CARBONITE

Carbonite
Setup Manual

v11.1

ROSS
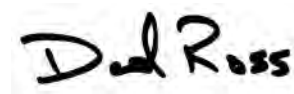
Thank You For Choosing Ross

You've made a great choice. We expect you will be very happy with your purchase of Ross Technology.

Our mission is to:

1. Provide a Superior Customer Experience
   • offer the best product quality and support

2. Make Cool Practical Technology
   • develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at *solutions@rossvideo.com*.

David Ross
CEO, Ross Video
dross@rossvideo.com

Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

Document Information

- Ross Part Number: **4802DR-120-11.1**
- Release Date: October, 2015. Printed in Canada
- Equipment: This document applies to the Carbonite (4802AR-200-xx), Carbonite MultiMedia (4802AR-201-xx), and Carbonite+ (4802AR-202-xx) frames.

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Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and any associated equipment, refer to the "**Important Safety Instructions**" listed in the front of this manual to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

Protective Earth: *This symbol identifies a Protective Earth (PE) terminal, which is provided for connection of the supply system's protective earth (green or green/yellow) conductor.*

Important: *This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.*

Warning: *The symbol with the word "Warning" within the equipment manual indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*

Caution: *The symbol with the word "Caution" within the equipment manual indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

Warning Hazardous Voltages: *This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.*

ESD Susceptibility: *This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.*

Important Safety Instructions

1. **Warning:** *Read these instructions.*

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this apparatus near water.

6. Clean only with a dry cloth.

7. Do not block any ventilation openings. Install in accordance with manufacturer's instructions.

8. Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Unplug this apparatus during lightning storms or when unused for long periods of time.

13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

14. Do not expose this apparatus to dripping or splashing, and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.

15. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.

16. The mains plug of the power supply cord shall remain readily operable.

17. *Warning:* Indoor Use: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

18. The safe operation of this product requires that a protective earth connection be provided. A grounding conductor in the equipment's supply cord provides this protective earth. To reduce the risk of electrical shock to the operator and service personnel, this ground conductor must be connected to an earthed ground.

19. *Warning:* This apparatus, when equipped with multiple power supplies, can generate high leakage currents. To reduce the risk of electric shock, ensure that each individual supply cord is connected to its own separate branch circuit with an earth connection.

20. *Caution:* These service instructions are for use by qualified service personnel only. 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.

21. Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after servicing.

22. Certain parts of this equipment still present a safety hazard with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing.

23. This product contains safety critical parts, which, if incorrectly replaced, may present a risk of fire or electrical shock. Components contained within the product's power supplies and power supply area are not intended to be customer-serviced and should be returned to the factory for repair.

24. To reduce the risk of fire, replacement fuses must be the same type and rating.

25. Use only power cords specified for this product and certified for the country of use.

26. The safe operation of this equipment requires that the user heed and adhere to all installation and servicing instruction contained within the equipment's Setup Manuals.

27. *Warning:* This product includes an "Ethernet Port" which allows this product to be connected to a local area network (LAN). Only connect to networks that remain inside the building. Do not connect to networks that go outside the building.

28. *Caution:* This apparatus contains a Lithium battery, which if replaced incorrectly, or with an incorrect type, may cause an explosion. Replace only with a CR2032 coin type lithium battery. Dispose of used batteries according to the manufacturer's instruction by qualified service personnel.

EMC Notices

United States of America — FCC Part 15

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.

Important: Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.

Canada

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe « A » est conforme a la norme NMB-003 du Canada.

Europe

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

International

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002**, and found to comply with the limits for a Class A Digital device.

> **Important:** *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

General Handling Guidelines

- Careful handling, using proper ESD precautions, must be observed.
- Power down the system before PCB removal.

A Word About Static Discharge

Throughout the many procedures in this manual, please observe all static discharge precautions.

> **Caution:** *Avoid handling the switcher circuit boards in high static environments such as carpeted areas, and when synthetic fiber clothing is worn. Touch the frame to dissipate static charge before removing boards from the frame, and exercise proper grounding precautions when working on circuit boards. Exercise proper grounding precautions when working on circuit boards.*

Warranty and Repair Policy

Ross Video Limited (Ross) warrants its switchers and related options, to be free from defects under normal use and service for a period of ONE YEAR from the date of shipment. Fader handle assemblies are warranted for the life of the product. If an item becomes defective within the warranty period Ross will repair or replace the defective item, as determined solely by Ross.

Warranty repairs will be conducted at Ross, with all shipping FOB Ross dock. If repairs are conducted at the customer site, reasonable out-of-pocket charges will apply. At the discretion of Ross, and on a temporary loan basis, plug in circuit boards or other replacement parts may be supplied free of charge while defective items undergo repair. Return packing, shipping, and special handling costs are the responsibility of the customer.

Software upgrades for switchers may occur from time to time, and are determined by Ross Video. The upgrades are posted on the Ross Video website, and are free of charge for the life of the switcher.

This warranty is void if products are subjected to misuse, neglect, accident, improper installation or application, or unauthorized modification.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profit). Implied warranties, including that of merchantability and fitness for a particular purpose, are expressly limited to the duration of this warranty.

This warranty is TRANSFERABLE to subsequent owners, subject to Ross Video's notification of change of ownership.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.

If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performances of our products.

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Technical Support

At Ross Video, we take pride in the quality of our products, but if a problem does occur, help is as close as the nearest telephone.

Our 24-Hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support are provided directly by Ross Video personnel. During business hours (eastern standard time), technical support personnel are available by telephone. Outside of normal business hours and on weekends, a direct emergency technical support phone line is available. If the technical support personnel who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. Our Technical support staff are available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

Supporting Documentation

Ross Video provides a wide variety of helpful documentation for the setup and support of your equipment. Most of this documentation can be found either on the Product Resources disk that came with your equipment, on the Ross Video website (*www.rossvideo.com*), or on the Ross Video Community site (*community.rossvideo.com*)

*   **Carbonite Online Help for DashBoard** — visit *help.rossvideo.com/carbonite*.
*   **Operation Manual (4802DR-110)** — operational instructions for all Carbonite switchers
*   **Carbonite Setup Manual (4802DR-120)** — setup and configuration instructions for Carbonite, Carbonite+, and Carbonite MultiMedia frames
*   **Carbonite eXtreme Setup Manual (4803DR-120)** — setup and configuration instructions for Carbonite eXtreme frames
*   **Carbonite QuickStart Poster (4802DR-200)** — setup information and specifications for the Carbonite, Carbonite+, and Carbonite MultiMedia frames

*   **Carbonite eXtreme QuickStart Poster (4803DR-200)** — setup information and specifications for the Carbonite eXtreme frame
*   **Upgrade Notes (4802DR-500)** — upgrade instructions, new features, and known issues for a given software version.
*   **Carbonite eXtreme Upgrade for NK-3G144-X** — upgrade instructions for the NK-3G144-X router to a Carbonite eXtreme switcher
*   **Software Licenses (4802DR-502)** — third-party software licences
*   **Carbonite Multilingual Safety Information (4802DR-503)** — translated product safety information
*   **Carbonite Frame Fan Replacement (4802DR-300)** — instructions for replacing cooling fans in the Carbonite, Carbonite+, Carbonite MultiMedia, or Carbonite Black frames
*   **Carbonite Frame RAM Replacement (4802DR-301)** — instructions for replacing the RAM in the Carbonite, Carbonite+, or Carbonite MultiMedia frames
*   **Control Panel Desk Mounting (4802DR-302)** — desk mounting instructions for Carbonite control panel
*   **1-2 ME Upgrade (4802DR-303)** — 1 to 2 ME upgrade instructions for C1-A and C1M control panels
*   **SideBox Installation (4802DR-304)** — installation and mounting instruction for SideBox module
*   **Auxiliary Control Panel Installation (4802DR-305)** — installation and mounting instruction for remote aux panel (CPS-AUX-053B)
*   **C10 2 ME Upgrade (4802DR-306)** — 1 to 2 ME upgrade instructions for the C10 control panel
*   **GVG100 Supported Command (4802DR-401)** — connection and GVG100 commands supported by the switcher
*   **RossTalk Commands (4802DR-403)** — supported commands using RossTalk protocol
*   **Device Setup Sheets (4802DR-6xx)** — setup information for controlling external devices from the switcher
*   **Robotic Camera Control (4802DR-131)** — overview of the operational interface when controlling a robotic camera from the switcher
*   **Audio Mixer Control (4802DR-132)** — overview of the operational interface when controlling an audio mixer from the switcher
*   **Video Server Control (4802DR-133)** — overview of the operational interface when controlling a video server from the switcher

- **Configuration Guide (4802DR-100)** — product description and marketing codes for switchers and options
- **CarboNET Installation (4805DR-100)** — installation instructions for the Carbonite PMC translator.

Contents

Features

Thank you for buying a Ross Video Carbonite Series Multi-Definition Live Production Switcher. The Carbonite series builds on the Ross Video reputation for designing switchers that fit the needs of any production environment.

MultiMedia Inputs

The four MultiMedia inputs on the Carbonite MultiMedia frame can be used for de-interlacing SDI video signals, or inputting Analog Component, Analog Composite, or non-HDCP HDMI video signals. These inputs also support normal SDI.

Analog Reference Input and Output

The switcher supports both external and internal reference sources. The external reference can be an input from a house sync to the single reference input BNC. The internal reference can also be used as a house sync with selectable tri-level sync or analog black burst with independent H/V settings for each of the two reference output BNCs.

Although tri-level sync is recommended as your reference source for all HD applications, analog black burst can be used when operating the switcher.

3G and 1080p 29.97 Video Formats

The switcher supports the 1080p 59.94Hz, 1080p 50Hz, and 1080p 29.97Hz video formats. To operate in these modes, the switcher must be restarted and some features and resources are limited or unavailable.

Integrated Up/Down Converters

All switchers come with integrated up/down converters and frame synchronizers (FSFC) capable of converting 1080i or 720p to SD, as well as convert SD signals to 1080i, or cross-convert 720p to 1080i.

Format conversion is not supported on the Carbonite frame when the switcher is operating in 720p or 1080pSF. The Carbonite MultiMedia frame supports de-interlacing on the multimedia inputs, except for progressive segmented frame (pSF) formats. The multimedia inputs support de-interlacing of the 720p format.

In a 3G or 1080p 29.97Hz switcher mode, the FSFC functionality is limited on the Carbonite MultiMedia and Carbonite+ switchers, and is not available on the Carbonite and Carbonite eXtreme switchers.

Custom Controls

This feature brings the power of macros to the switcher operator. A series of button presses can be easily recorded and assigned to any custom control button. Step through complex show openings as easily as pressing Custom Control buttons 1, 2, then 3.

> **Note:** The C10 does not support recording or running custom controls from the control panel. Custom controls can be recorded and run from the Custom Control node in DashBoard.

Device Control

The switcher can control a number of external devices, such as video servers and robotic cameras. For a complete list of supported devices, and information on how to set up and control these devices, visit the Ross Video website (*rossvideo.com/production-switchers/carbonite/interface-list*).

OverDrive® Caprica Support

Carbonite can be controlled from OverDrive® using the Caprica interface. This interface allows OverDrive® to perform memory recalls, most transitions (MediaWipe is not supported directly), and run custom controls on the switcher. For information on setting up Caprica to interface with the switcher, refer to the documentation that came with your Caprica server.

Carbonite must be in a 2.5 ME mode to be controlled by Caprica.

DVE (Fly Key)

The advanced 2D DVE comes standard with each switcher, and can be used for performing over the shoulder, or picture in picture shots. This allows all key types to be zoomed, cropped, and repositioned horizontally and vertically to create the look you want, or you can use one of the useful pre-built 2D effects to perform 2D background transitions.

The Carbonite+ and Carbonite MultiMedia frames have 8 channels of DVE, or 4 channels in a 3G MiniME™ or 3G 2.5 ME switcher mode. The Carbonite and Carbonite eXtreme frames can select between 8 channels of DVE and 0 FSFCs, or 4 channels of DVE and 6 FSFCs.

Effects Dissolve

The Effects Dissolve feature allows you to interpolate from one memory to another using a memory recall. The switcher will interpolate from the starting memory to the destination memory, creating a smooth, two key frame effect.
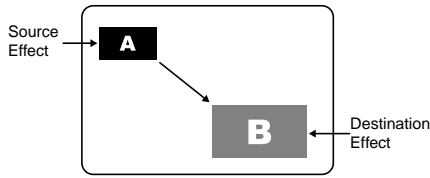
Only elements such as clip level and pattern position can be interpolated in the effects dissolve. Other elements, such as crosspoint selection, pattern, and next transition data are recalled first, and then the switcher will slew to the recalled memory.

An effects dissolve can be performed on as many elements and MEs as required, based on the memory that is being recalled.

General Purpose Interface (GPI)

The switcher is equipped with 34 GPI I/Os that can be assigned as either an input or output independently.

The GPI inputs allow the switcher to interface with peripheral equipment such as editors. Each GPI input can be used to perform simple editing and switcher functions such as fade to black or an auto transition.

LiveEDL

Edit Decision Lists (EDL) are files used by non-linear editing (NLE) suites to aid in post-production. Your switcher can capture EDL data in a file that you load into your NLE suite.

For information on using the LiveEDL feature, visit the Ross Video Website (*rossvideo.com*).

Media-Store

Up to 4 independent channels of still/animations are available switcher-wide, allowing for thousands of full screen stills and logos that can be cached and used on the switcher.

Media-Store provides 8 GB Gigabytes of cache. Channels 1 and 3 have 4 Gigabytes, and channels 2 and 4 have 4 Gigabytes. The number of images cached increases considerably when smaller, non-full screen images like logos are loaded from USB.

MediaWipe

A MediaWipe allows you to use an animation from the Media-Store to perform background and key transitions. When the transition starts, the switcher plays the selected animation over top of the background and keys that are being transitioned. A cut is then performed behind the animation to bring up the next shot when the animation ends.

UltraChrome

The UltraChrome chroma keyers uses advanced video processing technology to provide exceptional blue spill reduction and clean edges, even with difficult source material. Glass, smoke, translucent materials, and natural shadows are handled superbly.

There are 2 floating Chroma Keys that are available across all MEs.

MemoryAI Recall Mode

We take the guessing out of memory recalls by ensuring that a memory recall will not affect what is currently on-air. MemoryAI uses the content of the memory to configure the Next Transition area and Preview bus for the background and keyers so that the next transition takes the same sources on-air that were on-air in the memory.

For example, store a memory that has a key on-air with CAM1 and CAM2 selected on the background. When this memory is recalled normally, it pops the same key on-air with CAM1 and CAM2 on the background. When the memory is recalled with MemoryAI turned on, CAM1 is selected on the preset bus, and CAM2 is selected on a key that is not on-air. The transition area is then set up for a background transition to bring CAM2 onto the background, take any on-air keys off, and take a key on-air with CAM1.

Memory System

Storage for 100 complete switcher snapshots per ME, MiniME™, and MultiScreen comes standard with all switchers. All of these memories can be stored to a USB media drive, providing custom tailored memories for every operator and every show.

ME Effect System

The ME (Multi-level Effect) systems are standard. The number of MEs depends on the chosen switcher model.

Each ME provides 4 keyers supporting pattern mask, box mask, self-key, linear key, and UltraChrome advanced chroma key for each ME and is available to each keyer.

Half ME

The half ME option is available for any 2 ME Carbonite or Carbonite eXtreme switcher and adds a third ME with limited functionality.

Table 1: Half ME vs. Full ME Comparison

	Half ME	Full ME
MiniME™	No	Yes
MultiScreen	No	Yes
Floating FSFCs	No	Yes (if frame supports it)
Keyers	2	4
Key Types	Auto Select and Self Key	Auto Select, Self Key, Chroma Key, and DVE Key
Transition Types	Dissolve, Cut, and MediaWipe	Dissolve, Cut, Wipe, DVE, and MediaWipe
Pattern Mask	No	Yes

MiniME™

The MiniME™ is an additional ME that is provided with the switcher to perform basic dissolves and cuts. Each MiniME™ has 2 keyers, background, and preset buses. Unlike a full ME, the MiniME™ only supports dissolves and cuts, restricts key 1 to DVE keys only, and has no preview output. Key 2 on a MiniME™ is the same as an ME keyer. The MiniME™ shares all the same sources as the ME.

MediaManager

The MediaManager allows you to easily manage stills and animations on the switcher in a graphics interface.

MultiViewer

Each MultiViewer allows you to view up to 16 video sources, in 32 different layouts, from a single output BNC. Any video source on the switcher, including ME Program, Preview, and Media-Store channels, can be routed to any box on the MultiViewer. All boxes on the MultiViewer output include mnemonic source names and red and green tallies.

