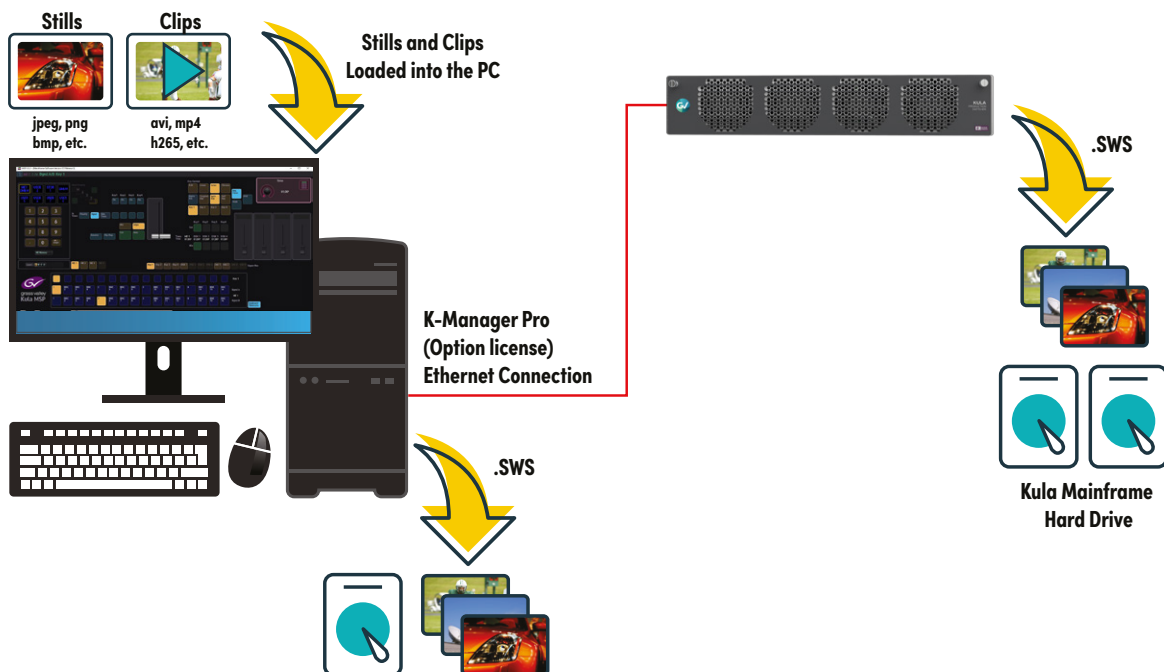
K-Mirror is an optional application that runs on the MSP platform and offers the ability to keep multiple frames on the same network in sync with each other. Customers can specify how much or little they sync between their networked frames, allowing them to keep their Kula frames up to date with the latest changes and making sure the production has the look and feel they require. Mirrored projects can also be stored within the PC's file system.

Mirror includes a Backup and Restore feature for individual mainframes.

HDR 3D LUT Translator

In addition to FormatFusion4, the new optional HDR 3D LUT Translator opens up 3D LUT workflows to Kula. 3D LUT files are used heavily in HDR conversion and are used to produce the same HDR look and feel from all your HDR enabled equipment. The 3D LUT files are set to a customer's exact requirement and then disseminated out to all HDR capable production equipment. The 3D LUT Translator application receives the 3D LUT file and translates this to the color space information that the Kula uses internally. Working with the K-Manager Pro option, the new translated file can be transferred automatically across the network to your Kula frame. Using the FormatFusion4 option on Kula enables the new 3D LUT file to be implemented allowing a single Kula frame to operate with a mix of SDR and HDR formats on inputs and outputs, converting standards where necessary.

The new 3D LUT translator option is an additional license and requires the MSP license and K-Manager pro license.



GV Kombine Meshed Switcher

Introduction

Producing premium 4K content frequently requires bandwidth and processing capacity that can only be achieved by combining multiple resources. This approach is used globally and on the biggest global events – however, this can limit the creative effects available to productions in UHD. The new GV Kombine from Grass Valley alleviates these limitations.

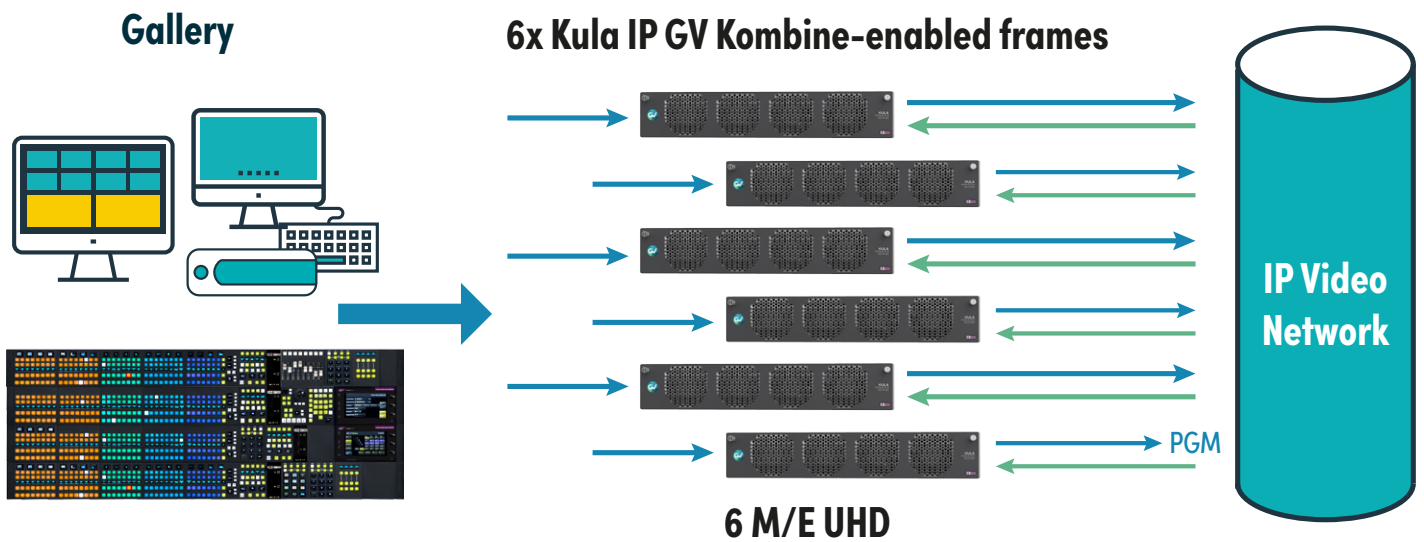
The Kombine licensed option introduces a new architecture to the Kula IP systems and no matter what your live television application, be it sports, news, light entertainment or music, the Kombine meshed switcher provides the flexibility to create a switcher to enable you to create your productions, your way.

Paired with the Maverik Soft Panel and the Maverik control surface, Kombine provides user-friendly tactile control of multiple Kula IP frames as a single entity.

Switching Multiple Frames Feels the Same as a Single Frame

GV Kombine gives you the freedom to combine Kula IP frames to achieve the UHD switcher capability you require for any application, while leaving the operator to concentrate on creating their best show – with the control surface and user interface they are comfortable using.

When you walk into a control room on a mobile truck or studio outfitted with GV Kombine meshed switcher, switching a show with multiple frames feels the same as switching a single frame. It's the same workflow for the operator. Creative limitations vanish with increased numbers of UHD M/Es and I/O.



Increased Production Capability

The new Kula option is built on the Kula IP's dedicated hardware platform, meaning that unlike the competition, you do not have to worry about running out of resources — it provides expanded UHD capacity to match today's and tomorrow's productions as well. Any Kula IP frame can be added to your production stack and you can build yourself a 16 M/E UHD switcher.

