

Kahuna

The World's Most Powerful Live Production Switchers



Snell
Advanced
Media

Fully-featured live production at UHD, HD and SD, for both IP and SDI operations



UHD
available
throughout
the range

HDR
Capable

www.s-a-m.com

Introduction

The Next Generation of live production switchers has arrived! SAM's heritage in live production is world renowned - from designing the first true multi-format switcher through to the creative power and flexibility of the Kahuna 360.

The introduction of an all new mainframe range takes this to an entirely new level; Kahuna 4800, Kahuna 6400 and Kahuna 9600 offer more fire-power and flexibility than ever before as well as UHD and HDR capabilities across the entire range.

Together with Kahuna Maverik - SAM's groundbreaking new switcher control surface - the new Kahuna range provides a hugely bolstered feature set, including more power for Mix Effects functionality and enhanced DVE resize engines.

Whatever your live television application, be it sports, news, light entertainment, music or house of worship, the Kahuna range provides the ultimate power, creativity, flexibility and built-in SAM reliability so you can create your productions, your way.



**Kahuna's new
FormatFusion 4
technology
seamlessly handles
UHD and HDR**

Contents

The range	1
The creative power of Kahuna	2
Multiple formats and productions	4
Unique Make M/E™ technology	5
Unbeatable control with Maverik	6
Innovative software tools	8
Kahuna multiviewer	9
IP and 12Gbps connectivity	10
Fiber connectivity	11
Kahuna features at a glance	12
Extensive training and support	13



For further information on award-winning SAM products visit:
www.s-a-m.com

The three switchers in the Kahuna range provide more power and flexibility than ever before.

Kahuna 9600

- Up to 24 M/Es
- 48 keyers

The most powerful switcher in the new Kahuna range, the Kahuna 9600 is an enterprise class switcher offering an unmatched feature set to meet the needs of the highest calibre of productions.

Kahuna 6400

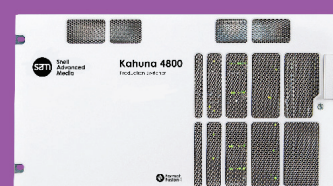
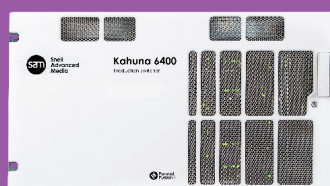
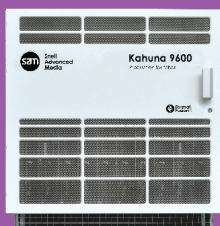
- Up to 12 M/Es
- 24 keyers

The Kahuna 6400 delivers huge power and flexibility to the widest range of applications including regional news, sports production, houses of worship and magazine programs. The Kahuna 6400 redefines what's possible in the mid-size production arena.

Kahuna 4800

- Up to 4 M/Es
- 16 keyers

Offering superb value for money, the Kahuna 4800 is an immensely capable and well engineered mid-level production switcher.



The Kahuna family combined with the Maverik control surface offers unbeatable live production.

Creativity

- Unmatched freedom in combining mixers, keyers and DVE effects to create any on-air style.
- Built-in intelligence allows the switcher to handle the mundane, freeing you to create great productions.

Productivity

- Dramatically reduce the overhead of show set-up times.
- Advanced file workflow tools enable you to turn around content in seconds.

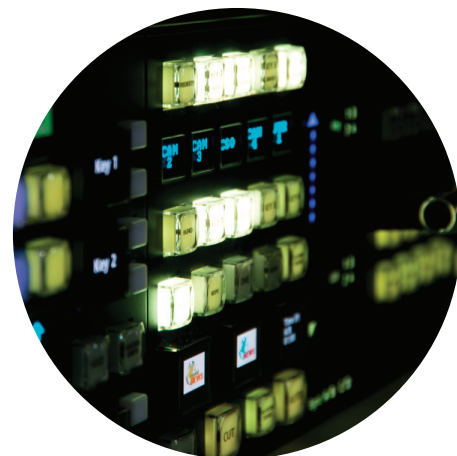
Reliability

- Designed for mission critical operations with a hot-swappable architecture.
- Innovative automated features provide even greater on-air confidence.