All Carbonite switchers come standard with 2 broadcast-quality integrated MultiViewer generators.

Note: *If the switcher is operating in 3G video mode, the number of video sources and layouts is reduced.*
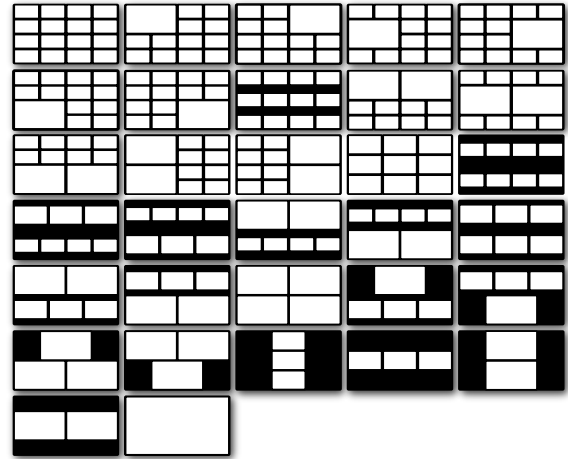
Figure 1: HD Layouts

If the switcher is operating in a standard-definition video format, the MultiViewer can be set to output high-definition. In HD output mode, the MultiViewer is only available on specific output BNCs and only supports 29 different layouts.
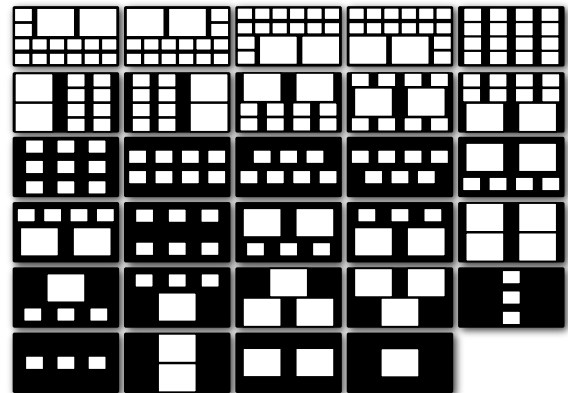
Figure 2: HD in SD Layouts (480i 4:3)

Clean Feed Output

Clean feed is typically used for bilingual and live-to-tape productions. It provides a second Program output that is derived from a different location than the standard program output. A frequent application is the recording of shows for later airing without call-in phone numbers inserted.

The clean feed output can come from before or between the keyers.
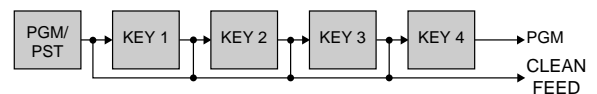
MultiScreen

All Carbonite switchers come standard with 2 integrated MultiScreen generators. Each MultiScreen can break a

scene into up to 4 outputs that can be sent to independent projectors or displays to make a unified picture. Integrated edge blending allows you to compensate for the overlap in projector outputs, or the outside bezel of your display.

Each screen in the MultiScreen output uses a MiniME™ to create the background and keys of the output. This allows you to have 2 MultiScreen generators with 2 screens each, or 1 MultiScreen generator with 3 or 4 screens.
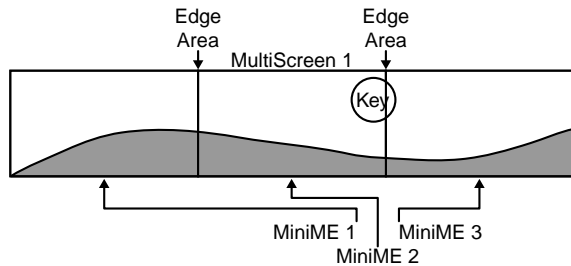
Pattern and Matte/Wash Generators

A single pattern generator dedicated to wipes comes standard, and is equipped with 10 classic wipes. Most wipes can be rotated, bordered, multiplied, aspectized, and repositioned.

Matte/Wash Generator

A matte generator and complex wash generator per ME, capable of multi-color washes comes standard. Any one of the color generators can be assigned to MATTE, or wipe pattern edges. An additional simple color generator is available for an Aux Bus.

Tally Outputs

The switcher has 34 assignable tally relays located in the rack frame. Each tally can be assigned to any number of combinations of input and output or bus.

CarboNET Support

The CarboNET PMC translator allows you to connect the control panel to the frame over ethernet. The control panel connects to the CarboNET over the standard serial link and then the CarboNET connects to the frame over ethernet.

Video Reference

The flexible reference system in the switcher allows you to use an Interlaced video format as the reference to operate the switcher in a video format of the same frequency. Choosing a progressive video format as a reference limits you to operating the switcher only in that same video format and frequency. For example, if you have a 1080i 59.94Hz input reference you can operate the switcher in 720p 59.94Hz, but not 1080i 50Hz. However, if you have a 720p 59.94Hz input reference, you can only operate the switcher in 720p 59.94Hz.

Supported Reference Formats

The switcher supports a number of reference modes for both internal and external reference signals. References to 1080p 59.94Hz (A) and 1080p 50Hz (A) refer to 1080p Level A only.

Table 2: Supported Reference Formats

Input Reference	Usable Format
480i	480i
	480i 16:9
	720p 59.94Hz
	1080i 59.94Hz
	1080pSF 29.97Hz
	1080p 29.97Hz
	1080p 59.94Hz (A)
576i	576i
	576i 16:9
	720p 50Hz
	1080i 50Hz
	1080pSF 25Hz
	1080p 50Hz (A)
720p 59.94Hz	720p 59.94Hz
	1080p 59.94Hz (A)
720p 50Hz	720p 50Hz
	1080p 50Hz (A)
1080i 59.94Hz	480i
	480i 16:9
	720p 59.94Hz
	1080i 59.94Hz
	1080pSF 29.97Hz
	1080p 29.97Hz

Input Reference	Usable Format
	1080p 59.94Hz (A)
1080i 50Hz	576i
	576i 16:9
	720p 50Hz
	1080i 50Hz
	1080pSF 25Hz
	1080p 50Hz (A)
1080pSF 23.98Hz	1080pSF 23.98Hz
1080pSF 29.97Hz	1080pSF 29.97Hz
1080pSF 25Hz	1080pSF 25Hz

✳ *Important:* The switcher must be in a specific switcher mode to select a 3G video format (1080p 59.94Hz or 1080p 50Hz) or the 1080p 29.97Hz video format. Refer to for information on setting the switcher mode.

The switcher allows you to use any interlaced video format to operate the switcher in any format of the same frequency; however, the use of 480i or 576i (Composite Sync) reference signals for High Definition (720p, 1080i, or 1080p) video modes is not recommended.

The use of composite sync reference formats is recommended for Standard Definition video modes only, and provides stable outputs with jitter performance in compliance with SMPTE-259M specifications.

Reference and Video Mode Setup

The switcher supports both internal and external references. An external reference is provided by an external device to the switcher through the **REF IN** BNC on the frame. An internal reference is generated by the switcher and can be fed out to other devices.

The switcher automatically detects the reference signal and only shows the video modes that you can operate the switcher in that are supported for that reference format.

To Set a Video Mode

If you are using an external reference, ensure that a proper reference is connected to the **REF IN** input BNC on the frame.

Note: You must use an interlaced reference source to have the switcher operate in an interlaced reference format if you are using an external reference.

Tip: Reference settings can also be set up from the **Reference** tab on the Configuration node in DashBoard.

1. Press **MENU** > **REF**.

2. Use the **VidMode** knob to select the video format that you want to use.

   The available video modes depends on the reference format coming into the switcher.

3. Press **NEXT**.

4. Use the **RefSrc** knob to select an internal (**Int**) or external (**Ext**) reference source.

5. Press the **RefSrc** knob to confirm the reference source.

Frame Sync and Format Conversion

The switcher has multiple input frame synchronizer / format converter (FSFC) and input de-interlacers that can be used to convert video input signals to the format that the switcher is operating in, as well as correct mistimed, or drifting, video input signal. The frame synchronizers cannot completely correct badly formatted video, mistimed switches, signal drops, or similar issues.

Each FSFC channel maintains a separate setting for different video formats. This lets you change between video formats without losing FSFC channel configurations.

The Carbonite frame has up to 6 FSFC channels that are shared between all inputs. The Carbonite MultiMedia and Carbonite+ frames have a dedicated FSFC channel per input.

Keep the following in mind when working with Frame Converters and Synchronizers:

- The De-Interlacers, and HDMI and Analog Inputs are only available on the MultiMedia frame.
- De-Interlacing strips embedded audio data, and all other HANC and VANC data, from the video signal.
- If a video format not compatible with the currently defined conversion is used, the video image is frozen with the last successfully processed image frame.
- FSFC create a one-frame delay in the video output of the switcher for the video signal being converted.
- FSFC strips embedded audio data from the video signal. Ensure that no FSFC channels are assigned to any input or bus you are using with external audio mode.
- In the Carbonite and Carbonite eXtreme frames, FSFC channels are assigned to either specific video inputs or bus-pairs. Each bus-pair requires two FSFC for key video and key alpha, or program and preset. Aux buses do not require bus-pairs.
- If one FSFC channel in a bus-pair is turned off, the paired FSFC channel is also turned off.

- The switcher is set to switch on the first field when using Bus mode.
- Format conversion is not supported when the switcher is operating in a 1080pSF video format. Only Frame Synchronization is supported.
- The FSFCs used in the switcher conform to the SMPTE ST 125:2013 standard. Some older equipment may not fully conform to the current standards and can send out-of-spec video to the switcher which can have unexpected results. Ensure that video coming into the switcher conforms to current standards, especially with regard to 480i video signals with variable blanking sizes.

Supported FSFC Input Mode Video Formats

FSFC can only convert between specific video formats at a given frequency. The available conversions also depends on the switcher mode you are in.

- In a 3G mode, the Carbonite MultiMedia and Carbonite+ switchers support synchronized and unsynchronized 1080p and 1080i inputs. The 1080i inputs are converted using a simple line-doubler and may result in lower quality video.
- In a 3G mode, the Carbonite and Carbonite eXtreme switchers only accept synchronized 1080p inputs.
- In a 1080p 29.97Hz mode, the Carbonite MultiMedia and Carbonite+ switchers support synchronized and unsynchronized 1080p 29.97Hz and 1080p 59.94Hz inputs. The 1080p 59.94Hz inputs are converted by dropping half the frames and may result in lower quality video.

Table 3: Supported FSFC Input Mode Video Formats for Conversion

Switcher Format	Carbonite / Carbonite eXtreme	Carbonite+	Carbonite MultiMedia
1080p 59.94Hz		1080p 59.94Hz	1080p 59.94Hz
		1080i 59.94Hz*	1080i 59.94Hz*
1080p 50Hz		1080p 50Hz	1080p 50Hz
		1080i 50Hz*	1080i 50Hz*
		1080p 59.94Hz**	1080p 59.94Hz**
1080p 29.97Hz		1080p 29.97Hz	1080p 29.97Hz
		1080p 59.94Hz**	1080p 59.94Hz**
1080i 59.94Hz	1080i 59.94Hz	1080i 59.94Hz	1080i 59.94Hz
			1080p 59.94Hz***
	720p 59.94Hz	720p 59.94Hz	720p 59.94Hz
	480i 59.94Hz	480i 59.94Hz	480i 59.94Hz
1080i 50Hz	1080i 50Hz	1080i 50Hz	1080i 50Hz
			1080p 50Hz***

Switcher Format	Carbonite / Carbonite eXtreme	Carbonite+	Carbonite MultiMedia
	720p 50Hz	720p 50Hz	720p 50Hz
	576i 50Hz	576i 50Hz	576i 50Hz
720p 59.94Hz	720p 59.94Hz	720p 59.94Hz	720p 59.94Hz
			1080p 59.94Hz***
			1080i 59.94Hz‡
			480i 59.94Hz‡
720p 50Hz	720p 50Hz	720p 50Hz	720p 50Hz
			1080p 50Hz***
			1080i 50Hz‡
			576i 50Hz‡
576i 50Hz	576i 50Hz‡‡	576i 50Hz‡‡	576i 50Hz‡‡
			1080p 50Hz***
	1080i 50Hz	1080i 50Hz	1080i 50Hz
	720p 50Hz	720p 50Hz	720p 50Hz
480i 59.94Hz	480i 59.94Hz‡‡	480i 59.94Hz‡‡	480i 59.94Hz‡‡
			1080p 59.94Hz***
	1080i 59.94Hz	1080i 59.94Hz	1080i 59.94Hz
	720p 59.94Hz	720p 59.94Hz	720p 59.94Hz

Notes

- • * Converted using either a simple line-doubler or 4-line interpolater and may result in lower quality video.
- • ** Converted by dropping frames and may result in lower quality video.
- • *** HDMI port only.
- • ‡ MultiMedia port only.
- • ‡‡ Aspect ratio conversion.

FSFC For Carbonite

This section provides information for setting up a FSFC on a Carbonite frame.

Note: The Carbonite switcher can be configured to have 6 FSFC resources, or 0. Refer to Switcher Modes on page 38 for information on resource settings.

To Set Up Input Mode FSFC

Input mode locks a specific FSFC channel to a specific input. Refer to *Supported FSFC Input Mode Video Formats* on page 16 for a list of compatible video format conversions.

1. Press **MENU** > **REF** > **NEXT**.

2. Use the **FSFC** knob to select the frame converter/synchronizer channel that you want to assign to a video input.

3. Press the **FSFC** knob.

4. Use the **FSFCx** knob to select **Input**.

5. Use the **Input** knob to select the video input you want to assign the FSFC to.

6. Use the **Frming** knob to select aspect ratio conversion mode you want to use.

   The options that are available depend on the video format that the switcher is converting from and to.

   - • **Full** — The video signal is scaled disproportionately to fill the display of the new aspect ratio. Aspect distortion occurs as the image is stretched/compressed to fit in the new aspect ratio.
   - • **Zoom** — The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced but the edges of the video signal may be cropped.
   - • **LttrBx** — Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
   - • **PllrBx** — Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

7. Press the **Frming** knob.

8. Press the **Confrm** knob to assign the FSFC channel.

To Set Up Bus Mode FSFC

Bus mode locks a specified FSFC channel to a specific bus.

1. Press **MENU** > **REF** > **NEXT**.

2. Use the **FSFC** knob to select the frame converter/synchronizer channel that you want to assign to a video input.

3. Press the **FSFC** knob.

4. Use the **FSFCx** knob to select **Bus**.

5. Use the **Bus** knob to select the bus you want to assign the FSFC to.

6. Use the **2ndCh** knob to select the second FSFC channel that you want to pair with the assigned channel.

   In a bus-pair keyer configuration, the first channel is used to convert the key video, and the second channel is used to convert the key alpha.

7. Press **NEXT**.

8. Use the **Frming** knob to select aspect ratio conversion mode you want to use.

The options that are available depend on the video format that the switcher is converting from and to.

- **Full** — The video signal is scaled disproportionately to fill the display of the new aspect ratio. Aspect distortion occurs as the image is stretched/compressed to fit in the new aspect ratio.
- **Zoom** — The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced but the edges of the video signal may be cropped.
- **LttrBx** — Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
- **PllrBx** — Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

9. Press the **Frming** knob.
10. Press the **Confrm** knob to assign the FSFC channel.

FSFC For Carbonite MultiMedia/Carbonite+

This section provides information for setting up a FSFC and de-interlacer on a Carbonite MultiMedia or Carbonite+ frame.

To Set Up Input FSFC

Input mode locks a specific FSFC channel to a specific input. Refer to *Supported FSFC Input Mode Video Formats* on page 16 for a list of compatible video format conversions.

Note: In a 3G mode, only 3 of every 6 dedicated FSFCs on the Carbonite MultiMedia and Carbonite+ switchers can be used. This means any 3 inputs on BNCs 1-6, any 3 on BNCs 7-12, any 3 on BNCs 13-18, and so on.

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.
2. Use the **Input** knob to select video input that you want to apply a FSFC to.
3. Turn on FSFC for the selected video input.
   - **Standard Inputs** — use the **FSFC** knob to select **On**.
   - **MultiMedia Inputs** — use the **Type** knob to select **SDI-FC**.
4. Use the **Frming** knob to select the aspect ratio conversion mode you want to use.

   The options that are available depend on the video format that the switcher is converting from and to.