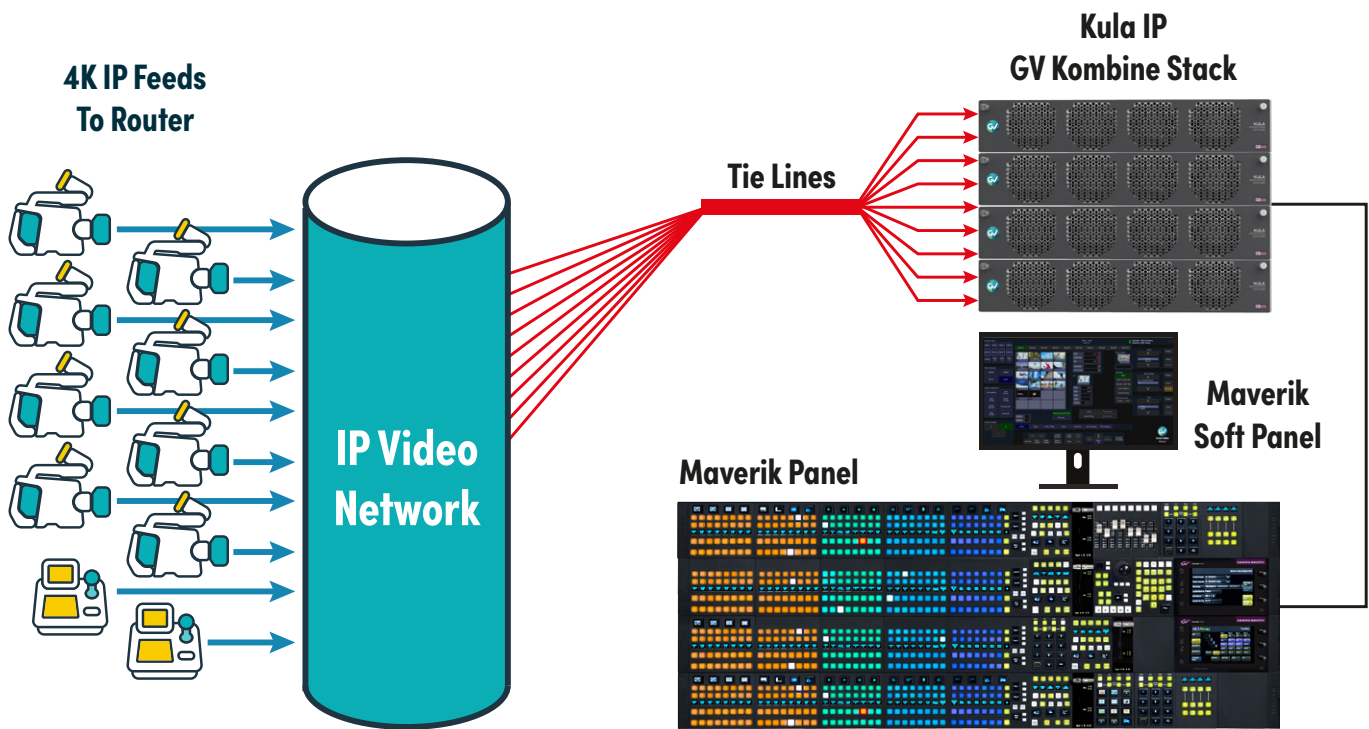
Every Kula UHD IP frame has three keys capable of five key layers, and using Grass Valley's Tie Line technology, all I/O is handled through your external IP. The number of inputs to your Kula frame is only limited by the number of sources available in your IP video network — removing the I/O UHD limitations.

GV Kombine deploys an intelligent "Tie Line" approach, the desired external router outputs (destinations) are connected to the Kula inputs. These inputs on the Kula IP frames 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.

Most importantly, any source selection on any bus is transparent to the operator, regardless from where the crosspoint is being made, i.e., in the external router, or in the Kula itself.

Using the built-in NMOS IP technology, the Kombine software scans all the available IP sources and each of these can be added as a crosspoint to your Kombine system.

The Kombine software knows which physical inputs/Tie Lines are allocated and which are not being used on a bus. Kula then assigns the physical input/Tie Line to the desired bus upon a source selection.



3 M/E KULA PRODUCTION SWITCHER

3 M/E 24 & 16 Crosspoint Panels, 2 RU Frame – Switchable to 1 M/E 4K UHD

Key Features

- 3 M/E (1 M/E / 2 M/E / program / preview) production switcher
- 2 RU frame supporting:
 - 36 inputs
 - 12 assignable outputs
 - 6 input or output bidirectional ports
- 4 keyers per M/E:
 - 4 full effects keyers with lin/luma
 - 4 assignable DVE engines (will give 8 independent boxes)
 - Chromakeys available on all keys
 - Transition keyer with dedicated ClipStores for key & fill
 - Mask generator per keyer
 - Separate wipe generator
 - Matte generator
- Large internal ClipStore with 10 outputs holding 2 minutes of uncompressed HD video and audio content that is totally routable
- 4 floating resizing down stream keyers/mixing aux outputs without using M/E or Sub M/Es
- Fully flexible internal multiviewer with configurable 4 heads and 16 tiles
- Control:
 - 66 GPI/Os
 - 2x RS-422 ports
 - 3 Ethernet ports for control panel and TCP/IP protocols
 - USB ports for user/clip/system files import, export and backup
- New control panel design with clear OLEDs, RGB push buttons and shaft encoders for quick and granular control
- Sophisticated macro recall and edit capability
- Clearly labeled control panel with separate mnemonics for source, key and macro names
- Instant delegation buttons for macros or key and aux bus control
- T-bar with direction strip indicators
- 16 and 24 crosspoint button panel models available for easy operation
- Can be expanded by connecting other Maverik modules



3 M/E 24 crosspoint control panel

Specifications

TV Standards

2.97 Gb/s Video Standards (3G/1080p)

1080p60 SMPTE ST 424

1080p60 SMPTE ST 425/Level A

1080p60 SMPTE ST 425/Level B

1080p59.94 SMPTE ST 424

1080p59.94 SMPTE ST 425/Level A

1080p59.94 SMPTE ST 425/Level B

1080p50 SMPTE ST 424

1080p50 SMPTE ST 425/Level A

1080p50 SMPTE ST 425/Level B

1.485 Gb/s Video Standards (HD)

1080i60 SMPTE ST 274(4), SMPTE ST 292(D)

1080i59.94 SMPTE ST 274(5), SMPTE ST 292(E)

1080i50 SMPTE ST 274(6), SMPTE ST 292(F)

1035i60 SMPTE ST 260, SMPTE ST 292(A)

1035i59.94 SMPTE ST 260, SMPTE ST 292(B)

1080PsF30

1080PsF29.97

1080PsF25

1080PsF24

1080PsF23.976

1080p30 SMPTE ST 274(7), SMPTE ST 292(G)

1080p29.97 SMPTE ST 274(8), SMPTE ST 292(H)

1080p25 SMPTE ST 274(9), SMPTE ST 292(I)

1080p24 SMPTE ST 274(10), SMPTE ST 292(J)

1080p23.976 SMPTE ST 274(11), SMPTE ST 292(K)

720p60 SMPTE ST 296(1), SMPTE ST 292(L)

720p59.94 SMPTE ST 296(2), SMPTE ST 292(M)

720p50 SMPTE ST 296(2), SMPTE ST 292(M)

270 Mb/s Video Standards (SD)

576i 16:9

576i 4:3

480i 16:9

480i 4:3

Reference

Analog genlock high-definition tri-level syncs signal or SD 1V blackburst

Frame

Video Signal Inputs

36, SD/HD/3G-SDI: HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/ SMPTE ST 292 / SMPTE ST 424 via BNC connectors

Video Signal Outputs

12 SD/HD/3G-SDI: Assignable via BNC connectors

Video Bidirectional Ports

HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors

6 bidirectional ports

Genlock

Genlock reference 2 off analog sync via BNC connectors

Control Interfaces

66 GPI Tally/GPO outputs: Assignable GPI/GPO

Isolated contact closures via 3x 25-way D-Type.