Flexibility

- Unique Make M/E™ technology allows the user to select available switcher resources to create a tailor-made M/E for specific requirements.
- FormatFusion3™ enables true multi-format operations, supporting any combination of SD, HD, 1080p (level A & B) and UHD. This eliminates the need for external conversion, reducing capital outlay, removing system timing issues and saving engineering set up time.
- New FormatFusion4™ technology raises the bar again, bringing seamless HDR capabilities to Kahuna. All inputs and outputs can independently handle HLG, PQ and SLOG3 for color spaced BT709 SDR and BT2020 HDR for workflows in UHD and HD. The core of the switcher can also be set to the deried EOTF and WCG setting.

- Kahuna is the only production switcher that can support HD SDI, IP and 12Gbps SDI single link across the entire range. For productions from UHD through to HD, Kahuna has an unmatched feature set. Now all that switcher power can be deployed in the new and emerging IP workflows or 12Gbps SDI single link plants without any creative compromise.



The creative power of Kahuna, including 2.5D and 3D DVEs, chroma key and key layer capabilities ensures you have all the tools to create the very best live TV.

Compositing power of a Kahuna M/E

The Unbeatable Power of a Kahuna Mix Effect

Each Kahuna 9600 and Kahuna 6400 M/E has 12 key layers (6 keys per M/E for Kahuna 4800). These are divided into 'superkeys' and 'ekeys' – 4 of each.

The four full superkeys perform linear, luma and chroma keying and all come with their own 2.5D resize engine. The four ekeys are downstream of the superkeys and have been designed to bring even more graphics to an M/E.

SuperKeys

- Lin/luma & chroma key border generator
- 2 x mask generators
- 2.5D resize engine (2 per superkey)
- Split dual tile mode

eKeys

- (DSK) Lin/luma & chroma key



More Creativity for Your Live Productions. The 3D DVE provides an unmatched level of performance, offering unique show branding and world leading creativity.



The Technical Director has the flexibility to assign powerful channels of 3D DVE to any M/E. All programming setups are fast, efficient and easy to store and recall. All DVE parameters can be included in a timeline and seamlessly transferred between multiple Kahuna systems.

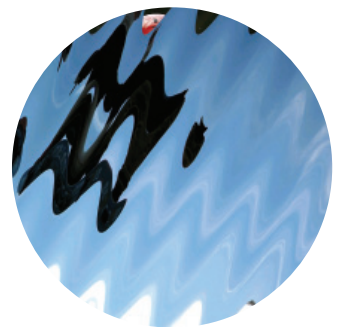
One board provides source-based and bus-based modes

- 4 Channels of 3D DVE effects (4:2:2:4)
- Combiner section combining all channels
- Intersecting planes
- Produces single key and fill output

Large model library

- Linear effects
- Non-linear effects
- Surface effects

Examples of just some of the 3D DVE effects available with the Kahuna family of switchers



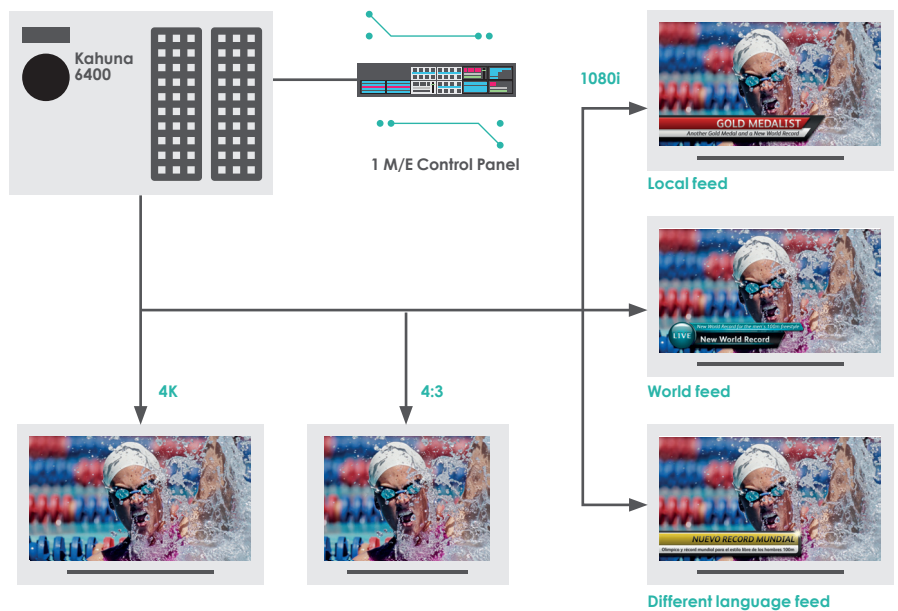
Multiple formats and productions

Multi-format outputs from a single M/E

The Kahuna Mix Effect, combined with FormatFusion3 technology is unique in the switcher world, giving you more capability to provide effects and branding for multiple audiences.