   - **Full** — The video signal is scaled disproportionately to fill the display of the new

aspect ratio. Aspect distortion occurs as the image is stretched/compressed to fit in the new aspect ratio.
- **Zoom** — The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced but the edges of the video signal may be cropped.
- **LttrBx** — Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
- **PllrBx** — Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

5. Press the **Frming** knob.
6. Press the **Confrm** knob to assign the FSFC channel.

Output Reference Synchronizers

The output reference synchronizers allow you to have the switcher output a reference signal that other devices, such as cameras and video servers, can lock to.

Note: Different applications require different output reference formats and delay settings. Consult a facility engineer for assistance in configuring these settings.

To Set Up an Output Reference Sync

If you are using one of the output references to time external devices, ensure that they are connected to the appropriate **REF OUT** output BNC.

*Tip: Output Reference Sync settings can also be set up from the **Reference** tab on the Configuration node in DashBoard.*

1. Press **MENU** > **REF** > **NEXT**.
2. Use the **RefO** knob to select the reference output BNC that you want to set up.
3. Press the **RefO** knob.
4. Use the **RefO** knob to select the reference format you want to output from the switcher.

   The available output reference formats depend on the video format that the switcher is operating in. You must be in a 50Hz video format for PAL and a 59.94Hz video format for NTSC.

5. Use the **Mode** knob to select the type of delay you want to apply to the reference signal.
   - **V** — vertical delay in lines
   - **H** — horizontal delay in pixels
   - **F** — frame delay in frames (NTSC/PAL only)

6. Use the **Value** knob to select the amount of delay you want to apply to the selected Mode.

You can reset the values by pressing **NEXT** and the **RefO** knob.

7. Press the **Value** knob.

8. Press the **Confrm** knob to assign the output reference synchronizer.

If you select an analog reference format (NTSC/PAL) you must set whether you want to use color framing for the reference output or not.

To Set Color Framing for Analog Reference

When the output reference (OSync) is set to an analog format (NTSC/PAL), the color framing in the sub-carrier can be synced to the color framing of the input reference. The input reference must also be set to an analog format.

> *Note:* *Jitter on the color framing of the input reference causes the analog output reference to reset in an attempt to re-sync.*

1. Press **MENU** > **REF** > **NEXT** > **NEXT**.

2. Use the **Clrfrm** knob to turn color framing on or off.
   - **NoSync** — color framing not synced between input and output references
   - **Sync** — reference output color framing is synced with reference input color framing

Aspect Ratio Conversion

Converting between standard-definition and high-definition video formats often requires converting between 4:3 and 16:9 aspect ratios. The switcher support Full, Zoom, Letterbox, and Pillarbox conversions.

In 480i and 576i video formats you can use either a 4:3 or 16:9 aspect ratio.

Full

The video signal is scaled disproportionately to fill the display of the new aspect ratio. Aspect distortion occurs as the image is stretched/compressed to fit in the new aspect ratio.

Figure 3: 4:3 to 16:9 Full Aspect Ratio Conversion
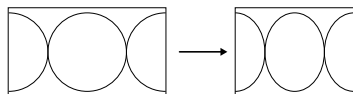
Figure 4: 16:9 to 4:3 Full Aspect Ratio Conversion

Zoom

The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced but the edges of the video signal may be cropped.

Figure 5: 4:3 to 16:9 Zoom Aspect Ratio Conversion
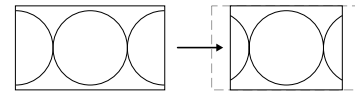
Figure 6: 16:9 to 4:3 Zoom Aspect Ratio Conversion

Letterbox

Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
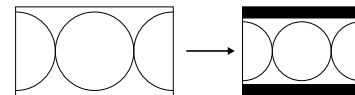
Figure 7: 16:9 to 4:3 Letterbox Aspect Ratio Conversion

Pillarbox

Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.
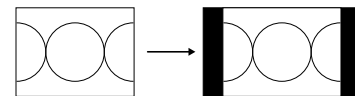
Figure 8: 4:3 to 16:9 Pillarbox Aspect Ratio Conversion

To Set an Aspect Ratio for 480i/576i

You can only select an aspect ratio if the switcher is operating in 480i or 576i.

1. Press **MENU** > **REF**.

2. Use the **Aspect** knob to select the aspect ratio (**16:9** or **4:3**) that you want to use.

3. Press the **Aspect** knob.

4. Press the **Confrm** knob to assign the aspect ratio.

Switching Field

The switching field is the field in an interlaced video format that the switcher uses to transition from one video source to another. An interlaced video format is made up of two fields, field 1 (odd lines) and field 2 (even lines).

> *Note:* *If you are running in a progressive video format, selecting an even or odd fields will cause the switcher to only allow transitions on every second frame.*

To Set the Switching Field

If you are using a Frame Sync or Format Conversion (FSFC), transitions are locked to F1.

1. Press **MENU** > **SYSTEM** > **NEXT**.

2. Use the **FldSwt** or **FrmSwt** knob to select which field video transitions occur on.

   • **F1** — transitions occur on odd field
   • **F2** — transitions occur on even field
   • **Both** — transitions occur on current field, either even or odd

3. Press the **FldSwt** or **FrmSwt** knob to save the settings.

Video Input Setup

Video sources come into the switcher through the input BNCs and the MultiMedia inputs. Depending on how you want to use these video sources, or where they come from, you may want the switcher to pair them together, or associate an external device with them. Pairing two video sources together is usually used for an auto select key where an external device, such as a character generator, outputs both a key video and key alpha. Associating a video source with an external device allows special control over that device to become active when you select the source on a bus.

MultiMedia Inputs

The four MultiMedia inputs on the Carbonite MultiMedia frame can be used for de-interlacing SDI video signals, or inputting Analog Component, Analog Composite, or non-HDCP HDMI video signals. These inputs also support normal SDI.

HDMI Inputs

> *Note: This feature applies to the Carbonite MultiMedia only.*

The HDMI inputs on the Carbonite MultiMedia frame allow you to input a video source from a computer or DVD player to the switcher. The switcher does not support HDCP-encrypted content over HDMI.

Supported HDMI Formats

The switcher supports a number of HDMI video formats.

- VGA — 640×480 (4:3)
- SVGA — 800×600 (4:3)
- XGA — 1024×768 (4:3)
- SXGA — 1280×1024 (5:4)
- 720p — 1280×720 (16:9)
- 1080i — 1920×1080 (16:9)
- 1080p — 1920×1080 (16:9)

To Set Up an HDMI Input

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.
2. Use the **Input** knob to select MultiMedia input you want to set up as an HDMI input.
3. Use the **Type** knob to select **HDMI**.
   - **HDMI-R** — HDMI signal in RGB color-space
   - **HDMI-Y** — HDMI signal in YCrCb color-space

   > *Tip: If you do not know which color-space your device is outputting in, select the source on the preview bus and look at the source on the preview monitor. If there are color errors in the video, select the other color-space.*

4. Use the **Format** or **F/Frmt** knob to select the format of the HDMI video signal.

   If the HDMI signal is of a different aspect ratio than the switcher is operating in, you must select an aspect ration conversion.

5. Press the **F/Frmt** knob to toggle to framing mode (**Fram/F**).
6. Use the **Fram/F** knob to select the aspect ration conversion you want to use.
   - **Full** — The video signal is scaled disproportionately to fill the display of the new aspect ratio. Aspect distortion occurs as the image is stretched/compressed to fit in the new aspect ratio.
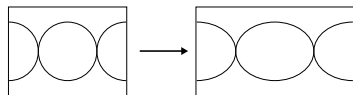   - **Zoom** — The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced but the edges of the video signal may be cropped.
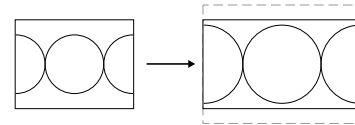   - **LttrBx** — Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
   - **PllrBx** — Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

Analog Inputs

> *Note: This feature applies to the Carbonite MultiMedia only.*

The analog inputs on the frame allow you to input a component or composite video.

Keep the following in mind when working with analog video:

- The composite video format is not available if the switcher is operating in a 1080pSF video format.
- When composite is selected, the switcher assumes the SD version of the video format that the switcher is operating in, based on frequency (50Hz = 576i, 59.94Hz = 480i).

Supported Analog Formats

The switcher supports a number of Analog video formats.

Composite

- NTSC
- PAL B/G

Component

- YUV (SMPTE/EBU N10)
- 480i
- 576i
- 720p 59.94

- 720p 50
- 1080i 59.94
- 1080i 50

To Set Up an Analog Input

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.

2. Use the **Input** knob to select MultiMedia input you want to set up as an Analog input.

3. Use the **Type** knob to select the type of analog input.

   - **Compos** — composite video format
   - **Compon** — component video format

4. If you selected component as the input type, use the **Format** or **F/Frmt** knob to select the video format of the component input.

5. If you selected composite as the input type, press the **F/Frmt** knob.

6. Use the **Frming** or **Fram/F** knob to select the aspect ratio conversion you want to use.

   - **Full** — The video signal is scaled disproportionately to fill the display of the new aspect ratio. Aspect distortion occurs as the image is stretched/compressed to fit in the new aspect ratio.
   - **Zoom** — The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced but the edges of the video signal may be cropped.
   - **LttrBx** — Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
   - **PllrBx** — Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

Auto Key Setup

An auto key allows you to associate a key alpha with a key video source in the switcher. When the video source is selected as a keyer, the key alpha is automatically used.

To Set Up an Auto Key Association

As well as input sources, internally generated sources, such as media-stores and color backgrounds, can be set up as an auto key.

1. Press **MENU** > **CONFIG** > **Input**.

2. Use the **Mnemnc** knob to select the key video source that you want to assign an alpha to.

3. Use the **Alpha** knob to select the key alpha source that you want to assign to the key video.

- **<none>** — no alpha
- **White** — assign a white background as a key alpha
- **Input BNC** — assign the source on the selected input as a key alpha
- **BK** — assign internal black as a key alpha
- **BG** — assign the matte generator as a key alpha
- **MX** — assign the source on Media-Store X as a key alpha
- **MEX** — assign the program output of ME X as the key alpha
- **MEX PV** — assign the preview output of ME X as the key alpha
- **MEX PV** — assign the clean feed output of ME X as the key alpha
- **MiniMEX** — assign the output of MiniME™ X as the key alpha

4. Use the **Mode** knob to select whether the alpha is shaped **Shaped**, or unshaped (**Linear**).

   - **Linear** — the alpha cuts a hole based on the gradient values of the alpha (gray)
   - **Shaped** — the alpha cuts a hole based on the monochrome value of the alpha (black or white)

Source Names

Each video source on the switcher can be given a unique name that is used on the mnemonics for that source, as well as internal menus. These names can be customized for how they appear on the mnemonics by adjusting the size or the font and the background color.

Note: If a TSL ID is assigned to a source, the switcher overwrites the source name on the MultiViewer and mnemonics with the TSL name. If there is no TSL name, or it has not been received yet, the source name is blank. For the labels on the MultiViewer, a combination of the TSL name and switcher source name are used. The new TSL name is passed from the switcher to any downstream TSL devices.

To Set Up a Source Name

Source names are restricted to eight characters in length.

1. Press **MENU** > **CONFIG** > **Input** > **Mnemnc**.

2. Use the **Save** knob to select the video source that you want to change the name for.

3. Change a character in the source name as follows:

   a) Use the **Pos** knob to select the position in the name that you want to add or change a character in.

   You can also press the **Pos** knob to clear the field.

b) Use the **Char** knob to select the character you want to place at the selected position.

4. Enter the remaining characters in the new name.

5. Press **NEXT**.

6. Use the **Size** knob to select the size of font you want to use on the mnemonic display.

- **Large** — first two characters are shown
- **Medium** — all eight (8) characters are shown on two lines with four characters on the top line
- **Small** — all eight (8) characters are shown on two lines with six characters on the top line

7. Use the **Color** knob to select background color of the mnemonic display.

8. Use the **Inv** knob to select if you want to invert the background color and the font color.

9. Press **NEXT**.

10. Press the **Save** knob.

To Assign a TSL ID to a Video Input

The switcher accepts incoming TSL data on TCP port 5727.

1. Press **MENU** > **Config** > **Input** > **NEXT** > **NEXT** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.

2. Use the **Input** knob to select the input BNC that you want to assign a TSL ID to.

3. Use the **TSLAdr** knob to select the TSL ID that you want to assign to the selected input BNC.

4. Use the **TSLTly** knob to have a source tallied on the MultiViewer based on the TSL input (**On**), or have the TSL tally information for the selected ID ignored (**Off**).

Note: If a TSL ID is assigned to a source, the switcher overwrites the source name on the MultiViewer and mnemonics with the TSL name. If there is no TSL name, or it has not been received yet, the source name is blank. For the labels on the MultiViewer, a combination of the TSL name and switcher source name are used. The new TSL name is passed from the switcher to any downstream TSL devices.

Control Panel Button Inserts

Insert films can be installed into most buttons on the control panel. Insert films allow you to label specific source buttons, control buttons, or replace the default button names with those of a different language.

Button insert templates can be downloaded from Ross Video.

*Note: If you have a C10, C1, C1-A, or C1M control panel with control over multiple MEs, you can use the **ME 1** and **ME 2** button caps provided to replace the last two AUX selection buttons. The **AUX 2**, **AUX 3** or **AUX 7** button selects ME 1, and the **AUX 3**, **AUX 4** or **AUX 8** button selects ME 2, depending on the control panel you have. Refer to the documentation that came with your insets for information on installing them.*

To Install a Button Insert

1. Remove the Cap Assembly from the Switch Assembly by grasping it firmly and pulling away from the control panel surface.
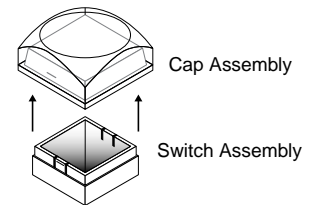
Figure 9: Removing Cap Assembly

2. Remove the Lens from the Diffuser using a common end micro screwdriver.
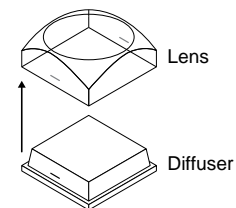
Figure 10: Removing Lens from Diffuser

3. Place the Insert Film into the Lens so the readable side is facing up. The notches on the sides of the Lens must be at the sides of the text on the Insert Film.
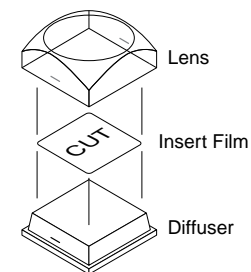
Figure 11: Inserting Film

4. Aligning the notches on the sides of the Lens and Diffuser, press the Lens and Diffuser together until they click.

5. Aligning the notches on the sides of the Cap Assembly to the tabs on the side of the Switch Assembly, press Cap Assembly down onto the Switch Assembly with a rolling motion until they click together.
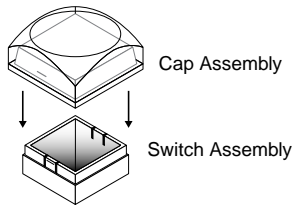
Figure 12: Removing Lens from Diffuser

Bus Maps

Any video input can be mapped to any source button on
the control panel using a bus map. There is an editable
bus map and a fixed, default, bus map, that can be applied
to all MEs on the switcher. Each source button can have
two inputs assigned (a standard source and a shifted
source).

To Create a Bus Map

All buses and MEs share the same bus map.

1. Press **MENU** > **CONFIG** > **BusMap**.

2. Use the **XptBtn** knob to select the source button to
    assign a video source to.

3. Use the **Input** knob to select the source to assign to
    the selected button on the unshifted bus.

    *   **<none>** — not assigned to a source (cannot be
        selected on a bus)
    *   **BK** — black
    *   **XX** — video inputs 1-24
    *   **MX** — Media-Store channels 1-4
    *   **MXMW** — Media-Store video channel used for
        MediaWipe effects on ME X (if installed)
    *   **MXMWA** — Media-Store alpha channel used
        for MediaWipe effects on ME X (if installed)
    *   **BG** — matte generator
    *   **PGM** — main program output of the switcher
        (cannot be selected on an ME/MultiScreen)
    *   **PV** — main preview output of the switcher
        (cannot be selected on an ME/MultiScreen)
    *   **CLN** — main clean feed output of the switcher
        (cannot be selected on an ME/MultiScreen)
    *   **MEX** — main program output of ME X (cannot
        be selected on the same or lower number ME)
    *   **MEX PV** — main preview output of ME X
        (cannot be selected on the same or lower number
        ME)
    *   **MEX CLN** — clean feed output of ME X (cannot
        be selected on the same or lower number ME)
    *   **AUXX** — Aux buses 1-4
    *   **MVX** — MultiViewer 1-2 (cannot be selected
        on ME/MiniME™)

*   **MinMEX** — MiniME™ 1-4 program (cannot be
    selected on an ME)
*   **Shift** — access shifted bus

4. Use the **Shift** knob to select the source to assign to
    the selected button on the shifted bus.

To Reset the Bus Map

1. Press **MENU** > **RESET** > **NEXT** > **NEXT**.

2. Press the **Dfault BusMap** knob.

3. Press the **Confrm** knob to reset the bus map.

GPI Device Control

You can assign a GPI output to a video source for basic
external device control. When a video source is taken
on-air, the switcher can be set to trigger a GPI output,
with a pre-delay. The external device can be set up to
cue a clip, or load a page when it receives the GPI input
trigger.