Assignable as GPI or GPO

16 10/100/1000base-T: 3x RJ45 Ethernet connectors fixings

2 RS-422 control ports

2x USB

Power

Kula frame: Auto sensing 100-250 VAC Power supply 50/60 Hz nominal. Two fully independent hot swappable PSU modules, with separate mains power feeds via 2x 13A IEC - 320-C14 socket

Power consumption: <400W

Temp range: 5 to 40°C (41 to 104°F), noncondensing operating

Mechanical

Frame

2 RU

Height: 87 mm (3.42 in.)

Depth: 604.8 mm (23.81 in.)

Weight: Approx. 14 kg (30.3 lbs.)

Kula Control 3 M/E 16 Crosspoint Panel

Width: 834 mm (32.83 in.)

Depth: 419.1 mm (16.5 in.)

Height : 64.7 mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar

Weight: Approx. 11 kg (24.23 lbs.)

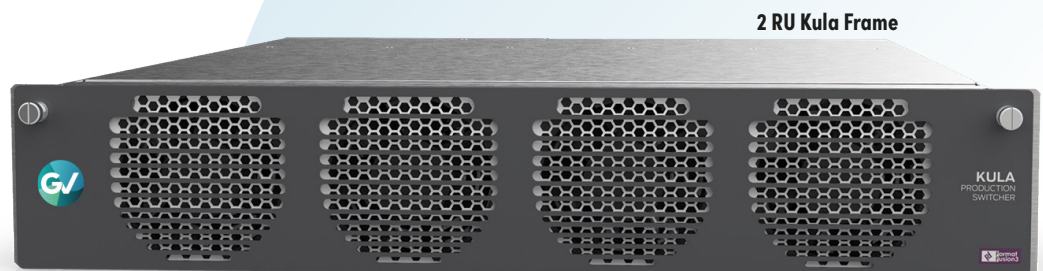
Kula Control 3 M/E 24 Crosspoint Panel

Width: 994 mm (39.13 in.)

Depth: 419.1 mm (16.5 in.)

Height: 64.7 mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar

Weight: Approx. 14.2 kg (31.29 lbs.)



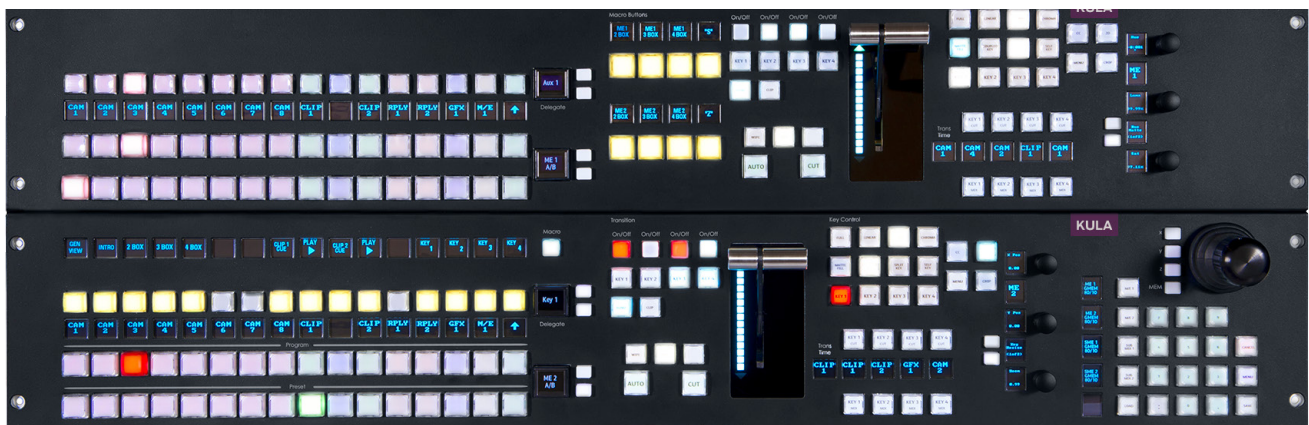
2 M/E KULA PRODUCTION SWITCHER

2 M/E 24 & 16 Crosspoint Panels, 2 RU Frame — Switchable to 1 M/E 4K UHD

Key Features

- 2 M/E (1 M/E / program / preview) production switcher
- 2 RU frame supporting:
 - 36 inputs
 - 12 assignable outputs
 - 6 input or output bidirectional ports
- 4 keys per M/E
 - 4 full effects keyers with lin/luma
 - 4 assignable DVE engines (will give 8 independent boxes)
 - Chromakeys available on all keys
 - Transition keyer with dedicated ClipStores for key & fill
 - Mask generator per keyer
 - Separate wipe generator
 - Matte generator
- 2 Sub M/Es background with 2 keyers*
 - 2 lin/luma keys
 - 1 assignable 2.5D DVE engine per Sub M/E
 - Chromakeys available on all keys
 - Use on any output or use within any M/E for more keying power
- Large internal ClipStore with 10 outputs holding 2 minutes of uncompressed HD video and audio content that is totally routable
- 4 floating resizing down stream keyers/mixing aux outputs without using M/E or Sub M/Es
- 8 channels of FormatFusion3 or FomatFusion4 assignable of any input/output or bus*
- Fully flexible internal multiviewer with configurable 4 heads and 16 tiles
 - Option to reallocate M/E 2 as a second multiviewer with up to 12 tiles across 1-4 heads
- Control:
 - 66 GPI/Os
 - 2x RS-422 ports
 - 3 Ethernet ports for control panel and TCP/IP protocols
 - USB ports for user/clip/system files import, export and backup
- New control panel design with clear OLEDs, RGB push buttons and shaft encoders for quick and granular control. Sophisticated macro recall and edit capability
- Clearly labeled control panel with separate mnemonics for source, key and macro names
- Instant delegation buttons for macros or key and aux bus control
- T-bar with direction strip indicators
- 16 and 24 crosspoint button panel models available for easy operation
- Can be expanded by connecting other Maverik modules

* Sub M/Es functionality shared to be either Sub M/Es or FormatFusion3 or FomatFusion4 engines. The 2 M/E and 3 M/E Kula will support 4K UHD, however at the same feature specification as the 1 M/E 4K UHD Kula.



2 M/E 16 crosspoint control panel

Specifications

TV Standards

2.97 Gb/s Video Standards (3G/1080p)

1080p60 SMPTE ST 424

1080p60 SMPTE ST 425/Level A

1080p60 SMPTE ST 425/Level B

1080p59.94 SMPTE ST 424

1080p59.94 SMPTE ST 425/Level A

1080p59.94 SMPTE ST 425/Level B

1080p50 SMPTE ST 424

1080p50 SMPTE ST 425/Level A

1080p50 SMPTE ST 425/Level B

1.485 Gb/s Video Standards (HD)

1080i60 SMPTE ST 274(4), SMPTE ST 292(D)

1080i59.94 SMPTE ST 274(5), SMPTE ST 292(E)

1080i50 SMPTE ST 274(6), SMPTE ST 292(F)

1035i60 SMPTE ST 260, SMPTE ST 292(A)

1035i59.94 SMPTE ST 260, SMPTE ST 292(B)

1080PsF30

1080PsF29.97

1080PsF25

1080PsF24

1080PsF23.976

1080p30 SMPTE ST 274(7), SMPTE ST 292(G)

1080p29.97 SMPTE ST 274(8), SMPTE ST 292(H)

1080p25 SMPTE ST 274(9), SMPTE ST 292(I)

