CARBONITE

Operation

Setup

Setup - eXtreme

Cutsheets

ROSS

Video Production Technology

Carbonite & Carbonite eXtreme

OPERATION MANUAL

v7.3

www.rossvideo.com

Video Production Technology

Document Information

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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*)

- **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+, or Carbonite MultiMedia 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 MLE Upgrade (4802DR-303)** — 1 to 2 MLE 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 MLE Upgrade (4802DR-306)** — 1 to 2 MLE upgrade instructions for the C10 control panel
- **GVG100 Supported Command (4802DR-401)** — connection and GVG100 commands supported by the switcher
- **LiveEDL Setup (4802DR-402)** — setup recording EDL files and LTC timecode source
- **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

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 (MultiMedia Frame Only)

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.

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.*

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*).

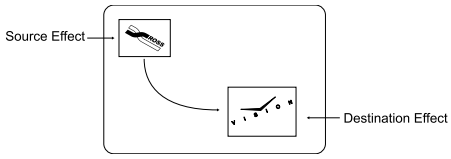
DVE

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 preset pattern keys 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 MultiMedia and Carbonite+ frames come with eight channels. The Carbonite and Carbonite eXtreme frames can select between 8 channels of DVE and no FSFC resources, or 4 channels of DVE and 6 FSFC resources.

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 MLEs as required, based on the memory that is being recalled.

General Purpose Interface

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 four (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.

Animation-Store comes standard with 8 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.

MediaWipes

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.

A MediaWipe use Media-Store channels 2 and 4 for the animation and alpha.

UltraChrome

The Ross UltraChrome™ 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.

Two floating Chroma Keys are available across both MLEs.

Memory AI Recall Mode

We take the guessing out of memory recalls by ensuring that a memory recall will not affect what is currently on-air. Memory AI 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.

Memory System

Storage for 100 complete switcher snapshots per MLE 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.

MLE Effect System

The MLE® (Multi-Level Effect) systems are standard. The number of MLEs depends on the chosen switcher model.

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

Media Manager

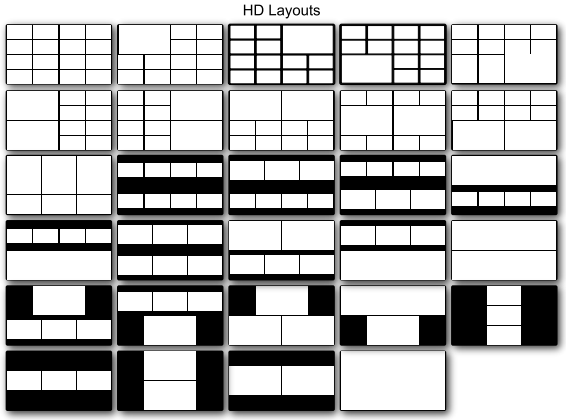
The Media Manager allows you to easily manage stills and animations on the switcher in a graphics interface.

MultiViewer

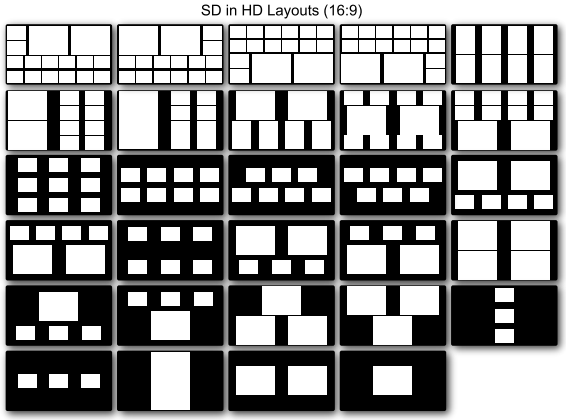
All Carbonite Multi-Definition Live Production Switchers come standard with two broadcast-quality integrated MultiViewers. Each MultiViewer allows you to view up to 16 video sources, in 29 different layouts, from a single output BNC. Any video source on the switcher, including MLE 1 and MLE 2 Program, Preview, and Media-Store channels, can be assigned to any box on the MultiViewer. All boxes on the MultiViewer include mnemonic source names and red and green tallies.

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.

HD Layouts



SD in HD Layouts (16:9)



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 MLE, 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 Carbonite Multi-Definition Live Production 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.

Control Panel Overview

This chapter provides a basic introduction to the Carbonite switcher, including an overview of the different areas on the control panel, using the menu system, as well as an introduction to the various ports, and video buses.

Control Panel Areas

Each Carbonite™ control panel is made up of a number of distinct areas that control different aspects of the switcher. Some of these areas may vary in size or function, depending on the control panel you have.

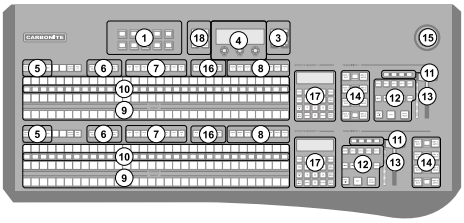


Figure 1: C2X Control Panel

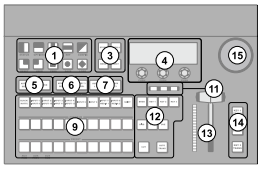


Figure 2: C10 Control Panel

1. **Pattern/Menu Selection Buttons** — These buttons are used to select a pattern for a wipe transition, or to access switcher menus. The C10/C1 control panels have the name of the menus below the pattern button.
2. **Custom Control Command Buttons** — These buttons are used to start, stop, edit, and navigate through custom controls.
3. **Menu Navigation and Memory Control Buttons** — These buttons are used to access switcher menus, move back and forth between menus, and store and recall switcher memories.
4. **Main Display and Selection Knobs** — The three selection knobs are used to adjust and select various menu items or values. The knobs are rotated to choose a value, and pressed to make a selection. The main display shows the menu system of the switcher.
5. **Key Type Buttons** — These buttons are used to choose the type of key you want to use. Use these buttons with the key select buttons to select the keyer, and the type of key you want to use.
6. **Key Select Buttons** — These buttons are used to choose which keyer is selected. The key type buttons and key bus follow the selected keyer.
7. **Aux Bus Select Buttons** — These buttons are used to choose which aux bus is selected. The aux bus follows the selected aux bus.
8. **Custom Control Bank Select Buttons** — These buttons are used to choose which custom control bank is selected. The custom control bus follows the selected custom control bank.
9. **Video Source Buses** — These buses are broken into the Preset, Program, and Key/Aux/Custom Control buses. The Preset bus is the bottom row of source buttons and selects the video source that will be taken on-air with the next background transition. The Program bus is the middle row of source buttons and selects the video source that is currently on-air on the background. The Key/Aux/Custom Control bus is the top row of source buttons and selects the video source that is chosen on the selected keyer or aux bus, or the custom control that is chosen on the selected custom control bank.
10. **Mnemonic Displays** — The mnemonic display shows the name of the source assigned to the source button directly below it. The mnemonic display-name and color for each video source can be adjusted.
11. **On-Air Lights** — These lights glow red to show which keyers are currently on-air.
12. **Transition Area** — These buttons are used to select which video source buses will be included in the next transition and what type of transition will be performed. The Cut and Auto Trans buttons are used to perform transitions. The user button on the C2X/C2S control panel is not implemented at this time.
13. **Manual Transition Fader Bar** — The fader is used to manually control the rate of a transition. What is being transitioned, and the type of transition, are controlled from the Transition Area.
14. **Keyer Transitions Buttons** — These buttons are used to perform cuts or auto transitions on keys directly, without having to include them as part of the next transition.
15. **Positioner** — The positioner is used to control some wipe, border, and wash parameters, as well as some external devices.

16. **MLE Selection Buttons** — These buttons are used to assign the control panel row to an MLE. The two user buttons are not implemented at this time.
17. **Effects Memory Area** — This area is user to store and recall memories on the assigned MLE, and to select the various transition rates used on the switcher.
18. **Memory Store/Recall Buttons** — These buttons are used to store or recall memories to one or more MLEs at the same time.

Menu System

The menu system is accessed either by pressing **MENU** and the Pattern/Menu Selection button for the menu you want to access, or through an auto-follow for selected functions.

Menu Navigation

The menu system allows you to access all of the setup and configuration information for the Carbonite switcher. In some cases, a menu can be accessed either by pressing the **MENU** button and navigating to the menu, or be double-pressing a button on the control panel.

1. Press **MENU**. The Pattern/Selection Mnemonics change to the menu names. On the C10/C1, the Pattern/Menu Selection buttons light up.
2. Press the Pattern/Menu button for the menu you want to navigate to. The first page of the menu is shown on the display.
3. Press **NEXT** to navigate to the next page of the current menu. If the **NEXT** button is not lit, there are no other pages to the current menu.

Tip: *If you want to return to the first page of a menu, press and hold **NEXT** and press **HOME** (**STORE** on the C10/C1). You can also navigate up one level in a menu tree by pressing and holding **NEXT** and pressing **UP** (**RECALL** on the C10/C1).*

Auto-Follow Menus

The switcher navigates to auto-follow menus automatically when you select certain functions on the switcher. For example, when you press the **KEY 1 SEL** button, the key adjustment menu is shown on the display.

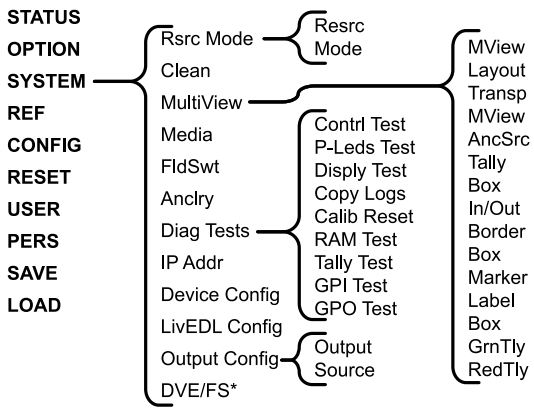
Auto-Follow functionality also applies to video source buttons that have external devices assigned to them. If you select a source button that an external device is assigned to, the peripheral control menu for that specific device is shown.

Menu Trees

The items on the branches of the menu tree can change, depending on the selections that are made on that branch. The menu trees below show the default state of the menu system.

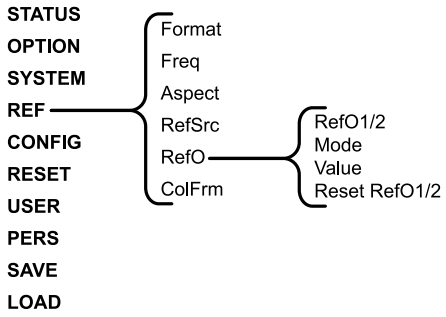
The Status and Options menus display the software version and reference format and the hardware serial number.

System



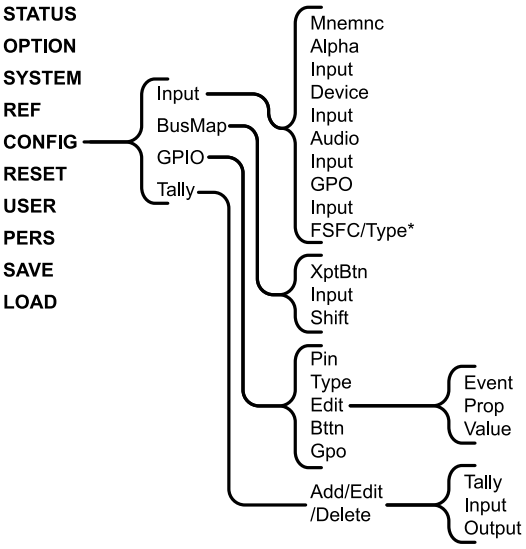
Note: *The **DVE/FS** menu item is only available on the Carbonite and Carbonite eXtreme frames.*

Reference (Ref)



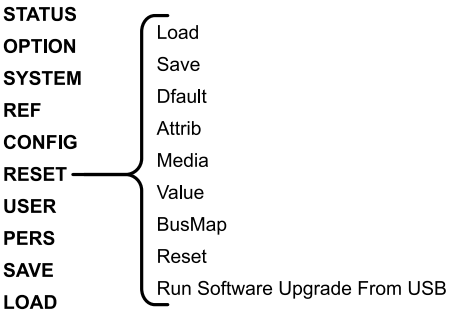
Note: *The **ColFrm** and **RefO** menu items are not available on the Carbonite eXtreme frame.*

Configuration (Config)

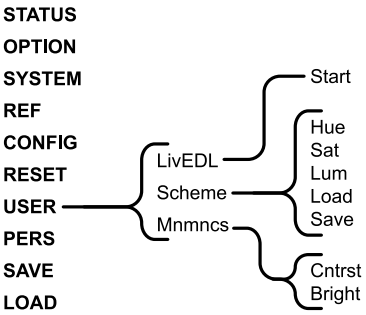


Note: *The **FSFC** menu item is labelled **Type** when a MultiMedia input on the MultiMedia frame is selected.*

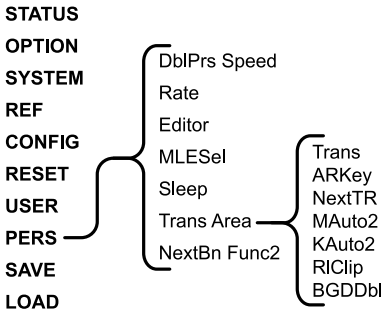
Reset



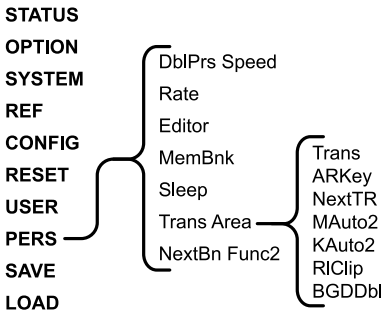
User



Personality (Pers) (C10/C1)

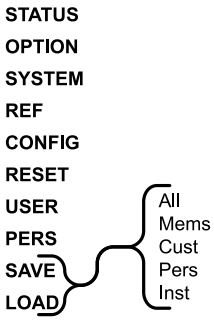


Personality (Pers)



Note: *The **MemBnk** option is only available on the C2X/C2S control panel.*

Save/Load



Switcher Basics

This chapter gives an overview of how video is controlled by your switcher. This includes video sources, video layering and re-entry, and preview. For information on setting up video inputs, refer to the Setup Guide that came with your switcher.

Video Sources

The switcher has access to two basic types of video sources, external and internal. All video sources can be assigned to video source buttons. By pressing a video source button on a bus, the video source assigned to that button is selected on that bus.

- **External** — External video sources come from cameras, video servers, character generators, or other external devices into the switcher.
- **Internal** — Internal video sources come from internally generated video, such as Media-Stores™, matte color, and black.

To Select a Source on a Bus

To select a video source on a bus, you must identify the MLE and bus you want to assign a video source to, and then press the source button you want to select on that bus.

Tip: *On the single row panels, you must select the **MLE 1** or **MLE 2** button to assign the buses to that MLE.*

Tip: *Source selection can also be made from the **Buses** tab on the Live Assist node in DashBoard. Key bus source selections can also be made using the **Key Source** button on the **Keyers** tab on the Live Assist node in DashBoard.*

- **Program Bus** — Select a source on the PROGRAM bus.
- **Preset Bus** — Select a source on the PRESET bus.
- **Key Bus** — Select a source on a KEY bus.
  - **Key 1** — Press **KEY 1 SEL** to assign the KEY/AUX/CUSTOM CONTROL bus to Key 1 and select a source on the bus.
  - **Key 2** — Press **KEY 2 SEL** to assign the KEY/AUX/CUSTOM CONTROL bus to Key 2 and select a source on the bus.
  - **Key 3** — Press **KEY 3 SEL** to assign the KEY/AUX/CUSTOM CONTROL bus to Key 3 and select a source on the bus.
  - **Key 4** — Press **KEY 4 SEL** to assign the KEY/AUX/CUSTOM CONTROL bus to Key 4 and select a source on the bus.
- **Aux Bus** — Press **AUX #** and press the knob for the Aux Bus you want to select.

  You can also select the Aux Bus directly using the Aux buttons.

Tip: *You can assign special sources to an Aux Bus by pressing and holding the **AUX #** button and pressing the **AUX PGM** (Program), **AUX PV** (Preview), or **AUX CLN** (Clean Feed) source button on the Preset bus. These are the first three buttons on the row.*

For information on assigning video inputs to source buttons, refer to the Setup Guide that came with your switcher.

Video Layering

How video is layered in the output of the switcher depends on how an MLE is re-entered onto the other, and what keyers are on-air for the MLE. If we assume that each MLE has all keyers on-air, and that MLE 1 is re-entered into the MLE 2, the layering will start with MLE 1 Background and progress to MLE 2 Keyer 4.

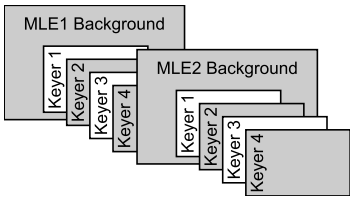


Figure 3: Video Layering

MLE Re-Entry

Re-entry is the term used to describe the process of selecting another MLE on an MLE. For example, if you select MLE 1 on MLE 2, MLE 1 is said to be re-entered onto MLE 2. Re-entry takes the output of an MLE and uses it as the background or key on the other MLE. If you select an MLE on the background bus, the MLE becomes background video source of the other MLE. If you select an MLE on a Key Bus, the MLE becomes the key source of the other MLE.

Keep the following in mind when working with re-entries:

- You cannot re-enter MLE 2 into MLE 1.
- You cannot re-enter an MLE, or the Clean Feed of an MLE, into itself.

To Re-Enter an MLE

1. Set up MLE 1 with a background and a key.

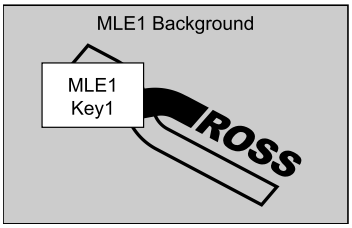


Figure 4: MLE 1

2. Set up MLE 2 with a key.

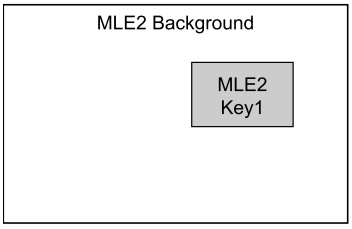


Figure 5: MLE 2

3. Select MLE 1 as a source on the Background Bus of MLE 2. Notice that the output of MLE 1 is now being used as the background of MLE 2.

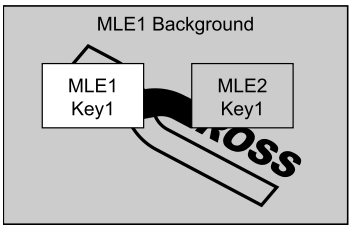


Figure 6: MLE 1 Re-entered onto MLE 2

FlexiClean Clean Feed

FlexiClean™ 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.

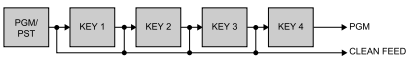


Figure 7: Clean Feed Modes

Video Preview

Video preview allows you to use an additional monitor to preview what the next shot is going to be. The preview for an MLE shows what is selected for the next transition on that MLE. This includes the keys and background video sources that will be on-air after the next transition.

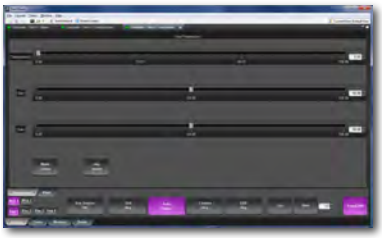
MultiViewer

Each MultiViewer allows you to view up to 16 video sources, in 29 different layouts, from a single output BNC. Any video source on the switcher, including MLE 1 and MLE 2 Program, Preview, and Media-Store channels, can be assigned to any box on the MultiViewer. All boxes on the MultiViewer include mnemonic source names and red and green tallies.

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.

DashBoard

The DashBoard Control System™ allows remote access to multiple pieces of Ross Video equipment, including openGear® cards, Carbonite production switchers, and BlackStorm video servers. From the DashBoard client you can control the various cards in your openGear frame, load media into a channel on BlackStorm, or set up a Chroma Key on Carbonite.



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.

Note: *If you are using Carbonite eXtreme, you must use DashBoard 6.0 BETA, or higher.*

Connecting to the Switcher

You must manually connect DashBoard to the switcher to establish communications. Once connected, DashBoard will remember the connection until you remove it.

To Manually Connect to Carbonite from DashBoard

You need the IP address of your switcher to connect to it manually from DashBoard.

1. Click **File** > **New** > **TCP/IP openGear Frame**.
2. In the **IP Address** field, enter the IP address of the switcher frame.

   Tip: *The IP address can be found by pressing **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **IP Addr**.*

3. In the **Display Name** field, enter the name you want to appear in the **Tree View**.
4. On the **Port** list, select **5253**.
5. Click **Finish**.
   The switcher frame appears in the **Tree View**.
6. Expand the frame indicator to show the device interface indicators.
7. Double-click on a device interface indicator to view it in the device editor.
   - **Live Assist** — controls the keyers and transition area of the switcher
   - **Status** — provides the current status of the switcher

Live Assist

The Live Assist node provides a graphical interface to the Keying, Transition, and memory settings of the switcher. You can switch between the different settings by selecting the tabs at the bottom of the DashBoard window.

PaneLINK

Live Assist can be set to either mirror actions on the switcher control panel, or only show actions on the currently selected MLE and Keyer on the current tab. For example, with **PaneLINK** turned on, pressing **KEY 1 SEL**, **WIPE**, and then **SELF KEY** causes Live Assist to show the **Keyers** tab, the **Trans** tab, and then the **Keyers** tab again. With **PaneLINK** turned off, Live Assist does not switch between tabs.