- User selected backgrounds
- User selected key buses
- Each output with dedicated FormatFusion3 engine for different outputs

The example on the right shows a 1M/E switcher driving 5 outputs, all with different needs, all timed together.

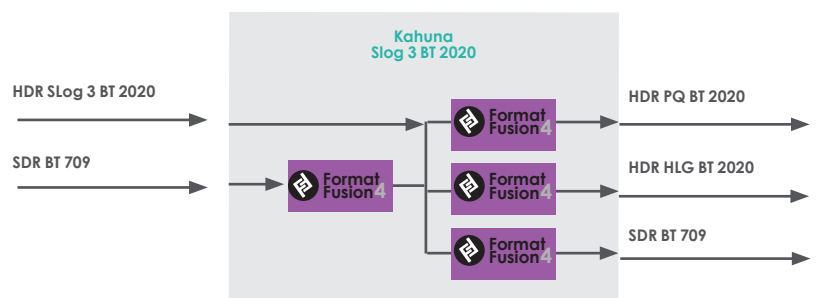


Seamless HDR productions (UHD and HD) with FormatFusion 4

FormatFusion4 brings HDR capabilities to all inputs and outputs on SAM's Kahuna production switcher. The technology seamlessly handles SDR and HDR in parallel for Sports, News and Light Entertainment productions. FormatFusion4 supports the Electrical Optical Transfer Functions (EOTF) for:

- Realtime control of Perceptual Quantizer (PQ)
- Realtime control of Hybrid Log Gamma (HLG)
- Sony S-Log3 profile

FormatFusion4 also includes color space support for Wide Color Gamut (BT709 and BT2020) in all formats (1080i, 1080p and UHD).

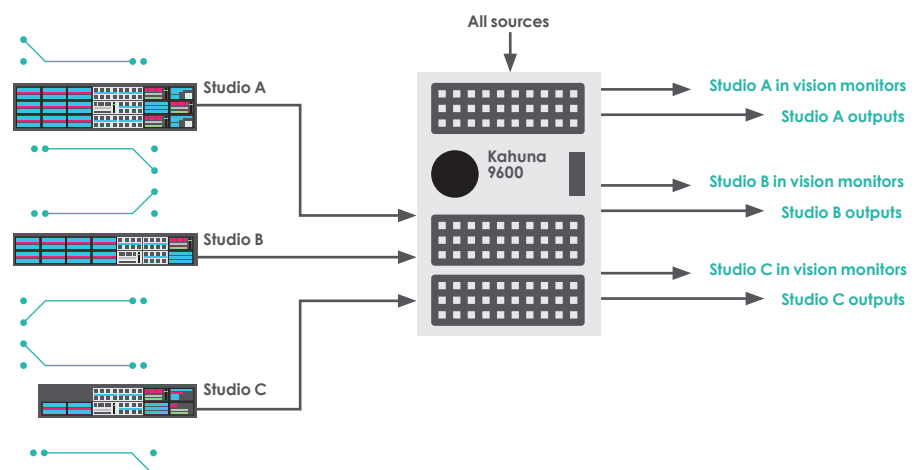


FormatFusion 4 is completely transparent to a customer's live production workflow and requires no additional engineering or external equipment, even in UHD!

Multiple productions made easy

Multiple productions can be handled simultaneously from a single mainframe. Each production output can be controlled by a separate switcher panel, with each of these having up to 120 inputs, transition effects, keyers and allocated DVE effects.

The diagram shows three studios all using the same Kahuna mainframe for all of their outputs and in vision monitors, saving space and costs.