1080p24 SMPTE ST 274(10), SMPTE ST 292(J)

1080p23.976 SMPTE ST 274(11), SMPTE ST 292(K)

720p60 SMPTE ST 296(1), SMPTE ST 292(L)

720p59.94 SMPTE ST 296(2), SMPTE ST 292(M)

720p50 SMPTE ST 296(2), SMPTE ST 292(M)

270 Mb/s Video Standards (SD)

576i 16:9

576i 4:3

480i 16:9

480i 4:3

Reference

Analog genlock high-definition tri-level syncs signal or SD TV blackburst

Frame

Video Signal Inputs

36, SD/HD/3G-SDI:SD/HD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/ SMPTE ST 292 / SMPTE ST 424 via BNC connectors

Video Signal Outputs

12 SD/HD/3G-SDI: Assignable via BNC connectors

Video Bidirectional Ports

HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors

6 bidirectional ports

Genlock

Genlock reference 2 off analog sync via BNC connectors

Control Interfaces

66 GPI Tally/GPO outputs: Assignable GPI/GPO Isolated contact closures via 3x 25-way D-Type. Assignable as GPI or GPO

16 10/100/1000base-T: 3x RJ45 Ethernet connectors fixings

2 RS-422 control ports

2x USB

Power

Kula frame: Auto sensing 100-250 VAC Power supply 50/60 Hz nominal. Two fully independent hot swappable PSU modules, with separate mains power feeds via 2x 13A IEC - 320-C14 socket

Power consumption: <400W

Temp range: 5 to 40°C (41 to 104°F), noncondensing operating

Mechanical

Frame

2 RU

Height: 87 mm (3.42 in.)

Depth: 604.8 mm (23.81 in.)

Weight: Approx. 14 kg (30.3 lbs.)

Kula Control 2 M/E 16 Crosspoint Panel

Width: 834 mm (32.83 in.)

Depth: 279.6 mm (11.0 in.)

Height: 64.7 mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar

Weight: Approx. 7.5 kg (16.52 lbs.)

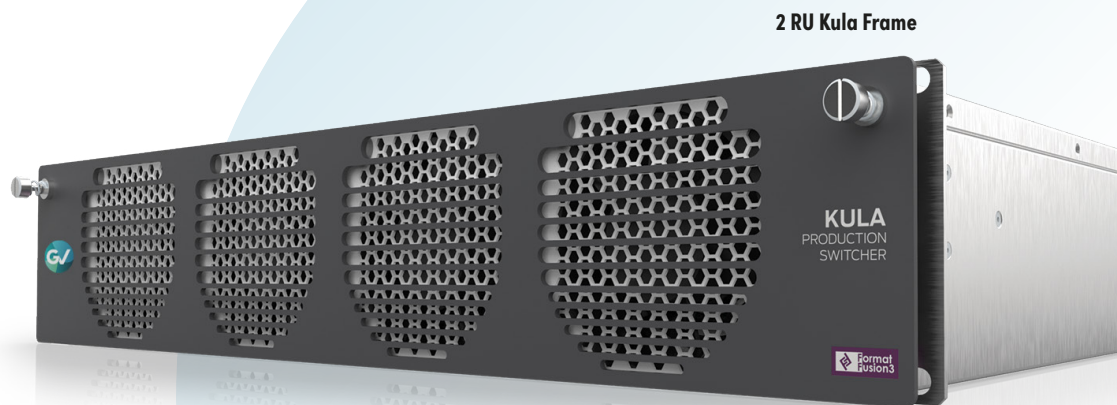
Kula Control 2 M/E 24 Crosspoint Panel

Width: 994 mm (39.13 in.)

Depth: 279.6 mm (11.0 in.)

Height: 64.7 mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar

Weight: Approx. 9.2 kg (20.28 lbs.)



2 RU Kula Frame

1 M/E KULA PRODUCTION SWITCHER

19 in. Rackmount 1 M/E 16 Crosspoint Panel,
2 RU Frame with 1 M/E

1 M/E 16 & 24 Crosspoint Panels, 2 RU Frame with 1 M/E

Key Features

- 2 RU
- 6 assignable outputs and 6 bidirectional inputs or outputs
- M/E supports 4 full effects keyers with lin/luma, 4 assignable DVE engines (will give 8 independent boxes)
 - Chromakeys available on all keys
 - Transition keyer (Mav Trans) with dedicated ClipStores for key & fill
 - Mask generator per keyer
 - Separate wipe generator
 - Matte generator
- Sub M/E background with 2 keyers* both lin/luma key
 - 1 assignable 2.5D DVE engine (will give 2 independent boxes)
 - Chromakeys on any output or use with the M/E for more keying power
 - RGB, YUV, and Bleed color correction
- Large internal ClipStore with 10 outputs holding 2 minutes of uncompressed HD video and audio content that is totally routable
- 4 floating resizable downstream keyers for main or aux outputs
- 4 channels of FormatFusion3 or FomatFusion4 assignable to any input/output or bus*
- Fully flexible internal multiviewer with 4 heads and 16 files
- Control:
 - 66 GPI/Os, 2x RS-422 ports, 3 Ethernet ports for control panel and TCP/IP protocols
 - USB ports for user/clip/system files import, export and backup
- 1 M/E control panel with a choice of 16 or 24 crosspoint buttons. Designed with clear OLEDs, RGB push buttons and shaft encoders for quick and granular control
- Sophisticated macro recall and edit capability
- Clearly labeled control panel with separate mnemonics for source, key and macro names
- Instant delegation buttons for macros or key and aux bus control
- T-bar with direction strip indicators
- Can be expanded by connecting other Maverik modules

* Sub M/Es functionality shared to be either Sub M/Es or FormatFusion3 or FomatFusion4 engines.



1 M/E 19" rackmount control panel



1 M/E 16 crosspoint control panel

Specifications

TV Standards

2.97 Gb/s Video Standards (3G/1080p)

1080p60 SMPTE ST 424
1080p60 SMPTE ST 425/Level A
1080p60 SMPTE ST 425/Level B
1080p59.94 SMPTE ST 424
1080p59.94 SMPTE ST 425/Level A
1080p59.94 SMPTE ST 425/Level B
1080p50 SMPTE ST 424
1080p50 SMPTE ST 425/Level A
1080p50 SMPTE ST 425/Level B

1.485 Gb/s Video Standards (HD)

1080i60 SMPTE ST 274(4), SMPTE ST 292(D)
1080i59.94 SMPTE ST 274(5), SMPTE ST 292(E)
1080i50 SMPTE ST 274(6), SMPTE ST 292(F)
1035i60 SMPTE ST 260, SMPTE ST 292(A)
1035i59.94 SMPTE ST 260, SMPTE ST 292(B)
1080PsF30
1080PsF29.97
1080PsF25
1080PsF24
1080PsF23.976
1080p30 SMPTE ST 274(7), SMPTE ST 292(G)
1080p29.97 SMPTE ST 274(8), SMPTE ST 292(H)
1080p25 SMPTE ST 274(9), SMPTE ST 292(I)
1080p24 SMPTE ST 274(10), SMPTE ST 292(J)
1080p23.976 SMPTE ST 274(11), SMPTE ST 292(K)
720p60 SMPTE ST 296(1), SMPTE ST 292(L)
720p59.94 SMPTE ST 296(2), SMPTE ST 292(M)
720p50 SMPTE ST 296(2), SMPTE ST 292(M)

270 Mb/s Video Standards (SD)

576i 16:9
576i 4:3
480i 16:9
480i 4:3

Reference

Analog genlock high-definition tri-level syncs signal or SD 1V blackburst

Frame

Video Signal Inputs

18 SD/HD/3G-SDI HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/SMPTE ST 292 / SMPTE ST 424 via BNC connectors

Video Signal Outputs

6 SD/HD/3G-SDI assignable via BNC connectors

Video Bidirectional Ports

HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/ SMPTE ST 292 / SMPTE ST 424 via BNC connectors

6 bidirectional ports

Genlock

Genlock reference 2 off analog sync via BNC connectors

Control Interfaces

66 GPI tally/GPO outputs: Assignable GPI/GPO isolated contact closures via 3x 25-way D-Type. Assignable as GPI or GPO

16 10/100/1000base-T 3x RJ45 Ethernet connectors fixings

2x RS-422 control ports

2x USB

Power

Kula frame: Auto sensing 100-250 VAC power supply: 50/60 Hz nominal. Two fully independent hot-swappable PSU modules, with separate mains power feeds via 2x 13A IEC – 320-C14

Power consumption: <400W

Temp range: 5 to 40°C (41 to 104°F), noncondensing operating

Mechanical

2 RU

Height: 87 mm (3.42 in.)