The **PaneLINK** button is located at the bottom right corner of the window.

Configuration

The Configuration node provides a graphical interface to the Reference, Mnemonics, Outputs, and MultiViewer settings of the switcher. You can switch between the different by selecting the tabs at the bottom of the DashBoard window.

Note: *Carbonite Configuration in DashBoard requires a screen resolution of 1920×1080.*

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
- **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

ViewControl

The ViewControl™ interface through DashBoard allows you to coordinate control of the Carbonite™ switcher, XPression™ Live Graphics System, and the BlackStorm™ Playout Server all through a touchscreen interface. Through ViewControl you can select sources, perform transitions, and run custom controls.

Keep the following in mind when working with ViewControl

- ViewControl requires DashBoard 5.1, or later.
- Only the sources assigned to the MultiViewer boxes are available for direct selection. Custom controls can be used to select other sources.
- A running custom control, or a custom control that is paused or held, are not shown on the ViewControl interface.
- The control panel does not follow key and bus selections made on ViewControl.

ViewControl Overview

The ViewControl interface provides quick access to a number of custom control buttons as well as the transition functionality of the switcher.

Custom Control Buttons

The custom control buttons can be assigned any custom control on the switcher and given unique names and icons. The button groups on the left (shown below) are organized into groups, or tabs.

Figure 8: Custom Control Buttons

Bus Selection Buttons

The bus selection buttons allow you to select the different buses on different MLEs of the switcher.

To select a source on a bus, press the bus selection button and press the MultiViewer box for the source you want to select. For example, to select camera 1 on MLE 2 Key 3, press **M2 K3** and then press the box for the camera 1 source.

Figure 9: Bus Selection Buttons

Keyer Transition Buttons

The Keyer Transition buttons allow you to perform a cut or dissolve of the keys on the Program bus, without having to include them as part of the next transition. These buttons act the same as the Keyer Transition Buttons on the control panel.

Tip: *The Cut buttons turn red when a key is on-air.*

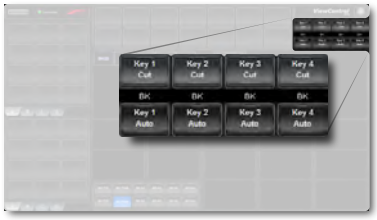


Figure 10: Keyer Transition Buttons

Transition Buttons

The transition buttons allow you to select what is included in the next transition, what type of transition is to be performed, and perform the transition. These buttons function similarly to the buttons in the Transition Area on the control panel.

Tip: *The Transition Buttons on ViewControl only control the transition are of MLE 2. To control MLE 1 you can create a custom control to perform the effect you want and assign it to one of the custom control buttons.*

Figure 11: Transition Buttons

Custom Control Button Setup

When you assign a custom control to a button, you can give that buttons a unique name and assign an icon to it. The images for the icons must be on a USB drive in the frame when you assign them. Once assigned the icons are stored in the frame and the USB can be removed. Each of the tabs can be named.

The configuration of the tabs and custom control assignment to buttons are stored with the switcher personality settings.

To Set up the Custom Control Buttons

If you want to assign icons to the custom control buttons, you must have the images you want to use for the icons stored on a USB drive installed in the frame. After the images have been assigned you can remove the USB drive.

1. Click the  icon in the upper right corner of the window.

Figure 12: ViewControl Edit Button

2. Press the custom control button that you want to set up.
3. Enter a name for the button in the **Button Name** field.

> **Tip:** *You can change the name of a tab by selecting a button on the tab and then entering a new name in the **Group Name** field.*

4. Click the **Bank** button and select the number of the bank you want to select a custom control from.
5. Click the **CC #** button and select the number of the custom control you want to assign to the button.
6. Navigate the files on the USB drive and click the image you want to assign as the icon for the button.

> **Tip:** *Press **Default Icon** to switch back to the default icon.*

7. Set up additional custom control buttons as required.
8. Press **Done** when you are done setting up custom control buttons.

Transitions

Transitions are used to change the background video and take keys on and off-air. A transition can include any combinations of background and keyers for an MLE. The background and each keyer can be transitioned independently and at the same time using the dedicated **KEY CUT** and **KEY AUTO** buttons.

Performing Transitions

What you can include in the transition, and the type of transition you can perform, depend on the number of media resources you have, and if you are performing a background and keyer transition at the same time.

Keep the following in mind when performing transitions:

- If any of the sources going on-air have an assigned GPI output, the GPI output is triggered and the switcher then waits the configured pre delay interval before performing the transition. If you perform a transition with the fader handle, the GPI output is triggered but the pre delay interval is ignored.
- If any of the sources going on-air are assigned to a video server, you can have the video server play when the source is taken on-air by using the **RIClip** knob to select **On**.
- If any of the sources going on-air are assigned to a video server, the switcher waits for the configured pre delay interval before performing the transition. If you perform a transition with the fader handle, the pre delay interval is ignored.
- If the fader is moved during an auto transition, control of the transition is passed to the fader. You must complete the transition with the fader. This allows you to override any auto transition in progress with the fader.
- A key only transition can be performed by pressing the **KEY CUT** or **KEY AUTO** button for the key you want to transition.
- You can pause an auto transition by pressing the **AUTO TRANS** button during the transition. Press the button again to continue the transition.

Understanding the Transition Menu

When you select a transition type button, the menu system displays a number of options that allow you to adjust how a transition is performed or appears. The options that are available depend on the type of transition that is selected.

Table 1: Transition Menu Items

Menu Item	Description
Time	selects the amount of time (Transition Rate), in frames, that an auto transition takes
RIClip	selects whether GPI outputs assigned to input sources are triggered before a transition
Dirctn	selects the direction that the wipe is performed (forward or reverse), as well as turns the Flip-Flop feature on or off
Key #	selects the amount of time, in frames, that an auto transition dissolve for the keyer takes
Pattrn	selects the pattern for the wipe transition
X Pos	selects the horizontal position for the wipe pattern
Y Pos	selects the vertical position for the wipe pattern
Aspect	selects the aspect ratio for the wipe pattern
Border	turns the border feature on and selects the size of the border on the wipe pattern
Soft	selects the amount of softness that is applied to the wipe border
Load	selects the color for the wipe border from a pre-set list
BHue	adjusts the hue of the wipe border color
BSat	adjusts the saturation of the wipe border color
BLum	adjusts the luminance of the wipe border color
Rot	selects the rotation for the wipe pattern
HMult	multiplies the wipe pattern horizontally (1-32)
VMult	multiplies the wipe pattern vertically (1-32)
Browse	selects an animation for a media transition
Attrib	used with the **Value** knob to adjust parameters for the MediaWipe (*Media-Store Attributes* on page 46)
Func	selects how the **Attrib** adjustments are saved
Limit	turns the Transition Limit feature on or off
Effect	selects the pattern for the DVE transition

To Perform a Transition

All transitions, with the exception of cuts on the background or key bus, have the same basic setup. To perform a transition, you must select what sources you want to transition on what buses, and how you want the transition to appear.

1. In the Transition Area, select the elements (**BKGD KEY 1 KEY 2 KEY 3 KEY 4**) you want to include in the next transition. To select multiple keys and background, press and hold the first element, and select the additional elements.
2. Select the video sources you want to take on-air on the program and key buses.

3. Select the type of transition (**DISS WIPE DVE MEDIA**) you want to perform.

   Note: *On the C2X/C2S control panel, the **USER** button is not implemented at this time.*

4. Use the **RIClip** knob if you want any video servers clips assigned to a source being taken on-air to play with the transition (**On**).
5. Perform the transition.

   Tip: *You can preview the transition on the preview output by pressing and holding the transition type button and perform the Auto Trans or Fader transition. You cannot preview the independent key-only transitions.*

   - **Auto Transition** — Press **AUTO TRANS**. The transition is performed at the set transition rate.
   - **Cut** — Press **CUT**.
   - **Fader** — Move the fader from one limit to the other. The rate at which you push the fader determines the rate of the transition.

   If a pre-delay has been set, the switcher will apply the pre-delay interval before performing the transition.

To Override the Pre-Delay Setting

During the pre-delay time, you can override the pre-delay count and cut the sources on-air immediately.

- While the switcher is waiting for the pre-delay countdown to complete, perform one of the following
  - Press the source button on the background bus that is going-on air. The pre-delay countdown and the transition are aborted and the source is cut to air on the background bus.
  - Initiate a transition with the fader handle. The pre-delay countdown is aborted and the transition proceeds as you move the fader handle.

To Abort a Transition During the Pre-Delay

During the pre-delay time, you can abort the transition completely.

- While the switcher is waiting for the pre-delay countdown to complete, perform one of the following
  - Press any source button on any bus other than the source button on the background bus that is going-on air.
  - Press the **BKGD** or **Key #** button in the next transition area.
  - Press the **CUT** or **AUTO TRANS** button.
  - If a key is included in the transition, press one of the dedicated key transition button.
  - Recall a memory. The pre-delay countdown and transition are aborted and the memory register is recalled.

Cut Transitions

A Cut is an instantaneous transition between video sources. Unlike all the other transition types, there are no intermediate steps between the video source that is on-air, and the video source you are transitioning to.

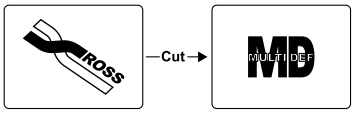


Figure 13: Example Cut Transition

A cut is performed either by selecting difference sources on a background or key bus, or by pressing a **CUT** button.

Dissolve Transitions

A Dissolve is a gradual fade between video sources. For a Background transition, the video signal on the Background bus and the video signal on the Preset bus are mixed together until the Preset bus video signal completely replaces the Background bus video signal.

Figure 14: Example Dissolve Transition

To Set Up a Dissolve

A dissolve transition requires that you set a background and key transition rate for the auto transition. A fader transition does not use the transition rate.

1. Press **DISS**.
2. Use the **Time** knob to set the length of the background transition.

   Tip: *You can also select a time by pressing one of the **5** through **60** buttons.*

   Tip: *If you have a C2X/C2S control panel, press **MLE RATE** in the Effects Memory area for the MLE you want to change the rate for, use the keypad to enter the new rate, and press **Enter**.*

3. Press **NEXT**.
4. Use the **Key #** knobs to select the length of the key transitions.

Tip: *If you have a C2X/C2S control panel, press **KEY RATE** in the Effects Memory area repeatedly to select the Keyer you want to set the rate for, use the keypad to enter the new rate, and press **Enter**.*

Wipe Transitions

A Wipe is a gradual transition where one video signal is replaced with another according to a wipe pattern. In the example below, a line wipe is being used.

Figure 15: Wipe Transition

For Key transitions, the key is wiped on or off-air with the transition and the background remains untouched. The duration of a wipe transition depends on either the transition rate for the MLE, or the rate at which the fader is moved.

To Set Up a Wipe

A wipe transition requires that you select a wipe pattern, set the direction and number/size of wipe pattern, as well as set a background and key transition rate for the auto transition. A fader transition does not use the transition rate.

1. Press **WIPE**.
2. Use the **Time** knob to set the length of the background transition.

   Tip: *If you have a C2X/C2S control panel, press **MLE RATE** in the Effects Memory area for the MLE you want to change the rate for, use the keypad to enter the new rate, and press **Enter**.*

   Tip: *If you have a C2X/C2S control panel, press **KEY RATE** in the Effects Memory area repeatedly to select the Keyer you want to set the rate for, use the keypad to enter the new rate, and press **Enter**.*

3. Use the **Dirctn** knob to select the direction that the wipe travels.
4. Press the **Dirctn** knob to toggle Flip-Flop on. With Flip-Flop on **FF**, the wipe runs forward during the first transition and then reverse during the second.
5. Press **NEXT**.
6. Use the **Pattrn** knob to select the wipe pattern you want to use. You can also select the pattern by pressing the pattern button directly.
7. Use the **X Pos** knob to position the wipe pattern horizontally. You can also use the positioner.
8. Use the **Y Pos** knob to position the wipe pattern vertically. You can also use the positioner.
9. Press **NEXT**.
10. Use the **Aspect** knob to adjust the aspect ratio of the pattern. Not all patterns can be adjusted.
11. Use the **Border** knob apply a border to the wipe. Refer to the section *To Apply a Border to a Pattern* on page 22 for information on borders.
12. Press **NEXT**. If a border is applied to the wipe, you must press **NEXT** multiple times to get to the next step.
13. Use the **Rot** knob to rotate the pattern. Not all patterns can be rotated.
14. Use the **HMult** knob to multiply the pattern horizontally.
15. Use the **VMult** knob to multiply the pattern vertically.

To Apply a Border to a Pattern

1. Press **WIPE** > **NEXT** > **NEXT**
2. Use the **Border** knob to adjust the size of the border around the pattern.
3. Use the **Soft** knob to adjust the softness of the pattern border.
4. Press **NEXT**.
5. Select a color for the border.
   - Use the **Load** knob to select a preset color for the border.
   - Press **NEXT** and use the **BHue**, **BSat**, and **BLum** knobs to select your own color.

DVE Transitions

A DVE transition is a gradual transition where one video signal is replaced with another according to a 2D DVE pattern.

Keep the following in mind when performing DVE transitions:

- You must include the background when performing a DVE transition on a Chroma Key, Self Key, or Auto-Select Key. If you do not include the background, a dissolve transition is performed.
- Performing a DVE transition on a DVE Key without including the background scales the transition effect to the size of the DVE Key. This transition does not consume an additional DVE resource.

- Performing a DVE transition on a DVE Key with the background included does not scale the transition effect. This transition consumes the second DVE resource.

To Set Up a DVE Transition

A DVE transition requires that you select the DVE pattern and duration for the transition.

1. Press **DVE**.
2. Use the **Time** knob to set the length of the background transition.

   Tip: *If you have a C2X/C2S control panel, press **MLE RATE** in the Effects Memory area for the MLE you want to change the rate for, use the keypad to enter the new rate, and press **Enter**.*

   Tip: *If you have a C2X/C2S control panel, press **KEY RATE** in the Effects Memory area repeatedly to select the Keyer you want to set the rate for, use the keypad to enter the new rate, and press **Enter**.*

3. Use the **Dirctn** knob to select the direction that the wipe travels.
4. Press **NEXT**.
5. Use the **Effect** knob to select the DVE pattern you want to use. You can also select most of the patterns by pressing, or double-pressing, the pattern button directly.
   - **PushL** — Push Left
   - **PushR** — Push Right (double-press)
   - **PushU** — Push Up
   - **PushD** — Push Down (double-press)
   - **SqzHor** — Squeeze Horizontally
   - **SqzVert** — Squeeze Vertically (double-press)
   - **SqzCtr** — Squeeze to the Center
   - **PushUL** — Push to Upper-Left
   - **PushUR** — Push to Upper-Right (double-press)
   - **PushDL** — Push to Lower-Left (double-press)
   - **PushDR** — Push to Lower-Right (double-press)
   - **SqzUR** — Squeeze to Upper-Right
   - **SqzUL** — Squeeze to Upper-Left
   - **SqzDR** — Squeeze to Lower-Right (double-press)
   - **SqzDL** — Squeeze to Lower-Right (double-press)
   - **CirclL** — Circle Left
   - **CirclR** — Circle Right (double-press)
   - **FlyTru** — Fly Through (double-press)
   - **Strtch** — Stretch Horizontally to Black
   - **Tumble** — Tumble Down (double-press)
   - **1000lb** — Falls and then Bounces
   - **SqzU** — Squeeze Up
   - **SqzD** — Squeeze Down
   - **SqzL** — Squeeze Left
   - **SqzR** — Squeeze Right

MediaWipe Transitions

A MediaWipe™ allows you to use an animation to cover a transition. When the transition starts, the switcher plays the selected animation over top of the background and keys that are being transitioned. When the cut point is reached, the switcher performs a cut transition.

It is important to use a full-screen image in the animation at the cut point so that the cut is not visible on-air.

Keep the following in mind when performing MediaWipes:

- Although you can select a still image for a media transition, it is not recommended.
- Only Auto Transition should be used for Media transitions. Using the fader to perform the transition manually could result in jumps in the animation.
- The duration of the transition (Time) is set by the length of the animation and the play speed of the animation.
- The audio associated with a MediaWipe is embedded in the video stream of the MLE that the transition is performed on. The audio can also be taken out of the video stream of the Media-Store channel used for the MediaWipe. The **M1MW** and **M2MW** outputs are dedicated to these Media-Store channels.

To Set Up a MediaWipe

A MediaWipe™ requires that you select the animation you want to use. How the animation plays and appears during the transition is stored in the animation. Refer to *Media-Store* on page 44 for information animations.

1. Press **MEDIA**.

   Tip: *Press and hold the **MEDIA** button and select the Media-Store channel you want to assign the animation to on the Preset bus. The Media-Store channels must be assigned to source buttons with the bus map to be*

selectable. The Media-Store Mode must be set to Swish+.

2. Use the **Dirctn** knob to select the direction that the wipe travels.
3. Press **NEXT**.
4. Press the **Browse** knob.
5. Use the **Browse** knob select the location where the animation is stored. You can also load an animation by entering the media number using the pattern buttons.
   - **Internal(0)** — Internal cache (flash memory containing sample images only)
   - **USB(1)** — USB drive installed in the frame
6. Press the left knob.
7. Use the left knob to select the animation you want to use for the transition.
8. If you have not set a cut frame for the animation, use the fader to move through the animation to the point where you want the video behind the animation to cut to the new video source.
9. Press and hold the **MEDIA** button and press **CUT** to set the new cut frame.

Transition Limits

The Transition Limit allows you to set the point in a transition where an auto transition stops. When active, the point in the transition where the auto transition will stop is indicated by a flashing segment on the transition progress bar next to the fader handle. The auto transition proceeds to this point and stops. The second auto transition starts from the transition limit point and either goes back to where the first transition started.

Tip: *If you turn Limit off when the transition has stopped at the transition limit point, the next transition starts from the transition limit point and goes forward to complete the transition, instead of going back to the start.*

To Set Up a Transition Limit

A transition limit is set using the fader of the MLE that you want to set up the transition limit on. The transition limit is specific to the MLE it is set on.

1. Set up the transition you want to perform.
2. Press **NEXT** until **Limit** is shown on the menu.
3. Move the fader to the position in the transition where you want to set the transition limit point.
4. Toggle the **Limit** knob (**On**) to set the transition limit point.

   The segment on the transition progress bar next to the fader handle flashes, indicating the location of the transition limit point.

The transition limit is set and active for the MLE you set it on. You can turn transition limit on and off by toggling the **Limit** knob while the fader is at either the top or bottom limit. If the fader is not on a limit when you toggle the transition limit on, a new transition limit will be set. Double-press the **Limit** knob to reset the transition limit point.

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 Manually Trigger a GPI Output

The GPI must already be set up as a output and the Next button functionality must be set to GPO before you can manually trigger it.

1. Press and hold the **NEXT** button.

   While holding the Next button, the mnemonic/pattern buttons light for each GPI output that is currently triggered.
2. Press the mnemonic/pattern button for the GPI output you want to trigger. The number of the GPI is shown on the mnemonics of the buttons. The numbers on the pattern buttons on the C10/C1 correspond to the GPI.

To Override a GPI Output

The RlClip personality option must be set to User for you to override GPI output triggering.

1. Prepare the transition as required, but do not perform the transition.
2. Press the transition type button again to bring up the transition menus.
3. Use the **RlClip** knob to select whether the GPI output is triggered (**On**), or is not triggered (**Off**).

Patterns, Washes, and Mattes

Patterns, Washes, and Mattes are internally generated graphical elements that can be used for key or background fill, key shapes, and transition effects. The switcher has a limited number of pattern and matte generators dedicated to each MLE.

Patterns

Pattern generators are used for wipes, masks, and washes. Each pattern generator can create a single pattern output that can be adjusted to create a specific look.

Patterns can be applied to the following:

- **Wipes** — Press **WIPE**.
- **Masks** — Select the key you want apply the mask to and use the **Mask** knob to select **Pattern**.
- **Washes** — Select the matte generator (**BG**) on a background or key bus and use the **Wash** knob to select **On**.

To Set Up a Pattern

When a pattern generator is assigned to a wipe, mask, or wash, the pattern setting are displayed. Selecting the **WIPE** button, **KEY SEL** button, or the matte generator (**BG**) returns to this menu. When a pattern generator is assigned the pattern settings are part of the setup menu.

1. Use the **Pattrn** knob to select the wipe pattern you want to use. You can also select the pattern by pressing the pattern button directly.
2. Use the **X Pos** knob to position the wipe pattern horizontally. You can also use the positioner.
3. Use the **Y Pos** knob to position the wipe pattern vertically. You can also use the positioner.
4. Press **NEXT**.
5. Use the **Aspect** knob to adjust the aspect ratio of the patten. Not all patterns can be adjusted.
6. Use the **Border** knob to apply a border to the wipe.
7. Press **NEXT**. If a border is applied to the wipe or mask, you must press **NEXT** multiple times to get to the next step.
8. Use the **Rot** knob to adjust the aspect ratio of the patten. Not all patterns can be rotated.
9. Use the **HMult** knob to multiply the pattern horizontally.
10. Use the **VMult** knob to multiply the pattern vertically.

Washes

Washes are applied to matte generators selected on the background or key buses and allow you to apply a two-color affect based on a selected pattern.

To Set Up a Wash

A wash applies colors to a pattern selected for a matte. The first color is preset to the matte color, but both are selectable. Selecting the source button again, or KEY SEL button returns to this menu. Refer to the sections on mattes and patterns for information on setting them up. You can load a preset color instead of creating the first custom color.