Unique Make M/E™ technology

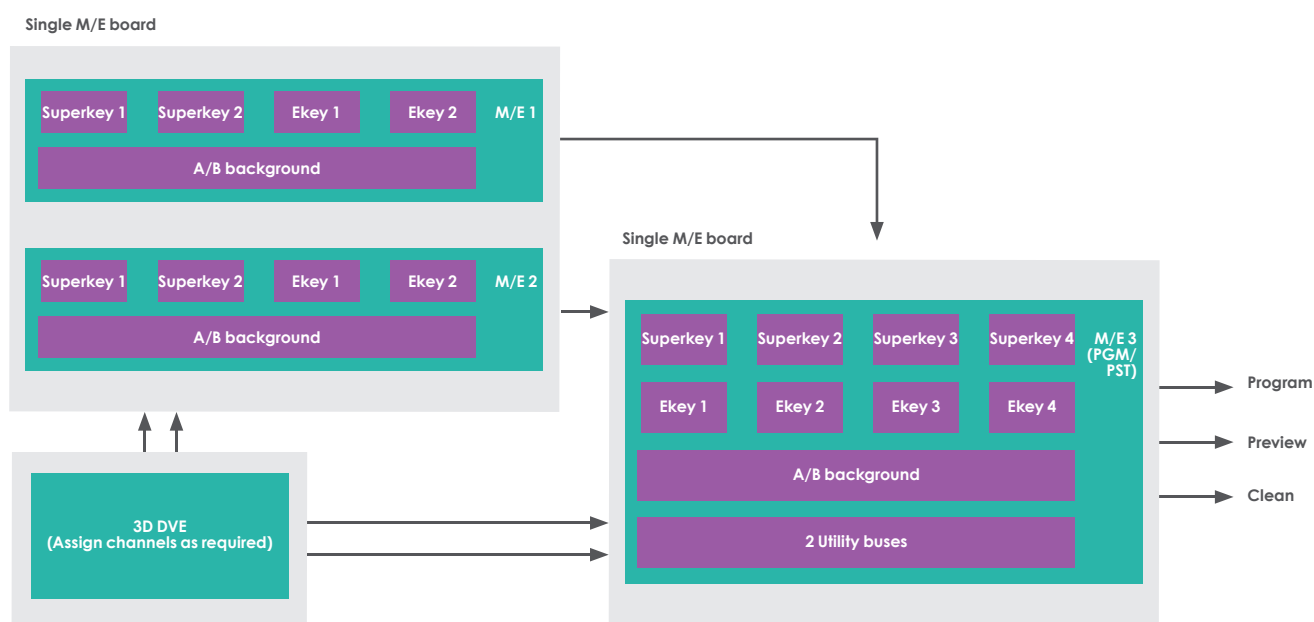
Share resources to get even more from your switcher.

Unique Make M/E™ technology provides the ultimate flexibility for any live TV requirement.

The example below shows how a powerful 3M/E switcher can be created from a 2M/E Kahuna 6400 with Make M/E, maximizing switcher resources for additional space and cost savings.

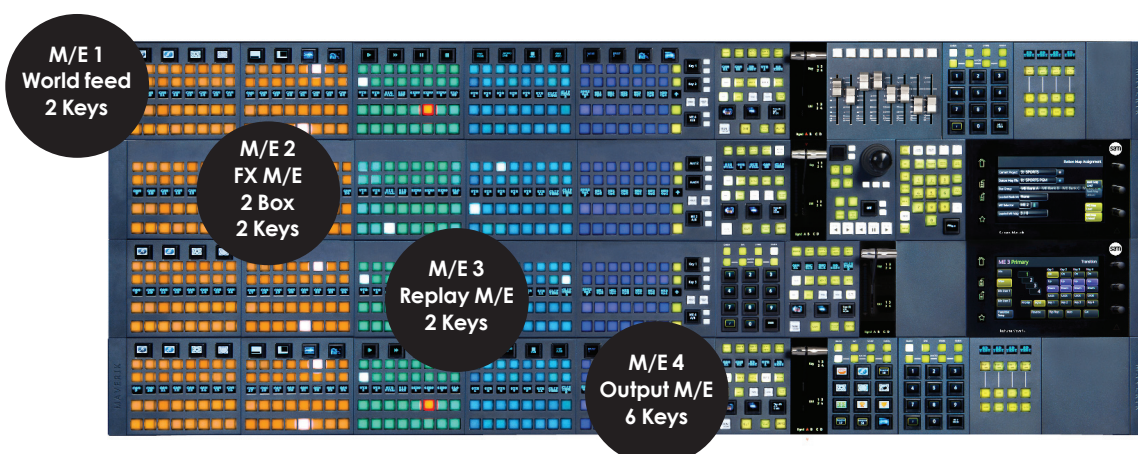
In today's dynamic environments, requirements can change in an instant, making flexibility essential. The Kahuna range offers a powerful feature set with a unique adaptability that lets the operator support multiple simultaneous productions for a range of delivery platforms.