To Assign a GPI to a Video Source

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT**
    > **NEXT**.

2. Use the **Input** knob to select the video source that
    you want to assign a GPI output to.

    If you are using the GPI to control the device, the
    video source should be video output coming from
    the device.

3. Use the **GPO** knob to select the GPI output that you
    want to assign to the video source.

    *Note: You must have GPIs set as outputs to be able to
    assign them to the video source.*

4. Use the **Predly** knob to select the pre-delay time,
    in frames, you want to use with the GPI output.

    When you transition a video source with a GPI
    assigned to it, and the Roll Clip feature is active, the
    switcher triggers the GPI output, and then waits the
    pre-delay time before performing the transition. The
    length of the pre-delay is usually the length of time
    your video server requires to start playing a clip or
    your character generator requires to load a page.

Video Outputs

The frame has a number of output BNCs that can have any video source in the switcher, including Media-Store channels, aux bus, and clean feed assigned to them.

Output Sources

You can assign a video source or a bus to any output BNC.

To Assign a Source to an Output

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **Output Config**.

2. Use the **Output** knob to select the output you want to assign a source to.

3. Use the **Source** knob to select the source you want to assign to the output.

   - **XX** — video inputs 1-24
   - **BK** — black
   - **BG** — matte generator
   - **MX** — Media-Store channel 1-4
   - **MXMW** — Media-Store video channel used for MediaWipe effects on ME X (if installed)
   - **MXMWA** — Media-Store alpha channel used for MediaWipe effects on ME X (if installed)
   - **PGM** — main program output of the switcher
   - **PV** — main preview output of the switcher
   - **CLN** — clean feed for main program of switcher
   - **MEX** — main program output of ME X (if installed)
   - **MEX PV** — main preview output of ME X (if installed)
   - **MEX CLN** — clean feed output of ME X (if installed)
   - **AUXX** — aux buses 1-4
   - **MVX** — MultiViewer 1-2
   - **MinMEX** — main program output of MiniME™ channel 1-4

Ancillary Data

Ancillary data is information such as closed captioning or embedded audio, for example, that is included in the non-active video portions of the video signal. These portions include the Horizontal Ancillary Data Space (HANC) and Vertical Ancillary Data Space (VANC).

The switcher can be configured to strip or pass this data from the video output. The amount of data, and how it is stripped, depends on the video format of the video signal.

Table 4: Last Line of Vertical Ancillary Data

Video Format	Normal Strip/Pass	Long Strip/Pass
480i	19	21
576i	22	24
720p	25	25
1080i	20	20
1080p	41	41

To Strip or Pass Ancillary Data

1. Press **MENU** > **SYSTEM** > **NEXT**.

2. Use the **Anclry** knob to select whether ancillary data is stripped or passed.

   - **N Strp** — ancillary data is stripped
   - **N Pass** — ancillary data is passed unmodified
   - **L Strp** — ancillary data and some lines of active video are replaced with black
   - **L Pass** — ancillary data and some lines of active video are passed unmodified

FlexiClean Clean Feed

FlexiClean clean feed provides a second program output per ME that is derived from a different point in the video layering than the standard program output. The clean feed can be set to come before any key in the video layering for an ME. This allows you to remove particular keys without affecting the primary program output.
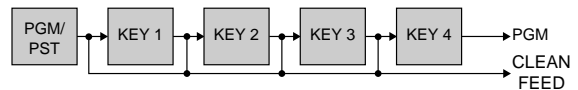
Figure 13: Possible Clean Feed Points

Keep the following in mind when working with clean feeds:

- Recalling a memory register using MemoryAI may cause the clean feed output to look different than expected. MemoryAI allows key elements to be recalled to other keys than originally resulting in different key layering.

To Set Up Clean Feed

1. Press **MENU** > **SYSTEM**.

2. Press the **Clean** knob to select the ME that you want to set the clean feed for.

   - **MX** — ME 1-2

3. Use the **Clean** knob to select which key the clean feed is taken before.

The selected key, and all keys after it, are not included in the clean feed output.

External Layer Mode

The clean feed for an ME is used to create a composite alpha from the keyers on that ME that is then available as a single alpha source. This allows you to output both the video and alpha from an ME to an external switcher. The key video comes from the output of the source ME and the key alpha comes from the clean feed of the source ME.

The alphas that are included in the layer mode output are set with the keyer buttons in the next transition area. Toggle a keyer button on to include the alpha from that keyer in the layer mode output.

When layer mode is turned on for an ME, you are restricted to cut, dissolve, and wipe transitions. MediaWipe and DVE transitions are not available.

Tip: To use layer mode internally, select the clean feed for the ME that is set to layer mode as the alpha for an auto key on another ME or MiniME™.

To Set Up Layer Mode

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.

2. Press the **LyrMod** knob to select the ME that you want to set the layer mode for.

   • **MX** — ME 1-2

3. Use the **LyrMod** knob to turn the layer mode feature on (**On**) or off (**Off**).

MultiViewer

The MultiViewer allows you to view multiple video sources from a single output BNC. Any video source, or bus, on the switcher, including Program, Preview, and Media-Store channels, can be assigned to any box on any MultiViewer. Up to 2 MultiViewer outputs are supported.

A time-clock can be added as an overlay to the MultiViewer showing either system time or time code.

Keep the following in mind when working with a MultiViewer:

• The MultiViewer is assigned to a video output.
• The layout is configured independently for each MultiViewer.

• Inputs are displayed with a red border when they are on-air. A green border is displayed when the input is selected on the Preset bus.
• When the switcher is operating in a standard-definition video format, the MultiViewer can be shown in the same video format or in 1080i.
• If the MultiViewer is operating in a different video format than the switcher, the output that the MultiViewer is fed out of is fixed to Output 7 (MV1) or Output 8 (MV2).

To Set Up a MultiViewer

Note: A MultiViewer must be assigned to a video output to be usable.

1. Press **MENU** > **SYSTEM** > **MultiView**.

   *Note: If the switcher is operating in a standard-definition video format, the **MVFrmt** knob is shown on the first page of the menu.*

2. Use the **MVFrmt** knob to select standard-definition (**SD**), or high-definition (**HD**) for the video format of the output of the MultiViewer.

   *Note: If you selected high-definition (**HD**) press the **MVFrmt** knob and confirm the changes. Output 7 will be locked to MultiViewer 1 and output 8 will be locked to MultiViewer 2.*

3. Use the **MView** knob to select the MultiViewer (**MV1** or **MV2**) that you want set up.

4. Use the **Layout** knob to select the arrangement of the boxes that you want to use for the selected MultiViewer.

5. Use the **Transp** knob to adjust the transparency of the background behind the source label for the selected MultiViewer.

6. Press **NEXT**.

7. Use the **Ovrlay** knob to select a video source that you want to overlay over the MultiViewer output.

   Tip: The overlay source can be used to overlay a camera shot of a shot-clock over the MultiViewer output.

8. Use the **Clip** knob to adjust the clipping of the overlay source.

   At **0%** the overlay source is completely opaque, and at **100%** it is completely transparent.

9. Press **NEXT**.

10. Use the **AncSrc** knob to select where the ancillary data, including embedded audio, fed out with the MultiViewer comes from.

    • **<none>** — no source is selected
    • **M1-M2** — Media-Store channels

- **MEXMW** — ME X Media Wipe video

11. Use the **Tally** knob to select how boxes on the MultiViewer are tallied.

   - **Box** — red or green border is shown around the outside of the MultiViewer box
   - **Label** — red or green boxes are shown inside the label area of the MultiViewer box
   - **LblRev** — the same as Label, but the placement of the tally boxes is swapped

12. Press **NEXT**.

13. Use the **FSLBL** knob to select whether FSFC is shown on the source labels (**On**) or not (**Off**) when a FSFC is applied to the source.

14. Press **NEXT** > **NEXT**.

15. Use the **Box** knob to select the box on the MultiViewer grid that you want to configure.

   For example, **MV1:4** is box 4 on MultiViewer 1, and **MV2:3** is box 3 on MultiViewer 2.

16. Use the **In/Out** knob to select the source or bus you want to assign to the box.

   When you assign an output to a box, the switcher routes the source selected on that bus to the box, and not the output of the bus.

17. Use the **Border** knob to turn the border around the MultiViewer box off (**Off**), white (**White**), or black (**Black**).

   When the border is turned off, some distortion may be visible around the edges of the box.

18. Press **NEXT**.

19. Use the **Aspect** knob to turn aspect ratio markers for the MultiViewer box on (**Aspect**) or off (**Off**).

20. Use the **Label** knob to turn source labels for the MultiViewer box off, or on in a selected position (**Bottom** or **Top**).

21. Press **NEXT**.

22. Use the **GrnTly** knob to turn the preview (green) tally for the MultiViewer box on or off.

23. Use the **RedTly** knob to turn the program (red) tally for the MultiViewer box on or off.

24. Press **NEXT**.

25. Use the **MScrnX** knob to turn the MultiScreen overlay on (**On**), or off (**Off**). The overlay shows what portions of the image are cropped out to fit into the output of the MultiScreen.

26. Configure additional MultiViewer boxes as required.

To Set Up a MultiViewer Clock

1. Press **MENU** > **SYSTEM** > **MultiView** > **NEXT** > **NEXT** > **NEXT** > **Edit Clock**.

2. Use the **Clock** knob to select the clock source to display.

   - **Off** — turns the clock off
   - **Tmcode** — displays the timecode fed to the switcher (hh:mm:ss:ff)
   - **System** — displays the system time of the switcher in 12-hour or 24-hour format (hh:mm:ss)

3. For a Timecode clock, use the **LTCFrm** knob to select whether the number of frames for a timecode is displayed (**On**) or not (**Off**).

4. For a System clock, use the **Format** knob to set how the time is displayed.

   - **24h** — time is displayed in 24-hour format.
   - **12h** — time is displayed in 12-hour format without am/pm.
   - **AM/PM** — time is displayed in 12-hour format with am/pm.

5. Press **NEXT**.

6. Use the **X Pos**, **Y Pos**, and **Size** knobs to position the clock and change the size.

7. Press **NEXT**.

8. Use the **LoadFg** knob to select the color of the text for the clock and press the knob.

9. Use the **LoadBg** knob to select the background color for the clock and press the knob.

10. Press **NEXT**.

11. Use the **FgHue** knob to adjust the hue of the text color for the clock.

12. Use the **FgSat** knob to adjust the saturation of the text color for the clock.

13. Use the **FgLum** knob to adjust the luminance of the text color for the clock.

14. Press **NEXT**.

15. Use the **BgHue** knob to adjust the hue of the background color for the clock.

16. Use the **BgSat** knob to adjust the saturation of the background color for the clock.

17. Use the **BgLum** knob to adjust the luminance of the background color for the clock.

MultiScreen / MiniME™

The MultiScreen allows you to output multiple video signals that can be combined into a single scene. The

switcher treats the multiple outputs as a single background and translates the keys across the multiple backgrounds.

Keep the following in mind when setting up a MultiScreen environment.

- The MultiScreen uses MiniME™ resources to provide the outputs. This allows you to have up to two DVE keys per screen of the MultiScreen. As a key crosses from one screen to the next, a key from either of the MiniME™ outputs is being used to provide the two halves of the key.
- MultiScreen does not support chroma keys.
- The MultiScreen can either take separate parts of a pre-tiled source, or scale a single source to the size of the MultiScreen output. When you use a pre-tiled source, you must assign sources to each MiniME™ that is used in the MultiScreen. This substitution table allows you to select a single source on the MultiScreen program bus and the switcher automatically assigns the required source to each MiniME™.
- If you are using DVE keys with your MultiScreen, you should set these resources as floating.

MiniME™ Assignment

Each MiniME™ output is pre-assigned to a screen on the MultiScreen layout. MiniME™ 1 and 2 are assigned to MultiScreen 1 and MiniME™ 3 and 4 are assigned to MultiScreen 2. If you select a layout that uses more than two screens, the MiniME™ resources that were assigned to MultiScreen 2 are assigned to MultiScreen 1.

To Set Up a MultiScreen

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **NEXT** > **NEXT** > **MultSc Config**.

2. Use the **MultSc** knob to select the MultiScreen 1 (**MultS1**) or MultiScreen 2 (**MultS2**)

3. Use the **Layout** knob to select the layout you want to use.

   - **Off** — turns off the MultiScreen
   - **Dual H** — two screens side by side
   - **Dual V** — two screens one on top of the other
   - **TrpleH** — three screens side by side
   - **TrpleV** — three screens one on top of the other
   - **QuadH** — four screens side by side
   - **QuadV** — four screens one on top of the other
   - **2x2** — four screens stacked two wide and two high

   Note: The available layouts depend on the number of screens being used by the other MultiScreen.

4. Press the **Layout** knob and **Confrm**.

5. Use the **Offset** knob to adjust the placement of the background scaling in the MultiScreen output.

   This can be used to adjust for the aspect ratio difference between the input video and the MultiScreen output.

6. Press **NEXT**.

7. Use the **Edge** knob to select the edge between the screens that you want to adjust the size of.

8. Use the **Dstnce** knob to adjust the size of the gap between the MultiScreen screens.

   - If you are using monitors for your MultiScreen display, you can use a positive value to compensate for the bezel on the outside of a display.
   - If you are using projectors for your MultiScreen display, you can use the negative value to compensate for the amount of overlap of the projected images.

9. If you selected a negative distance, press **Blend Edit** and use the **Blend** knob to turn edge blending on (**On**) or off (**Off**).

10. If the edge blending is on, use the **Smooth** and **Gamma** knobs to correct for the overlap in projected images.

    - **Smooth** — adjust the appearance of the transition area between the overlapping images.
    - **Gamma** — adjust the gamma correction applied to the overlapping images to match the output of your projectors.

11. Repeat the edge adjustment for all other edges in your layout.

To Set Up a Pre-Tiled Source

You must set up your external source generator to output a separate output for each screen of the MultiScreen layout. The bezel compensation and data doubling setting should be set up on the source generator.

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.

2. Use the **SubSrc** knob to select the source button you want to use to assign the pre-tiled sources to the MiniME™ outputs for the MultiScreen.

3. Press **Edit**.

4. Use the **ME/Bus** knob to select the MiniME™ that you want to assign a substitution source to.

5. Use the **Substn** knob to select the pre-tiled source for the MiniME™.

On-Air Setting

Some switcher outputs can be set to be considered on-air or not. This allows you to set which outputs are tallied, how resource allocation is divided, and how the Roll Clip feature works.

To Set the On-Air Status for an Output

1. Press **MENU** > **CONFIG** > **NEXT** > **On Air**.
2. Use the **Type** knob to select the type of switcher output.
    - **ME** — the program output of a ME.
    - **Aux** — the output of an Aux bus.
    - **MiniME** — the program output of the MiniME™.
    - **MultSc** — all MiniME™ outputs of a MultiScreen.
3. Use the **Index** knob to select the particular switcher output.

    For example, if you select type as **Aux**, an index selection of **8** corresponds to Aux bus 8.

4. Use the **OnAir** knob to select whether the output is considered on-air (**On**) or not (**Off**).

Tallies

Tallies are simple contact closure relays that the switcher uses to signal other devices, and users, that a particular video source is on-air. Typically, tallies are used to light a red light on a camera to show people that they are on-air and what camera they should be looking at.

To Set Up a Tally

1. Press **MENU** > **CONFIG** > **NEXT** > **Tally**.
2. Press the **Add** knob.

    If you are editing, or deleting, an existing tally, use the **Add** knob to select the tally and press the **Edit**, or **Delete**, knob.

3. Use the **Tally** knob to select the tally or GPI output that you want to set up. This is the tally or GPI number, and not the pin on the tally connector.