Depth: 604.8 mm (23.81 in.)

Weight: Approx. 14 kg (30.3 lbs.)

Kula Control 1 M/E 16 Crosspoint Panel

Width: 834 mm (32.83 in.)

Depth: 139.7 mm (5.5 in.)

Height: 64.7 mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar

Weight: Approx. 3.5 kg (7.72 lbs.)

Kula Control 1 M/E 24 Crosspoint Panel

Width: 994 mm (39.13 in.)

Depth: 139.7 mm (5.5 in.)

Height: 64.7 mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar

Weight: Approx. 5 kg (11.02 lbs.)

Kula Control 1 M/E Panel (Rackmount)

Width: 482.6 mm (19 in.)

Depth: 221.5 mm (8.72 in.)

Height: 87.9 mm (3.46 in.), 146.5 mm (5.79 in.) total height including T-Bar

Weight: Approx. 3.6 kg (7.14 lbs.)

Connectors Kula 1 M/E and 1 M/E Rackmount

Frame Communications

2x 16 10/100/1000base-T 3x RJ45 Ethernet connectors fixings

Internal Panel Connection

6x RJ45 Ethernet connectors fixings. Connection to other MAV modules

NOT Ethernet connections, must be direct to MAV modules. Do not use network switches or hubs

CAT5 or above cables – crossover cables are NOT suitable

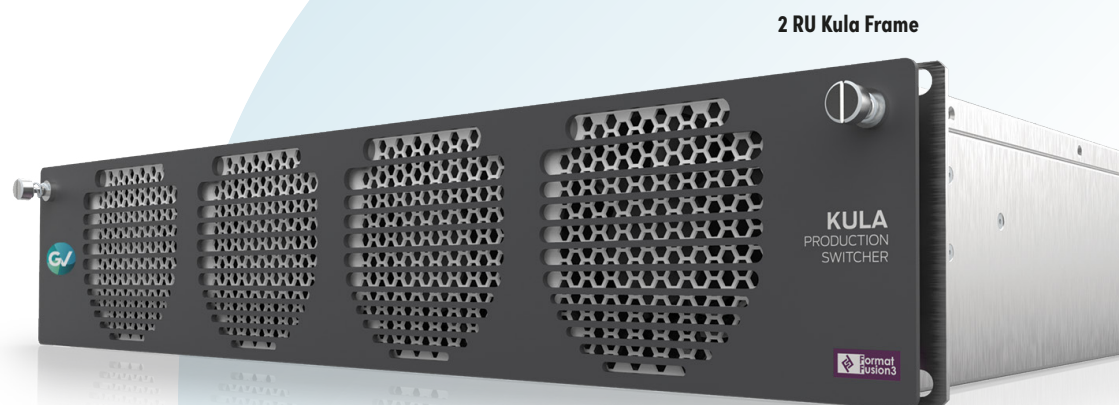
2x USB 2 ports

1x monitor connection to local touchscreen

PSU: 2x fully independent external PSU modules with separate mains power feeds via 2x 10A IEC leads

Output from each PSU: 12V DC 100W via Kycon KPPX 4-pin or compatible connectors to the KPP control surface

2 supplied as standard, one PSU provides dual redundancy



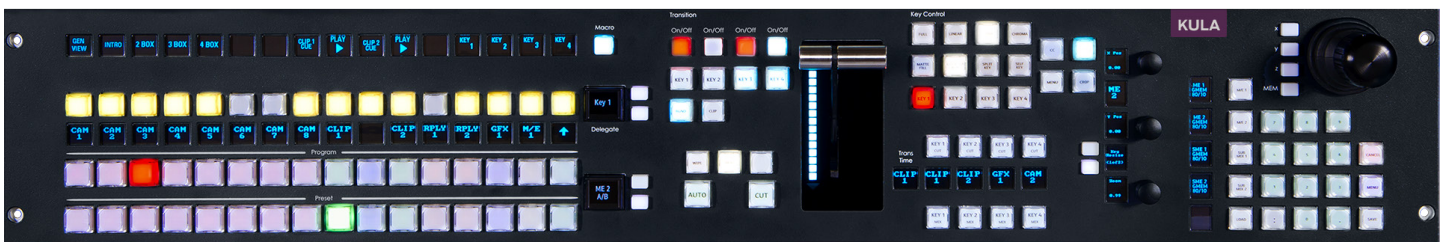
1 M/E 4K UHD KULA PRODUCTION SWITCHER

1 M/E 16 Crosspoint Panel, 2 RU Frame with 1 4K UHD M/E

Key Features

- 2 RU
- 10x 4K UHD inputs (quad link or 2SI)
- 4K UHD program output
- 4K UHD preview output
- 4K UHD clean output
- 2 HD downconverted assignable outputs
- M/E supports:
 - 2 full effects keyers with lin/luma
 - Chromakey
 - Separate wipe generator
 - Matte generator
- Large internal ClipStore with 4 outputs holding 30 seconds of uncompressed 4K UHD video and audio*
- 2 channels of FormatFusion3 or FomatFusion4 assignable to any input/output or bus
- 1 M/E control panel with a choice of 16 or 24 crosspoints and clear OLEDs
- RGB pushbuttons and shaft encoders for quick and granular control, sophisticated macro recall and edit capability
- Clearly labeled control panel with separate mnemonics for source, key and macro names, instant delegation buttons for macros or key and aux bus control
- T-bar with direction strip indicators
- Can be expanded by connecting other Maverik modules

* 2 stores in UHD and 2 stores in 1080p



1 M/E 16 crosspoint control panel

Specifications

TV Standards

2.97 Gb/s Video Standards (3G/1080p)

1080p60 SMPTE ST 424
1080p60 SMPTE ST 425/Level A
1080p60 SMPTE ST 425/Level B
1080p59.94 SMPTE ST 424
1080p59.94 SMPTE ST 425/Level A
1080p59.94 SMPTE ST 425/Level B
1080p50 SMPTE ST 424
1080p50 SMPTE ST 425/Level A
1080p50 SMPTE ST 425/Level B

1.485 Gb/s Video Standards (HD)

1080i60 SMPTE ST 274(4), SMPTE ST 292(D)
1080i59.94 SMPTE ST 274(5), SMPTE ST 292(E)
1080i50 SMPTE ST 274(6), SMPTE ST 292(F)
1035i60 SMPTE ST 260, SMPTE ST 292(A)
1035i59.94 SMPTE ST 260, SMPTE ST 292(B)
1080PsF30
1080PsF29.97
1080PsF25
1080PsF24
1080PsF23.976
1080p30 SMPTE ST 274(7), SMPTE ST 292(G)
1080p29.97 SMPTE ST 274(8), SMPTE ST 292(H)
1080p25 SMPTE ST 274(9), SMPTE ST 292(I)
1080p24 SMPTE ST 274(10), SMPTE ST 292(J)
1080p23.976 SMPTE ST 274(11), SMPTE ST 292(K)
720p60 SMPTE ST 296(1), SMPTE ST 292(L)
720p59.94 SMPTE ST 296(2), SMPTE ST 292(M)
720p50 SMPTE ST 296(2), SMPTE ST 292(M)