1. Use the **Hue 1** knob to adjust the hue of the first custom color.
2. Use the **Sat 1** knob to adjust the saturation of the first custom color.
3. Use the **Lum 1** knob to adjust the luminance of the first custom color.
4. Press **NEXT**.
5. Use the **Wash** knob to select **On**.
6. Press **NEXT**.
7. Use the **Size** knob to select the size of the wash pattern.
8. Press **NEXT** > **NEXT** > **NEXT** > **NEXT**.
9. Use the **Hue 2** knob to adjust the hue of the second custom color.
10. Use the **Sat 2** knob to adjust the saturation of the second custom color.
11. Use the **Lum 2** knob to adjust the luminance of the second custom color.

Mattes

Mattes are solid color signals that can be applied to backgrounds and keys, and borders. Color selection is done either by picking a preset color, or by adjusted hue, saturation, and luminance to create a custom color.

Mattes can be applied to the following:

- **Background** — Select the matte generator (**BG**) on a background or key bus. The full region of the background or key is filled with the selected color.
- **Border** — Assign a border to a **WIPE** transition or a key. The wipe border is filled with the selected color.

To Set Up a Matte Color

When a matte generator is assigned to a background or key, the matte setting are displayed. Selecting the source button again, or **KEY SEL** button returns to this menu. When a matte generator is assigned to a key border or wipe border, the matte settings is part of the setup menu, and become active when **Border** is set to greater than 0.

1. Press **NEXT**.
2. Use the **Load** knob to select the preset color you want to use.
3. Press the **Load** knob to load the selected color. If you want to use the preset color, ignore the rest of this procedure.
4. Press **NEXT**.
5. Use the **Hue** knob to adjust the hue of your custom color.
6. Use the **Sat** knob to adjust the saturation of your custom color.
7. Use the **Lum** knob to adjust the luminance of your custom color.

Keying

Keying is the term used to describe when you insert (or electronically cut) portions of one scene into another, or place titles over background images. Keys are made up of two basic components, an alpha, that cuts the hole in the background video, and a fill, that fills the hole with different video.

Keys, like MLEs, are layered onto the background video signal from the lowest numbered key to the highest on an MLE.

Note: *DashBoard Live Assist will not notify you of error messages or if a confirmation is required. For example, if there are no available resources for the DVE Key, or Chroma Key, you are trying to create, the switcher will not create the key and no notification will be shown.*

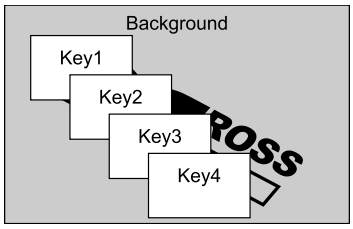


Figure 16: Key Priority

Understanding the Keying Menu

When you select a key type button (), the menu system displays a number of options that allow you to adjust how a the key appears. The options that are available depend on the type of key that is selected.

The switcher supports Self, Auto Select, Chroma, and DVE keys in each MLE.

Table 2: Keying Menu Items

Menu Item	Description
Clip	removes lower-saturated colors from the video image
Gain	adjusts the transition between video image, and the parts of the video image that are removed
Transp	adjusts the overall transparency of the key video
Linear	sets the clip, gain, and transparency values for self keys back to the default
Invert	reverses the polarity of the key alpha so that the holes in the background are cut by dark areas of the key alpha instead of bright areas
Mask	selects the type of mask that is applied to the key (*Masks* on page 35)
M-Frce	turns the force mask feature on or off (*To Pattern Mask a Key* on page 35)
M-Inv	turns the invert mask feature on or off (*To Pattern Mask a Key* on page 35)
Size	adjusts the size of the mask or DVE key
Pattrn	selects the pattern for the pattern mask
X Pos	selects the horizontal position of the mask or DVE key
Y Pos	selects the vertical position of the mask or DVE key
Aspect	selects the aspect ratio for the mask pattern or DVE key
Border	turns the border feature on and selects the size of the border on the mask pattern or DVE key
Soft	selects the amount of softness that is applied to the mask or DVE key border
Load	selects the color for the border from a pre-set list
BHue	adjusts the hue of the border color
BSat	adjusts the saturation of the border color
BLum	adjusts the luminance of the border color
Rot	selects the rotation for the mask pattern
HMult	multiplies the mask pattern horizontally (1-32)
VMult	multiplies the mask pattern vertically (1-32)
HCrop	press to toggle between **HCrop**, **Left/R**, and **L/Rght** • **HCrop** — adjusts the horizontal cropping of the DVE key • **Left/R** — adjusts the cropping of the left side of the DVE key • **L/Rght** — adjusts the cropping of the right side of the DVE key
VCrop	adjusts the vertical cropping of the DVE key • **Top/B** — adjusts the cropping of the top of the DVE key • **T/Bttm** — adjusts the cropping of the bottom of the DVE key
Left/R	press to toggle between **Left/R** and **L/Rght** • **Left/R** — adjusts the cropping of the left side of the box mask • **L/Rght** — adjusts the cropping of the right side of the box mask
Top/B	press to toggle between **Top/B** and **T/Bttm** • **Top/B** — adjusts the cropping of the top of the box mask • **T/Bttm** — adjusts the cropping of the bottom of the box mask

Self Keys

A Self Key is a key in which the luminance, or brightness, values of the key source are used as the alpha for the key.

Tip: *To select a Self Key on the C10 control panel you must press the **AUTO SELECT** button. The Auto Select key defaults to a Self Key when there is no alpha associated to the video source. If there is an alpha associated to the video source, you*

*must press and hold the **AUTO SELECT** button and press the source button again, like you were setting up a Split Key.*

To Set up a Self Key

A self key is set up by selecting the keyer and video source you want to use, and adjusting the key parameters.

Tip: *You can return the clip and gain values to the default settings by pressing the **Make Linear** knob.*

1. Select the keyer that you want to set up a Self Key on.
2. Select the video signal, on the key bus, that you want to use for the key.
3. Press **SELF KEY**.
4. Use the **Clip** knob to remove lower-saturated colors from the video image.
5. Use the **Gain** knob to adjust the transition between video image, and the parts of the video image that are removed.
6. Use the **Transp** knob to adjust the transparency of the key from opaque (**0%**) to fully transparent (**100%**).
7. Press **NEXT**.
8. Use the **Invert** knob to reverse the polarity of the key alpha (**On**) so that the holes in the background are cut by dark areas of the key alpha instead of bright areas.
9. Press **NEXT**.
10. Use the **Mask** knob to apply a mask to the key.

Auto Select Keys

An Auto Select Key is a key in which two video signals are required to make the key. The *Alpha* is used to cut the hole in the video and the *fill* is used to fill the hole. These signals often originate from external devices such as character generators, external still stores, or other graphics systems.

To Set Up an Auto Select Key

An auto select key is set up by selecting the keyer and video source you want to use, and adjusting the key parameters. The pairing of the *video* and *alpha* video signals is done when configuring video inputs. Refer to the Setup Guide that came with your switcher for information on setting up Auto Keys.

Tip: *You can return the clip and gain values to the default settings by pressing the **Make Linear** knob.*

1. Select the keyer that you want to set up an Auto Select Key on.
2. Select the video signal on the key bus that you want to use for the key.
3. Press **AUTO SELECT**.
4. Use the **Clip** knob to remove lower-saturated colors from the video image.
5. Use the **Gain** knob to adjust the transition between video image, and the parts of the video image that are removed.
6. Use the **Transp** knob to adjust the transparency of the key from opaque (**0%**) to fully transparent (**100%**).
7. Press **NEXT**.
8. Use the **Invert** knob to reverse the polarity of the key alpha (**On**) so that the holes in the background are cut by dark areas of the key alpha instead of bright areas.
9. Press **NEXT**.
10. Use the **Mask** knob to apply a mask to the key.

The Auto Select key uses the pre-assigned Auto Key association to select the proper video and alpha. If you want to temporarily select a different video source for the alpha, press and hold the **AUTO SELECT** button and select the video source you want to use as the new fill.

UltraChrome Chroma Key

An UltraChrome™ 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. The default color is blue.

Chroma Key adjustments are persistent and are not affected by a soft reset or switcher reboot. However, initializing the Chroma Key or performing a factory reset returns all adjustments to default values.

Chroma Key Modes

The UltraChrome Chroma Key operates in one of two modes, Basic or Advanced, depending on the complexity of the Chroma Key you are setting up.

- **Basic Mode** — In basic mode, UltraChrome provides a simple background/foreground chroma key with adjustment for background spill and edge softness.
- **Advanced Mode** — In advanced mode, UltraChrome provides advanced background

shadow and translucency control, as well as control over background/foreground transition areas.

Although it is possible to switch back and forth between advanced and basic mode, the additional image correction of the advanced mode is only applied in the advanced mode. For example, if you use the basic mode to set up the Chroma Key and then switch to the advanced mode, the entire image may change as the image correctors provided by the advanced mode are applied at their default settings.

Chroma Key Basic Mode

The following chroma key parameters can be adjusted in Basic Mode:

- **Background Area** — Allows you to modify the range of colors that are considered background and are masked out of the Chroma Key.
- **Edge** — Allows you to adjust the amount of edge softening applied to the foreground. This helps blend the foreground into the new background.
- **Foreground Area** — Allows you to modify the range of colors that are considered foreground and are not masked.
- **Luminance** — Allows you to adjust the overall brightness of the shadow, translucent, and foreground-background transition area to improve the Chroma Key appearance.
- **Shadow** — Allows you to adjust the amount of shadow extraction from the background. This is the actual shadow that the foreground subject is casting onto the screen.
- **Spill** — Allows you to remove background color casts that may spill into the foreground image (green color cast on the foreground from a green-screen for example).
- **Foreground - Background Transition Gain** — Allows you to adjust the transparency of the foreground - background transition area. This helps blend the foreground into the new background.
- **Translucency** — Allows you to adjust the size and transparency of translucent, or semi-transparent, areas.

To Set Up a Chroma Key in Basic Mode

The UltraChrome chroma key tries to automatically adjust for the scene you are trying to chroma key. For the best results, initialize the key first, and then identify the areas where you need to adjust the key.

1. Select the keyer that you want to set up a basic Chroma Key on.
2. Select the video signal on the key bus that you want to use for the key.
3. Press **CHR KEY**.
4. Use the **Mode** knob to select **Basic**.
5. Use the **Color** knob to select the color you want to key out.
6. Press the **Init** knob to initialize the chroma key. Every time the **Init** knob is pressed, the switcher resets all the Chroma Key parameters to their default settings.
7. Press **NEXT**.
8. Adjust the Background as follows:
   a) Use the **Type** knob to select **Bkgd**.
   b) Use the **Value** knob to adjust the background gain.
      - Increasing the Gain value causes the background to appear more opaque. This results in less of the background color being removed.
      - Decreasing the Gain value causes the background to appear more transparent. This results in more of the background color being removed.
9. Adjust the edges of the foreground as follows:
   a) Use the **Type** knob to select **Edge**.
   b) Use the **Value** knob to add or remove edge softening of the foreground image and alpha channel.
      - Increasing the Softness value increases the amount of softness applied to the foreground edges and alpha channel.
      - Decreasing the Softness value decreases the amount of softness applied to the foreground edges and alpha channel.
10. Adjust the Foreground colors, or hues, as follows:
    a) Use the **Type** knob to select **Foregd**.
    b) Use the **Cntrl** knob to select **Clip**.
    c) Use the **Value** knob to adjust the foreground clipping.
       - Increasing the Clip value removes lower-saturated colors from the foreground image.

- Decreasing the Clip value includes lower-saturated colors in the foreground image.

d) Use the **Cntrl** knob to select **Hue**.

e) Use the **Value** knob to select the central, or base, color for the foreground.

- Increasing the Hue value moves counter-clockwise around the color wheel to select a base color.
- Decreasing the Hue value moves clockwise around the color wheel to select a base color.

f) Use the **Cntrl** knob to select **Reject**.

g) Use the **Value** knob to include or reject hues adjacent to the base color.

- Increasing the Reject value decreases the amount of adjacent hues that are included in the foreground.
- Decreasing the Reject value increases the amount of adjacent hues that are included in the foreground.

11. Adjust the amount of background color that is spilling over into the foreground as follows (green color cast on the foreground from a green screen for example):

a) Use the **Type** knob to select **Spill**.

b) Use the **Value** knob to remove any color cast onto the foreground.

- Increasing the Range value causes more of the foreground colors to be corrected for background color spill.
- Decreasing the Range value causes fewer of the foreground colors to be corrected for background color spill.

12. Press **NEXT**.

13. Use the **Mask** knob to apply a mask to the key.

Chroma Key Advanced Mode

An UltraChrome chroma key, in advanced mode, breaks the image into five elements which determine, or partially determine, which part of the image is keyed out, or removed.

- **Background** — Background elements are those pixels in the source video that are the same color as the one you chose to key out. Note that the Shadow and translucent areas (see below) are completely contained within the Background area.
- **Shadow** — Shadow elements are those pixels in the source video with colors that are within the Background range, but with lower luminance values, depending on the shadow range. You modify the Shadow range to cover darker areas of the background (e.g. where the foreground is casting a shadow on the background screen).
- **Translucency** — Translucent elements are those pixels in the source video that are in the Background range, but with higher luminance values than the Shadow range. You can control the upper-end of the Translucency range by setting a wider hue-range to constrain the area. You can also control the transparency of the Translucent area.
- **Transition** — Transition elements are those pixels in the source video with colors that are not within any of the previous three ranges and are also not considered part of the Foreground area. These are typically the pixels near the edge of the foreground, where it blends into the background.
- **Foreground** — Foreground elements are those pixels that are not within the Background, Shadow, Translucency, or Transition ranges. This is the area with colors that will not be keyed out and will remain solid.

The remaining three adjustments that can be made to an Advanced UltraChrome chroma key allow you to adjust spill suppression, edge softness and luminance.

- **Spill Suppress** — Spill Suppression elements are those pixels in the Foreground that have a noticeable tint of the Background color. This typically occurs around the edge of the foreground subject as glow from the background blue-screen or green-screen “spills” onto them.
- **Edge Softness** — Edge Softness lets you apply varying degrees of softening to the Foreground edges to help it blend in with the underlying background image that it is being keyed over.
- **Luminance** — Luminance allows you to control the overall brightness of Shadow, Translucency, and Transition areas as well as partial reflections to more closely match the Foreground brightness.

To Set Up a Chroma Key in Advanced Mode

The UltraChrome chroma key tries to automatically adjust for the scene you are trying to chroma key. For the best results, initialize the key first, and then identify the areas where you need to adjust the key.

1. Select the keyer that you want to set up a basic Chroma Key.
2. Select the video signal on the key bus that you want to use for the key.
3. Press **CHR KEY**.
4. Use the **Mode** knob to select **Adv**.
5. Use the **Color** knob to select the color you want to key out.
6. Press the **Init** knob to initialize the chroma key. Every time the **Init** knob is pressed, the switcher resets all the Chroma Key parameters to their default settings.
7. Press **NEXT**.
8. Adjust the Background as follows:
   a) Use the **Type** knob to select **Bkgd**.
   b) Use the **Cntrl** knob to select **NegHue**.
   c) Use the **Value** knob to adjust the range of hues that are included in the Background, expanding counter-clockwise around the color wheel.
   d) Use the **Cntrl** knob to select **PosHue**.
   e) Use the **Value** knob to adjust the range of hues that are included in the Background, expanding clockwise around the color wheel.
   f) Use the **Cntrl** knob to select **Sat**.
   g) Use the **Value** knob to adjust the saturation range of the background color.
      - Increasing the Saturation Range value includes a wider range of saturation values to be included in the background.
      - Decreasing the Saturation Range value includes a narrower range of saturation values to be included in the background.
9. Adjust the edges of the foreground as follows:
   a) Use the **Type** knob to select **Edge**.
   b) Use the **Cntrl** knob to select **Sens**.
   c) Use the **Value** knob to set the edge sensitivity.
      - **Low** — Reduces the level of detail in the edges of the chroma key as well as the overall noise in the key image that can be the result of certain lighting conditions or high detail camera settings. This is the default setting.
      - **High** — Include the maximum detail in the edges of the chroma key.
   d) Use the **Cntrl** knob to select **Soft**.
   e) Use the **Value** knob to add or remove edge softening of the foreground image and alpha channel.
      - Increasing the Softness value increases the amount of softness applied to the foreground edges and alpha channel.
      - Decreasing the Softness value decreases the amount of softness applied to the foreground edges and alpha channel.
10. Adjust the Foreground Area as follows:

> **Tip:** *The Foreground settings allow you to adjust the range of colors which are considered Foreground colors, and thus keyed fully on.*

   a) Use the **Type** knob to select **Foregd**.
   b) Use the **Cntrl** knob to select **Clip**.
   c) Use the **Value** knob to adjust the foreground clipping.
      - Increasing the Clip value removes lower-saturated colors from the Foreground image.
      - Decreasing the Clip value includes lower-saturated colors in the Foreground image.
   d) Use the **Cntrl** knob to select **Hue**.
   e) Use the **Value** knob to select the central, or base, color for the foreground.
      - Increasing the Hue value moves counter-clockwise around the color wheel to select a base color.
      - Decreasing the Hue value moves clockwise around the color wheel to select a base color.
   f) Use the **Cntrl** knob to select **Reject**.
   g) Use the **Value** knob to include or reject hues adjacent to the base color.
      - Increasing the Reject value decreases the amount of adjacent hues that are included in the foreground.

- Decreasing the Reject value increases the amount of adjacent hues that are included in the foreground.

11. Adjust the luminance, or brightness, as follows:

> **Tip:** *The luminance settings allow you to adjust the overall brightness of the Shadow, Translucent, and Transition areas to change the appearance of reflections from semi-transparent objects and to match Shadow and Transition area brightness with the Foreground brightness.*

a) Use the **Type** knob to select **Lum**.

b) Use the **Cntrl** knob to select **BkLuma**.

c) Use the **Value** knob to change the overall brightness of Shadow, Translucent, and Transition areas.

- Increasing the Background Luminance value increases the brightness of Background, Translucent, and Transition areas.
- Decreasing the Background Luminance value decreases the brightness of Background, Translucent, and Transition areas.

d) Use the **Cntrl** knob to select **Refl**.

e) Use the **Value** knob to change the brightness of semi-transparent reflections (like reflections from glasses).

- Increasing the Reflections value increases the brightness of semi-transparent reflections.
- Decreasing the Reflections value decreases the brightness of semi-transparent reflections.

12. Adjust the Shadow area as follows:

> **Tip:** *The Shadow adjustment allows you to extract a shadow from the background. This is the actual shadow that the foreground subject is casting onto the screen.*

a) Use the **Type** knob to select **Shadow**.

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

c) Use the **Value** knob to adjust the Shadow appearance.

- Increasing the Gain value creates darker shadows.
- Decreasing the Gain value creates lighter shadows.

d) Use the **Cntrl** knob to select **Range**.

e) Use the **Value** knob to adjust the range of the Shadow colors.

- Increasing the Range value widens the Shadow area by including lower-luminance background colors. The increased range comes as a result of colors moving from the Translucent area to the Shadow area.
- Decreasing the Range value narrows the Shadow area by excluding high-luminance colors. These excluded colors move back into the Translucent area.

13. Adjust the amount of background color that is spilling over into the foreground (green color cast on the foreground from a green-screen for example) as follows:

a) Use the **Type** knob to select **Spill**.

b) Use the **Cntrl** knob to select **Clip**.

c) Use the **Value** knob to adjust spill suppress clipping.

- Increasing the clip value removes higher-saturated colors from spill suppress correction.
- Decreasing the clip value includes higher-saturated colors in spill suppress correction. If your foreground image contains bright-colored areas that are suffering from background spill, decrease the clip value to have it corrected.

d) Use the **Cntrl** knob to select **Hue**.

e) Use the **Value** knob to select the central, or base, color for spill suppress correction. If the color spill does not appear to be the same color as the background, use this control to adjust which hue is considered to be "spilled" into the foreground.

- Increasing the hue value moves counter-clockwise around the color wheel while selecting a base color.
- Decreasing the hue value moves clockwise around the color wheel while selecting a base color.

f) Use the **Cntrl** knob to select **Reject**.

g) Use the **Value** knob to include or reject adjacent hues to the base.
   - Increasing the reject value increases the amount of adjacent hues that are included in spill correction.
   - Decreasing the reject value decreases the amount of adjacent hues that are included in spill correction.

14. Adjust the Transition area as follows:

> **Tip:** *The Transition area is the range of pixels that are left over (i.e. not in the Shadow or Translucency area). The Transition settings allows you to adjust the appearance of the Transition area.*

a) Use the **Type** knob to select **Trans**.

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

c) Use the **Value** knob to adjust the appearance of the Transition colors.
   - Increasing the Gain value makes the Transition area pixels more opaque.
   - Decreasing the Gain value makes the Transition area pixels more transparent.

15. Adjust the Translucency area as follows:

> **Tip:** *The Translucency settings allow you to adjust the appearance of clear items such as eye-glass lenses.*

a) Use the **Type** knob to select **Trnslc**

b) Use the **Cntrl** knob to select **Gain**

c) Use the **Value** knob to adjust the appearance of the Translucent colors
   - Increasing the Gain value causes the translucent colors to appear more opaque.
   - Decreasing the Gain value causes the translucent colors to appear more transparent.

d) Use the **Cntrl** knob to select **Range**.

e) Use the **Value** knob to adjust the range of the Translucent colors.
   - Increasing the Range value widens the Translucent area by including more hues from the Background range (the lower-end of the range is defined by the Shadow range you just set).
   - Decreasing the Range value narrows the Translucent area by excluding hues.