Unique Make M/E technology in the Kahuna 9600 and Kahuna 6400 allows the user to select available switcher power to create a tailor made M/E for specific requirements - ie, select inputs, keyers, stores, DVE and outputs, freeing up resources for other creative/editorial productions.



This powerful approach allows operators to custom build their own M/E feature set as well as run multiple productions simultaneously from a single mainframe for both HD and UHD.

- Produce multi-feeds from any M/E
- Group up backgrounds, key and output buses to create multiple M/Es - Up to 4 M/Es from a single full M/E board
- Assign any M/E output to any aux bus
- Full keyer and background transitions on any aux output saving resource



Unbeatable control

Kahuna Maverik offers a new way of thinking for switcher control and the first production switcher control surface to allow total customization on a huge scale.



It has been designed with the Director and Technical Director in mind for producing any television genre or event with outstanding results.

Great push button feel, excellent clarity of the OLED macro buttons, and display innovations that instantly show information to the user all underpin the advanced ergonomics and design of Maverik.

Key Maverik Features

- Unprecedented freedom in panel design
- Ability to change panel configuration on a production by production basis
- Easy creation of multiple production areas
- Any size of layout can access all the power of the switcher's mainframe
- Crystal clear OLED buttons with user assignable thumbnails
- Touchscreen at the M/E level for instant functionality selection
- High resolution and intuitive user function

The Mav Concept

Kahuna Maverik provides control of switcher resources where you need them, in a totally unique and customizable way. What's more, it's highly intuitive and easy to use, providing flawless on-air confidence in even the most demanding and fast-paced environments.

The individual control elements of a Maverik control panel system are known as Mavs. The Mav concept allows the layout of any combination of Mavs in any desired configuration.

This approach allows the control surface to be tailored to any production need and not restricted to pre-made desk dimensions.

Mav modules are manufactured in common sizes and fit into SAM's unique MavRow racking system.

The MavRow racking system can support any combination of Mavs in any order and will even allow on-the-fly Mav changes on a production by production basis.



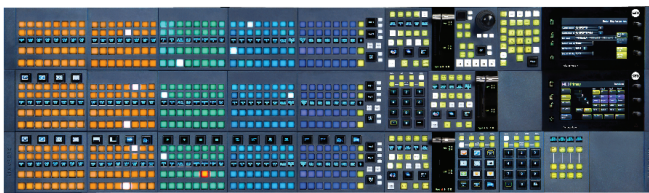
Introducing Kahuna Maverik — the switcher control surface that doesn't conform to the norm.

Whether it's News, Sports, Light Entertainment, Music, Events or House of Worship programming, Kahuna Maverik can be set out exactly the way you need – for effortless productions and maximum functionality in minimal space.



Create the Maverik panel that's right for your live productions with our on-line configurator at www.s-a-m.com/maverik

Sports



Sports

Effortless and assured live production for all sporting events. Maverik enables quick, simple, instant recalls for animated transitions and effects while offering the largest number of crosspoints for direct source access.

Light Entertainment



Light Entertainment

Smooth running for the most demanding of shows. Kahuna Maverik enables you to achieve maximum production values in a small footprint including operating live broadcast and on-set in-vision screens from a single panel.

Music



Music

The panel can be configured to suit any specific requirement for each individual event. This unique architecture allows side by side operation for out of this world productions.

News



News

Kahuna Maverik is perfect for fast paced news operations. It allows you to deploy the ideal panel so that you're first with the headlines whilst offering the most engaging productions.

Innovative software tools extend control capabilities, streamline workflows and save valuable set-up time.

Third Party Integration

The Kahuna range features an extensive protocol list enabling the control of a large number of third party external devices and single person gallery/control room operation for efficient production. Third party devices include:

- Production Servers
- Audio Mixers
- Robotic Camera Control
- Graphics Engines
- Tally Systems
- Multi-Viewers
- News Automation Systems

On-Air Confidence for every Operator

Among the many innovations in the Kahuna range is Source Safe™. This clever technology senses a signal on an input and sets up the correct processing for that signal - without the need for operator intervention. With this capability, the system can detect the source format of signals coming through the plant to production and ensure that they can be brought smoothly into the workflow.