270 Mb/s Video Standards (SD)

576i 16:9
576i 4:3
480i 16:9
480i 4:3

Reference

Analog genlock high-definition tri-level syncs signal or SD TV blackburst

Frame

Video Signal Inputs

36, SD/HD/3G-SDI: HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors

Video Signal Outputs

12 SD/HD/3G-SDI: Assignable via BNC connectors

Video Bidirectional Ports

HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)

Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors

6 bidirectional ports

Genlock

Genlock reference 2 off analog sync via BNC connectors

Control Interfaces

66 GPI Tally/GPO outputs: Assignable GPI/GPO Isolated contact closures via 3x 25-way D-Type. Assignable as GPI or GPO

16 10/100/1000base-T: 3x RJ45 Ethernet connectors fixings

2x RS-422 control ports

2x USB

Power

Kula frame: Auto sensing 100-250 VAC Power supply 50/60 Hz nominal. Two fully independent hot swappable PSU modules, with separate mains power feeds via 2x 13A IEC - 320-C14 socket

Power consumption: <400W

Temp range: 5 to 40°C (41 to 104°F), noncondensing operating

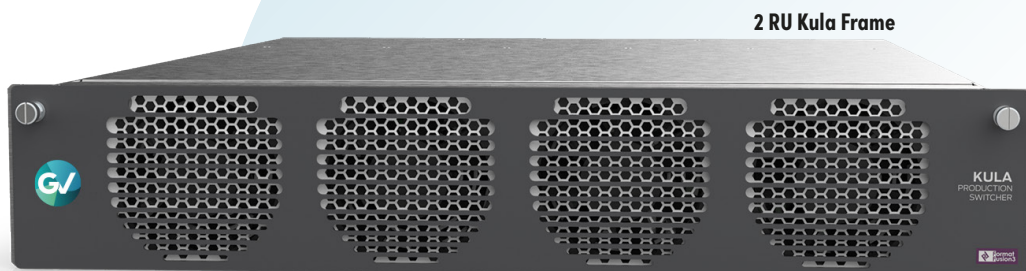
Mechanical

Frame

2 RU
Height: 87 mm (3.42 in.)
Depth: 604.8 mm (23.81 in.)
Weight: Approx. 14 kg (30.3 lbs.)

Kula Control 1 M/E 16 Crosspoint Panel

Width: 834 mm (32.83 in.)
Depth: 139.7 mm (5.5 in.)
Height: 64.7mm (2.55 in.), 123.3 mm (4.86 in.) total height including T-Bar
Weight: Approx. 3.5 kg (7.72 lbs.)



KULA 12G-SDI PRODUCTION SWITCHER

In a space-saving, cost-effective package, the 12G-SDI Kula switcher is ideal for a variety of production environments including live events (flyaway packs, OB vans) sports, houses of worship and conferences and events.

Building on Grass Valley's Kula range of multiformat production switchers is the Kula 12G-SDI, the world's first dedicated 12G-SDI production switcher. This innovative technology aligns with Grass Valley's business-transforming solutions across live playout and production, which are empowering the move to 4K UHD for broadcast and media organizations, especially within live sports where 4K UHD has significant momentum.



Kula 12G-SDI is engineered with a single link 12G-SDI infrastructure. This means media organizations can focus on the future of their 4K UHD productions using less cabling and supporting their legacy equipment. For those planning a future transition to 4K UHD, they can achieve it faster than normal using existing 3 Gb/s / 1080p SDI infrastructures before the move to 12G-SDI signal distribution. It can be easily integrated into existing 4K UHD applications.

Kula 12G-SDI offers exceptional value for money in an entry-level package for either 12G-SDI or 3G/1080p operations. With 1 M/E, three keyers, DVE effects and features adopted from the powerful Kahuna switchers, Kula 12G-SDI offers a strong backbone for the most comprehensive productions.

Powerful I/Os

Kula 12G-SDI offers 12G-SDI BNCs for 4K UHD connectivity, as well as 3G BNCs for quad link signals; HD sources are also available – all in a 2 RU frame.

Applications

With its space-saving frame, compact panel, feature-rich effects and the ability to work in hybrid or full 4K UHD workflows, it's perfect for all of the different production environments that today's media organizations manage.

Sports

With sports broadcasts embracing 4K UHD to give viewers a more immersive experience, Kula 12G-SDI enables live sports productions to maintain that 4K UHD workflow. Kula 12G-SDI is intuitive in that it allows operators to select multiple cameras quickly, integrate replay systems easily and create animated wipe transitions from the internal ClipStore effortlessly. These types of features are ideally suited for college sports productions.

In the Field

Being out in the field amidst the action is a crucial part of a broadcaster's job, especially those operating small footprint OB vans in tight locations. Kula 12G-SDI, with its 19-inch panel, is ideal for these smaller OB trucks where space is a concern.

With the Kula, broadcasters can set up, shoot a production and move on to the next location quickly. Kula 12G-SDI has a smaller, lighter frame so it can effortlessly produce 4K UHD productions on location.

4K UHD Workflows

With the growth of 4K UHD sports channels and sports news programming, media organizations need a way to automate these productions as they become part of the 4K UHD workflow. The Kula 12G-SDI makes this possible.

The Kula 12G-SDI is easy to operate with simple macro functionality for fast recall, powerful processing and multiple outputs within a small frame – all in 4K UHD.

A 12G-SDI and a 4K UHD Solution

Kula 12G-SDI is part of Grass Valley's portfolio offering 12 Gb/s single link routing, multiviewers, conversion and infrastructure technologies so that users can work in 4K UHD faster and more efficiently while benefiting from exceptional value for money.

Grass Valley's portfolio makes it easy and cost-effective for you to transition to 4K UHD (single link or quad link) from HD/hybrid workflows.

Key Features

- 1 M/E with 3 keyers
- 4K UHD functionality
- HD, 3G and 4K UHD in the same frame
- SDI connectivity for 12G sources and 3G sources
- 10x 12G-SDI inputs / 40x HD inputs
- Transparent configuration for 4K UHD productions
- FormatFusion3 or FormatFusion4
- Internal ClipStore
- Easy operations in 4K UHD

Specifications

TV Standards

11.88 Gb/s Video Standards (4K UHD)

SMPTE ST 2082-10
3840 x 2160p 50 Hz
3840 x 2160p 59.9 Hz
3840 x 2160p 60 Hz

2.97 Gb/s Video Standards (3G/1080p)

1080p59.94 SMPTE ST 424
1080p59.94 SMPTE ST 425/Level A
1080p59.94 SMPTE ST 425/Level B
1080p50 SMPTE ST 424
1080p50 SMPTE ST 425/Level A
1080p50 SMPTE ST 425/Level B

1.485 Gb/s Video Standards (HD)

1080i60 SMPTE ST 274(4), SMPTE ST 292(D)
1080i59.94 SMPTE ST 274(5), SMPTE ST 292(E)
1080i50 SMPTE ST 274(6), SMPTE ST 292(F)
1035i60 SMPTE ST 260, SMPTE ST 292(A)
1035i59.94 SMPTE ST 260, SMPTE ST 292(B)
1080PsF30
1080p29.97
1080PsF25
1080PsF24
1080PsF23.976
1080p30 SMPTE ST 274(7), SMPTE ST 292(G)
1080p29.97 SMPTE ST 274(8), SMPTE ST 292(H)
1080p25 SMPTE ST 274(9), SMPTE ST 292(I)
1080p24 SMPTE ST 274(10), SMPTE ST 292(J)
1080p23.976 SMPTE ST 274(11), SMPTE ST 292(K)
720p60 SMPTE ST 296(1), SMPTE ST 292(L)
720p59.94 SMPTE ST 296(2), SMPTE ST 292(M)
720p50 SMPTE ST 296(2), SMPTE ST 292(M)