16. Press **NEXT**.

17. Use the **Mask** knob to apply a mask to the key.

DVE Keys

The DVE Key allows you to apply digital video effects, such as scale, crop, aspect ratio, position, and border to video image.

To Set Up a DVE Key

A DVE key requires DVE resources that may not be available. Depending on how your switcher is configured, you may be asked to steal the resources from another element, or be prevented from using the resources.

1. Select the keyer that you want to set up a DVE Key on.
2. Select the video signal on the key bus that you want to use for the key.
3. Press **DVE** for the key type.
4. Use the **X Pos** knob to position the DVE key horizontally. You can also use the positioner.
5. Use the **Y Pos** knob to position the DVE key vertically. You can also use the positioner.
6. Use the **Size** knob to adjust the overall size of the DVE key. You can also twist the positioner.
7. Press **NEXT**.
8. Use the **Aspect** knob to adjust the aspect ratio of the DVE key.
9. Use the **Border** knob to apply a border to the DVE key. Refer to the section *To Apply a Border to a DVE Key* on page 35 for information on borders.
10. Press **NEXT**. If a border is applied to the DVE key, you must press **NEXT** multiple times to get to the next step.
11. Crop the DVE key horizontally as follows:

    a) Use the **HCrop** knob to crop the DVE key horizontally on both the left and right sides at the same time.

    b) Press **HCrop** and use the **Left/R** knob to crop the DVE key horizontally on the left side only.

    c) Press **Left/R** and use the **L/Rgt** knob to crop the DVE key horizontally on the right side only.

12. Crop the DVE key vertically as follows:

a) Use the **VCrop** knob to crop the DVE key vertically on both the top and bottom sides at the same time.

b) Press **VCrop** and use the **Top/B** knob to crop the DVE key vertically on the top side only.

c) Press **Top/B** and use the **T/Bttm** knob to crop the DVE key vertically on the bottom side only.

13. Use the **Freeze** knob to freeze the DVE key. You can freeze the video and appearance of a DVE Key. When a DVE Key is frozen, the DVE attribute menus are disabled and you can not move the DVE Key or adjust DVE attributes.
14. Use the **Mask** knob to apply a mask to the key.

To Apply a Border to a DVE Key

1. Press **DVE** > **NEXT**
2. Use the **Border** knob to turn on the border and adjust the size of the border around the DVE key.
3. Use the **Soft** knob to adjust the softness of the border.
4. Press **NEXT**.
5. Select a color for the border.
   - Use the **Load** knob to select a preset color for the border.
   - Press **NEXT** and use the **BHue**, **BSat**, and **BLum** knobs to select your own color.

Masks

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

Two types of masks are available, Box masks and Pattern masks. All key types can be masked.

- **Box Mask** — uses a simple box shape to mask out a portion of the key
- **Pattern Mask** — uses a pattern from the pattern generator to mask out a portion of the key

A Pattern Mask cannot be applied to a DVE key.

To Pattern Mask a Key

Pattern masks can be adjusted for size, location, rotation, and multiplication.

1. Select the keyer that you want to set up a mask for.
2. Press **NEXT**. Depending on the key type and features set up for the key, you must press **NEXT** multiple times to get to the next step.
3. Use the **Mask** knob to select **Pattrn**.
4. Use the **M-Frce** knob to force the area inside the mask region to the foreground (**On**).
5. Use the **M-Inv** knob to invert the masked area with the unmasked area (**On**). The portion of the key that was masked out is now visible, and the portion that was visible is masked.
6. Press **NEXT**.
7. Use the **Size** knob to adjust the size of the mask region. You can also twist the positioner.
8. Press **NEXT**.
9. Use the **Pattrn** knob to select the mask pattern you want to use. You can also select the pattern by pressing the pattern button directly.
10. Use the **X Pos** knob to position the mask horizontally. You can also use the positioner.
11. Use the **Y Pos** knob to position the mask vertically. You can also use the positioner.
12. Press **NEXT**.
13. Use the **Aspect** knob to adjust the aspect ratio of the pattern. Not all patterns can be adjusted.
14. Use the **Border** knob to turn on the border and adjust the size of the border.
15. Use the **Soft** knob to adjust the softness of the border.
16. Press **NEXT**.
17. Use the **Rot** knob to rotate the pattern. Not all patterns can be rotated.
18. Use the **HMult** knob to multiply the pattern horizontally.
19. Use the **VMult** knob to multiply the pattern vertically.

To Box Mask a Key

Box masks can be adjusted for size, location, rotation, and multiplication.

1. Select the keyer that you want to set up a mask for.
2. Press **NEXT**. Depending on the key type and features set up for the key, you must press **NEXT** multiple times to get to the next step.

3. Use the **Mask** knob to select **Box**.
4. Use the **M-Frce** knob to force the area inside the mask region to the foreground (**On**).
5. Use the **M-Inv** knob to invert the masked area with the unmasked area (**On**). The portion of the key that was masked out is now visible, and the portion that was visible is masked.
6. Press **NEXT**.
7. Use the **X Pos** knob to position the mask region horizontally. You can also use the positioner.
8. Use the **Y Pos** knob to position the mask region vertically. You can also use the positioner.
9. Use the **Size** knob to adjust the size of the mask region.
10. Press **NEXT**.
11. Adjust the position of the left and right sides of the mask as follows:
    a) Use the **Left/R** knob to adjust the position of the left side of the box mask.
    b) Press the **Left/R** knob.
    c) Use the **L/Right** knob to adjust the position of the right side of the box mask.
12. Adjust the position of the top and bottom sides of the mask as follows:
    a) Use the **Top/B** knob to adjust the position of the top side of the box mask.
    b) Press the **Top/B** knob.
    c) Use the **T/Bttm** knob to adjust the position of the bottom side of the box mask.

Split Keys

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.

A split key can be applied to an **AUTO SELECT**, or **SELF KEY**.

To Set Up a Split Key

A split key works on an **Auto Select** or **Self Key** that has been set up and you want to apply a different alpha to.

1. Set up your key with the video source you want to use.
2. Press and hold the **Auto Select** or **Self Key**, depending on the key type you are splitting.
3. Press the source button on the key bus for the alpha source you want to use.

   Tip: *If the new alpha source is not assigned to a source button, press any other button on the key bus and use the **Alpha** knob to select a different alpha source.*
4. Press the **Alpha** knob to accept the new alpha.

Key Copy

You can copy the entire contents of a keyer to another keyer in the same, or a different MLE. The entire contents of the destination keyer are replaced with the contents of the source keyer.

When you copy a key, the switcher tries to assign resources to the destination key to match the source key. If these resources are not available, the switcher steals resources in the following order.

1. From off-air keys that are not the source key.
2. From the source key, if it is not on-air.
3. From on-air keys that are not the source key.
4. From the source key, even if it is on-air.

To Copy a Keyer to Another

This procedure copies the contents of Key 1 to Key 3 as an example. Use the same procedure for any key combination.

1. Press and hold the **KEY 3 SEL** button.

   This is the destination keyer that you want to copy to.
2. Press the **KEY 1 SEL** button.

   This is the source keyer that you want to copy from.

Key Swap

You can swap the entire contents of any two keyer in the same, or different MLEs. The video source, position, and key type are all swapped between keyers. This allows you to change the apparent key priority, or layering, of the keys in the video output. For example, key 3 appears over key 2. If you perform a swap between key 3 and key 2, it appears as if key 2 is now over key 3.

Keep the following in mind when performing a key swap:

- Key swap does not change the on-air status of a keyer.

- If a DVE key is set to freeze, it will be unfrozen by the swap.
- A key swap can be recorded as part of a custom control.
- You cannot swap between keyers on different MLEs on a C10/C1 control panel.

To Perform a Key Swap

This procedure swaps the contents of Key 2 and Key 3 as an example. Use the same procedure for any key combination.

1. Press and hold the **KEY 2 SEL** button.
2. Press the **KEY 3** button in the next transition area.

Memory Functions

A memory register is a snapshot of the current state of the switcher that can include one or multiple MLEs. Up to 100 memory registers (10 banks of 10 registers) per MLE can be stored and recalled on the switcher. Each of these memory registers can store as little as the information of one MLE, or as much as the current state of the entire switcher, including all MLEs, Aux Buses, and DVE settings.

Memory Access Mode

Switcher memories can be accessed either through **Direct Access** or **Bank** mode.

- **Direct Access** — enter the bank and memory number to store or recall a memory
- **Bank** — enter the memory number to store or recall a memory (the bank is locked)

To Set the Memory Access Mode

The memory access mode applies to both memory storing and recalling.

1. Press **STORE**.
2. Use the **Mode** knob to select the memory access mode you want to use.

Storing Memories

When you store a memory, you are storing the complete state of that panel row. This includes the current state of all the areas on the MLE, including keyer settings, transition rates, wipe and pattern selections, and source selections. In addition to the current state of the panel, the current settings for the various keyers, such as chroma key settings, and clip and gain settings, are also stored.

To Store a Memory (C10/C1)

To store a memory, you must select which MLE to store the memory for, and then use the pattern buttons to select the bank and register to store the memory in.

1. Press **STORE** > **NEXT** and use the knob to select the MLE, or all MLEs that you want to store the memory for.
2. Use the numbers on the pattern buttons to select the bank and register you want to store the memory to. For example, press ◩ and then ◘ to select bank 4, register 9.

The memory has been stored to the selected memory register and the **RECALL** button is selected.

To Store a Memory (C1-A/C1M/C2/C2M/C2X/C2S)

To store a memory, you must select which MLE to store the memory for, and then use the pattern buttons to select the bank and register to store the memory in.

1. Press **MLE 1 STORE**, **MLE 2 STORE**, or both, to select the MLE to store the memory for.
2. Use the numbers on the mnemonic buttons to select the bank and register you want to store the memory to.

The memory has been stored to the selected memory register and the **MLE 1 RECALL** button is selected.

To Store a Memory (C2X/C2S)

1. Press **Store** in the Effects Memory area for the MLE you want to store the memory to.
2. Select the recall mode that you want to store with the memory. Toggle the button on (lit) to have it stored with the memory.
   - **PGM** — selects the PGM recall mode
   - **MEM AI** — selects the Memory AI recall mode
   - **EFF DISS** — selects the Effects Dissolve recall mode
3. Press **BANK**.
4. Press the number for the bank you want to select.
5. Press the number for the memory register you want to select.
   The memory is stored in the selected location and the Effect Memory area is assigned to recall.

Recalling Memories

When you recall a memory, the existing configuration of that MLE is replaced with the settings stored in the memory.

Keep the following in mind when recalling memories:

- How a memory is recalled depends on the how the **Memory Attributes** are set.
- Recalling a memory that includes a new media-store image to be loaded from a USB drive may result in the currently loaded image to be displayed for a few frames while the new image is loaded.
- Recalling a memory that includes a source assigned to a camera also recalls the shot stored in the

memory for that camera if the **CamRcl** memory attribute is set to **Recall**. There is no delay in the memory recall so camera movement may be visible while the shot is recalled.

- You can exit without recalling a memory register by pressing any button other than a Wipe Pattern, dedicated key transition, CUT, AUTO TRANS, or source button.
- You can override the video source stored in a memory by pressing and holding a source button and recalling the memory (**Bus Hold**). The held source button overrides the source that is recalled with the memory for that bus. The memory is not affected by a Bus Hold and will recall properly without the Bus Hold.
- Enabling Memory AI mode changes the way key elements are recalled. If a key is currently on-air, the element for that key is recalled in the next available off-air key. If there is no available off-air keys, the element is not recalled. All resource sharing is set to FLOAT mode so that key elements may be recalled to other keys than originally stored.

To Recall a Memory (C10/C1)

To recall a memory, you must select which MLE to recall the memory for, and then use the pattern buttons to select the bank and register to recall the memory from.

1. Press **RECALL** > **NEXT** and use the knob to select the MLE, or all MLEs that you want to recall the memory for.
2. Use the numbers on the pattern buttons to select the bank and register you want to recall the memory from. For example, press ◩ and then ◈ to select bank 4, register 9.

To Recall a Memory (C1-A/C1M/C2/C2M/C2X/C2S)

To recall a memory, you must select which MLE to recall the memory for, and then use the pattern buttons to select the bank and register to recall the memory from.

1. Press **MLE 1 RECALL**, **MLE 2 RECALL**, or both, to select the MLE to recall the memory for.
2. Use the numbers on the mnemonic buttons to select the bank and register you want to recall the memory from.

The memory has been stored to the selected memory register and the **MLE 1 RECALL** button is selected.

To Recall a Memory (C2X/C2S)

1. Press **Recall** in the Effects Memory area for the MLE you want to recall the memory to.
2. Select the recall mode that you want use with the memory. Toggle the button on (lit) to select the recall mode, or toggle none of them on to have the memory recalled as it was stored.
   - **PGM** — selects the PGM recall mode
   - **MEM AI** — selects the Memory AI recall mode
   - **EFF DISS** — selects the Effects Dissolve recall mode
3. Press **BANK**.
4. Press the number for the bank you want to select.
5. Press the number for the memory register you want to select.

Tip: *Press the memory number button again to undo the last recall.*

Memory Recall Mode

The Memory Recall mode sets how a memory is recalled. This includes whether a memory is recalled on-air, or only on the program bus, or if effects such as Effects Dissolve or DVE Dissolve are used.

To Set Up the Recall Mode Memory Attribute

Tip: *Recall Mode settings are also available on the **Memory** tab on the Live Assist node in DashBoard.*

1. Press **RECALL** > **NEXT**.
2. Use the **Attrib** knob to select **Recall Mode**.
3. Use the **Value** knob to select the memory recall mode you want to use.
   - **Memory** — the memory recall mode (**PGM**, **MemAI**, or **EffDis**) stored with the memory is used
   - **PGM** — all elements are recalled as stored (default)
   - **MemAI** — transition area is configured to take the on-air elements of the memory on-air with the next transition
   - **EffDis** — on-air elements listed below are transitioned to the elements stored in the memory
     - Matte colors (background, wash or borders)

- Keyer settings like clip, gain, transparency
- Mask position and size
- Chroma key settings, except the background color
- Pattern settings like size, position, aspect, border, softness, rotation
- DVE settings like size, position, aspect, border, softness, cropping
- Media-Store x/y position
- Transition Progress

To Set the Effects Duration

Effects duration applies to Effects Dissolves, and sets the length of time that the switcher will use to transition from the on-air scene to the scene stored in the memory.

Tip: *If you have a C2X/C2S control panel, press **EFF DISS** in the Effects Memory area to turn Effects Dissolve on (lit) or off (unlit) for that MLE.*

1. Press **RECALL** > **NEXT**.
2. Use the **Attrib** knob to select **EffDur**.
3. Use the **Value** knob to select duration you want to use to transition from the current on-air scene to the on stored in the memory.
   - **Memory** — the duration stored in the memory is used
   - **1-999fr** — sets a specific duration in frames

Tip: *If you have a C2X/C2S control panel, press **EFF RATE** in the Effects Memory area for the MLE you want to change the rate for, use the keypad to enter the new rate, and press **Enter**. A value of 0 selects the duration stored in the memory.*

Memory Attributes

Memory Attributes allow you to specify what elements are recalled with a memory, as well as adding effects to memory recalls. These elements include the background/preset buses, keyer bus, Aux bus, and Media-Store selections, as well as keyer on-air status, and transition selections.

In addition to setting which sources to recall with the memory, effects such as performing an auto transition after the memory recall or running a custom control after the memory recall, can also be included.

Memory attributes can be set both when the memory is stored, and when it is recalled. This allows you to store a set of attributes with a memory and then recall it as stored, or override the attributes stored in the memory and apply different ones when the memory is recalled. A memory attribute does not need to be stored in the memory to be recalled.

Memory Attributes in DashBoard

The **Memory** tab in Live Assist allows you to set the store and recall memory attributes for the switcher. The **Store** tab allows you to set the store attributes, and the **Recall** tab the recall attributes.

For all attributes, gray indicates no recall (**NoRcl**), blue indicates settings are recalled as they are stored in the memory (**Memory**), and pink indicates settings are recalled (**Recall**).

To Set the Program Bus Source Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **PGMBus**.
3. Use the **Value** knob to select how the sources selected on the program bus are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — sources are not recalled on the program bus
   - **Recall** — sources are recalled on the program bus (default)

To Set the Preset Bus Source Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **PSTBus**.
3. Use the **Value** knob to select how the sources selected on the preset bus are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — sources are not recalled on the preset bus
   - **Recall** — sources are recalled on the preset bus (default)

To Set the Transition Type Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **Trans**.
3. Use the **Value** knob to select how the next transition type and parameters are recalled.
   - **Memory** — settings come from the memory being recalled

- **NoRcl** — transition selections are not recalled
- **Recall** — transition selections are recalled (default)

To Set the Next Transition Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **NextTr**.
3. Use the **Value** knob to select how the next transition area is recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — next transition area settings are not recalled
   - **Recall** — next transition are settings are recalled (default)

To Set the Run Auto Trans Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **RnAuto**.
3. Use the **Value** knob to select whether a transition is performed after the memory is recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRun** — a transition is not performed after the memory is recalled (default)
   - **Run** — a transition is performed after the memory is recalled

To Set the Shared Pattern Generator Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **SrdPat**.
3. Use the **Value** knob to select whether the settings for the shared Key Mask/Wash pattern generator is recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — shared pattern generator settings are not recalled
   - **Recall** — shared pattern generator settings are recalled (default)

To Set the Key Bus Sources Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **KeyBus**.
3. Use the **Key** knob to select the keyer you want to use the attribute for.
4. Use the **Value** knob to select whether sources selected on the selected key bus are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — sources are not recalled on the key bus
   - **Recall** — sources are recalled on the key bus (default)

To Set the Key On-Air Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **KeyBus**.
3. Use the **Key** knob to select the keyer you want to use the attribute for.
4. Use the **Value** knob to select whether sources selected on the selected key bus are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — sources are not recalled on the key bus
   - **Recall** — sources are recalled on the key bus (default)

To Set the Key Type Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **KType**.
3. Use the **Key** knob to select the keyer you want to use the attribute for.
4. Use the **Value** knob to select whether the key type is recalled for the selected key.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — key type is not recalled
   - **Recall** — key type is recalled (default)

To Set the Key Mask Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **KMask**.
3. Use the **Key** knob to select the keyer you want to use the attribute for.

4. Use the **Value** knob to select whether mask settings for the selected key are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — key mask settings are not recalled
   - **Recall** — key mask settings are recalled (default)

To Set the Media-Store Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **Media**.
3. Use the **Media** knob to select the Media-Store channel you want to use the attribute for.
4. Use the **Value** knob to select whether Media-Store image and settings for the selected channel are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — Media-Store image and settings are not recalled (default)
   - **Recall** — Media-Store image and settings are recalled

To Set the Aux Bus Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **Aux**.
3. Use the **Aux** knob to select the aux bus you want to use the attribute for.
4. Use the **Value** knob to select how the sources selected on the aux bus are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — sources are not recalled on the aux bus (default)
   - **Recall** — sources are recalled on the aux bus

To Set the Camera Shot Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **CamRcl**.
3. Use the **Value** knob to select whether camera shots are recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRcl** — camera shots are not recalled
   - **Recall** — camera shots are recalled (default)

To Set the Roll GPO Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **RllGPO**.
3. Use the **Value** knob to select whether GPI outputs attached to sources are triggered when recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRoll** — GPI outputs are not triggered
   - **Roll** — GPI outputs are trigged (default)

To Set the Roll VTR Attribute

1. Press **RECALL** > **NEXT** > **NEXT**.
2. Use the **Attrib** knob to select **RllVTR**.
3. Use the **Value** knob to select whether a play command is trigged when a source that is assigned to a video server is recalled.
   - **Memory** — settings come from the memory being recalled
   - **NoRoll** — play command is not triggered
   - **Roll** — play command is triggered (default)

Switcher Sets

The switcher stores configuration and operation data in a number of registers that contain the individual entries for items such as memories or personality settings. These registers can be stored as a single archive file, or as a register set that contains all the individual register of that type; all memories for example. These files are stored into Sets on USB drive. Different Sets can be created for different shows or applications, allowing you to quickly locate and recall the switcher configurations.

The switcher stores information in the following registers:

- **Memory** — contains all the memories for all MLEs
- **Custom Control** — contains all the custom control banks and macros
- **Personality** — contains all the user interface settings, such as transition rates, that are stored under the **PERS** menu
- **Installation** — contains all the external device setup, and software settings for the switcher

To Store a Set

Switcher Sets can only be stored to a USB drive. The USB drive must be present before you try to store the Set. A total of 10 Sets of switcher setup information can be stored onto the same USB drive.

1. Insert a USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive.
2. Press **MENU** > **SAVE**.
3. Use the **Save** knob to select the set (**0-9**) you want to store the switcher registers to.
4. Press the knob to select the registers you want to store to the selected set. If an (*) is shown on the menu, that register already exist in the set and will be overwritten.
   - **ALL** — store all registers to the set
   - **Mems** — store only the memory registers to the set
   - **Cust** — store only the custom control registers to the set
   - **Pers** — store only the personality registers to the set
   - **Inst** — store only the installation registers to the set
5. Press **Confrm**.

To Load a Set

Switcher Sets can only be loaded from a USB drive. The USB drive must be present before you try to load the settings.