Yet another SAM innovation is EPP™, (Enhanced Progressive Processing) which provides unparalleled video processing quality. The Kahuna range does not simply support 1080p High Definition – it ensures that this super high quality remains uncompromised at every stage of the production process and is reflected in every output form, irrespective of delivery mechanism to the end viewer.

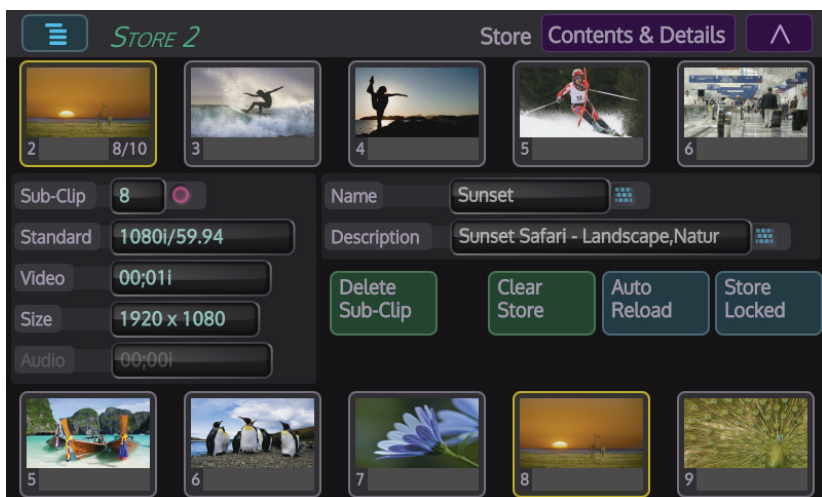
On-board Clipstore with 20 outputs

- Up to 64Gb RAM – (8 minutes of HD)
- 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
- Easy management and export with K- Watch
- Grab live incoming video or file via USB or network
- Backed up with raided 500GB HDD

K-Manager

K-Manager is a free software program that enables the conversion of files such as jpgs, bmp, tga, avi and wav files into Kahuna native files to import on the Kahuna. It also allows the conversion to jpgs etc from the Kahuna native file format (sws).

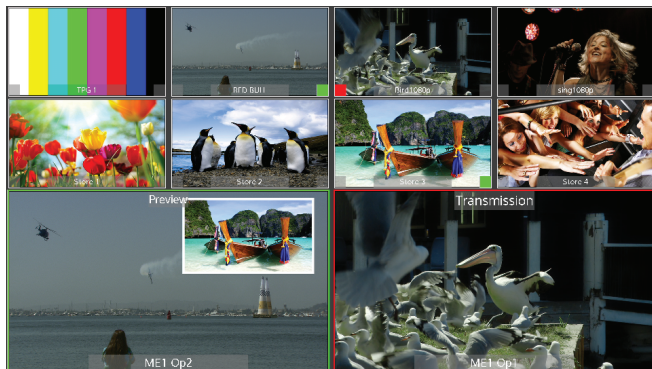
K-Manager also allows you to resize and change the still/clip standard whether you need 525/59.94 or 1080i/59.94 or even 720p/60.



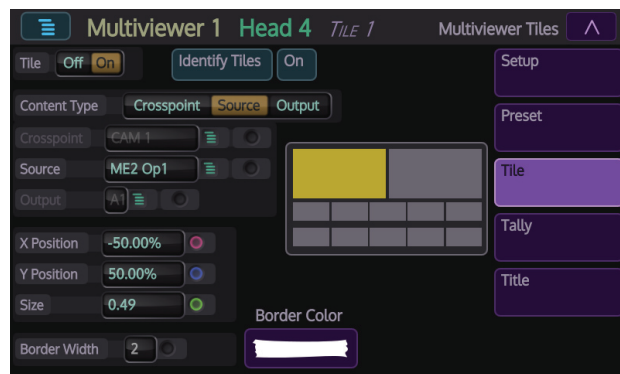
^ Screenshot showing clipstore

Internal clipstore holds up to 71,200 frames/40 minutes of uncompressed SD or 8 minutes of HD

Format independent multiviewer included as standard



^ Typical multiviewer output layout



^ Kahuna Multiviewer GUI

Kahuna Multiviewer

The format independent multiviewer provides great flexibility with preselected, user-defined layouts and is ideal for small to mid-size productions. It's also an excellent choice to supplement larger scale production monitoring requirements.