    > *Note: A GPI must be set to tally mode before it can be used as a tally. Refer to To Set Up a GPI Output on page 42 for information in setting a GPI as a tally.*

4. Use the **Input** knob to select the video source that you want to tally.
    - **BK** — black
    - **BG** — matte generator
    - **XX** — video inputs 1-24
    - **MX** — Media-Store channel 1-4

5. Use the **Output** knob to select the bus that you want to video source tallied for. When the video source is selected on this bus, the tally is triggered.
    - **OnAir** — on-air
    - **OnPrv** — on preview
    - **PGM** — program bus
    - **PV** — preview bus
    - **CLN** — clean feed
    - **PGMX** — program bus of ME X (if installed)
    - **PRVX** — preview bus of ME X (if installed)
    - **CLNX** — clean feed of ME X (if installed)
    - **MinMEX** — program bus of MiniME™ X
    - **MMXPrv** — preview bus of MiniME™ X
    - **MultSX** — program bus of MultiScreen X
    - **MSXPrv** — preview bus MultiScreen X
    - **AuxX** — program bus of aux bus X

6. Press the **Tally** knob.

Color Correction

Color correction in the switcher is performed by either Processing Amplifiers (Proc Amps) in the HSL (Y-Cr-Cb) color space or by RGB Color Correctors in the RGB color space. Both Proc Amps and RGB Color Correctors allow you to apply color correction to video sources, before the crosspoint. Corrected video is then available to all MEs.

Color correction is additive, allowing you to apply any combination of Proc Amp and RGB Color Corrector based adjustment to a video signal. If multiple color corrections are applied, the correction is applied first, and the bus-based correction is applied after that.

Proc Amp Color Correction

> *Note:* *This feature applies to the Carbonite+ and Carbonite MultiMedia only.*

The Proc Amp video correction allows you to adjust the gain, offset, black level, and gamma of the video signal.

To Apply a Proc Amp to a Video Source

1. Double-press the source button for the input video source you want to apply the Proc Amp to.

   If a device is assigned to the video source, you may have to press **NEXT** to view the correct page.

   > *Tip:* *If correction has already been applied (**ON**), press **Reset** to return the Proc Amp and Color Correction to the default values.*

2. Press the **PrcAmp** knob.

   > *Tip:* *You can return the Proc Amp adjustment to the default settings by using the **Cntrl** knob to select **Reset** and press the **Perfrm Reset** knob.*

3. Adjust the overall gain as follows:
   a) Use the **Cntrl** knob to select **Gain**.
   b) Use the **Value** knob to adjust the chrominance and luminance gain together.

4. Adjust the chrominance gain as follows:
   a) Use the **Cntrl** knob to select **ChGain**.
   b) Use the **Value** knob to adjust the chrominance gain only.

5. Adjust the luminance gain as follows:
   a) Use the **Cntrl** knob to select **LmGain**.
   b) Use the **Value** knob to adjust the luminance gain only.

6. Adjust the hue rotation as follows:
   a) Use the **Cntrl** knob to select **HueRot**.

b) Use the **Value** knob to adjust the Hue. Increasing the Hue Rotation turns the color wheel clockwise, and decreasing the Hue Rotation turns the color wheel counter-clockwise.

7. Adjust the black level as follows:
   a) Use the **Cntrl** knob to select **BlkLvl**.
   b) Use the **Value** knob to adjust the black level. Black level acts as a luminance offset.

8. Adjust the gamma value as follows:
   a) Use the **Cntrl** knob to select **GamVal**.
   b) Use the **Value** knob to adjust the luminance gamma value.

9. Adjust the gamma offset as follows:
   a) Use the **Cntrl** knob to select **GamOff**.
   b) Use the **Value** knob to adjust the luminance gamma offset.

10. Adjust the Cr (red color difference) gain as follows:
    a) Use the **Cntrl** knob to select **CrGain**.
    b) Use the **Value** knob to adjust the gain of the Cr.

11. Adjust the Cr (red color difference) offset as follows:
    a) Use the **Cntrl** knob to select **CrOff**.
    b) Use the **Value** knob to adjust the offset of the Cr.

12. Adjust the Cb (blue color difference) gain as follows:
    a) Use the **Cntrl** knob to select **CbGain**.
    b) Use the **Value** knob to adjust the gain of the Cb.

13. Adjust the Cb (blue color difference) offset as follows:
    a) Use the **Cntrl** knob to select **CbOff**.
    b) Use the **Value** knob to adjust the offset of the Cb.

RGB Color Correction

> *Note:* *This feature applies to the Carbonite+ and Carbonite MultiMedia only.*

The RGB color correctors allow you to adjust the red, green, and blue component *gain*, *offset*, and *gamma* of the video signal.

To Apply a RGB Color Correction to a Video Source

1. Double-press the source button for the input video source you want to apply the RGB color corrector to.

   If a device is assigned to the video source, you may have to press **NEXT** to view the correct page.

   > *Tip:* *If correction has already been applied (**ON**), press **Reset** to return the Proc Amp and Color Correction to the default values.*

2. Press the **ClrCor** knob.

   > *Tip:* *You can return the RGB color corrector adjustment to the default settings by using the **Cntrl** knob to select **Reset** and press the **Perfrm Reset** knob.*

3. Use the **Color** knob to select **RGB** or the individual color component you want to adjust (**Red**, **Green**, **Blue**).

4. Adjust the gain of the selected color component(s) as follows:

   a) Use the **Cntrl** knob to select **Gain**.

   b) Use the **Value** knob to adjust the gain of the component(s).

5. Adjust the offset of the selected color component(s) as follows:

   a) Use the **Cntrl** knob to select **Offset**.

   b) Use the **Value** knob to adjust the offset of the component(s).

6. Adjust the lower offset of the selected color component(s) as follows:

   a) Use the **Cntrl** knob to select **LowOff**.

   b) Use the **Value** knob to adjust the lower offset of the component(s).

7. Adjust the gamma value of the selected color component(s) as follows:

   a) Use the **Cntrl** knob to select **GamVal**.

   b) Use the **Value** knob to adjust the gamma value of the component(s).

8. Adjust the gamma offset of the selected color component(s) as follows:

   a) Use the **Cntrl** knob to select **GamOff**.

   b) Use the **Value** knob to adjust the gamma offset of the component(s).

ViewControl

ViewControl integrates the MultiViewer output of the switcher with a graphical overlay from DashBoard to provide live video in the ViewControl windows.

Keep the following in mind when working with ViewControl:

• ViewControl requires DashBoard 5.1, or later.

Connecting ViewControl

ViewControl combines an overlay image from DashBoard with a custom MultiViewer output from the switcher to generate the interface. This requires some external SDI/HDMI video conversion equipment, as well as a touchscreen display.
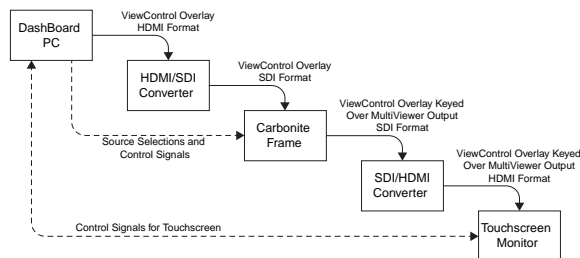

Figure 14: ViewControl Setup

The following connections are required for ViewControl:

• Set the output resolution of the DashBoard computer to either 1920×1080 or 1280×720.

• Use an HDMI to SDI converter to take the output of the DashBoard computer and put it into a resolution that the switcher can use.

> *Note: An external converter is not required if you are using one of the HDMI inputs on the Carbonite MultiMedia frame.*

Ensure that the resolution is not changed.

• Apply a FSFC to the input that is coming from the DashBoard computer.

• Set up a MultiViewer 1 to use a ViewControl layout.

• Use an SDI to HDMI converter to take the output of the switcher and put it into a resolution that the touchscreen monitor can use. Ensure that the resolution is not changed.

• Connect the USB cable for the touchscreen to the DashBoard computer.

To Set Up The Video Input for ViewControl

Carbonite+ and Carbonite MultiMedia

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.

2. Use the **Input** knob to select video input that you want to apply a FSFC to.

3. Turn on FSFC for the selected video input.

   • **Standard Inputs** — use the **FSFC** knob to select **On**.
   • **MultiMedia Inputs** — use the **Type** knob to select **SDI-FC**.

4. Use the **Frming** knob to select **Full**.

5. Press the **Frming** knob.

6. Press the **Confrm** knob to assign the FSFC channel.

Carbonite

1. Press **MENU** > **REF** > **NEXT**.

2. Use the **FSFC** knob to select the frame converter/synchronizer channel that you want to assign to a video input.

3. Press the **FSFC** knob.

4. Use the **FSFCx** knob to select **Input**.

5. Use the **Input** knob to select video input that you want to apply a FSFC to.

6. Use the **Frming** knob to select **Full**.

7. Press the **Frming** knob.

8. Press the **Confrm** knob to assign the FSFC channel.

To Set Up the MultiViewer for ViewControl

1. Press **MENU** > **SYSTEM** > **MultiView**.

2. Use the **MView** knob to select **MV1**.

3. Use the **Layout** knob to select one of the ViewControl layouts.

   • **VCtrlT** — (**ViewControl Top**) places the boxes at the top of the screen.
   • **VCtrlB** — (**ViewControl Bottom**) places the boxes at the top of the screen.

> *Tip: If you want to create a custom ViewControl layout, you can use one of the other MultiViewer layouts (except the 16-box layout in the SD-HD MultiViewer) to create the look you want, and use PanelBuilder in DashBoard to assign functionality to the layout. Sources can be hidden from a layout by assigning black to the box. For more information on PanelBuilder, refer to the DashBoard documentation.*

4. Press **NEXT**.

5. Use the **Ovrlay** knob to select the source BNC that the ViewControl output from the DashBoard computer is connected to.

6. Double-press the **Clip** knob to select the default **6.3%**.

7. Press **NEXT** > **NEXT** > **NEXT**.

8. Use the **Box** knob to select box one for the MultiViewer you are using for ViewControl. For example, if you are assigning MultiViewer one (1) to ViewControl, select **MV1:1**.

9. Use the **In/Out** knob to select **PV**.

10. Use the **Box** knob to select box two.

11. Use the **In/Out** knob to select **PGM**.

12. Assign additional sources to the remaining MultiViewer boxes. These are the sources that will be available in ViewControl.

Switcher Personality

There are a number of settings for how the switcher will react to different situations, or how switcher elements appear to the operator. All these settings are grouped together into the Switcher Personality. These settings include double-press rates and sleep time, among others.

Auto Remove Key

You can have a key removed from the Next Transition area, so that it is not included in the next transition, after it has been transitioned off-air using the **KEY X CUT** or **KEY X AUTO** buttons. This allows you to transition a key off-air in an emergency and not have it accidentally transitioned back on-air with the next transition from the Transition Area.

To Set the Auto Remove Key Behavior

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **Trans Area**.

2. Use the **RemKey** knob to select whether a key remains selected in the Next Transition Area (**Off**) after a **KEY X CUT** or **KEY X AUTO** transitions the key off-air, or is removed from the Next Transition Area (**On**).

Auto Trans Second Press

When you press the **AUTO TRANS** or **KEY AUTO** button during a transition, the switcher can be set to either halt the transition (the transition freezes on-air) and wait for the button to be pressed again, immediately reverse, or immediately cut the transition back to the initial state.

When the transition is halted, pressing the **AUTO TRANS**, or **KEY AUTO**, button again can be set to either continue the transition, or reverse the transition back to the initial state.

To Set the Auto Trans Second Press Behavior

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **Trans Area** > **NEXT**.

2. Use the **MAuto 2**, or **KAuto 2**, knob to select what happens when the **AUTO TRANS**, or a **KEY AUTO**, button is pressed during a transition.

   - **HltFwd** — the transition is halted and then continues in the same direction when the transition button is pressed again
   - **HltRev** — the transition is halted and then reverses directions when the transition button is pressed again

   - **Rev** — the transition immediately reverses directions when the transition button is pressed
   - **Cut** — the transition immediately cuts back to the initial state when the transition button is pressed
   - **Ignore** — the button press is ignored by the switcher and the transition continues

Background Double-Press

The Background Double-Press feature allows you to have a double-press of the BKGD button on a Transition Module select background and all on-air keyers as part of the next transition.

To Set the Background Double-Press Behavior

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **Trans Area** > **NEXT** > **NEXT**.

2. Use the **BGDDbl** knob select how you want double-press the BKGD button on the transition area to behave.

   - **Ignore** — ignore the on-air keyers
   - **TrsClr** — include all on-air keyers with the next transition

Color Schemes

The buttons on the control panel can be set to glow with different colors. This color can be picked from a list of pre-set color schemes, or a custom color can be selected. Up to four (4) custom color schemes can be saved on the switcher.

To Select a Panel Color Scheme

The color scheme sets the glow color for the buttons on the control panel. Each ME can be set with a different glow color.

1. Press **MENU** > **USER** > **Scheme**.

2. Press **NEXT**.

3. Use the **Load** knob to select the color scheme you want to use.

   If you have created custom color schemes, you can select it from the menu.

4. Press the **Load** knob.

5. Press the **Confrm** knob.

To Create a Custom Panel Color Scheme

Custom colors are created using standard hue, saturation, and luminance values. Once created, you can save your custom color.

1. Press **MENU** > **USER** > **Scheme**.

2. Use the **Hue** knob to adjust the hue of your custom color.

3. Use the **Sat** knob to adjust the saturation of your custom color.

4. Use the **Lum** knob to adjust the luminance of your custom color.

5. Press **NEXT** > **NEXT**.

6. Use the **Save** knob to select the custom scheme that you want to store the custom color to.

7. Press the **Save** knob.

8. Press the **Confrm** knob.

To Set the Brightness of the Control Panel Buttons

1. Press **MENU** > **USER** > **Scheme** > **NEXT** > **NEXT** > **NEXT**.

2. Use the **Brightness** knob to set the brightness of the buttons on the control panel.

Double-Press Rate

You can set the double-press rate of the switcher to suit your preference. Setting a fast rate requires you to double-press the knobs in quick succession in order to be recognized as a double-press. Setting a slow rate allows more time between presses but may register two single presses as a double-press.

To Set the Double-Press Rate

1. Press **MENU** > **PERS** > **DblPrs Speed**.

2. Double-press the **HERE** knob at the rate you want to use for double-pressed on the switcher.

3. Press **MENU** to store the new rate.

Editor Mode

The switcher can be controlled by an external editor. The external editor can control the switcher to perform transitions, or recall memories, among the supported commands.

Refer to the GVG100 Supported Protocol Document for a list of supported commands.

To Set the Switcher to Editor Mode

*Tip: You can quickly turn off editor mode by pressing and holding the **MENU** button and pressing **PERS**.*

1. Press **MENU** > **PERS**.

2. Use the **Editor** knob to select **On** to allow the switcher to be controlled by an external editor.

Memory Bank Button Behavior

Note: This feature is available on the C2S, C2X, C3S, and C3X only.

The Memory Bank Button Behavior feature allows you to set how the **BANK** button behaves when pressed and released.

To Set the Bank Button Behavior

1. Press **MENU** > **PERS** > **NEXT**.

2. Use the **MemBnk** knob to select how you want the **BANK** button to behave when pressed and released.

   • **Normal** — the keypad is used to enter the bank number directly, followed by the memory (For example, to access memory 3 on bank 2, press **BANK** > **2** > **3**.)

   • **Legacy** — the next bank is selected every time the button is pressed, cycling through all banks (For example, to access bank 5, press **BANK** repeatedly until bank 5 is selected.)

Memory Button Behavior

Note: This feature is not available on the C1-A or C10.

The store and recall buttons next to the display can be set to either select ME 1 or ME 2 directly, or select the list of MEs, MiniME™s, or MultiScreens. This is useful if you do not want the pressing of a store or recall button to select or de-select an ME. The selection of what is included in the memory store or recall is done by pressing and holding either of the store or recall buttons and selecting the source buttons on the keyer bus for the MEs, MiniME™s, or MultiScreens you want to include.

To Set the Memory Button Behavior

1. Press **Store** > **NEXT** > **NEXT**.

2. Use the **MemBtn** knob to select whether both of the store and recall buttons act together (**Single**), or as separate ME specific buttons (**Indiv**).

Memory Recall Behavior

Note: This feature is available on the C10 and C1 only.

The switcher can be set to select the current ME as the ME memories are recalled on by default.

To Set the Memory Recall Behavior

1. Press **MENU** > **PERS** > **NEXT**.

2. Use the **MESel** knob to select how you want memories to recall.

- **Hold** — you must select the ME that the memory is recalled on
- **Follow** — memories are recalled on the ME selected on the control panel

Next Button Secondary Function

You can configure the **NEXT** button to allow you to manually trigger GPI outputs. This allows you to use the GPI to manually roll a clip on a video server, or load the next page on a character generator. Refer to the External Device Setup Sheets for more information on setting up an using external devices.