1. Insert your USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive.
2. Press **MENU** > **LOAD**.
3. Use the **Load** knob to select the set (**0-9**) you want to load the switcher registers from.
4. Press the selected set. Only registers with an (*) shown on the menu exist in the set.
   - **ALL** — recall all registers from the set
   - **Mems** — recall only the memory registers from the set
   - **Cust** — recall only the custom control registers from the set
   - **Pers** — recall only the personality registers from the set
   - **Inst** — recall only the installation registers from the set
5. Press **Confrm**.

Media-Store

Media-Store allows you to load stills, animations, or audio files from the USB drive and make them available across all MLEs. Two channels of media-store with alpha, or four channels without alpha, are provided.

Keep the following in mind when working with media-stores:

- A still, animation, or audio can be loaded either by browsing the file system, or by entering the still number using the pattern buttons.
- You can clear a media-store channel by loading media number 000.
- If you are loading an Auto Key into a media-store channel, you must have another media-store channel associated with the current one to load the alpha into.
- An FTP connection using RossLinq can be created from an external device directly to a Media-Store channel on the switcher.

Working With Media-Store Animations

Media-Store animations are used for things animated backgrounds, branding "bugs", or media transitions. You can set up an animation to loop, play automatically when take on-air, play in reverse, or even play at different speeds.

You can play an animation manually by selecting the source button for the media-store channel with the animation you want to play, and pressing **Run**. The knob changed to **Stop** as the animation is playing.

Keep the following in mind when working with media-store animations:

- When you load an animation to an off-air media-store channel, or the animation goes off-air with a transition, the preview shows the cut point (**CutFr**) for that animation, and not the first frame of the video.
- You can manually cycle through frames by turning the **Run** knob while the animation is stopped.
- Double-pressing the **Run** knob stops playback and re-cues the animation to the first frame.
- You can shuttle forwards and backwards through the animation by turning the positioner clockwise or anti-clockwise when the animation is stopped. Shuttle speed is increased and decreased by turning the positioner more or less in each direction.
- You can run or stop an animation by pressing the button on the top of the positioner.

Working with Media-Store Audio

Audio can be added to the playout of a Media-Store channel either by loading the file directly, or by naming the audio file the same as the animation or still you want it to play out with. When you load the still or animation, the switcher will automatically load the audio file of the same name.

Keep the following in mind when working with audio:

- Audio plays out on Program, Preview, Aux, and MultiViewer outputs only.
- Audio files must be 20-bit or 24-bit wav files at a 48kHz sample rate.
- Audio files must be in the same folder and have the same name as the still or animation they are to be associated with.
- An audio file does not need to be of the same length as the animation it is associated with.
- A still with audio or audio only have the Auto Play and Looping attributes. These apply to the audio playout.
- The looping time of an animation with audio is the length of the animation.
- Audio is embedded in the ancillary data of the output video stream. You must have ancillary data set to pass to include the audio in the output.
- If you are using audio with a MultiViewer, you must set the ancillary source for the MultiViewer. This is the only source that audio will be available for in the MultiViewer output.
- A Media-Store channel can be loaded with Audio only.

Media-Store Modes

Media-store channels can be set up to operate independently, or paired, with one channel providing the key, and the other the alpha.

- **Swish** — Two channels of media-store are available. Each channel can contain an image or channel 1 can contain an image and an associated alpha in channel 3. Channels 2 and 4 are reserved for media transitions.
- **Swish+** — Four channels of media-store are available. Channel 2 (video) and channel 4 (alpha) can also be used for media transitions. Channels 2 and 4 are not reserved.

To Set the Media-Store Mode

1. Press **MENU** > **SYSTEM** > **NEXT**.
2. Use the **Media** knob to select the media-store mode.
   - **Swish** — two (2) channels are available or channel 1 for key and channel 2 for alpha (channels 2 and 4 are reserved for Media Transitions)
   - **Swish+** — four (4) channels are available
3. Press the **Media** knob.
4. Press the **Confrm** knob.

Loading Stills or Animations

Stills or animations can be loaded into media-store channels either from USB or the internal cache using the media number, or by browsing to the file.

Note: *The internal cache is used for sample images only and cannot be used to store user stills or animations.*

Media numbers are 4-digit numbers that are assigned to stills or animations and allow you to load stills or animations directly using the pattern buttons. Each media number is made up of three sections, the Place (0-1), the Bank (00-99), and the Item Number (0-9). The Place is either 0 for internal stills, or 1 for external.

Media-Store File Specifications

Media-Store images and animations can be TGA, PNG, or JPG file formats. For animations, the files must be numbered to indicate the order they go in, and the name and the number must be separated with an underscore. For audio, 20-bit or 24-bit wav files of the same name as the still or animation are used to associate audio with a still or animation.

Anim_001.tga
Anim_002.tga
Anim_003.tga
...
Anim_100.tga

Together, these files are treated as a single animation named Anim that is 100 frames long.

Files names cannot contain symbols such as **! @ # & * ( ) / , ? ' "** and cannot start with an underscore (_).

To Load a Still or Animation

Stills or animations can be loaded from the USB drive, or from the internal cache. Only the default images that came with your switcher are available on the internal cache.

1. If you are loading a file from USB, insert your USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive.

   If the files on your USB are new, it takes about 2 seconds per file for the switcher to generate the thumbnail for the Media Manager. Once all the thumbnails are generated, they are displayed in the Media Manager window.
2. Press the source button for the media-store channel that you want to load a still into. If the file has an alpha, the paired channel will load the alpha as well.
3. Press the **Browse** knob.
4. Use the left knob to navigate to the file your want to load. Press the knob to make a selection.
   - **<..>** — up one
   - **USB(1)** — the USB drive
   - **Internal(0)** — the internal cache
   - **<folder>** — a sub-folder of the name "folder"
   - **image** — a still of the name "image"
   - **image.tga .wav** — a still with an associated audio file (not in the database)
   - **image [V][A]** — a still with an associated audio file (in the database)
   - **animation [V10]** — a 10 frame animation of the name "animation" (in the database)
   - **animation.tga[10] .wav** — a 10 frame animation with an associated audio file (not in the database)
   - **animation [V10][A]** — a 10 frame animation with an associated audio file (in the database)

Tip: *If you want to associate an audio file with the still or animation but the **.wav** does not appear in the name, ensure that the audio file is named the same as the still or animation and in the same folder.*

A still or animation can be loaded using the **Media Number** for the still and the pattern buttons.

To Load Stills Using Media Numbers

How you load a still using the media number depends on whether the Place or Media are locked. If the Place is locked, you only have to enter the 3-digit Media number. If the Place and Media are locked, you only have to enter the last digit of the Media number.

Note: *Loading 000 clears the current Media-Store channel.*

1. Insert your USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive. If you are loading a file from the internal cache, you do not need the USB drive.
2. Press the source button for the media-store channel that you want to load a still into. If the file has an alpha, the paired channel will load the alpha as well.
3. Using the pattern buttons, enter the media number for the still you want to load.

   For example, press **1051** to select the USB(1) drive, Media 051.
4. Press **Select**.

Media-Store Capture

Still images can be captured from any input BNC, as well as the program, preview, and clean feed from any MLE.

To Capture a Still

1. If you are capturing to a USB, insert your USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive.
2. Press the source button for the media-store channel that you want to capture a still into.
3. Press the **Capt** knob.
4. Press the **P/B** or **E/E** knob to select the mode you want the media-store in.
   - **E/E** — electronic-to-electronic, or record, mode allows you to record a still
   - **P/B** — playback mode allows you to review your still
5. Use the **P/B** or **E/E** knob to select the video source that you want to perform the capture of.
6. Press **NEXT**.
7. Use the **USB** knob to select the location that you want to store the captured still to.
8. Use the **Alpha** knob to select whether you want to capture the alpha signal (**Yes**) or not (**No**). You must have an input BNC or an Aux Bus selected as the capture source to capture the alpha.
9. Press **NEXT**.
10. Use the **Capt** knob to select a number for the still you want to capture.
11. Press the **Capt** knob to perform the capture. The new media item is stored and the media number is increased by one.

Media-Store Attributes

Attributes are applied to the image or animation directly, regardless of the channels that the image or animation are loaded in. If you adjust the attributes of the still in one channel, these settings are applied to that image or animation in all other channels that the same image or animation is loaded into.

Understanding the Attributes Menu

When you select a still or animation, the menu system displays a number of attributes that allow you to adjust how a the image or animation appears. The options that are available depend on the type of media-store image or animation that is selected.

Table 3: Attributes Menu Items

Menu Item	Description
X Pos	selects the horizontal position of the image or animation
Y Pos	selects the vertical position of the image or animation
Shaped	selects *shaped* or *unshaped* for the *alpha* of the image or animation
Looping	selects whether the animation loops automatically or not
Reverse	selects whether the animation plays in reverse or not
AutoPly	selects whether the animation starts playing automatically when taken on-air or not
Speed	selects the speed that an animation plays at (0.1-10)
Media#	selects the media number that you want to use to recall the still or animation
CutFr	selects the point, in frames, from the start of the animation that the background cut occurs
GPO	selects the GPI output that you want to trigger by a media transition
GPOFr	selects the time, in frames, from the start of the media transition that the GPI output is triggered
Mute	selects whether the associated audio is turned on or off during playback

To Set Media-Store File Attributes

The attributes that you can set depend on whether the file you are setting them for is a still or animation.

1. Insert your USB drive into the USB Port on the switcher. You must wait 5 seconds for the switcher to recognise the USB drive. If you are loading a file from the internal cache, you do not need the USB drive.

2. Press the source button for the media-store channel that you want to load a still into. If the file has an *alpha*, the paired channel will load the alpha as well.
3. Press **NEXT**.
4. Use the **Attrib** knob to select the attribute you want to set, and the **Value** knob to select the value you want to assign to the attribute.
   - **X Pos** — selects the horizontal position of the image or animation
   - **Y Pos** — selects the vertical position of the image or animation
   - **Shaped** — selects *shaped* or *unshaped* for the alpha of the image or animation
   - **Looping** — selects whether the animation loops automatically or not
   - **Reverse** — selects whether the animation plays in reverse or not
   - **AutoPly** — selects whether the animation starts playing automatically when taken on-air or not
   - **Speed** — select the speed that an animation plays at (0.1-10)
   - **Media#** — select the media number that you want to use to recall the still or animation
   - **CutFr** — select the point, in frames, from the start of the animation that the background cut occurs
   - **GPO** — select the *GPI* output that you want to trigger by a media transition
   - **GPOFr** — select the time, in frames, from the start of the media transition that the GPI output is triggered
   - **Mute** — select whether the associated audio is turned on or off during playback
5. Use the **Func** knob to select how you want to save the attributes.
   - **Save** — saves the adjustments for the selected **Attrib** value only
   - **SavAll** — saves the adjustments for all **Attrib** values
   - **Revert** — undoes the adjustments for the selected **Attrib** value only
   - **RevAll** — undoes the adjustments for all **Attrib** values
6. Press the **Func** knob to make the selection.

To Lock a Media Number Place and Bank

Locking the Media Number Place and Bank means that you do not have to enter them when loading a still. Lock setting are specific to the channel they are set on.

1. Press the source button for the media-store channel that you want to set the Place and Bank lock settings for.
2. Press the **Browse** knob.
3. Press **NEXT**.
4. Use the **Place** knob to select USB or Internal.
5. Press the **Place** knob to toggle the lock on or off. Locked is shown with [] around the name.
6. Use the **Media** knob to select the bank you want to lock to.
7. Press the **Media** knob to toggle the lock on or off. Locked is shown with [] around the name.

Media Manager

The Media Manager provides a graphical interface to the operation of the Media-Store from a web browser. The layout of the Media Manager window is stored in Perspectives. The last loaded Perspective is used when the browser is refreshed or opened.

From the Menu Bar at the top of the window you can manage Perspectives or log out. To launch a window, click on the button. When a window is open, a tab is shown in the middle of the menu bar, allowing you to quickly switch between windows.

Table 4: Menu Bar Icons

Icon	Name	Description
	**Media Manager**	Provides a graphic interface to the Media-Store, allowing you to load, play, and eject stills or animations. Only a single Media Manager window can be open.
	**Perspectives**	Allows you to save, load, and delete perspectives (layouts).
	**Logout**	Logs out of the current session.

Media Manager Login

To log into and view the Media Manager, you must have a computer connected to the same subnet as the switcher,

the IP address of your switcher, and the Google Chrome™ browser installed on your computer.

When you are communicating with the switcher, a moving status indicator is shown in the lower right corner of the browser window. If you lose communications with the switcher, refresh the browser window to reconnect. Refreshing the browser will reset your Perspectives.

Keep the following in mind when logging in and using the Media Manager:

- Ross Video recommends using Google Chrome™ v14.0 running on Windows 7® or Mac® OS X™ Lion to connect to the Media Manager.
- Your browser must have JavaScript and cookies enabled.
- Ross Video recommends that you do not connect more than 5 Media Manager clients to a single switcher at the same time.

To Log Into the Media Manager

Multiple users can be logged into the Media Manager at the same time.

1. On your computer, launch your web browser.
2. In the address bar, type the IP address of your switcher.
   You are prompted for a user name and password.
3. Enter the user name and password for the Media Manager.
   The default User Name is `admin` and Password is `password`.
4. Select **Remember Me** log back into the Media Manager automatically when the web browser is closed and opened again, or the window is refreshed.
5. Press **Login**.

Note: *Click **Logout** in the upper right of the Media Manager window to log out of your current session.*

The Media Manager Window

The Media Manager window provides a graphical interface to the Media-Store. From this window, you can load stills or animations from the internal cache or USB into a Media-Store channel or edit the on-air properties. Media-Store channels have a red background when on-air and green when going on-air with the next transition.

Figure 17: Media Manager Window

Tip: *The film-strip symbol (🎞) on a thumbnail indicates that the media item is an animation, the key symbol (🔑) indicates that the still or animation has an alpha, and the speaker symbol (🔊) indicates that the media item has audio associated with it.*

Stills and animations can be loaded into a channel by either selecting the channel and double-clicking on the file, or by dragging a file and dropping it onto the channel. When a channel or file is selected, the properties for the animation or still can be viewed in the **ITEM DETAILS** area.

Note: *If the files on your USB are new, it takes about 2 seconds per file for the switcher to generate the thumbnail for the Media Manager. Once all the thumbnails are generated, they are displayed in the Media Manager window.*

Animation Controls

The Media Manager interface allows you to manually control the play-out of an animation.

Figure 18: Media-Store Channel — Animation Controls

Table 5: Animation Controls

Icon	Name	Description
	**Play**	Play the animation loaded in the Media-Store channel.
	**Looping**	Turns **Looping** of the animation on or off.
	**Reverse**	Toggle the direction that the animation is played in.
	**Auto-Play**	Turns **AutoPly** for the animation on or off.

Icon	Name	Description
	Eject	Eject the current still or animation from the Media-Store channel. This is the same as loading media number **000** on the panel.

Playlists

Playlists allow you to create a rundown of stills or animations that you want to load into a Media-Store channel. Using the left and right arrows, you can advance to the next or previous still or animation in the playlist.

Note: *Items on the playlist are not pre-cached. As you advance to the next item in the list, the switcher must load that still or animation. Depending on what you are loading, and if the item has been loaded before, this could take a few seconds.*

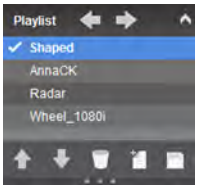


Figure 19: Playlist

Table 6: Playlist Controls

Icon	Name	Description
	Previous	Advance to the previous item in the playlist. The item in the playlist that is being shown on the Media-Store channel indicated with a check-mark. The playlist does not loop back to the top when it reaches the last item.
	Next	Advance to the next item in the playlist.
	Up and Down	Move the currently selected item up in the playlist.
	Up and Down	Move the currently selected item down in the playlist.
	Delete	Delete the selected item from the playlist. This does not delete the item, or clear the Media-Store channel.
	New Playlist	Clears the current playlist.
	Load or Save Playlist	Allows you to load, save, or delete a playlist on the switcher. If you delete a playlist that was loaded into a Media-Store channel, it does not clear that channel.
	Expand or Collapse	Expand or Collapse the playlist area for the Media-Store channel.

Custom Controls

Once programmed, a custom control can be played back by pressing a button. The custom control can be as simple as triggering an output GPI pulse, or as complex as recalling a specific memory register on an MLE, performing a switcher transition, and selecting a group of keys.

Note: *The C10 does not support recording or running custom controls.*

Custom Control Setup

The custom control interface on your switcher can be customized to show custom control names on the mnemonics just below the Custom Control bus, or automatically add delays between each custom control event as you are recording a custom.

To Set Custom Control Options

1. Press **BANK 1** > **EDIT** > **NEXT**.
2. Use the **Row** knob to select the control panel row that you want to set how the custom control names appear on the mnemonics.
3. Use the **CCMem** knob to set how custom control names are shown on the mnemonics.
   - **Off** — only video source names are shown
   - **Split** — mnemonics are split with custom control names on the top and source names on the button
   - **Full** — only custom control names are shown
4. If you selected **Split**, use the **MColor** knob to select whether the mnemonics use the bus map color (**Xpt**) or the custom control color (**CC**).
5. Use the **CCPaus** knob to set whether pauses are added automatically after each event.
   - **Manual** — pauses are not added automatically
   - **Record** — each command is automatically separated from the previous command by a pause equal to the real-time delay between the user entering commands

Recording Custom Controls

When you create a custom control, you record a series of button presses on the panel, as well as special functions, that are played back when you run the custom control.

Almost any action or setting can be stored in a custom control, with the following exceptions:

- Diagnostic Functions
- Confirmation Dialogs
- Panel-Specific Functions

To Record a Custom Control

A basic custom control records a series of button presses on the control panel. If the **CCPaus** feature is set to **Record**, pauses will automatically be added between button pressed. If it is set to **Manual** you will have go back and edit the custom control to add the pauses.

1. Press **MENU** > **BANK 1** > **START/STOP**.
2. Use the **Bank** knob to select the bank that the custom control you want to record will be stored on, or select the bank button directly.
3. Use the **CC** knob to select the custom control that you want to record, or select the custom control on the bus directly. If the custom control already has a macro recorded, an ***** is shown next to the number.
4. Press **Record Start** to start recording. On the C1 this is the **START/STOP** button.
5. Insert the events you want to record. These can include source selections, key types, transitions, and menu selection, for example. Special functions can also be inserted.

   Each custom control can have a maximum of 99 events, plus the End event.
6. Press **Record Stop** to finish recording. On the C1 this is the **START/STOP** button.

Tip: *Press **CANCEL** if you do not want to store your changes to the custom control.*

Special Functions

Special functions allow you to include events not associated with a button press into a custom control. A special function can be inserted into any existing custom control, or used when creating a new custom control.

Hold

Allows you to place a command in a custom control that will stop the custom control at the hold. You must press the custom control button again, or use a GPI trigger, to continue the custom control.

Pause

Allows you to place a command in a custom control that will stop a custom control at the pause. The length of the pause is set when the pause is inserted.

When holding the **INSERT** button, pauses are shown as **P*x***, where ***x*** is the length of the pause in frames.

Loop

Allows you to have a custom control run continuously until stopped, or a Cancel/Cancel All custom control command is executed from another custom control.

GPO

Allows you to trigger a pre-selected GPI output using a custom control. The specific GPI output is set when the GPO command is inserted.

CutKey

Allows you create a custom control that will cut keys on or off. The specific key and whether the key is cut on or off is set when the key cut command is inserted.

TrnKey

Allows you to create a custom control that will transition keys on or off. The specific key and whether the key is transitioned on or off is set when the key transition command is inserted.

IncKey

Allows you to create a custom control that will include a key with the next transition to take the key on-air, or off-air. The specific key and whether it should go on-air, or off-air is set when the include key command is inserted.

Resume

Allows you to resume a particular custom control that is at a hold. The specific custom control is set when the resume is inserted. If the target custom control is not at a hold even, the resume command will not start the target custom control.

Cancel

Allows you to stop a particular custom control. The specific custom control is set when the cancel is inserted.

CancelAll

Allows you to stop all running custom controls.

State

Allows you to embed the entire state of an MLE into a custom control. A state in a custom control behaves just like a memory.

To Insert a Special Event into a Custom Control

A special function can be inserted into any existing custom control, or used when creating a new custom control.

1. Start recording or editing your custom control where you want to insert the special event.
2. Press **INSERT**.
3. Use the **INSERT** knob to select the event you want to insert.

   You can also press and hold the **INSERT** button and press the source button on the custom control bus for the event you want to insert. The event names are shown on the mnemonics.

   - **Hold** — press the **Hold** knob to insert a hold
   - **Pause** — use the **Secs** and **Frames** knobs to enter the length of the pause
   - **Loop** — press the **Loop** knob to loop the custom control back to the beginning
   - **GPO** — use the **Pin** knob to select the GPI output
   - **CutKey** — use the **Key** knob to select the key, and the **State** knob to select whether you want the key cut on or off
   - **TrnKey** — use the **Key** knob to select the key, and the **State** knob to select whether you want the key transitioned on or off
   - **IncKey** — use the **Key** knob to select the key, and the **State** knob to select whether the key should be transitioned on-air or off-air with the next transition
   - **Resume** — use the **Bank** knob to select the custom control bank, and the **CC** knob to select which custom control to resume
   - **Cancel** — use the **Bank** knob to select the custom control bank, and the **CC** knob to select which custom control to cancel
   - **CancelAll** — press the **CancelAll** knob to insert a cancel all custom controls command
   - **State** — use the **MLE** knob to select the MLE

4. Press the **Insert** knob to insert the event.

5. Press **START/STOP**

Running a Custom Control

Once a custom control has been programmed, you can run that custom control by pressing the button that the custom control was recorded to.