The format independent multiviewer is a standard feature with the Kahuna 4800, Kahuna 6400 and Kahuna 9600 production switchers.

Features

- Up to 8 flexible output heads
- Up to 24 windows
- All external and internal sources selectable to all heads and all windows
- Instant preselect layouts
- Clear and follow-through labelling
- Red and green tallies
- Assign to any output
- Format independent
- Memorize and recall layouts as part of a show set up.

Production monitoring can now be performed in a progressive format, whilst the production output is typically interlaced

Designed for mission critical operations with reliability built in and future-proofed for your operation of tomorrow.

Live Production You Can Rely On

Built to SAM's exacting engineering standards and backed up by 24 by 7 customer support, a SAM live production switcher can be relied upon in even the most demanding of live tv environments.

- Redundant power supplies
- Hot-swappable boards
- Completely integrated hardware solution incorporating all DVEs, clipstores and interfaces for third party control within the mainframe

Flexible, Modular Architecture

The financial realities of today can often place constraints on a business' capital investment. The Kahuna 9600 and Kahuna 6400 switchers help to alleviate this pressure with their modular architecture. This lets you buy what you need today and expand over time as and when requirements grow.

UHD Capable Throughout the Range

As industry professionals explore the practicalities of UHD production and how it can evolve, the production switcher element is already solved by SAM.

The Kahuna range is UHD capable now, so you can install and use the Kahuna 9600, 6400 or 4800 in this new arena of television production.

HD and UHD can be mixed together as backgrounds and key layers on the M/E. The output can also be in UHD or scaled down to HD.

- Each UHD M/E has 4 x UHD keyers
- 30 x UHD inputs and 16 x UHD outputs
- Supports wipes on all UHD M/Es
- Native internal clipstore for UHD animations
- Transparent operation for TD / Operator

Kahuna is the only production switcher that can support HD SDI, IP and 12Gbps SDI single link across the entire range.

The uniquely flexible input/output architecture ensures a smooth transition from HD SDI to IP or 12Gbps infrastructures.

Hybrid Solution Future

Today the latest generation of Kahuna 9600 family is globally installed and working with 3Gbps / 1.5Gbps / 270Mbps productions. The flexible input and output approach allows mixed configurations of all fin types with new and installed Kahuna 9600, 6400 and 4800 systems.

HD SDI, IP and 12 Gbps SDI can all coexist in the one mainframe without losing any functionality or purchasing out board equipment.

Professional Productions Over IP

IP connectivity is available over interchangeable rear fins that will support uncompressed and compressed video formats.

Kahuna inputs and outputs stages are compliant with the latest developments in video over IP.

SMPTE 2022-6, SMPTE 2022-7, TR03 and TR04 are supported along with SMPTE 2042 (VC-2) and TICO.

Kahuna IP fins are available as 10GbE and 40GbE IP giving you the flexibility to work in either or both.

Kahuna, like any Edge device is connected directly to the switch at the heart of the IP plant. Kahuna can receive up to 120 IP inputs and broadcasts the switcher outputs on to the video network.

12 Gbps SDI Single Link Connectivity (SMPTE 2082-10)

UHD production is increasing especially in sports and Kahuna is found in the control room, gallery and truck. As the move into UHD is underway a means of 12Gbps SDI over a single coaxial cable or fiber is required. Similar to the IP approach, the 12Gbps SDI inputs and outputs are supported by an interchangeable fin.

Kahuna Benefits

- Easy connectivity management for IP and 12Gbps SDI environments
- Future proof for transitions to IP or 12Gbps SDI single link
- Hybrid configuration in the same mainframe
- Evolves with standards



Input 10GbE IP fin order code 9669840



Output 10GbE IP fin order code 9669850



Input 40GbE fin order code 9669880



Output 40GbE fin order code 9669890



Input 12Gbps Fin order code 9669860



Output 12Gbps Fin order code 966987

Fiber Fins

Fiber is now a vital element in helping to streamline high quality signal transmissions over greater distances without compromising the picture quality. Therefore, Kahuna has expanded its support by offering fiber directly on both inputs and outputs making it more flexible, scalable and dynamic than any other production switcher on the market.