Refer to *GPI Control* on page 42 for more information on setting up and using GPIs.

To Set the NEXT Button Secondary Function

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **NextBn Func2**.
2. Use the **Func** knob to select the second function of the Next button.

- **<none>** — no secondary function
- **GPO** — you can manually trigger a GPI output

Next Transition Follow

You can have the key bus follow the next transition selection buttons (**BKGD** and **KEY 1-4**). When set to follow, pressing a **KEY** button in the next transition area has the switcher assign the key bus and menu system to that keyer. When set to no follow, the key bus is not changed by selections in the next transition area.

To Set the Next Transition Follow Behavior

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **Trans Area**.
2. Use the **NextTr** knob to select whether the switcher follows the next transition area or not.

- **NoFllw** — switcher is not changed by selection of next transition include buttons (**BKGD** or **KEY 1-4**)
- **Follow** — switcher assigns the menu and key bus to the next transition include buttons as they are pressed

Next Transition Reset

You can have the transition area reset to a default background dissolve after each transition. This allows

you to prevent the selections from the last transition from being accidentally included with the next transition.

To Set the Next Transition Reset Behavior

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **Trans Area**.
2. Use the **Trans** knob to select whether the transition area is reset after a transition.

- **NotRst** — area is not changed after a transition
- **Reset** — area is reset to a background dissolve after each transition

Power-Save Mode

The switcher goes into a Power-Save mode after a user-defined amount of time (20 minutes by default) without user interaction. Touching any button, knob, or fader will wake the switcher. The switcher does not act on the button, knob, or fader control that wakes it from sleep mode.

During Power-Save mode, video related hardware is not affected and video signals still pass through the switcher.

To Set the Power Save Mode and Timer

1. Press **MENU** > **PERS** > **NEXT** > **NEXT**.
2. Press the **Sleep**/**PwrSve** knob to toggle between the power save modes.

- **Sleep** — displays are turned off and buttons light in raindrop pattern
- **PwrSve** — all buttons and displays are turned off and as much power is conserved as possible

3. Use the **Sleep**/**PwrSve** knob to set the amount of time that the switcher will wait without user input before going into sleep or power-save mode. Setting the value to off prevents the switcher from ever going into sleep or power-save mode.

Roll GPO/Roll Clip

The switcher uses a GPI output to start a clip playing on an external video server. This can be set to have the GPI output always trigger if a source going on-air is from a video server, or you have to set the GPI output to trigger manually.

If your external video server supports the AMP protocol, the roll clip functionality works directly without the use of a GPI output.

To Set the Roll GPO/Clip Behavior

1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **Trans Area** > **NEXT** > **NEXT**.

2. Use the **RIClip** knob to select whether GPI outputs, or video servers, assigned to input sources are triggered before a transition.

   • **Force** — the GPI output, or video server, is always triggered with the transition
   • **User** — you must select to trigger the GPI, or video server, output with the transition

Transition Rate Units

When you perform an auto transition, you must specify the length of time that you want the transition to take. This value can be entered either in video frames or seconds, depending on what you are most comfortable with.

To Set the Units Used for Transition Rates

   1. Press **MENU** > **PERS**.
   2. Use the **Rate** knob to select either frames (**Frames**) or seconds (**Secnds**) as the units you want to use for transition rates.

Undo Memory Recall

The memory recall undo feature can be turned on or off. A memory recall is undone by pressing the memory number a second time after a memory is recalled.

The undo memory functionality can be set independently for the main memory system and the Effects Memory area.

To Turn Undo Memory Recall Off

   1. Press **MENU** > **PERS** > **NEXT** > **NEXT** > **NEXT**.
   2. Use the **GMUndo** knob to turn the undo feature on (**On**) or off (**Off**) for the main memory system.
   3. Use the **MEUndo** knob to turn the undo feature on (**On**) or off (**Off**) for the effects memory modules, if your control panel has them.

User Buttons

These buttons can be assigned as ME, Aux Bus, MiniME™, or MultiScreen selection buttons. The number and position of the buttons on the control panel depend on the model of your control panel.

If a button is assigned to an ME, MiniME™, or MultiScreen, you can press and hold the button to be able to select a different ME, MiniME™, or MultiScreen from the key bus. If the user button is assigned to an Aux, it will allow you to select a different Aux.

To Set A User Button

   1. Press **MENU** > **USER** > **NEXT** > **UseSel Buttns**.
   2. Use the **Button**/**RowBtn** knob to select the user button you want to set up.
   3. Use the **Type** and **Index** knobs to select the function for the user button.

   • **None** — user button is not assigned
   • **ME** — use the **Index** knob to select which ME the user button is assigned to
   • **Aux** — use the **Index** knob to select which Aux Bus the user button is assigned to
   • **MiniME** — use the **Index** knob to select which MiniME™ the user button is assigned to
   • **MultSc** — use the **Index** knob to select which MultiScreen the user button is assigned to

Switcher Modes

The switcher mode allows you to set the features and resources that you want to have available on your switcher. Some feature and resources are not compatible with all switcher modes.

Table 5: Carbonite/Carbonite eXtreme Switcher Mode Features

Features	MiniME FSFC	MiniME	MiniME 29.97	MiniME 3G	2.5 ME	2.5 ME 29.97	2.5 ME 3G
DVEs	4	8	8	4	8	8	4
Float FSFCs	6	0	0	0	0	0	0
2.5 MEs	No	No	No	No	Yes	Yes	Yes
MiniME™	Yes	Yes	Yes	Yes	No	No	No
Video Modes	SD, HD	SD, HD	1080p 29.97	3G	SD, HD	1080p 29.97	3G
Source Formats	SD, HD	SD, HD	1080p 29.97, 1080p 59.94	1080i, 3G	SD, HD	1080p 29.97, 1080p 59.94	1080i, 3G
ViewControl	Yes	Yes	Yes	No	Yes	Yes	No
MultiViewer Boxes	16	16	16	10	16	16	10

Table 6: Carbonite+/Carbonite MultiMedia Switcher Mode Features

Features	MiniME	MiniME 29.97	MiniME 3G	2.5 ME	2.5 ME 29.97	2.5 ME 3G
DVEs	8	8	4	8	8	4
Float FSFCs (Carbonite+)	12	12	12	12	12	12
2.5 MEs	No	No	No	Yes	Yes	Yes
MiniME™	Yes	Yes	Yes	No	No	No
Video Modes	SD, HD	1080p 29.97	3G	SD, HD	1080p 29.97	3G
Source Formats	SD, HD, 3G (HDMI only)	1080p 29.97, 1080p 59.94	1080i, 3G	SD, HD, 3G (HDMI only)	1080p 29.97, 1080p 59.94	1080i, 3G
ViewControl	Yes	Yes	No	Yes	Yes	No
MultiViewer Boxes	16	16	10	16	16	10

Keep the following in mind when changing switcher modes:

- The MiniME FSFC mode is only supported by the Carbonite and Carbonite eXtreme frames.
- When switching to a mode that only supports 10 boxes in the MultiViewer the unsupported layouts are changed to the H244 layout.

- In a 3G mode, the MultiViewer output is fixed to outputs 7 and 8 and the 1080i video format.
- In a 3G mode, the Carbonite and Carbonite eXtreme switchers only accept synchronized 1080p inputs.
- In a 3G mode, the Carbonite MultiMedia and Carbonite+ switchers support synchronized and unsynchronized 1080p and 1080i inputs. The 1080i inputs are converted using a simple line-doubler and may result in lower quality video.
- In a 3G mode, the HDMI inputs on the Carbonite MultiMedia switcher only support 1080p. The analog inputs are not supported in a 3G mode.
- In a 3G mode, only 3 of every 6 dedicated FSFCs on the Carbonite MultiMedia and Carbonite+ switchers can be used. This means any 3 inputs on BNCs 1-6, any 3 on BNCs 7-12, any 3 on BNCs 13-18, and so on.
- In a 3G, 1080p 29.97Hz, or 2.5 ME mode, the Carbonite and Carbonite eXtreme switchers do not support the use of a color background as a source on a DVE or chroma key.
- In a 1080p 29.97Hz mode, 1080p 29.97Hz is the only available video mode.
- In a 1080p 29.97Hz mode, the Carbonite MultiMedia and Carbonite+ switchers support synchronized and unsynchronized 1080p 29.97Hz and 1080p 59.94Hz inputs. The 1080p 59.94Hz inputs are converted by dropping half the frames and may result in lower quality video.
- In a 1080p 29.97Hz mode, the HDMI inputs on the Carbonite MultiMedia switcher only support 1080p 59.94Hz and 1080p 29.97Hz. The analog inputs are not supported in a 1080p 29.97Hz mode.

To Set the Switcher Mode

Note: Not all switchers support all modes. A restart is required to put the switcher into the new mode.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.
2. Use the **SwitcherMode** knob to select the features that you want enabled on your switcher.

    - **MiniME FSFC** — floating FSFCs on the Carbonite and Carbonite eXtreme frames.
    - **MiniME** — MiniME™ with standard SD and HD video formats.
    - **MiniME 29.97** — MiniME™ with the 1080p 29.97Hz video format.
    - **MiniME 3G** — MiniME™ with 3G video formats, not including 1080p 29.97Hz.
    - **2.5 ME** — 2.5 ME with standard SD and HD video formats.

- **2.5 ME 29.97** — 2.5ME with the 1080p 29.97Hz video format.
- **2.5 ME 3G** — 2.5 ME with 3G video formats, not including 1080p 29.97Hz.

3. Press the **SwitcherMode** knob.

4. Press the **Reboot** knob to restart the switcher in the new mode.

Network Connections

The switcher is equipped with two Ethernet ports to allow remote access. Once the Ethernet ports are set up, you can connect to the switcher over FTP to upload stills to the Media-Store channels, as well as download switcher data files.

The switcher does not require an IP address to operate unless you are using a CarboNET to connect the control panel to the frame.

Network Setup

Setting up a network connection allows you to connect to the switcher remotely. By default, the switcher uses DHCP to automatically obtain an IP address. You can manually set a static IP address, network mask, and default gateway if your network does not have a DHCP server.

Note: If you are going to use a CarboNET to connect the control panel to the frame, you must set the frame to a static IP address, or configure your DHCP server to always give the frame the same IP address. The CarboNET needs a fixed IP address to connect to.

To View the Current Network Settings

*Tip: Network settings can also be set from the **Network** tab on the Configuration node in DashBoard.*

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT FrmIP Addr**.
2. Use the left knob to view the current network setting.
   - **X-Addr** — IP address for network port 1 or 2
   - **X-Mask** — network mask for network port 1 or 2
   - **X-MAC** — MAC address for network port 1 or 2
   - **Gatwy** — gateway for both network ports

To Set an IP Address Using DHCP

Due to the nature of DHCP, your switcher may get a different IP address each time it is powered on or re-connected to a network. You must have the switcher connected to a network to be able to obtain an IP address using DHCP.

Note: If you are going to use a CarboNET to connect the control panel to the frame, you must set the frame to a static IP address, or configure your DHCP server to always give the frame the same IP address.

*Tip: Network settings can also be set from the **Network** tab on the Configuration node in DashBoard.*

Note: Ensure that DIP switch 3 on the frame is set in the up position. If this DIP switch is set in the down position, the IP address is fixed at 192.168.0.123.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **IP Addr**.
2. Use the left knob to select the network port that you want to set to DHCP. Only one port can be set to DHCP at a time.
   - **1-Mode** — network port 1
   - **2-Mode** — network port 2
3. Press the **Edit** knob.
4. Use the **Value** knob to select **DHCP**.
5. Press the **Value** knob.
6. Press the **Reboot** knob to restart the switcher in DHCP mode.
   The switcher will request an IP address when it restarts.

To Set a Static IP Address

You must have the switcher connected to a network to be able to set a static IP. If the switcher is not connected to a network, the switcher does not display the IP address.

*Tip: Network settings can also be set from the **Network** tab on the Configuration node in DashBoard.*

Note: Ensure that DIP switch 3 on the frame is set in the up position. If this DIP switch is set in the down position, the IP address is fixed at 192.168.0.123.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **IP Addr**.
2. Use the left knob to select the network port that you want to set a static IP address for.
   - **1-Mode** — network port 1
   - **2-Mode** — network port 2
3. Press the **Edit** knob.
4. Use the **Value** knob to select **Static**.
5. Press **NEXT**.
6. Use the left knob to select **1-Addr** for port 1 or **2-Addr** for port 2.
   a) Use the **Field** knob to select the segment in the address that you want to change.
   b) Use the **Value** knob to select the new value you want to use for that segment.

7. Use the left knob to select **1-Mask** for port 1 or **2-Mask** for port 2.

    a) Use the **Field** knob to select the segment in the mask that you want to change.

    b) Use the **Value** knob to select the new value you want to use for that segment.

8. Use the left knob to select **Gatwy**.

    a) Use the **Field** knob to select the segment in the gateway that you want to change.

    b) Use the **Value** knob to select the new value you want to use for that segment.

9. Press the **Gatwy** knob.

10. Press the **Reboot** knob to restart the switcher in with the new static IP address.

FTP Connection (RossLinq)

You can create a File Transfer Protocol (FTP) connection from a computer to your switcher. You can use the FTP connection to copy still images and animations to and from your switcher as well as copy Edit Decision List (EDL) files from your switcher.

The procedure for creating an FTP connection from a computer varies between operating systems and client software. Consult with the documentation that came with your computer for assistance with creating an FTP connection.

To Create an FTP Connection with Windows 7

This procedure applies to Microsoft® Windows XP® Professional and Windows® 7.

1. On your computer launch Windows Explorer.

2. In the address bar, type ftp://IP Address of your switcher.
You are prompted for a username and password.

3. Type the user name for the application your are creating an FTP connection for. Each application has specific requirements. The switcher will set these requirements automatically based on the username.

- xpression – used when creating a connection from a Ross® XPression Motion Graphics System directly to the Media-Store channels on the switcher, as well as any USB drive installed in the switcher
- liveedl – used to create a connection to the LiveEDL folder on the switcher to download an edit decision list file form the switcher
- user – used to create a connection to the general storage folders on the switcher, as well as any USB drive installed in the switcher
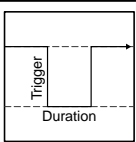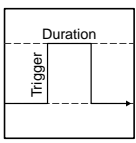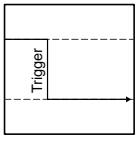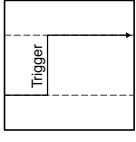
4. Enter the password password

GPI Control

General Purpose Interface (GPI) is a high/low voltage signalling protocol that allows the switcher to send simple commands to an external device, or receive commands from a device. Each pin on the GPI is set as either high (+5 Volts), or low (0 Volts), and it is the switching between high and low that sends commands to the external device, or to the switcher.

GPI Trigger Types

There are four trigger types supported by the switcher. These can be either output triggers, or input triggers.

Table 7: Trigger Types

Trigger	Description	
Low Edge	The output level is set high, and momentarily goes low for the trigger.	Trigger / Duration
High Edge	The output level is set low, and momentarily goes high for the trigger.	Duration / Trigger
Low Level	The output level toggles from the base high level to the low level. The output signal remains at this level until reset.	Trigger
High Level	The output toggles from the base low level to the high level. The output signal remains at this level until reset.	Trigger

GPI Setup

Each GPI pin on the switcher can be configured as either an input, or an output. By default, all GPIs are set as inputs.

To Set Up a GPI Input

The switcher requires a Low Edge GPI input trigger.

1. Press **MENU** > **CONFIG** > **GPIO**.
2. Use the **Pin** knob to select the GPI pin that you want to configure as an input.
3. Use the **Type**, or **I/O**, knob to select **GPI**.
4. Press the **Edit** knob.

5. Use the **Event** knob to select the action you want to assign to the selected GPI input pin.

- **<none>** — no action is taken
- **CC** — run a specific custom control
  - use the **Prop** knob to select **Bank** and the **Value** knob to select the custom control bank
  - use the **Prop** knob to select **CC** and the **Value** knob to select the custom control
- **MemRcl** — recall a memory on all MEs (use the **Value** knob to select the memory to recall)
- **FtB** — perform a fade to black on all program outputs
- **MCut** — perform a background cut on the selected ME (use the **Value** knob to select the ME, MiniME™, or MultiScreen)
- **MAuto** — perform a background auto transition on the selected ME (use the **Value** knob to select the ME, MiniME™, or MultiScreen)
- **KCut** — perform a key cut on the selected ME and Key
  - use the **Prop** knob to select **ME** and the **Value** knob to select the ME, MiniME™, or MultiScreen
  - use the **Prop** knob to select **Keyer** and the **Value** knob to select the keyer
- **KAuto** — perform a key auto transition on the selected ME, MiniME™, or MultiScreen and Key
  - use the **Prop** knob to select **ME** and the **Value** knob to select the ME, MiniME™, or MultiScreen
  - use the **Prop** knob to select **Keyer** and the **Value** knob to select the keyer number
- **AuxXpt** — select a video source on an aux bus
  - use the **Prop** knob to select **Aux** and the **Value** knob to select the aux bus
  - use the **Prop** knob to select **Input** and the **Value** knob to select the video source

To Set Up a GPI Output

A GPI output can be set as a Normal GPI output, or as a Tally output. As a tally output, the GPI output must be assigned to a video source. A GPI output in tally mode can still be used as a normal GPI output.