Keep the following in mind when running custom controls:

- A custom control will continue to run until it reaches a hold, is stopped by another custom control, you edit a custom control, or the custom control reaches the end.
- When a custom control is running, the button on the custom control bus is red.
- When a custom control is held (at Hold), the button on the custom control bus flashes white.
- You can run multiple custom controls at the same time. The number of running custom control is shown on the display when in custom control mode.
- You can stop a running custom control by pressing the red custom control button on the custom control bank.
- A maximum of 128 custom controls can be run at the same time.

To Run a Custom Control

Once a custom control has been recorded, you can run that custom control at any time.

1. Press **MENU**.
2. Select the bank that the custom control you want to run is on by pressing the bank button.
3. Select the custom control you want to run by pressing the source button on the custom control bus.
   The custom control starts to play immediately.

Editing Custom Controls

After you have recorded a custom control, you can go back and edit that custom control to add or remove events.

To Edit a Custom Control

When editing a custom control, you can delete and insert events at any point in the custom control, or append events to the end.

Tip: *When editing a custom control, press **RUN EVENT** to run the currently selected event. This can help you diagnose problems in a custom control.*

1. Press **MENU** > **BANK 1** > **EDIT**.
2. Use the **Bank** knob to select the bank that the custom control you want to record will be stored on, or select the bank button directly.
3. Use the **CC** knob to select the custom control that you want to edit, or select the custom control on the bus directly. The custom control will have an ***** next to the number.
4. Use the **Func** knob to select where and how you want to edit the custom control.
   - **Edit** — select the position in the custom control to edit events
   - **Append** — add events to the end of the custom control
5. Press the **Func** knob to start editing.
   You can also start editing a custom control by pressing and holding **EDIT** and selecting the bank and custom that you want to edit to.
   The display changes to show the name and duration of the custom control, and the currently selected event in the custom control.
6. Delete an event in a custom control as follows:
   a) Use the left knob to select the event you want to delete. You can also use the **PREV** and **NEXT** buttons.
   b) Press **DELETE**.
7. Insert an event into a custom control as follows:
   a) Use the left knob to select the event you want insert an event before. You can also use the **PREV** and **NEXT** buttons.
   b) Press **INSERT**.
   c) Insert the events you want.
8. Press **START/STOP** to finish recording.

Naming Custom Controls

Each custom control can be given a unique name and mnemonic color. The name is shown in the mnemonic display when CCMnem is set to Split or Full.

To Name a Custom Control

The procedure to name or rename a custom control is the same.

1. Press **MENU** > **BANK 1** > **EDIT**

2. Use the **Bank** knob to select the bank that the custom control you want to name is stored on, or select the bank button directly.
3. Use the **CC** knob to select the custom control that you want to name, or select the custom control on the bus directly.
4. Use the **Func** knob to select **Rename**.
5. Press the **Func** knob.
6. Select a name as follows:
   a) Use the **Pos** knob to select the character position too edit. A name can have up to 8 character.
   b) Use the **Char** knob to select a character for the current position.
7. Press **NEXT**.
8. Use the **Size** knob to select the text size for the mnemonic label.
   - **Small** — 6 characters displayed on the top line, and 2 on the bottom
   - **Medium** — 4 characters displayed on the top line, and 4 on the bottom
   - **Large** — first 2 characters are displayed
9. Use the **Color** knob to select the background color of the mnemonic.
10. Use the **Inv** knob to swap the color of the text and the background.

    The Invert (Inv) selection is not applied when the mnemonic is in split mode. In split mode, the top half of the display is inverted, and the bottom is not.

Deleting Custom Controls

Any custom control on the switcher can be deleted to remove unused customs to free up space for new custom controls.

To Delete a Custom Control

There is no undo for this delete function.

1. Press **MENU** > **BANK 1** > **DELETE**
2. Use the **Bank** knob to select the bank that the custom control you want to delete is stored on, or select the bank button directly.
3. Use the **CC** knob to select the custom control that you want to delete, or select the custom control on the bus directly.
4. Press the **Func** knob.
5. Press the **Confrm** knob to delete the custom control.

Copying and Pasting Custom Controls

The contents, or events, of a custom control can be copied from one custom control and pasted to another. Along with the events, the name and mnemonic settings are also copied.

To Copy and Paste a Custom Control

1. Press **MENU** > **BANK 1** > **Edit**.
2. Use the **Bank** knob to select the bank that the custom control you want to copy is on, or select the bank button directly.
3. Use the **CC** knob to select the custom control that you want to copy, or select the custom control on the bus directly. If the custom control has a macro recorded, an ***** is shown next to the number.
4. Use the **Func** knob to select **Copy**.

   Tip: *If you do not have a C10 or C1 control panel, you can press the **Copy** mnemonic button to perform the copy instead of using the **Func** knob.*
5. Press the **Func** knob to perform the copy.
6. Select the custom control that you want to paste into.
7. Use the **Func** knob to select **Paste**.

   Tip: *If you do not have a C10 or C1 control panel, you can press the **Paste** mnemonic button to perform the copy instead of using the **Func** knob.*
8. Press the **Func** knob to perform the paste.

SideShot Custom Control Shot Box

The SideShot connects to the switcher and provides quick access to all 24 custom controls on each custom control bank. Refer to the instructions that came with SideShot for setup information.

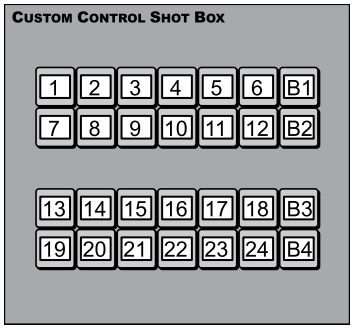


Figure 20: SideShot Button Mapping

The four buttons on the right side of the module select the active custom control bank, and the remaining buttons trigger the custom control on the bank. The mnemonic for the custom control is inverted if the custom control is running.

Switcher Soft Reset

If required, the switcher can be reset to return it to a user-defined default setting, or the factory default state. A reset can be performed the entire switcher, or individual components, such as keys.

Soft Reset

The software reset returns the switcher to the default state. Black is selected on all buses, all keys are cut off-air, and the transition rate is set back to default. This is useful if you need to return the switcher to a known state.

To Reset the Switcher Software

1. Press and hold **MENU**.
2. Press **Reset All** (**RESET** on the C10/C1).

Custom Reset Settings

You can customize many of the default switcher parameters and save them as a user-defined reset settings. These custom reset settings can then be recalled when you want to return the switcher to a previous state.

To Save a Custom Reset Setting

You can customize many of the default switcher parameters and save them as a user-defined custom reset.

1. Press **MENU** > **RESET** > **NEXT**.
2. Use the **Attrib** knob to select **Media**.
3. Use the **Media** knob to select **Media1**.
4. Use the **Value** knob to select whether the Media-Store channel is reset with a switcher reset or not.
   - **NoRst** — the Media-Store channel is not reset
   - **Reset** — the Media-Store channel is reset with a switcher reset

   Repeat this for the remaining Media-Store channels.
5. Use the **Attrib** knob to select **Aux**.
6. Use the **Aux** knob to select **Aux 1**.
7. Use the **Value** knob to select whether the Aux bus is reset with a switcher reset or not.
   - **NoRst** — the Aux bus is not reset
   - **Reset** — the Aux bus is reset with a switcher reset

   Repeat this for the remaining Aux buses.
8. Press **NEXT** > **NEXT** > **NEXT**.
9. Press **RState Save**.
10. Press **Confrm** to save the new reset settings.

To Load a Custom Reset Setting

1. Press **MENU RESET**.
2. Press **RState Load**.

   You can also press and hold **MENU** and press **Reset All** (**RESET** on the C10/C1).

Factory Default Settings

You can restore the switcher to the factory default state. All installation and personality settings are reset.

To Factory Reset the Switcher

1. Press **MENU** > **RESET** > **NEXT** > **NEXT**.
2. Press the **Factry Reset** knob.
3. Press the **Confrm** knob to load the factory default settings.

Resetting Individual Components

You can reset only the component that you want, instead of the entire switcher. Individual MLEs, keys, aux buses, dissolves, wipes, and menu items can be reset.

Table 7: Resetting Individual Components

To Reset	Buttons to Press	Result
Wipes	**WIPE** and **RESET**	all wipe parameters, including position, pattern, and border, are reset
Dissolves	**DISS** and **RESET**	all dissolve parameters are reset
Keys	**KEY # SEL** and **RESET**	key parameters for key # including clip, gain, and mask, are reset, but not key type, or chroma key color selection (each keyer is reset individually) (# is the number of the key)
MLEs	**MLE #** and **RESET** (C10/C1 only)	MLE # parameters, including source selections, are reset (each MLE is reset individually) (# is the number of the MLE)
	MLE # STORE and **MLE # RECALL** (all other panels)	
Aux Buses	**AUX #** and **RESET**	Aux bus # parameters, including source selections, are reset (each Aux is reset individually) (# is the number of the aux bus)
Menu Items	double-press the knob for the value you want to reset	the value for that knob is reset

Glossary

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).

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 or 1080i) 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 allow 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.

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SETUP MANUAL

v7.3

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Video Production Technology

Document Information

- Ross Part Number: **4802DR-120-07.3**
- Release Date: **June**, **2013**. Printed in Canada
- Equipment: This document applies to the Carbonite (4802AR-200-*xx*), Carbonite MultiMedia (4802AR-201-*xx*), and Carbonite+ (4802AR-202-*xx*) frames.

Copyright

Patents

This product is protected by the following US Patents: 4,205,346; 5,115,314; 5,280,346; 5,561,404; 7,034,886; 7,508,455; 7,602,446; 7,834,886; 7,914,332. This product is protected by the following Canadian Patents: 2039277; 1237518; 1127289. Other patents pending.

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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. 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. Indoor Use: WARNING: 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 Engineering 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.

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 Engineering 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' 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*)

- **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+, or Carbonite MultiMedia 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 MLE Upgrade (4802DR-303)** — 1 to 2 MLE 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 MLE Upgrade (4802DR-306)** — 1 to 2 MLE upgrade instructions for the C10 control panel
- **GVG100 Supported Command (4802DR-401)** — connection and GVG100 commands supported by the switcher
- **LiveEDL Setup (4802DR-402)** — setup recording EDL files and LTC timecode source
- **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

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 (MultiMedia Frame Only)

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.

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.*

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*).

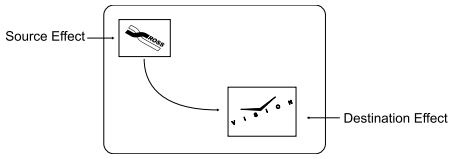
DVE

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 preset pattern keys 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 MultiMedia and Carbonite+ frames come with eight channels. The Carbonite and Carbonite eXtreme frames can select between 8 channels of DVE and no FSFC resources, or 4 channels of DVE and 6 FSFC resources.

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 MLEs as required, based on the memory that is being recalled.

General Purpose Interface

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 four (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.

Animation-Store comes standard with 8 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.

MediaWipes

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.

A MediaWipe use Media-Store channels 2 and 4 for the animation and alpha.

UltraChrome

The Ross UltraChrome™ 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.

Two floating Chroma Keys are available across both MLEs.

Memory AI Recall Mode

We take the guessing out of memory recalls by ensuring that a memory recall will not affect what is currently on-air. Memory AI 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.

Memory System

Storage for 100 complete switcher snapshots per MLE 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.

MLE Effect System

The MLE® (Multi-Level Effect) systems are standard. The number of MLEs depends on the chosen switcher model.

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

Media Manager

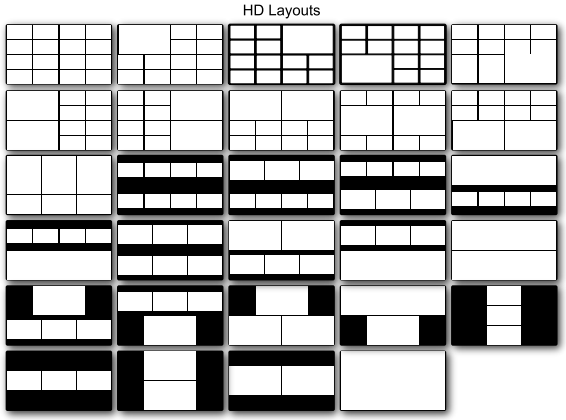
The Media Manager allows you to easily manage stills and animations on the switcher in a graphics interface.

MultiViewer

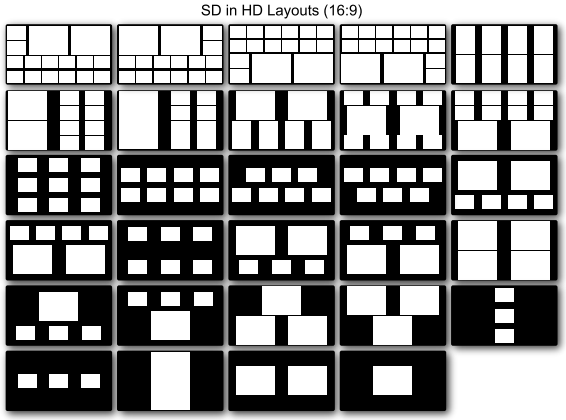
All Carbonite Multi-Definition Live Production Switchers come standard with two broadcast-quality integrated MultiViewers. Each MultiViewer allows you to view up to 16 video sources, in 29 different layouts, from a single output BNC. Any video source on the switcher, including MLE 1 and MLE 2 Program, Preview, and Media-Store channels, can be assigned to any box on the MultiViewer. All boxes on the MultiViewer include mnemonic source names and red and green tallies.

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.

HD Layouts



SD in HD Layouts (16:9)



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 MLE, 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 Carbonite Multi-Definition Live Production 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.

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.

Table 1: Supported Reference Formats

Input Reference	Usable Format
480i	480i
	480i 16:9
	720p 59.94Hz
	1080i 59.94Hz
	1080pSF 29.97Hz
576i	576i
	576i 16:9
	720p 50Hz
	1080i 50Hz
	1080pSF 25Hz
720p 59.94 Hz (60)	720p 59.94 Hz (60)
720p 50Hz	720p 50Hz
1080i 59.94Hz (60)	480i
	480i 16:9
	720p 59.94Hz
	1080i 59.94Hz
	1080pSF 29.97Hz
1080i 50Hz	576i
	576i 16:9
	720p 50Hz
	1080i 50Hz
	1080pSF 25Hz
1080pSF 23.98Hz	1080pSF 23.98Hz
1080pSF 29.97Hz	1080pSF 29.97Hz
1080pSF 25Hz	1080pSF 25Hz

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 or 1080i) 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 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.

To Set a Reference Format

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. In DashBoard, the **Freq** and **Format** settings are replaced with a single **Video Mode** button.*

1. Press **MENU** > **REF**.
2. Use the **Freq** knob to select the frequency for the video format you want to use. The 480i and 576i video formats are locked to a frequency of 59.94Hz and 50Hz, respectively.
3. Use the **Format** knob to select the reference format that you want the switcher to operate in. For an external reference, this must be the same as the reference format that is being fed into the switcher.

   The list of available formats only shows those video formats that support the selected frequency.
4. Use the **Aspect** knob to select the aspect ratio for the 480i and 576i video formats.

5. Press **NEXT**.
6. Use the **RefSrc** knob to select an internal (**Int**) or external (**Ext**) reference format.
7. 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 six 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 frame, 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.

Supported FSFC Input Mode Video Formats

FSFC can only convert between specific video formats at a given frequency.

Note: *De-interlacing of video signals, marked with an (*), is only available using the MultiMedia inputs.*

Table 2: Supported FSFC Input Mode Video Formats

Switcher Video Formats	Allowable Input Formats
1080i 59.94Hz	480i 59.94Hz
	720p 59.94Hz
	1080p 59.94Hz (HDMI only)
1080i 50Hz	576i 50Hz
	720p 50Hz
	1080p 50Hz (HDMI only)
720p 59.94Hz	480i 59.94Hz*
	1080i 59.94Hz*
	1080p 59.94Hz* (HDMI only)
720p 50Hz	576i 50Hz*
	1080i 50Hz*
	1080p 50Hz* (HDMI only)
480i 59.94Hz	480i 59.94 (aspect ratio conversion)
	720p 59.94Hz
	1080i 59.94Hz
	1080p 59.94Hz (HDMI only)
576i 50Hz	576i 50Hz (aspect ratio conversion)
	720p 50Hz
	1080i 50Hz
	1080p 50Hz (HDMI only)

FSFC For Carbonite Frame

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

Note: *The Carbonite frame can be configured to have 6 FSFC resources, or none. Refer to DVE/FSFC Resources (Carbonite Frame Only) on page 33 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 13 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 **FSFC*x*** 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+ Frames

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 13 for a list of compatible video format conversions.

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.*

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

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.

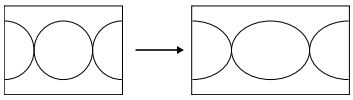


Figure 1: 4:3 to 16:9 Full Aspect Ratio Conversion

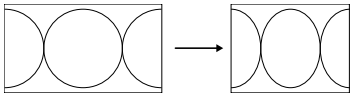


Figure 2: 16:9 to 4:3 Full Aspect Ratio Conversion

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.

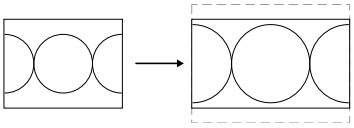


Figure 3: 4:3 to 16:9 Zoom Aspect Ratio Conversion

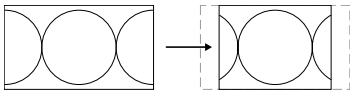


Figure 4: 16:9 to 4:3 Zoom Aspect Ratio Conversion

Letterbox

Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.

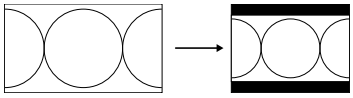


Figure 5: 16:9 to 4:3 Letterbox Aspect Ratio Conversion

Pillarbox

Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

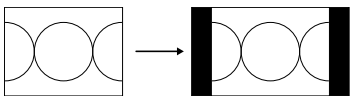


Figure 6: 4:3 to 16:9 Pillarbox Aspect Ratio Conversion

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 (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)
- 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** > **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 (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 component as the input type, press the **F/Frmt** knob.
6. Use the **Frming** or **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.

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
   - **Ln#** — assign the source on input # as an *unshaped* (linear) key alpha
   - **Shpd#** — assign the source on input # as a *shaped* key alpha
   - **BK** — assign internal black as a key alpha
   - **BG** — assign the matte generator as a key alpha
   - **M#** — assign the source on Media-Store # as a key alpha
4. Use the **SD ASP** knob to select the incoming aspect ratio of the 480i or 576i video signal. This is the aspect ratio of the incoming SD video signal, and not what you want it converted to.

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 appears on the mnemonics by adjusting the size or the font and the background color.

To Set Up a Source Name

Source names are restricted to eight characters in length.

Tip: *Source names and mnemonic setting can also be set from the **Mnemonics** tab on the Configuration node in DashBoard.*

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.

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 MLEs, you can use the **MLE 1** and **MLE 2** button caps provided to replace the last two AUX selection buttons. The **AUX 2**, **AUX 3** or **AUX 7** button selects MLE 1, and the **AUX 3**, **AUX 4** or **AUX 8** button selects MLE 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.

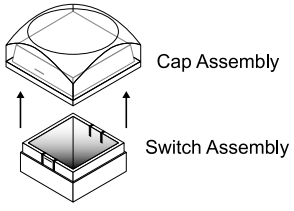


Figure 7: Removing Cap Assembly

2. Remove the Lens from the Diffuser using a common end micro screwdriver.

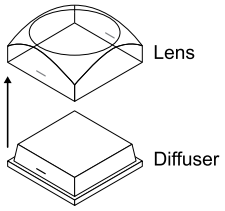


Figure 8: Removing Lens from Diffuser

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.

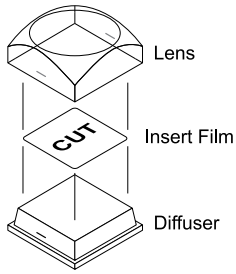


Figure 9: Inserting Film

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.

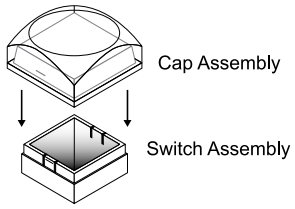


Figure 10: Removing Lens from Diffuser

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 MLEs 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 MLEs 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.
   - **BK** — black
   - **1-24** — video inputs (number of inputs depends on hardware)
   - **M1-M4** — Media-Store channels
   - **BG** — matte generator
   - **MLE1-MLE2** — MLE re-entry (MLE 2 must be installed)
   - **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**.
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.
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 be assigned to any video source in the switcher, including media-store channels, aux bus, and clean feed.

Output Sources

You can assign a video source or a bus to an Output BNC or the PRV BNC.

To Assign a Source to an Output

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

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.

   The PGM output is locked to the Program output of the highest MLE on the switcher.
3. Use the **Source** knob to select the source you want to assign to the output.
   - **1-24** — video inputs
   - **BK** — black
   - **BG** — matte generator
   - **M1-M4** — Media-Store channels
   - **M1MW** — Media-Store video channel used for MediaWipes on MLE 1 (if installed)
   - **M2MW** — Media-Store video channel used for MediaWipes on MLE 2
   - **M1MWA** — Media-Store alpha channel used for MediaWipes on MLE 1 (if installed)
   - **M2MWA** — Media-Store alpha channel used for MediaWipes on MLE 2
   - **PGM** — main program output of the switcher
   - **PV** — main preview output of the switcher
   - **CLN** — clean feed for main program of switcher
   - **MLE1** — main program output of MLE 1 (if installed)
   - **MLE1 PV** — main preview output of MLE 1 (if installed)
   - **MLE1 CLN** — clean feed output of MLE 1 (if installed)
   - **AUX1-8** — aux buses
   - **MV1-MV2** — MultiViewers

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.