Reference

Analog genlock high-definition tri-level syncs signal or SD 1V blackburst

Frame

Video Signal Inputs

10x 12G-SDI (SMPTE ST 2082) single link BNC connectors
40x SD/HD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)
Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors
Genlock reference: 2 off analog sync (loop A and B through)

Video Signal Outputs

3x 12G-SDI (SMPTE ST 2082) single link BNC connectors
12x HD/SD/1080p (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)
Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors

Video Bidirectional Ports

HD/SD/3G (270 Mb/s / 1.485 Gb/s / 2.97 Gb/s)
Serial digital interface: As REC601/SMPTE ST 292/ SMPTE ST 424 via BNC connectors
2 bidirectional ports

Control Interfaces

Standard

44 GPI tally/GPO outputs: Assignable GPI/GPO isolated contact closures via 2x 25-way D-Type. Assignable as GPI or GPO
10/100/1000base-T 3x RJ45 Ethernet connectors fixings
2 RS-422 control ports
2x USB

Power

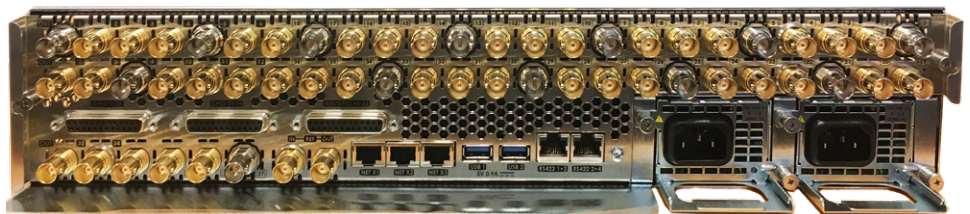
Kula frame: Auto sensing 100-250 VAC power supply 50/60 Hz nominal. Two fully independent hot swappable PSU modules, with separate mains power feeds via 2x 13A IEC - 320-C14 socket

Consumption: <400W

Temp range: 5 to 40°C (41 to 104°F) noncondensing operating

Mechanical

2 RU
Height: 87 mm (3.42 in.)
Depth: 604.8 mm (23.81 in.)
Weight: Approx. 14 kg (30.3 lbs.)



KULA IP

Production Switcher

The move to IP, which is becoming a reality for broadcasters and media organizations, is a massive shift for our industry and also a huge opportunity.

We're seeing our customers' technology models changing: many of them are looking to work with real-time audio and video transport over 10 GbE, 40 GbE and 100 GbE IP networks. This has led to the development of several real-time protocols such as uncompressed SMPTE ST 2022-6, SMPTE ST 2022-7 and VSF TR03/SMPTE ST 2110 to stream and enable interoperability across equipment in the production chain.

Enter the Kula IP, a new smart production switcher from Grass Valley, that delivers massive amounts of power and seamlessly connects with today's IP network infrastructures. Kula IP supports these real-time protocols for streaming video on inputs and outputs and works with networks switches of up to 100 GbE.

The Kula IP production switcher provides high-end effects and is available in 2 M/E and 3 M/E models, as well as a 1 M/E UHD model.

Applications

The new Kula IP is perfect for a broad range of applications within the IP environment:

- Sports
- Regional news
- Magazine programs
- Internet feeds
- Outside/ remote broadcasts
- Flyaway

Kula IP is uniquely positioned for media companies that need full IP I/O yet want a more cost-effective route into the IP domain. Of course it's crucial that customers still benefit from a premium level of production capabilities in a smaller, more efficient form factor.

Kula IP offers flexible M/E functionality and aux outputs, main program and in-vision outputs. Productions have never been so easy in IP.



Powerful M/Es

Kula IP offers the most powerful M/E on the market. Each M/E has four keyers with resize engines including Dual Tile mode offering eight key layers, a dedicated animated clip transition called a Mav Trans and an A/B background.

Additional Sub M/E Functionality

Kula IP provides additional Sub M/Es to the standard M/E functionality.* Each Sub M/E includes two linear/luminance/chroma keyers. One keyer can be assigned to a 2.5D DVE resize engine, offering an extra three key layers plus an A/B background for creative productions without burning M/E resources.

Assignable Downstream Keyers

Four floating DSKs are available within the Kula IP. They can be independently assigned to any output or used downstream of any M/E. They have resize engines and can create eight key layers.

Capability of Delivering Multiple Outputs

Kula IP can output multiple standards simultaneously using the Kahuna technology FormatFusion3*, opening up more functionality across the delivery of HD, 1080p and 4K.

Multiviewer Matching Kahuna's High Performance

Kula IP's internal multiviewer offers flexibility with configurable one to four heads and 16 tiles to build preview windows to prepare for professional live productions. When more monitoring is required, M/E 2 can be reallocated to become a 2nd configurable multiviewer with up to 12 tiles across one to four heads.

Largest ClipStore

The Kula production switcher has the largest internal ClipStore in its class: it provides ten ClipStore outputs with 16 GB of RAM, which gives up to two minutes of uncompressed HD video.

Large Input and Output

With 36 IP inputs and 12 IP outputs, the Kula IP is a practical production switcher. For more flexibility, Kula IP has an extra four SDI inputs and two extra bi-directional SDI ports assignable as an input or output.

Control Surface that Supports Direct Control and Macro Allocation

Kula IP has several panels in the one, two and three M/E range. It offers up to 16 or 24 crosspoint buttons, separate key control and transition operations and assignable macro buttons with OLED displays for crystal clear identification. Kula IP can connect to up to eight extra modules to the panel from the Maverik modular panel range.

* Sub M/Es functionality is either Sub M/Es or FormatFusion3 or FormatFusion4 engines. The 2 M/E and 3 M/E Kula will support 4K UHD, however at the same feature specification as the 1 M/E 4K UHD Kula.

Key Features

- Up to 3 M/Es
- Up to 32 key layers
- Up to IP 50 GbE interface + 50 GbE packet redundancy
- Supports 36 inputs and 12 outputs over RTP streams SMPTE ST 2022-6, SMPTE ST 2022-7 & TR03 uncompressed video
- 6 x SDI BNCs
- Supports 1080i/720p/1080p & UHD
- FormatFusion3 or FormatFusion4
- Internal ClipStore
- Internal multiviewer up to 28 tiles
- Easy operation

Input/Output Tables with SMPTE ST 2022-6, SMPTE ST 2022-7 & VSF TR03/SMPTE ST 2110

Kula IP	3 M/E	2 M/E	1 M/E UHD
Inputs			
IP over 4x 50 GbE QSFP28	36	36	9
3/1.5G or single-link 12G SDI inputs over BNC	4	4	1x 12G or 4x HD
Outputs			
IP over 4x 50 GbE QSFP28	12	12	3
Bidirectional I/O			
3/1.5G assignable in or out BNC	2	2	2

Specifications

TV Standards

2.97 Gb/s Video Standards (1080p)

1080p59.94 SMPTE ST 424
1080p59.94 SMPTE ST 425/Level A
1080p59.94 SMPTE ST 425/Level B
1080p50 SMPTE ST 424
1080p50 SMPTE ST 425/Level A
1080p50 SMPTE ST 425/Level B

1.485 Gb/s Video Standards (HD)

1080i60 SMPTE ST 274(4), SMPTE ST 292(D)
1080i59.94 SMPTE ST 274(5), SMPTE ST 292(E)
1080i50 SMPTE ST 274(6), SMPTE 292(F)
1035i60 SMPTE ST 260, SMPTE ST 292(A)
1035i59.94 SMPTE ST 260, SMPTE ST 292(B)
1080PsF30
1080PsF29.97
1080PsF25
1080PsF24
1080PsF23.976
1080p30 SMPTE ST 274(7), SMPTE ST 292(G)
1080p29.97 SMPTE ST 274(8), SMPTE ST 292(H)
1080p25 SMPTE ST 274(9), SMPTE ST 292(I)
1080p24 SMPTE ST 274(10), SMPTE ST 292(J)
1080p23.976 SMPTE ST 274(11), SMPTE ST 292(K)
720p60 SMPTE ST 296(1), SMPTE ST 292(L)
720p59.94 SMPTE ST 296(2), SMPTE ST 292(M)
720p50 SMPTE ST 296(2), SMPTE ST 292(M)

IP Connectivity

Duplex signals supported over RTP streams via 2x SFP+ 28 cages.