1. Press **MENU** > **CONFIG** > **GPIO**.
2. Use the **Pin** knob to select the GPI pin that you want to configure as an output.
3. Use the **Type** (or **I/O**) knob to select the type of trigger signal you want to use for the GPI output.

- **LowE** – low edge trigger
- **HighE** – high edge trigger
- **LowL** – low level trigger
- **HighL** – high level trigger

4. For edge triggers, use the **Dur** knob to set the length of time (in frames) that the GPI edge output remains triggered.

5. For level triggers, use the **Mode** knob to set how you want to GPI output to act.

- **Normal** — when assigned to a video source and RollClip is active, will trigger with the source going on-air, and back with the source going off-air (pre-delay values are only used when the source is going on-air)
- **Tally** — when assigned to a video source, will trigger with the source going on-air, and back with the source going off-air (RollClip and pre-delay values are ignored)

GPI Output Triggers

Each video source can have a GPI output assigned to it. This GPI can be used to trigger an external device, such as a video server, to play the cued clip when the video sources from the video server are taken on-air. This trigger can be set up to occur automatically any time the video source is transitioned on-air, or it can be triggered manually.

An automatic GPI output trigger can be overridden if required.

Note: The Next Button Secondary Function must be set to GPO to be able to trigger a GPI output manually using the NEXT button.

Keep the following in mind when working with GPI output triggers:

- The **RIClip** knob must be set to **On** to trigger a GPI output with a transition.
- Edge triggered GPI outputs remain triggered for the configured duration.
- Level triggered GPI outputs toggle between high and low each time they are triggered.

To Assign a GPI Output to a Video Source

You can set a pre-delay, or pre-roll, that will specify when the GPI is triggered in relation to taking the video source on-air. This is useful for VTR pre-roll delay and other situations where an input source is not immediately ready to be taken to air. The **RIClip** knob must be set to **On** to trigger the GPI output with the transition.

Note: You cannot assign a GPI output to Aux bus special sources (AUX PGM, AUX PV, AUX CLN).

1. Press **MENU** > **CONFIG** > **Input** > **NEXT** > **NEXT**.

2. Use the **Input** knob to select the video source that you want to assign a GPI output to.

   When you select this source on a bus, the GPI output will trigger automatically.

3. Use the **GPO** knob to select the GPI output that you want to assign to the selected video source.

4. Use the **Predly** knob to select the pre-delay interval (in frames) that the switcher waits after the GPI output is triggered before taking the input source on-air.

To Set a GPI to Be Triggered Manually

To manually trigger a GPI output, the GPI must be assigned to one of the pattern/mnemonic buttons.

1. Press **MENU** > **CONFIG** > **GPIO** > **NEXT**.

2. Use the **Bttn** knob to select the pattern/mnemonic button that you want to assign a GPI output to.

3. Use the **GPO** knob to select the GPI output that you want to assign to the button.

Live Edit Decision Lists

Edit Decision Lists are files used by non-linear editing (NLE) suites to aid in post-production. Your switcher can capture EDL data in a file that you load into your NLE suite.

LiveEDL Setup

You can configure your switcher to trigger multiple GPI outputs at the start, end, or both, of an EDL data capture to trigger video servers that are recording the feeds coming into the switcher. The EDL data from the switcher can then be paired with the feeds from the video servers, using the timecode data, in the NLE suite to edit or re-cut the show.

You can also set a pre-delay for each GPI output. EDL data capture does not begin until the highest pre-delay has passed. This is useful when the switcher needs to wait for external equipment to become ready. The example below shows the effects of various triggering and pre-delay settings.

To Set the LiveEDL Behavior

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **Config LivEDL**.

2. Use the **GPO** knob to select the GPI output that is connected to your video server.

   The GPI must be configured as a GPI output before it can be selected.

3. Use the **Trigger** knob to select when the GPI output is triggered.

   - **Off** — GPI is not triggered
   - **Start** — GPI output is triggered at the beginning of the EDL capture
   - **Stop** — GPI output is triggered at the end of the EDL capture
   - **Both** — GPI output is triggered at the beginning and end of the EDL capture

   If Start or Both is selected, you must set the pre-delay for the GPI.

4. Use the **PreDly** knob to select the pre-delay interval (in frames) that the switcher waits after the GPI output is triggered before starting to capture EDL data.

Timecode Setup

The switcher uses timecode data to mark the EDL file so that it can be used in the non-linear editing suite along with the feeds from the video servers. The timecode data can be either from an external timecode generator, or internally generated. An offset can be applied to both timecode sources.

For an external timecode, an LTC generator must be connected to the LTC port on the back of the frame.

To Confirm External LTC Signal

If you have an external linear timecode generator connected the **LTC** port on the back of the frame, you can confirm that the switcher is receiving timecode data from the switcher.

1. Press **MENU** > **STATUS** > **NEXT**.

2. Confirm that the timecode information shown on the display matches the timecode from the timecode generator.

If required, an offset can be applied to the incoming timecode data.

To Set the LTC Timecode Source

If you are using an external timecode generator, an offset, or delay, is applied to the incoming timecode signal before it is stored in the LiveEDL data file. If you are using an internal timecode, the offset is the starting time that the switcher uses for the timecode that is stored in the LiveEDL file.

> *Note: If a valid timecode signal is detected on the LTC port on the frame, the external timecode will be used even if an internal timecode is set.*

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **Config LivEDL** > **NEXT**.

2. Use the **Offset** knob to select the source of the timecode data you want to use.

   - **Ext.** — the timecode data received on the LTC port is used
   - **Int.** — an internal timecode is generated

3. Set the timecode offset for an External timecode as follows:

   a) Use the **LTCOff** knob to select the offset, in frames, that you want to delay the incoming timecode signal by.

4. Set the starting time for an Internal timecode as follows:

   a) Use the **Field** knob to select the hours, minutes, or seconds that you want to adjust.

      The timecode is shown in the [HH:MM:SS]> format.

   b) Use the **Value** knob to set the starting time in the selected field.

LiveEDL Data Capture

Capturing EDL data is manually started and stopped from the switcher. When you select to start capturing EDL data, and GPI outputs set to trigger on start are triggered. If a pre-delay has been set for the GPIs, the switcher does not start capturing EDL data until the pre-delay time has finished.

When you stop capturing EDL data, you have the option to delete the data, or save it to a USB drive. You can also connect to the switcher via FTP and download the files directly to your editing suite. Use the username liveedl and password password to create the FTP connection to the switcher.

Keep the following in mind when reviewing the EDL data from the switcher:

*   When a MediaWipe is selected as the transition type, the switcher records the transition duration as the cut point frame multiplied by two (2). This is to ensure that the cut point is recorded accurately.
*   If you used more than one ME, or Aux bus, in your shot, a separate EDL file is saved for each ME and Aux bus. The ME re-entry is shown as being selected on the first ME, and the source selections on the second ME are saved to the separate LiveEDL file. Aux bus information is only stored to a LiveEDL file when the Aux bus is not in fixed mode.

To Start Capturing EDL Data

The EDL data can be stored to one of 1000 LiveEDL files stored on the switcher. A separate file is created for each ME when the additional MEs are used.

1. Press **MENU** > **USER** > **LiveEDL**.
2. Use the **Start** knob to select the LiveEDL file on the switcher that you want to store the EDL data to.

    If the LiveEDL file already contains data, you are given the option to delete the data, or save it to a USB.

3. Press the **Start** knob to start recording.

To Stop Capturing and Save EDL Data

1. Press **MENU** > **USER** > **LiveEDL**.
2. Press the **Stop** knob to stop recording.
3. Save the EDL data to a USB as follows:
    a) Insert your USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive.
    b) Press the **Save** knob.
    c) Press the **Confrm** knob to store the LiveEDL file to the USB drive.

CarboNET

The CarboNET PMC translator allows you to connect the control panel to the frame over ethernet. The control panel connects to the CarboNET over the standard serial link and then the CarboNET connects to the frame over ethernet.

Note: The CarboNET requires the frame to have a fixed IP address so that it can connect to the frame. The frame must either be set to a static IP address, or your DHCP server must be set to always give the frame the same IP address.

CarboNET Cabling

Carbonite 2M
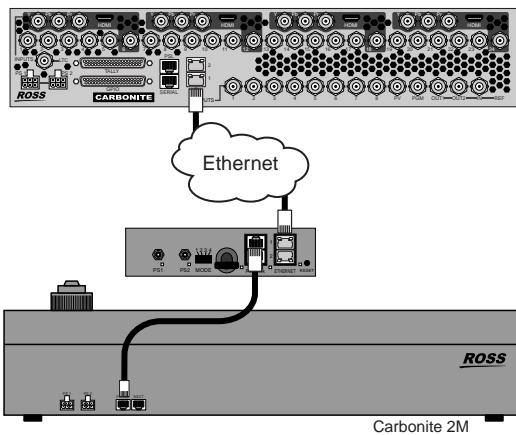
Tip: While the CarboNET is waiting to connect to the frame, the current network connection information for the CarboNET that the control panel is connected to is shown on the menu display of the control panel. This includes DHCP vs Static, IP address, subnet mask, MAC address, and gateway.

CarboNET Network Settings

By default, the CarboNET uses DHCP to automatically obtain an IP address. You can manually set a static IP address, network mask, and default gateway if your network does not have a DHCP server or if you need to set a static IP.

The CarboNET is automatically discovered in DashBoard and appears as **CarbonitePanel** followed by the MAC address of that particular CarboNET.

To Configure the Network Setting

1. Double-click on the **CarbonitePanel** node and click on the **Ethernet** tab.

    *Note: The **Current DIP Switch** field shows the state of the DIP1 and DIP2 switches on CarboNETthe control panel. Some settings do not allow you to change the IP settings from DashBoard.*

2. Click **Static** or **DHCP** to select how you want to set the ethernet settings.
3. For a static IP address, enter the IP address (**IP Address**), subnet mask (**Subnet Mask**), and gateway (**Default Gateway**) you want to use.
4. In the **Carbonite IP Address** field, enter the IP address of the frame you are connecting to.
5. Click **Apply Changes**.

To Assign a Custom Name

The name appears in the tree view in DashBoard and allows you to easily identify your particular device.

1. Double-click on the **CarbonitePanel** node and click on the **Panel Name, Permissions** tab.
2. In the **Panel Name** field, enter the new name.

DIP Switch Settings

The up position for the DIP switch is OFF.

DIP1	DIP2	DIP3	DIP4	Function
OFF	OFF			User IP Settings
OFF	ON			CarboNET DHCP IP, Frame unchanged
ON	OFF			CarboNETControl Panel IP (192.168.0.124), Frame IP (192.168.0.123)
ON	ON			reserved
		OFF		reserved
		ON		reserved
			OFF	Default Boot
			ON	Boot from memory card

Troubleshooting

Keep the following in mind if you are having trouble connecting the panel to the frame through the CarboNET:

*   Check the serial connection (PMC) between the CarboNET and the panel. The cable to the control panel must be CAT5e, or higher, Shielded Twisted Pair to a maximum of 200m.
*   If the panel is properly connected to the CarboNET, the ethernet settings of the CarboNET are shown on the menu display of the control panel.
*   Verify the ethernet settings being displayed on the panel with those set in DashBoard for the CarboNET.
*   Verify the IP address for the frame that the CarboNET should be connecting to. Are they both on the same network?

Diagnostics and Calibration

There are a number of calibration and diagnostics tools in the switcher that can be used to troubleshoot problems with your switcher.

Note: *If you are having problems with your switcher, please contact Ross Video Technical Support for assistance.*

Switcher Information and Logs

Switcher information and logs can be used to identify and diagnose problems with the switcher. Use this information when contacting Ross Video Technical Support.

Switcher Status in DashBoard

The DashBoard control system allows you to connect to the switcher and view status information for various components of the frame.

Download and install the latest version of DashBoard from http://www.opengear.tv/. Review the documentation that comes with DashBoard for information on installing and launching DashBoard.

The video processor and switcher have separate nodes in DashBoard.

Status

The Status node provides a read only overview of the state of a number of important switcher components and equipment.

The following items are available on the **Status** node:

- **Software Version** — the current version of the software running on the switcher
- **Serial Number** — the serial number of the frame
- **Engine Type** — the model of frame
- **Switcher Mode** — the current mode the switcher is operating in
- **Video Mode** — the video format that the switcher is operating in
- **Video Reference Source** — the source of video reference to the switcher
- **External Reference** — the video format of the external reference, if connected
- **Reference** — status of whether the switcher has locked to the reference format
- **Field Dominance** — the switching field
- **Ancillary Mode** — how ancillary data is handled (strip or pass)
- **Temperature** — status of the ambient temperature in the frame

- **CPU Temperature (C)** — the temperature of the frame CPU in degrees Celsius
- **FPGA Temperature (C)** — the temperature of the frame FPGA in degrees Celsius
- **Fan #1** — status of fan 1 in the frame (left fan)
- **Fan #2** — status of fan 2 in the frame (right fan)
- **Timecode** — the current timecode being received by the switcher

To View the Software Version

- Press **MENU** > **STATUS**.

The current software version (**SW Ver**) and reference format are displayed.

To Copy Logs To a USB

Switcher logs can be stored onto a USB to be sent to technical support to diagnose problems with your switcher.

Note: *Logs must be copied before a reboot or power-cycle of the switcher, or the information in them will be lost.*

1. Insert USB drive into the USB port on the switcher. Wait 5 seconds after inserting the USB drive before using it.
2. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests**.
3. Press **NEXT**.
4. Press the **Copy Logs** knob to copy the switcher logs to the USB drive.

The logs have been copied into the \switcher directory on the USB drive.

Calibration

Calibration allows you to reset the limits of the faders on the control panel and re-center the positioner with X, Y and Z limits.

To Calibrate the Switcher

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **NEXT** > **Calib Reset**.
2. Move the positioner backwards and forwards, left to right, and twist the positioner left and right a few times.
3. Move each fader from one limit to the next a few times. Do not push the fader hard when it reaches the limit.
4. Press **MENU** to save the calibration information.

System Real-Time Clock

The switcher uses an internal clock to generate the time for the clock overlay for the MultiViewer.

To Set the System Real-Time Clock

1. Press **MENU** > **CONFIG** > **NEXT** > **Clock**.
2. Press **Edit**.
3. Use the **Hour**, **Minute**, and **Second** knobs to select the current time.
4. Press the **Hour** knob.
5. Press the **Confrm** knob.

Diagnostics

Diagnostics consist of a number of tests that are used to confirm the functionality of switcher components.

Frame Diagnostic LEDs

There are a number of LEDs inside the frame that are used to diagnose the operation of the switcher.

Figure 15: Frame Diagnostic LEDs

- **FRM UPGD** — is lit when the software on the frame is being upgraded
- **1 (heartbeat)** — flashes to indicate normal operation of the frame
- **2 - 8** — unused
- **PANEL** — is lit when the frame has proper connection to the control panel
- **MC** — is not used at this time
- **POWER** — is lit when the frame is on
- **PS1** — is lit when power supply one is getting power
- **PS2** — is lit when power supply two is getting power

Frame DIP Switches

There are a number of DIP switches inside the frame that are used to diagnose the operation of the switcher.

Table 8: Frame DIP Switches

DIP	Description
1	This DIP switch forces a RAM test every time the switcher is powered on. It is in the up (off) position by default. Refer to *To Run the RAM Test* on page 48 for more information.
2	This DIP switch is unused and should be left in the default up (off) position.
3	This DIP switch is used to set the IP address of the frame to the default value (192.168.0.123). It must be in the up (off) position to set another IP address for

DIP	Description
	the frame. Refer to *Network Setup* on page 40 for more information.
4	This DIP switch prevents software upgrades. It must be in the up (off) position to upgrade the switcher.
5	This DIP switch is unused and should be left in the default up (off) position.
6	This DIP switch is unused and should be left in the default up (off) position.
7	This DIP switch is unused and should be left in the default up (off) position.
8	This DIP switch is unused and should be left in the default up (off) position.