Note: *Frame Converters and Synchronizers strip embedded audio data from the video signal.*

Table 3: 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

To Strip or Pass Ancillary Data

1. Press **MENU** > **SYSTEM** > **NEXT**.
2. Use the **AncIry** 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 MLE 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 MLE. This allows you to remove particular keys without affecting the primary program output.

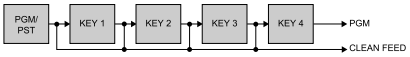


Figure 11: Possible Clean Feed Points

Keep the following in mind when working with clean feeds:

- The clean feed output must be assigned to an aux bus to be available on an output BNC.
- Recalling a memory register using Memory AI may cause the Clean Feed output to look different than expected. Memory AI 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 MLE that you want to set the clean feed for.
   - **M1** — MLE 1
   - **M2** — MLE 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.

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 two 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 MultiViewers are assigned to video outputs.
- 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) and only two layouts are available.

To Set Up a MultiViewer

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

Tip: *Both MultiViewer outputs can also be set up from the **MultiViewers** tab on the Configuration node in DashBoard.*

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. This setting is not available on the **MultiViewer** tab in DashBoard.

   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 to assign to the Output.
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 **Clip** knob to select **100%**.
8. Press **NEXT**.
9. Use the **AncSrc** knob to select where the ancillary data, including embedded audio, fed out with the MultiViewer comes from.
   - **1-24** — video inputs (number of inputs depends on hardware)
   - **M1-M4** — Media-Store channels
   - **M#MW** — MLE Media Wipe video
   - **M#MWA** — MLE Media Wipe alpha
   - **PGM** — program output of the switcher
   - **PV** — preview output of the switcher
   - **MLE1-MLE2** — MLE program output
   - **MLE# P** — MLE preview output
10. 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

11. Press **NEXT**.
12. 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.
13. Press **NEXT**.
14. 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.
15. 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.
16. Use the **Border** knob to turn the border around the MultiViewer box on or off.
17. Press **NEXT**.
18. Use the **Marker** knob to turn aspect ratio markers for the MultiViewer box on (**Aspect**) or off (**Off**).
19. Use the **Label** knob to turn source labels for the MultiViewer box off, or on in a selected position (**Bottom** or **Top**).
20. Press **NEXT**.
21. Use the **GrnTly** knob to turn the preview (green) tally for the MultiViewer box on or off.
22. Use the **RedTly** knob to turn the program (red) tally for the MultiViewer box on or off.
23. Configure additional MultiViewer boxes as required.

To Set Up a MultiViewer Clock

1. Press **MENU** > **SYSTEM** > **MultiView** > **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. Use the **LoadFg** knob to select the color of the text for the clock.
4. Use the **LoadBg** knob to select the background color for the clock.
5. Press **NEXT**.
6. Use the **X Pos** knob to position the clock horizontally.
7. Use the **Y Pos** knob to position the clock vertically.
8. Use the **Size** knob to adjust the overall size of the clock.
9. Press **NEXT**.
10. Use the **FgHue** knob to adjust the hue of the text color for the clock.
11. Use the **FgSat** knob to adjust the saturation of the text color for the clock.
12. Use the **FgLum** knob to adjust the luminance of the text color for the clock.
13. Press **NEXT**.
14. Use the **BgHue** knob to adjust the hue of the background color for the clock.
15. Use the **BgSat** knob to adjust the saturation of the background color for the clock.
16. Use the **BgLum** knob to adjust the luminance of the background color for the clock.

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 you want to set up. This is the tally number, and not the pin on the tally connector.
4. Use the **Input** knob to select the video source that you want to tally.
   - **BK** — black

- **BG** — color background
- **1-24** — input BNCs video sources
- **M1-M4** — Media-Store sources

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.
   - **PGM** — program bus
   - **PV** — preview bus
   - **CLN** — clean feed
   - **PGM1** — MLE 1 program bus (if installed)
   - **PRV1** — MLE 1 preview bus (if installed)
   - **CLN1** — MLE 1 clean feed (if installed)
   - **Aux1-Aux8** — Aux buses
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 MLEs.

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 (Carbonite + and 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 (Carbonite+ and 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.

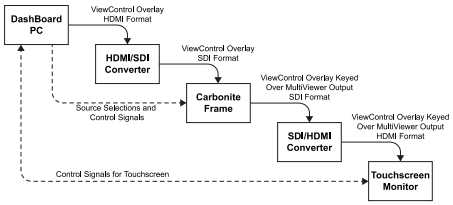


Figure 12: ViewControl Setup

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 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 to use the 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 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 **FSFC*x*** 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 the MultiViewer (**MV1** or **MV2**) that you want to assign to ViewControl.
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 # CUT** or **KEY # 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 # CUT** or **KEY # 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 MLE 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.

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 (C2X/C2S)

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 Recall Behavior (C10/C1)

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

To Set the Memory Recall Behavior

1. Press **MENU** > **PERS** > **NEXT**.
2. Use the **MLESel** knob to select how you want memories to recall.
   - **Hold** — you must select the MLE that the memory is recalled on
   - **Follow** — memories are recalled on the MLE 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 36 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.

Program Row (C2/C2M/C2X/C2S)

The switcher can be set to have the bottom or top control panel row used for the Program MLE (MLE 2).

To Set the Program Row

1. Press **MENU** > **PERS** > **NEXT**.
2. Use the **PGMRow** knob to select which row on the control panel is used for the Program MLE (MLE 2).
   - **Top** — the top row is used for the Program MLE
   - **Bottom** — the bottom row is used for the Program MLE

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.

Switcher Resources

The switcher has a number of resources that it must share across keyers or MLEs. How these resources are shared, and what happens when a resource is needed by another keyer or MLE can be set to ask if you want to steal the resource from another keyer or MLE, float the resources across all keyers and MLEs, or lock the resources to a particular keyer or MLE.

Switcher Resources

Note: *Memory Recall Mode cannot be set to MemAI or Memory to be able to set the resource sharing.*

1. Press **MENU** > **SYSTEM** > **Rsrc Mode**.
2. Use the **Resrc** knob to select the resource that you want to assign.
   - **CRKEY#** — UltraChrome™ chroma keys
   - **DVE#** — DVE channels
3. Use the **Mode** knob to select how the resource is assigned.
   - **M#:K#** — assign to specific MLE keyer
   - **M#:TR** — assign to specific MLE transition area
   - **FLOAT** — float across all MLEs and keyers (you are prompted to take resources if a resource is already in use by another on-air key)
   - **ASK** — float across all MLEs and keyers (you are prompted to take the resource if a resource is already in use by another on-air, or off-air key)

   If a chroma key resource is being taken from a keyer, the key type is changed to Auto Select and it is cut off-air.
4. Press **Mode**.
5. Press **Confrm** to accept the new resource settings.

DVE Resource Capture

Capturing a DVE resource for a new key or transition takes the DVE resources from the following sources in order of availability:

1. **Transition Area** — if a DVE transition is not in progress
2. **Off-Air DVE key** — highest number resource is taken first
3. **On-Air DVE key** — current DVE Key is converted to an Auto-Select key and taken off-air
4. **Transition Area** — if a DVE transition is in progress, the transition is converted to a dissolve

Chroma Key Resource Capture

Capturing a Chroma Key resource for a new key causes the following to occur:

- The current Chroma Key is converted to an Auto-Select Key
- If the current Chroma Key is on-air, it is taken off-air

DVE/FSFC Resources (Carbonite Frame Only)

The Carbonite frame can support either 8 channels of DVE and no FSFC resources, or 4 channels of DVE and 6 FSFC resources. The switcher must be rebooted to switch between the two resource modes.

To Switch Between DVE/FSFC Resource Modes

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **NEXT** > **NEXT**.
2. Use the **DVE/FS** knob to select the resource mode.
   - **8/0** — provides 8 channels of DVE and 0 FSFC resources
   - **4/6** — provides 4 channels of DVE and 6 FSFC resources
3. Press **DVE/FS** > **Reboot** to apply the changed.

   The switcher reboots to apply the changes to the resources.

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.

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.

To View the Current Network Settings

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

1. 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.
2. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **IP Addr**.
3. 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
4. Press the **Edit** knob.
5. Use the **Value** knob to select **DHCP**.
6. Press the **Value** knob.
7. 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.

1. 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.
2. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT IP Addr**.
3. 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
4. Press the **Edit** knob.
5. Use the **Value** knob to select **Static**.
6. Press **NEXT**.
7. 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.
8. 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.
9. 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.
10. Press the **Gatwy** knob.

11. 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 Video 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`

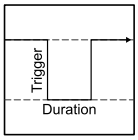
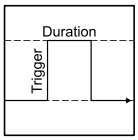
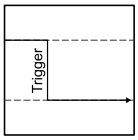
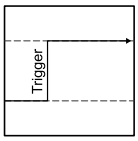
GPI Control

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 4: Trigger Types

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

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 MLEs (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 MLE (use the **Value** knob to select the MLE)
   - **MAuto** — perform a background auto transition on the selected MLE (use the **Value** knob to select the MLE)
   - **KCut** — perform a key cut on the selected MLE and Key
     - use the **Prop** knob to select **MLE** and the **Value** knob to select the MLE number
     - use the **Prop** knob to select **Keyer** and the **Value** knob to select the keyer number
   - **KAuto** — perform a key auto transition on the selected MLE and Key
     - use the **Prop** knob to select **MLE** and the **Value** knob to select the MLE number
     - 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.

   If you select a negative value, the switcher will take the video source on-air, wait for the pre-delay time, and then trigger the GPI output.

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.

To Manually Trigger a GPI Output

The GPI must already be set up as a output and the Next button functionality must be set to GPO before you can manually trigger it.

1. Press and hold the **NEXT** button.

While holding the Next button, the mnemonic/pattern buttons light for each GPI output that is currently triggered.

2. Press the mnemonic/pattern button for the GPI output you want to trigger. The number of the GPI is shown on the mnemonics of the buttons. The numbers on the pattern buttons on the C10/C1 correspond to the GPI.

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
- **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. The clock can be set for either 12 or 24-hour reporting.

To Set the System Real-Time Clock

1. Press **MENU** > **CONFIG** > **NEXT** > **Clock**.
2. Use the **24Hour** knob to select a 24-hour (**On**) or 12-hour (**Off**) clock.
3. Press **Edit**.
4. Use the **Hour**, **Minute**, and **Second** knobs to select the current time.
5. Press the **Hour** knob.
6. 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 13: 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 5: 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 41 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 the frame. Refer to *Network Setup* on page 34 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 6: Switcher Error Messages

Error	Description	Solution
DDR 0 Not Found; DDR 1 Not Found; or DDR 0 & 1 Not Found	There is a problem with the switcher DDR memory. The switcher may be used but many features will be limited or disabled.	Re-start your switcher. If the problem persists, contact 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.

Operating Temperature

The Carbonite switchers have been qualified at an operational temperature range of **0-40°C (32-140°F)**.

Video Input Specifications

Input Specification	Value
Equalization (using Belden 1694 cable)	>100m @ 1.5 Gb/s
	>300m @ 270 Mb/s (5°-40°C)
Impedance	75 ohms, terminating
Video Inputs, SDI	SMPTE 259M/292M 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	>17dB @ 1.5GHz
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 serial digital

Audio Specifications

Specification	Value
Audio Depth	24-bit AES3 in HD (20-bit in SD)
Sample Rate	48kHz
Channels	8 Stereo Pairs (16 channels)
Synchronization	Locked to Video
File Format	Multi-channel Waveform Audio File (.wav)

Power Rating

Table 7: Input Voltage

Component	Power Rating
Panel	100-120V~
	220-240V~
	47-63Hz
Frame, Carbonite/Carbonite+/Carbonite MultiMedia	100-120V~
	220-240V~
	47-63Hz

Table 8: Power Consumption

Component	Power Consumption
C10	24W 2.0A 12V
C1	24W 2.0A 12V
C1-A	30W 2.5A 12V
C1M	30W 2.5A 12V
C2	42W 3.5A 12V
C2M	50W 4.2A 12V
C2S	54W 4.5A 12V
C2X	65W 5.5A 12V
Frame, Carbonite	90W 7.5A 12V
Frame, Carbonite+	110W 9.2A 12V
Frame, Carbonite MultiMedia	125W 10.4A 12V

Serial Port

The serial port on the back of the frame supports the RS-422 transmission standard in the following format:

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

Table 9: 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 GPI I/O port on the back of the frame supports 34 GPI I/O pins.

Table 10: 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
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 Tally port on the back of the frame supports 34 fixed tallies.

Table 11: Tally Rating

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

Table 12: Tally Pinouts

Pin	Tally #
1	Common (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

Pin	Tally #
13	12
14	13
15	14
16	15
17	16
18	17
19	Common (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 (7-12, 26-30)
32	26
33	30
34	31
35	32
36	33
37	34

Glossary

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).

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 or 1080i) 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 allow 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.

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Carbonite eXtreme

SETUP MANUAL

v7.3

www.rossvideo.com

Video Production Technology

Document Information

- Ross Part Number: **4803DR-120-07.3**
- Release Date: **June**, **2013**. Printed in Canada
- Equipment: This document applies to the Carbonite eXtreme (2500AR-201-*xx*) frame.

Copyright

Patents

This product is protected by the following US Patents: 4,205,346; 5,115,314; 5,280,346; 5,561,404; 7,034,886; 7,508,455; 7,602,446; 7,834,886; 7,914,332. This product is protected by the following Canadian Patents: 2039277; 1237518; 1127289. Other patents pending.

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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. 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. Indoor Use: WARNING: 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 Engineering 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. WARNING: Hazardous Energy Levels are present on the chassis midplane where I/O card resettable fuses are located. Access to the inside chassis areas is restricted to service personnel only. Refer to the Installation and Diagnostic instruction sections for important information on the means to avoid this hazard.

29. The socket-outlet shall be installed near the equipment and shall be easily accessible.

30. 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.*

CE/C-Tick Approval

The equipment meets the requirements of the Australian Communications and Media Authority (Limits & Methods Of Measurement Of Radio Interference Characteristics Of Information Technology Equipment (EN55022/CISPR 22)).

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 Engineering 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' 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.

Company Address

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Website	*www.rossvideo.com*

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 Documentation

- **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+, or Carbonite MultiMedia 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 MLE Upgrade (4802DR-303)** — 1 to 2 MLE 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 MLE Upgrade (4802DR-306)** — 1 to 2 MLE upgrade instructions for the C10 control panel
- **GVG100 Supported Command (4802DR-401)** — connection and GVG100 commands supported by the switcher

- **LiveEDL Setup (4802DR-402)** — setup recording EDL files and LTC timecode source
- **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

NK Series Documentation

- **NK-IPS User Guide (9807DR-1004)** — setup information for the NK-IPS
- **NK Series Device Finder (9807DR-024)** — setup information for using Device Finder to set the IP address of an NK-IPS

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.

Hot Swappable Boards

The boards and power supplies in the 10RU Carbonite eXtreme™ frame are hot swappable. The resources, or sources provided by a board are lost when the board is removed.

Important: *Only qualified service personnel are allowed to replace or service system boards and/or cards.*

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.*

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*).

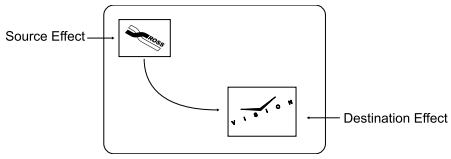
DVE

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 preset pattern keys 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 MultiMedia and Carbonite+ frames come with eight channels. The Carbonite and Carbonite eXtreme frames can select between 8 channels of DVE and no FSFC resources, or 4 channels of DVE and 6 FSFC resources.

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 MLEs as required, based on the memory that is being recalled.

General Purpose Interface

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 four (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.

Animation-Store comes standard with 8 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.

MediaWipes

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.

A MediaWipe use Media-Store channels 2 and 4 for the animation and alpha.

UltraChrome

The Ross UltraChrome™ 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.

Two floating Chroma Keys are available across both MLEs.

Memory AI Recall Mode

We take the guessing out of memory recalls by ensuring that a memory recall will not affect what is currently on-air. Memory AI 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.

Memory System

Storage for 100 complete switcher snapshots per MLE 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.

MLE Effect System

The MLE® (Multi-Level Effect) systems are standard. The number of MLEs depends on the chosen switcher model.

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

Media Manager

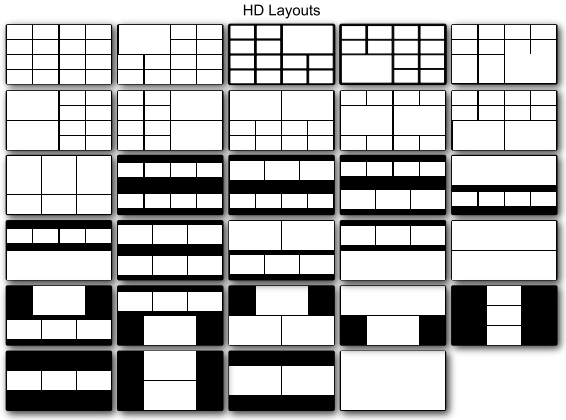
The Media Manager allows you to easily manage stills and animations on the switcher in a graphics interface.

MultiViewer

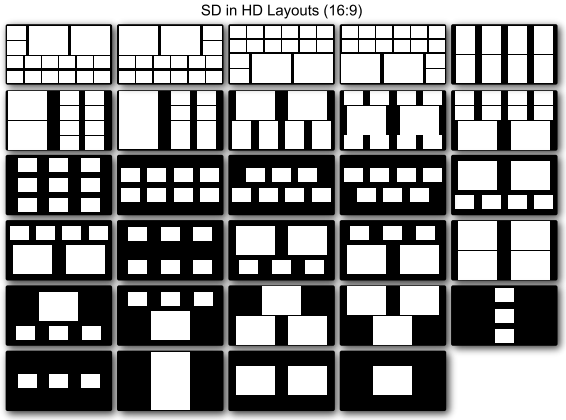
All Carbonite Multi-Definition Live Production Switchers come standard with two broadcast-quality integrated MultiViewers. Each MultiViewer allows you to view up to 16 video sources, in 29 different layouts, from a single output BNC. Any video source on the switcher, including MLE 1 and MLE 2 Program, Preview, and Media-Store channels, can be assigned to any box on the MultiViewer. All boxes on the MultiViewer include mnemonic source names and red and green tallies.

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.

HD Layouts



SD in HD Layouts (16:9)



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 MLE, 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 Carbonite Multi-Definition Live Production 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.

Frame Cards

All the functional cards and power supplies in the Carbonite eXtreme frame can be removed and replaced if required. Although the cards are hot-swappable, any video sources or resources provided by a card are lost when the card is removed.

Caution: *When the frame is energized, Hazardous Energy Levels are present on the chassis midplane where I/O card resettable fuses make contact with the 15V DC supply bus. Hazardous Energy Sources can cause fire or serious burns under short circuit conditions. Access to the inside chassis areas must be restricted to service personnel only, by use of the chassis door screw. The screw should be engaged to limit access to the inside chassis without a tool.*

Caution: *Servicing within the chassis while energized should be limited to module card or supply installation, or defect replacement. Installation of the cards should be carried at the front of the enclosure and care should be taken to avoid any card or user contact with the resettable fuses on the chassis's midplane. All other service or repair should be carried out off-line with the chassis in a de-energized state.*

Note: *You must install the rear module in the slot before you install the card.*

Card	Description
Input Card (9807-5004)	Each input card provides the video resources for the eight BNC connectors on the left or right side of the rear module.
Output Card (9807-5003)	Each output card provides the video resources for the eight BNC connectors on the left or right side of the rear module.
Controller Card (2500AR-003A)	The controller cards provide two looping reference connectors, two T-Bus connectors, and two USB ports; as well as the alarm GPI. The T-Bus connectors provide the interface to Ross Routing Systems components, such as the RCP-NK1 Remote Control Panel and the NK-IPS Network Bridge. The GPI Alarm is not implemented at this time.
Ethernet Interface Card (4803AR-070A) and GPIO/Tally Card (4803AR-072A)	The interface card provides the communications ports for the control panel and Breakout panel; as well as two Ethernet ports.
Switcher/Crosspoint Card (4803AR-001A)	The switcher/crosspoint card provides the video switching and device communications for the switcher.

Rear Modules

Rear modules install into the back of the frame and provide the physical connectors for two input or output cards.

To Install a Rear Module

Important: *Only qualified service personnel are allowed to replace or service system boards and/or cards.*

Note: *There are different input and output rear modules. Ensure that you are installing the correct module. Input rear modules are installed in the top slots and output rear modules are installed in the bottom slots.*

1. Locate the rear module, or blank plate, that you want to remove.
2. Remove the six (6) screws securing the rear module to the frame and remove the old rear module.

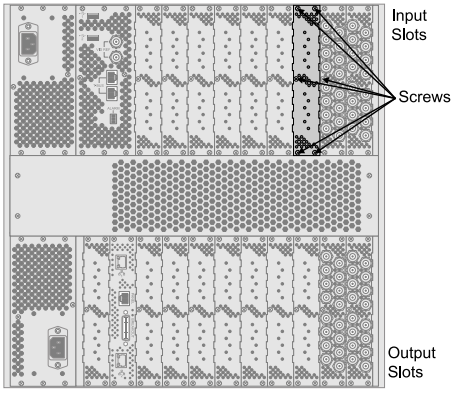


Figure 1: Rear Module Screws

3. Align the connectors on the back of the new rear module to the connectors on the midplane at the back of the frame and insert the rear module into the slot.
4. Re-install the six screws into the new rear module to secure it in position.