SMPTE ST 2022-6, SMPTE ST 2022-7, VSF TR03/SMPTE ST 2110

36 inputs – 1.485 Gb/s format sources
36 inputs – 2.970 Gb/s format sources
9 inputs 4K UHD in SMPTE ST 2110
12 outputs – 1.485 Gb/s format sources
12 outputs – 2.970 Gb/s format sources
3 outputs 4K UHD in SMPTE ST 2110

Ethernet Signals

QSFP28 optical x2
Conforms to IEEE 802.3ba – 100 GbE

SDI Signals

2x bidirectional
4x SDI BNC Inputs – 1.485 Gb/s format sources and 2.970 Gb/s format sources OR 1x 12G-SDI (SMPTE ST 2082) single link BNC connector

Genlock

Genlock reference 2 off analog sync via BNC connectors

Control Interfaces

66 GPI tally/GPO outputs assignable GPI/GPO isolated contact closures via 3x 25-way D-Type. Assignable as GPI or GPO
16 10/100/1000base-T 3x RJ45 Ethernet connectors fixings.
2x RS-422 control ports
2x USB

Power

Kula IP Frame

Auto sensing: 100-250 VAC power supply 50/60 Hz nominal
Two fully independent hot swappable PSU modules, with separate mains power feeds via 2x 13A IEC – 320-C14 socket
Power consumption: <400W
Temperature range: 5 to 40°C (41 to 104°F) noncondensing operating

Mechanical

2 RU
Height: 87 mm (3.42 in.)
Depth: 604.8 mm (23.81 in.)
Weight: Approx. 14 kg (30.3 lbs.)

Ordering

3 M/E Kula Switcher – 24

9679375

3 M/E 24 Crosspoint Panel, 2 RU Frame with 3 M/Es. Switchable to 1 M/E 4K UHD

3 M/E Kula Switcher – 16

9679305

3 M/E 16 Crosspoint Panel, 2 RU Frame with 2 M/Es. Switchable to 1 M/E 4K UHD

2 M/E Kula Switcher – 24

9679370

2 M/E 24 Crosspoint Panel, 2 RU Frame with 2 M/Es. Switchable to 1 M/E 4K UHD

2 M/E Kula Switcher – 16

9679300A

2 M/E 16 Crosspoint Panel, 2 RU Frame with 2 M/Es. Switchable to 1 M/E 4K UHD

1 M/E Kula Switcher – 19

9679320A

19-inch Rackmount 1 M/E 16 Crosspoint Panel, 2 RU Frame with 1 M/E

1 M/E Kula Switcher – 16

9679310A

1 M/E 16 Crosspoint Panel, 2 RU Frame with 1 M/E

1 M/E 4K UHD Kula Switcher

9679330A

1 M/E 16 Crosspoint Panel, 2 RU Frame with 1 4K UHD M/E

1 M/E UHD Kula 12G-SDI Switcher – 19

9679131

19-inch 1 M/E 16 Crosspoint Panel, 2 RU Frame with 1 12G-SDI, switchable to 2 HD M/Es

3 M/E Kula IP Switcher – 24

KULA-24-3M-IP

3 M/E 24 Crosspoint Panel, 2 RU Frame with 3 M/Es. IP I/O. Switchable to 1 M/E 4K UHD

3 M/E Kula IP Switcher – 16

KULA-16-3M-IP

3 M/E 16 Crosspoint Panel, 2 RU Frame with 2 M/Es. IP I/O. Switchable to 1 M/E 4K UHD

2 M/E Kula IP Switcher – 24

KULA-24-2M-IP

2 M/E 24 Crosspoint Panel, 2 RU Frame with 2 M/Es. IP I/O. Switchable to 1 M/E 4K UHD

2 M/E Kula IP Switcher – 16

KULA-16-2M-IP

2 M/E 16 Crosspoint Panel, 2 RU Frame with 2 M/Es. IP I/O. Switchable to 1 M/E 4K UHD

1 M/E UHD Kula IP Switcher – 19

KULA-19-1M-UHD-IP

19-inch 1 M/E 16 Crosspoint Panel, 2 RU Frame with 1 12G-SDI, switchable to 2 HD M/Es. IP I/O

Application Software

MSP-LIC-1ME-SW

MSP License for control of the Kula frames with the 1 M/E soft panel GUI on a customer supplied PC

K-MGR-PRO-SW

K-Manager PRO software application that enables FTP transfer to Kula frames

KAH-LIC-3DLUT-XLTR

3D LUT Translator for Kula

Frame Only

9679110A

2 RU Frame with 2 M/Es

9679200A

2 RU Frame with 1 M/E

9679210A

2 RU Frame with 1 4K UHD M/E

9679130

2 RU 12G-SDI Frame with 1 12G-SD M/E, switchable to 2 HD M/Es

KULA-FRM-2M-IP

2 RU Frame with 2 IP M/Es

KULA-FRM-1M-UHD-IP

2 RU UHD Frame with 1 IP M/E

Panel Only

9679350A

2 M/E 24 Crosspoint Panel

9679340A

2 M/E 16 Crosspoint Panel

9679170A

1 M/E 24 Crosspoint Panel

9679070A

1 M/E 16 Crosspoint Panel

9679080A

1 M/E 16 Crosspoint Panel fitting in 19" rack frame

Upgrade Options

32GB-CLIP-UPG

10 Output ClipStore Holding 32 GB

KULA-LIC-FF4-1ME

Kula 1 M/E FormatFusion4

KULA-LIC-FF4-2ME

Kula 2 M/E FormatFusion4

GV-LIC-KOMBINE-FRM

GV Kombine option*

* Kula IP only

Extensive Training and Support

Extensive training and support services ensure you get the very best out of your Grass Valley live production switcher.

Grass Valley Customer Care Services

Grass Valley's customer service offers first class solutions for optimizing your operations, through world leading technical support and fast responsiveness.

Grass Valley Customer Care comes as standard for the first year of your purchase to give you absolute confidence in your investment. Extended GV Care agreements are available.

Grass Valley has expert support engineers, available to you 24 hours a day, 7 days a week, 365 days a year via telephone, email or live chat. When replacement parts are needed, we offer an advanced parts exchange, sending you either a new frame or panel in return for the faulty part as a one-time swap.

Replacements are dispatched immediately from Grass Valley locations worldwide. Our investment ensures speedy resolution of issues that might affect your operations.

Online Support Increases Access, Enhances Transparency

Through our online support portal you can monitor and track any support issue and even engage one-to-one with support engineers for fast answers to any question via our interactive live chat.

Grass Valley's customer services are there to help and support you. For further information about GV Care contact your Grass Valley representative.

Training

To ensure that customers experience the full benefits of their switcher, Grass Valley is committed to providing the highest levels of training for Kula owners, operators and engineers.

Training before and after a system purchase is available worldwide at customer premises, Grass Valley offices or an alternative third-party location. The duration of these training sessions will depend on user requirements.

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

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