Input Fins enable you to use dual single mode Fiber SFP modules or Coax SFP modules or even both simultaneously.



The FDI Input Fin supports 12 inputs over 6 SFP Cages.



Output Fins offer a hybrid option accommodating for BNCs and Fiber. Each output Fiber SFP module is a single mode Fiber Dual Transmitter allowing for any future innovations and requirements.



The FDO Output Fin supports 16 outputs over 3 SFP Cages and 10 HD-SDI BNC's



With Kahuna
multiple
formats and
multiple live
productions
are a breeze

The SAM Kahuna family feature set at a glance – perfect for every sports, news, light entertainment, music or house of worship application.



	Kahuna 4800	Kahuna 6400	Kahuna 9600
Number of M/Es & keyers	2-4 full M/Es each with 4 keyers	1-3 full M/Es each with 8 keyers	1-6 full M/Es each with 8 keyers
Max number of M/Es with Make M/E	×	12	24
Number of inputs	48 or 60	Up to 60	Up to 120
Number of Superkeyers	8	12	24
Number of eKeys (all with chroma key functionality)	8	12	24
Number of key layers	24	36	72
Number of outputs	24 as standard, upgrade to 32	Up to 32	Up to 64
3D DVE (Up to 4 channels per board)	✓	✓	✓
Internal clipstore	10 outputs	10 outputs	20 outputs
Format Fusion3 on all inputs	✓	✓	✓
Fusion3 on all outputs (in groups of 8)	✓	✓	✓
Programmable outputs	1 per M/E	8 per M/E	8 per M/E
RGB Color correction (input and all outputs)	✓	✓	✓
Multi-panel operation	Up to 3 panels	Unlimited	Unlimited
Third party integration	✓	✓	✓
4K ready	✓	✓	✓

Extensive training and support

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

Kahuna Care service

SAM's customer service offers first class solutions for optimizing your operations, through world-leading technical support and fast responsiveness during the life of your product.

Kahuna Care is a premium support package that offers professional services 24 hours a day all year round. Benefiting from advance parts replacement service, your mission critical system will always be maintained to the highest standard both quickly and effectively.

SAM also offers health checks, repair services, training and spare parts packages, giving you total peace of mind throughout the life of your product.

SAM's customer services are there to help and support you. For further information about Kahuna Care contact customersupport@s-a-m.com

Club K

Club K is an on-line community for SAM production switcher users, where information and ideas can be shared between users and owners, and where SAM can easily communicate with customers.

The Club K web site provides all Kahuna customer contacts with a 24 hour, 365 day a year, one stop resource, featuring customer support, information on the latest product news, upgrades (options, spares and customer service contracts), special offers and discussion forum.

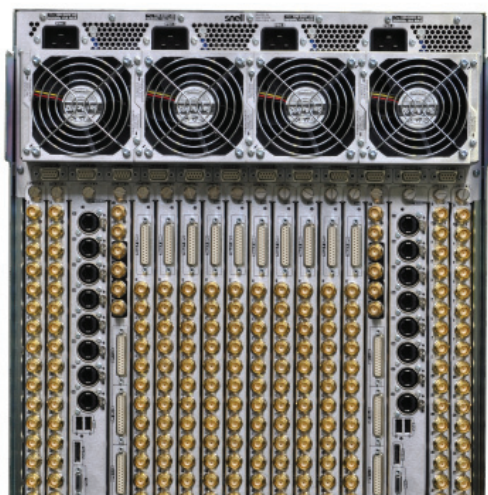
Training

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

Courses are available for basic or advanced operations, technical support, maintenance and familiarization. They can be custom-designed to meet specific requirements.

Kahuna customer services at a glance

	In Warranty	Out of Warranty (without Kahuna care)	Out of Warranty (with Kahuna care)
9 to 5 phone support	✓	✓	✓
On-line support resources	✓	✓	✓
Advanced part replacement (next day service)	✓	✗	✓
24 x 7 x 365 phone support	✓	✗	✓
Repair service	not required	✓	not required
Health check	as needed	as needed	as needed



~ Kahuna 9600



~ Kahuna 6400