To Run the Control Panel Test

Test the functionality of any of the buttons, knobs or fader and positioner on the control panel.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **Contrl Test**.
   The second line of the display shows the current button, knob, positioner, or fader being used.
2. Test the button, knob, positioner, and fader you want to check.
3. Press the **MENU** and **Exit** buttons at the same time to end the test. Press **MENU** and **RESET** on the C1/C10.

To Run the LED Test

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **P-LEDs Test**.
   All the buttons and indicators on the control panel cycle through different colors.
2. Press **MENU** to end the test.

To Run the Display Test

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **Disply Test**.
   A series of letters, numbers, and symbols scroll across the displays and the mnemonics cycle colors.
2. Press **MENU** to end the test.

To Run the RAM Test

The switcher can be set to perform a RAM test every time it powers on. To enable this feature, set DIP switch 1 in the frame to the down position.

Note: When a RAM test is started, it must be allowed to finish. If the test is interrupted by a power cycle, the test will continue when the switcher powers on again. This may appear as if the switcher is failing to power on correctly, or is stuck in an upgrade.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **NEXT** > **RAM Test**.
   The top line of the menu shows the result of the last RAM test.
2. Press the **Reboot** knob to run the test.
   The switcher runs the test and then reboots.
3. The results of the test are shown on the top line of the menu.
4. Press **MENU** to end the test.

To Run the Tally Test

The Tally Test turns all tallies off, and then turns each tally on consecutively. There is a three (3) second delay between each tally being toggled on. Once the last tally has been turned on, all the tallies blink on and off three times.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests**> **NEXT** > **NEXT** > **Tally Test**.
   All tallies are turned off, and then each tally is turned on consecutively. There is a three (3) second delay between each tally being toggled on. Once the last tally has been turned on, all the tallies blink on and off three times.
2. Press **MENU** to end the test.

To Run the GPI Input Test

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **NEXT** > **NEXT** > **GPI Test**.
   The second line of the menu show the state of all GPI input pins as High or Low.
2. Press **MENU** to end the test.

To Run the GPI Output Test

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Diag Tests** > **NEXT** > **NEXT** > **GPO Test**.
   All GPI outputs are turned off, and then each one is turned on consecutively. There is a three (3) second delay between each GPI output being triggered. Once the last tally has been triggered, all the GPI outputs blink on and off three times.
2. Press **MENU** to end the test.

Error Messages

The following error messages may appear when starting your switcher.

Table 9: Switcher Error Messages

Error	Description	Solution
DDR 0 Not Found; DDR	There is a problem with the switcher DDR memory. The	Re-start your switcher. If the problem persists, contact
1 Not Found; or DDR 0 & 1 Not Found	switcher may be used but many features will be limited or disabled.	Ross Video Technical Support for assistance.
Panel/Frame Mismatch	Your switcher control panel is connected to the wrong frame type.	Connect your switcher control panel to the proper frame and re-start the switcher.
Upgrade PMC?	Your switcher requires a Panel Module Controller (PMC) upgrade as part of a software upgrade. The switcher may be used without the PMC upgrade but may respond in an unpredictable manner.	Allow the PMC upgrade to proceed. Contact Ross Video Technical Support for assistance if you are unsure about upgrading your switcher.
Unknown panel type Please upgrade	The frame does not recognise the control panel. This could be caused by an unsupported panel being connected to the frame, or a problem with the panel module controlled or the configuration files.	Ensure that you have the correct control panel connected to the frame. If the problem persists, download the latest upgrade file from and force an upgrade of the switcher. Contact Ross Video Technical Support for assistance if you are unsure about upgrading your switcher.

Specifications

The information is this section is subject to change without notice.

Switcher Resources

The number of resources specific to your switcher depends on the options installed.

Resource	Carbonite	Carbonite+	Carbonite MultiMedia
2D DVE Channels per ME (Max/Min)*	8/4		
Aux Buses	8		
Chroma Keys per ME	2 (floating)		
Custom Controls	256 (8 Banks × 32 CCs)		
FSFCs (Max/Min) *	6/0	24	
GPI I/Os	34		
Keyers per ME	4		
Matte Generators per ME	2		
Media-Store Channels	4		
Media-Store CACHE	8 GB		
Memories per ME	100		
MEs (max)	2		
MiniME™ Engines	4		
MultiScreen Generators	2**		
MultiViewer Boxes	16		
MultiViewer Layouts	32		
MultiViewer Outputs	2		
Pattern Generators per ME	2		
Tallies	34		
SDI Video Inputs	24		
SDI Video Outputs	10		
Fixed Frame IP (DIP switch 3)	192.168.0.123		
Fixed Panel/CarboNET IP (DIP switch)	192.168.0.124		

Notes

- • * The number of DVE channels and FSFCs that are available depends on the switcher mode you are in. This table assumes that all options are installed.
- • ** Each MultiScreen consumes MiniME™ engines to generate the output. The number of MultiScreen outputs that are available depends on the number of MiniME™engines that are available.

Environmental Characteristics

	All Switchers
Ambient Temperature Range	0 - 40°C (32 - 104°F)
Frame Cooling	Active, Front-to-Back airflow
Control Panel Cooling	Passive

Video Input Specifications

Input Specification	Value
Equalization (using Belden 1694 cable)	>50m @ 3Gb/s
	>100m @ 1.5 Gb/s
	>300m @ 270 Mb/s (5°-40°C)
Impedance	75 ohms, terminating
Video Inputs, SDI	SMPTE 259M/292M/424M serial digital (non-looping)
Video Inputs, HDMI	HDMI 1.4
	High Speed HDMI Cable (Max 10m)
Video Inputs, Analog	Input Impedance — 75 Ohm
	Levels — 1V peak-to-peak, nominal
Reference Inputs (non-terminating, looping	Standard Definition — analog black
	High Definition — tri-level sync

Video Output Specifications

Output Specification	Value
Return Loss	<-23dB @ 1.5GHz
	<-18dB @ 3GHz
Rise and Fall Time	800ps ±10% (SD)
	240ps ±10% (HD)
Signal Level	800mV ±10%
DC Offset	0 Volts
Overshoot	<10%
HD Mode	10-bit SMPTE-292M/424M serial digital

Audio Specifications

Specification	Value
Audio Depth	24-bit AES3 in HD (20-bit in SD)

Specification	Value
Channels	8 Stereo Pairs (16 channels)
File Format	Multi-channel Waveform Audio File (.wav)
Sample Rate	48kHz
Synchronization	Locked to Video

Jitter

Specification	Value
HD - Tri-Level Sync	Alignment (> 100KHz) < 0.2UI
	Timing (<10Hz) < 1.0UI
HD - Composite Reference	Performance not guaranteed with composite reference
SD - Tri-Level Sync	Alignment (> 1KHz) < 0.2UI
	Timing (<10Hz) < 0.2UI
SD - Composite Reference	Alignment (> 1KHz) < 0.2UI
	Timing (<10Hz) < 0.5UI

System Timing

- All video inputs zero time relative to reference input, auto timing will correct for inputs out of time by up to +/- 0.25 line.
- System delay is less than 1 line.

Power Consumption — Control Panel

	C10	C1-A	C1M	C2	C2M	C2S	C2X	C3S	C3X
Consumption	24W 2.0A 12V	30W 2.5A 12V	30W 2.5A 12V	42W 3.5A 12V	50W 4.2A 12V	54W 4.5A 12V	66W 5.5A 12V	66W 5.5A 12V	84W 7.0A 12V
Input Voltage	100 - 120V~ 220 - 240V~ 47-63Hz 1.6A								

Power Consumption — Frame

	Carbonite	Carbonite+	Carbonite MultiMedia
Consumption	90W 7.5A 12V	110W 9.2A 12V	125W 10.4A 12V
Input Voltage	100 - 120V~ 220 - 240V~ 47-63Hz 1.6A		

Ports
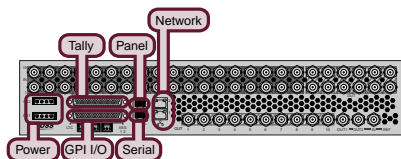
Serial Port

The serial port supports the RS-422 transmission standard in the following format:

- 38.4k Baud
- 8 bits
- 1 stop bit
- Even Parity

Table 10: Serial Port Pinouts

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
4	n/c
5	n/c
6	Rx-
7	Ground
8	Ground

GPI Port

The switcher supports 34 GPI I/Os.

Table 11: GPI I/O Pinouts

Pin	Signal
1	GPI I/O 1
2	GPI I/O 2
3	GPI I/O 3
4	GPI I/O 4
5	GPI I/O 5
6	GPI I/O 6
7	GPI I/O 7
8	GPI I/O 8
9	GPI I/O 9
10	GPI I/O 10
11	GPI I/O 11

Pin	Signal
12	GPI I/O 12
13	GPI I/O 13
14	GPI I/O 14
15	GPI I/O 15
16	GPI I/O 16
17	GPI I/O 17
18	GPI I/O 18
19	GPI I/O 19
20	GPI I/O 20
21	GPI I/O 21
22	GPI I/O 22
23	GPI I/O 23
24	GPI I/O 24
25	Ground
26	GPI I/O 25
27	GPI I/O 26
28	GPI I/O 27
29	GPI I/O 28
30	GPI I/O 29
31	Ground
32	GPI I/O 30
33	GPI I/O 31
34	GPI I/O 32
35	GPI I/O 33
36	GPI I/O 34
37	n/c

Tally Port

The switcher supports 34 fixed tallies.

Table 12: Tally Rating

Specification	Value
Input Voltage	24VAC(rms)/40VDC
Maximum Current	120mA
Impedance	<15 ohm

Note: The tally pin must be connected to the proper common to complete the circuit. For example, tally 6 on pin 7 must be connected to the common on pin 31.

Table 13: Tally Pinouts

Pin	Tally #
1	Common (pins 2-6, 20-25)
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	10
12	11
13	12
14	13
15	14
16	15
17	16
18	17
19	Common (pins 13-18, 32-37)
20	18
21	19
22	20
23	21
24	22
25	23
26	24
27	25
28	26
29	27
30	28
31	Common (pins 7-12, 26-30)
32	29
33	30
34	31
35	32
36	33
37	34

Glossary

Interlaced

An Interlaced video format starts at the top of the screen and draws all the odd number scan lines and then all the even number scan lines in sequence. This results in half the image being drawn in one pass and the other half of the image being drawn in the second. These two passes are called Fields, where the first pass is called Field 1 and the second pass is called Field 2. When both Field 1 and Field 2 have been drawn, resulting in a complete image, you have a single Frame.

Progressive

A Progressive scan video format draws each scan line in sequence, starting from the top of the screen and working to the bottom. Unlike Interlaced, with Progressive scan the entire image is drawn at one time, in a single pass. This means that there are no fields in a Progressive scan image.

Auto Key

A pairing of two video signals, a key video and a key alpha, to create a key. In the switcher, you associate the fill and alpha so that the switcher knows which alpha to use when the video is selected.

Auto Transition

An automatic transition in which the manual movement of the fader handle is simulated electronically. The transition starts when the **AUTO TRANS** button is pressed and takes place over a pre-selected time period, measured in frames.

Chroma Key

Chroma Key is a key in which the hole is cut based on a color value, or hue, rather than a luminance value or alpha signal. The color is removed and replaced with background video from another source.

Cut

An instantaneous switch from one video signal to another.

Dissolve

A transition from one video signal to another in which one signal is faded down, while the other is simultaneously faded up. The terms mix or cross-fade are often used interchangeably with dissolve.

Dynamic Host Configuration Protocol

An Ethernet protocol where a device, such as the switcher, is given an IP address by the network host. This eliminates the need to manually enter the network parameters and IP address.

Field

One half of a complete picture (or frame) interval containing all of the odd, or all of the even, lines in interlaced scanning. One scan of a TV screen is called a field; two fields are required to make a complete picture (which is a frame).

Force, Mask

An effect that forces the masked region to the foreground but is not bound by the key. For example, if you have a preset pattern key and apply a mask to it. The masked area is bound by the edges of the key pattern. When force is turned on, the masked area is filled with the video from the key (nothing appears masked) but you can move the mask outside of the key pattern and the key video is still filling the masked region.

Frame

One complete picture consisting of two fields of interlaced scanning lines.

File Transfer Protocol

A network protocol that is used to transfer files from one host computer to another over a TCP-based network.

Gain

Gain represents the range of signal values present in a video signal from a lowest to a highest point (from black to white for example). Increasing gain expands this range, while decreasing gain compresses this range. Clipping occurs if applied gain changes cause output signal values to fall outside the allowable range. Generally, increasing the gain for a specific color component causes the video signal colors to become increasingly saturated with that color. Similarly, decreasing the gain for a specific color component progressively removes that color component from the output video signal.

Gamma

Gamma corrections introduce non-linear corrections to a video signal. A gamma correction can be described as taking a point on the output versus input video signal line and pulling it perpendicularly away from the line. The result is a Bezier curve between the start, the new point, and the end point. Generally, increasing the gamma value adds more of the component to the video signal in the location of the gamma offset point. Decreasing the gamma value reduces the amount of the component in the video signal in the location of the gamma offset point. Moving the gamma offset point allows you to select

which part of the input video signal receives the gamma correction. For example, if you increase the red gamma correction to the part of the video signal that has no red component you will add red to those areas while having little effect on areas that already contain a significant amount of red. This allows you to add a red tint to the image while minimizing the amount of red-clipping that occurs.

General Purpose Interface

A simple high/low signal that is used to trigger an action either on an external device or on the switcher. A GPI can be an input or an output to the switcher.

High Definition

A high definition (720p, 1080i, or 1080p/3G) video signal.

Hue

The characteristic of a color signal that determines whether the color is red, yellow, green, blue, purple, etc. (the three characteristics of a TV color signal are chrominance, luminance, and hue). White, black, and gray are not considered hues.

Hue Rotation

Hue rotate affects the color of the entire video signal by rotating the input video hues. This produces an output video signal with colors that are shifted from their original hues. By rotating colors around the wheel, hue values will shift. For example, a clockwise rotation where yellows become orange, reds become magenta, blues become green. The more rotation applied, the further around the wheel colors are shifted.

Key

An effect produced by cutting a hole in the background video, then filling the hole with video or matte from another source. Key source video cuts the hole, key fill video fills the hole. The video signal used for cut and fill can come from the same, or separate, sources.

Key Alpha

The video signal which cuts a hole in the background video to make a key effect possible. Also called Key Video or Source. In practice, this signal controls when a video mixer circuit will switch from background to key fill video.

Key Invert

An effect that reverses the polarity of the key source so that the holes in the background are cut by dark areas of the key source instead of bright areas.

Key Mask

A keying technique in which a pattern is combined with the key source to block out unwanted portions of the key source.

Key Video

A video input which is timed to fill the hole provided by the key source video. An example of key video is the video output of a character generator.

Linear Key

Linear keys make it possible to fully specify the transparency of a key from opaque, through transparent, to fully off. The transparency is specified by the key alpha that is associated with the key video. A keyer capable of a linear key converts the key signal voltage directly to the transparency effect on the screen.

Mnemonics

A green, orange, or yellow display used to show the names of a source above or below the source button or used as a custom command or pattern button.

Offsets

Offsets shift the video signal by a set amount. Depending on the offset applied, different parts or all of the video signal may be affected. Clipping occurs if applied offsets cause output signal values to fall outside the allowable range.

Pre-Delay

A pre-delay is a delay that is inserted into a transition between the triggering of a GPI output and performing the transition. The length of the pre-delay is usually the length of time your video server requires to start playing a clip or your character generator required to load a page.

RossTalk

An ethernet based protocol that allows the control over Ross devices using plain english commands.

Standard-Definition

A standard definition (480i or 576i) video signal.

Self Key

A key effect in which the same video signal serves as both the key signal and key fill.

Shaped Key

An additive key where the Key Alpha cuts a hole based on the monochrome value of the alpha. Shades of gray are translated into either white or black, giving the key

a hard edge. Shaped Key alphas are sometimes used with Character Generators to cut very precise holes for the fill.

Split Key

A Split key allows you to assign a different alpha source for a key than the fill/alpha associations that are set up during configuration or to use a separate alpha source for a Self key.

Tally

An indicator which illuminates when the associated button, or control, is selected or is on-air.

Unshaped Key

A multiplicative key where the Key Alpha cuts a hole based on the gradient values of the alpha. Shades of gray are translated into transparency levels, giving the key a soft edge. Unshaped Key alphas can also be considered true linear alphas. Key alphas are set to unshaped by default.

Index