Input/Output Cards

The input and output cards install into the front of the frame and provide the video resources for the input/output matrix. Each rear module can support up to two input or output cards.

Note: *The controller and interface cards install into the frame in the same way as the input and output cards.*

To Install or Remove a Card

Important: *Only qualified service personnel are allowed to replace or service system boards and/or cards.*

Note: *There are different input and output cards. Ensure that you are installing the correct card. Input cards are installed in the top slots and output cards are installed in the bottom slots.*

To remove a card, follow the same procedure in reverse.

1. Locate slot at the front of the frame that you want to install a card into. A rear module must be installed into the slot before you can install the card . Each rear module provides connections for two cards.
2. Orient the new card so that the component side is towards the power supplies.
3. Rotate the ejector tabs on the card out.

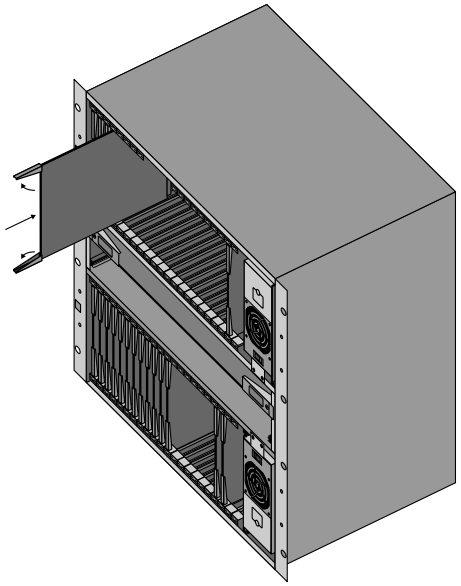


Figure 2: Card Installation

4. Align the card to the top and bottom guide rails and insert the card into the slot until it is firmly seated.

Warning: *Do not use excessive force to seat the card. If the card does not fit into the slot, check the alignment of the card and the rear module.*

5. Rotate the ejector tabs in, towards the front of the card, to lock the card into the slot.

Power Supplies

The frame supports up to two 500 W power supplies providing full redundancy. If one power supply fails, the other provides enough power to support the entire frame.

To Install or Remove a Power Supply

Both the primary and redundant power supplies install in the same way, and are both located inside the frame. To remove a power supply, follow the same procedure in reverse.

Warning Hazardous Voltages: *Hazardous voltages are present within the power supply for a short period of time after removal from the frame. The power supply cover is intended to protect the user from access to these areas, and should not be removed. Ross Video power supplies are intended to be factory serviced by qualified Ross Video service personnel only.*

Important: *Only qualified service personnel are allowed to replace or service system boards and/or cards.*

1. Ensure that the power switch on the power supply is turned off.
2. Locate the power supply slot that you want to install a power supply into.

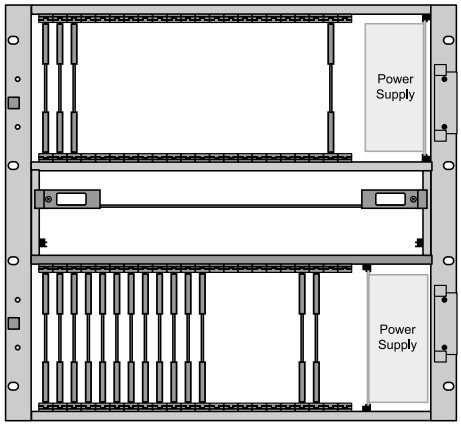


Figure 3: Power Supply Slots

3. Align the edges of the power supply guides to the guide rails in the frame.

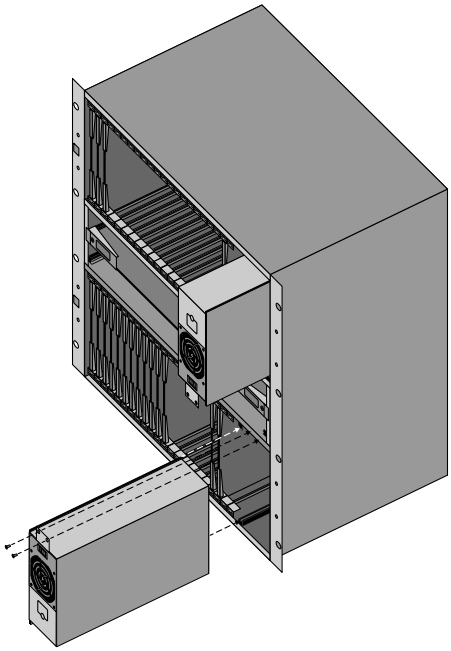


Figure 4: Installing Power Supplies

4. Slide the power supply into the slot until it is firmly seated.
5. Install the two retaining screws to secure the power supply in the frame.
6. Turn the power switch on the power supply on.

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.

Table 1: Supported Reference Formats

Input Reference	Usable Format
480i	480i
	480i 16:9
	720p 59.94Hz
	1080i 59.94Hz
	1080pSF 29.97Hz
576i	576i
	576i 16:9
	720p 50Hz
	1080i 50Hz
	1080pSF 25Hz
720p 59.94 Hz (60)	720p 59.94 Hz (60)
720p 50Hz	720p 50Hz
1080i 59.94Hz (60)	480i
	480i 16:9
	720p 59.94Hz
	1080i 59.94Hz
	1080pSF 29.97Hz
1080i 50Hz	576i
	576i 16:9
	720p 50Hz
	1080i 50Hz
	1080pSF 25Hz
1080pSF 23.98Hz	1080pSF 23.98Hz
1080pSF 29.97Hz	1080pSF 29.97Hz
1080pSF 25Hz	1080pSF 25Hz

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 or 1080i) 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 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.

To Set a Reference Format

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. In DashBoard, the **Freq** and **Format** settings are replaced with a single **Video Mode** button.*

1. Press **MENU** > **REF**.
2. Use the **Freq** knob to select the frequency for the video format you want to use. The 480i and 576i video formats are locked to a frequency of 59.94Hz and 50Hz, respectively.
3. Use the **Format** knob to select the reference format that you want the switcher to operate in. For an external reference, this must be the same as the reference format that is being fed into the switcher.

   The list of available formats only shows those video formats that support the selected frequency.
4. Use the **Aspect** knob to select the aspect ratio for the 480i and 576i video formats.

5. Press **NEXT**.
6. Use the **RefSrc** knob to select an internal (**Int**) or external (**Ext**) reference format.
7. 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.

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

- 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 eXtreme frame, 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.

Supported FSFC Input Mode Video Formats

FSFC can only convert between specific video formats at a given frequency.

Table 2: Supported FSFC Input Mode Video Formats

Switcher Video Formats	Allowable Input Formats	
1080i 59.94Hz	480i 59.94Hz	
	720p 59.94Hz	
	1080i 50Hz	576i 50Hz
720p 50Hz		
720p 59.94Hz		480i 59.94Hz
	1080i 59.94Hz	
	720p 50Hz	576i 50Hz
1080i 50Hz		
480i 59.94Hz		480i 59.94 (aspect ratio conversion)
	720p 59.94Hz	
	1080i 59.94Hz	
	576i 50Hz	576i 50Hz (aspect ratio conversion)
720p 50Hz		
1080i 50Hz		

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 **FSFC*x*** 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.

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.

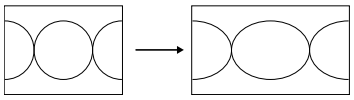


Figure 5: 4:3 to 16:9 Full Aspect Ratio Conversion

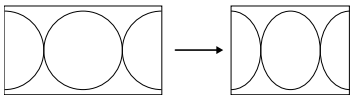


Figure 6: 16:9 to 4:3 Full Aspect Ratio Conversion

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.

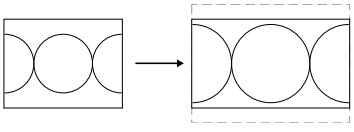


Figure 7: 4:3 to 16:9 Zoom Aspect Ratio Conversion

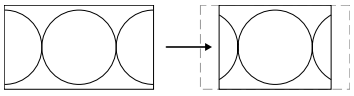


Figure 8: 16:9 to 4:3 Zoom Aspect Ratio Conversion

Letterbox

Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.

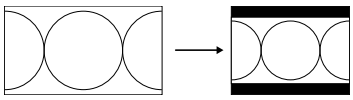


Figure 9: 16:9 to 4:3 Letterbox Aspect Ratio Conversion

Pillarbox

Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

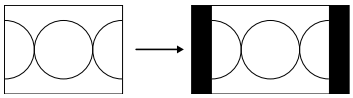


Figure 10: 4:3 to 16:9 Pillarbox Aspect Ratio Conversion

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.

Router Inputs and Outputs

Video signals can either pass directly from an input BNC on the router to an output BNC on the router, bypassing the video processing of the switcher subsystem, or can pass through the switcher subsystem. Only video signals passing through the switcher can be used for transitions or keying.

The Switchboard node in DashBoard allows you to assign video sources to the input and output BNCs. The router subsystem views the switcher inputs as outputs 145-168 and the switcher outputs as inputs 145-154. These inputs and outputs must be mapped to BNCs on the router to allow video sources in and out of the switcher.

Note: *Video signals that are routed through the switcher subsystem are delayed versus those that are routed directly from an input BNC to an output BNC.*

Switcher Inputs from the Router

Video inputs to the switcher must be assigned to outputs (**Switcher Input 1-24**) on the router.

To Assign a Router Input to a Switcher Input

1. Open the Switchboard node in DashBoard for your frame.
2. In the **Output** column, select the switcher input (**Switcher Inputs 1-24**) that you want to assign a router input to.
3. In the **Input** column, select the source from the router (**In 1-In 144**) that you wan to assign to the selected switcher input.

Switcher Outputs to the Router

Video outputs from the switcher must be assigned to outputs on the router.

To Assign a Switcher Output to a Router Output

1. Open the Switchboard node in DashBoard for your frame.
2. In the **Output** column, select the output of the router that you want to assign an output of the switcher to.
3. In the **Input** column, select the output from the switcher that you want to assign to a router output.
   - **Switcher Preview** — main preview output of the switcher
   - **Switcher Program** — main program output of the switcher
   - **Switcher Output 1-8** — video outputs from the switcher
   - **In1-In144** — router inputs (bypass switcher)

Input Cable Equalization

Cable equalization allows the switcher to adjust to the cable length and signal data rate of the input video to minimize jitter.

To Set Up Input Cable Equalization

1. In DashBoard, select the Carbonite eXtreme node under the NK-IPS node that the frame is connected to.
2. Click the **Card Details** tab.
3. Click on the input card slot that you want to set up cable equalization on. Each card supports eight input BNCs on the back of the frame.

   The current status of the card in the selected slot is shown to the right of the illustration of the frame. If a video signal is present on a BNC, the **Signal Present** indicator for that BNC shows green.
4. Select the **EQ Enable** box for each BNC that you want to enable cable equalization for.
5. Click **Send Configuration**.
6. On the **Send Config to NK Device** dialog box, select the device that you want to send the new configuration to.
7. Click **Send**.

Video Input Setup

Video sources come into the switcher from the router subsystem. A video source must be directed from the router input to an input of the switcher for the switcher to use that source.

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.

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
   - **Ln#** — assign the source on input # as an *unshaped* (linear) key alpha
   - **Shpd#** — assign the source on input # as a *shaped* key alpha
   - **BK** — assign internal black as a key alpha
   - **BG** — assign the matte generator as a key alpha
   - **M#** — assign the source on Media-Store # as a key alpha
4. Use the **SD ASP** knob to select the incoming aspect ratio of the 480i or 576i video signal. This is the aspect ratio of the incoming SD video signal, and not what you want it converted to.

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 appears on the mnemonics by adjusting the size or the font and the background color.

Source names can also come from a router mnemonic names file downloaded from the router and uploaded to the switcher.

To Set Up a Source Name

Source names are restricted to eight characters in length.

Tip: *Source names and mnemonic setting can also be set from the **Mnemonics** tab on the Configuration node in DashBoard.*

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 Upload a Router Mnemonic Names File

Refer to the documentation that came with your router for information on setting the mnemonic names and saving the file. Mnemonic names are saved and downloaded from the Switchboard application in Router Utilities.

1. Download the mnemonic names file and store it on the computer that is running DashBoard.
2. Click the **Router Mnemonics** tab on the Configuration node in DashBoard for the switcher.
3. Click **Upload** and locate the `.nks` file from the router.
4. Click **OK** and **Continue** to upload the file.

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 MLEs, you can use the **MLE 1** and **MLE 2** button caps provided to replace the last two AUX selection buttons. The **AUX 2**, **AUX 3** or **AUX 7** button selects MLE 1, and the **AUX 3**, **AUX 4** or **AUX 8** button selects MLE 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.

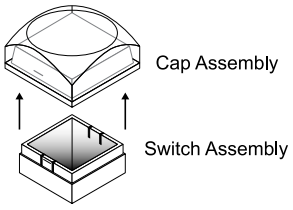


Figure 11: Removing Cap Assembly

2. Remove the Lens from the Diffuser using a common end micro screwdriver.

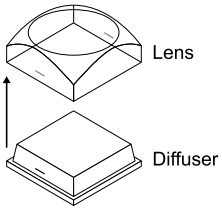


Figure 12: Removing Lens from Diffuser

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.

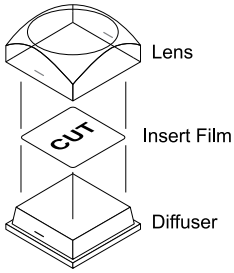


Figure 13: Inserting Film

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.

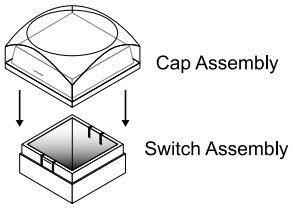


Figure 14: Removing Lens from Diffuser

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 MLEs 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 MLEs 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.
   - **BK** — black
   - **1-24** — video inputs (number of inputs depends on hardware)
   - **M1-M4** — Media-Store channels
   - **BG** — matte generator
   - **MLE1-MLE2** — MLE re-entry (MLE 2 must be installed)
   - **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**.
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.
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 outputs of the switcher must be assigned to outputs of the router to be available externally. The router views the switcher outputs as inputs to be mapped to outputs.

Output Sources

You can assign a video source or bus to an output source, which can be assigned to one or more output BNCs.

To Assign a Source to an Output

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

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.
   - **1-24** — video inputs
   - **BK** — black
   - **BG** — matte generator
   - **M1-M4** — Media-Store channels
   - **M1MW** — Media-Store video channel used for MediaWipes on MLE 1 (if installed)
   - **M2MW** — Media-Store video channel used for MediaWipes on MLE 2
   - **M1MWA** — Media-Store alpha channel used for MediaWipes on MLE 1 (if installed)
   - **M2MWA** — Media-Store alpha channel used for MediaWipes on MLE 2
   - **PGM** — main program output of the switcher
   - **PV** — main preview output of the switcher
   - **CLN** — clean feed for main program of switcher
   - **MLE1** — main program output of MLE 1 (if installed)
   - **MLE1 PV** — main preview output of MLE 1 (if installed)
   - **MLE1 CLN** — clean feed output of MLE 1 (if installed)
   - **AUX1-8** — aux buses
   - **MV1-MV2** — MultiViewers

Output Re-Clocking and Data Rate Selection

Re-clocking allows the router to minimize any jitter in the output signal. The Data Rate selection allows you to lock the router to an HD or SD output data rate, or have the router select the data rate automatically.

Tip: *By default, re-clocking and automatic data rate are enabled for all outputs. You may want to disable output re-clocking to reduce the cumulative effects of serial re-clocking along a signal path.*

To Set Up Output Re-Clocking and Data Rate Selection

1. In DashBoard, select the Carbonite eXtreme node under the NK-IPS node that the frame is connected to.
2. Click the **Card Details** tab.
3. Click on the output card slot that you want to set up re-clocking or data rate selection on. Each card supports eight output BNCs on the back of the frame.

   The current status of the card in the selected slot is shown to the right of the illustration of the frame. If a video signal is present on a BNC, the **Locked** indicator for that BNC shows green for an SD signal, or blue for an HD signal.
4. Select the **Reclocked Enabled** box for each BNC that you want to enable output re-clocking for.
5. Select the **Auto Data Rate** or **Manual Data Rate HD** boxes to set how you want the router to select the output data rate for each BNC.
   - **Auto Data Rate** — only **Auto Data Rate** box is selected
   - **HD Data Rate** — only **Manual Data Rate HD** box is selected
   - **SD Data Rate** — both boxes are de-selected
6. Click **Send Configuration**.
7. On the **Send Config to NK Device** dialog box, select the device that you want to send the new configuration to.
8. Click **Send**.

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.

Note: *Frame Converters and Synchronizers strip embedded audio data from the video signal.*

Table 3: 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

To Strip or Pass Ancillary Data

1. Press **MENU** > **SYSTEM** > **NEXT**.
2. Use the **AncIry** 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 MLE 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 MLE. This allows you to remove particular keys without affecting the primary program output.

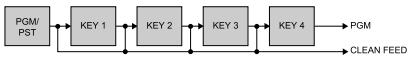


Figure 15: Possible Clean Feed Points

Keep the following in mind when working with clean feeds:

- The clean feed output must be assigned to an aux bus to be available on an output BNC.
- Recalling a memory register using Memory AI may cause the Clean Feed output to look different than expected. Memory AI 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 MLE that you want to set the clean feed for.
   - **M1** — MLE 1
   - **M2** — MLE 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.

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 two 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 MultiViewers are assigned to video outputs.
- 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) and only two layouts are available.

To Set Up a MultiViewer

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

Tip: *Both MultiViewer outputs can also be set up from the **MultiViewers** tab on the Configuration node in DashBoard.*

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. This setting is not available on the **MultiViewer** tab in DashBoard.

   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 to assign to the Output.
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 **Clip** knob to select **100%**.
8. Press **NEXT**.
9. Use the **AncSrc** knob to select where the ancillary data, including embedded audio, fed out with the MultiViewer comes from.
   - **1-24** — video inputs (number of inputs depends on hardware)
   - **M1-M4** — Media-Store channels
   - **M#MW** — MLE Media Wipe video
   - **M#MWA** — MLE Media Wipe alpha
   - **PGM** — program output of the switcher
   - **PV** — preview output of the switcher
   - **MLE1-MLE2** — MLE program output
   - **MLE# P** — MLE preview output
10. 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
11. Press **NEXT**.
12. 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.
13. Press **NEXT**.
14. 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.

15. 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.

16. Use the **Border** knob to turn the border around the MultiViewer box on or off.
17. Press **NEXT**.
18. Use the **Marker** knob to turn aspect ratio markers for the MultiViewer box on (**Aspect**) or off (**Off**).
19. Use the **Label** knob to turn source labels for the MultiViewer box off, or on in a selected position (**Bottom** or **Top**).
20. Press **NEXT**.
21. Use the **GrnTly** knob to turn the preview (green) tally for the MultiViewer box on or off.
22. Use the **RedTly** knob to turn the program (red) tally for the MultiViewer box on or off.
23. Configure additional MultiViewer boxes as required.

To Set Up a MultiViewer Clock

1. Press **MENU** > **SYSTEM** > **MultiView** > **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. Use the **LoadFg** knob to select the color of the text for the clock.

4. Use the **LoadBg** knob to select the background color for the clock.
5. Press **NEXT**.
6. Use the **X Pos** knob to position the clock horizontally.
7. Use the **Y Pos** knob to position the clock vertically.
8. Use the **Size** knob to adjust the overall size of the clock.
9. Press **NEXT**.
10. Use the **FgHue** knob to adjust the hue of the text color for the clock.
11. Use the **FgSat** knob to adjust the saturation of the text color for the clock.
12. Use the **FgLum** knob to adjust the luminance of the text color for the clock.
13. Press **NEXT**.
14. Use the **BgHue** knob to adjust the hue of the background color for the clock.
15. Use the **BgSat** knob to adjust the saturation of the background color for the clock.
16. Use the **BgLum** knob to adjust the luminance of the background color for the clock.

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 you want to set up. This is the tally number, and not the pin on the tally connector.
4. Use the **Input** knob to select the video source that you want to tally.
   - **BK** — black
   - **BG** — color background
   - **1-24** — input BNCs video sources
   - **M1-M4** — Media-Store sources
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.
   - **PGM** — program bus
   - **PV** — preview bus
   - **CLN** — clean feed
   - **PGM1** — MLE 1 program bus (if installed)
   - **PRV1** — MLE 1 preview bus (if installed)
   - **CLN1** — MLE 1 clean feed (if installed)
   - **Aux1-Aux8** — Aux buses
6. Press the **Tally** knob.

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.

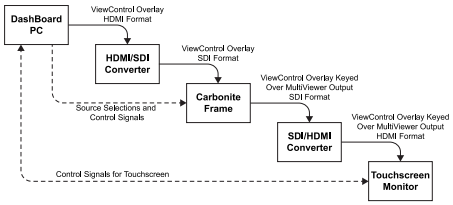


Figure 16: ViewControl Setup

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 and put it into a resolution that the switcher can use. Ensure that the resolution is not changed.
- Apply a FSFC to the input that is coming from the DashBoard computer.
- Set up a MultiViewer to use the 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

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 **FSFC*x*** 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 the MultiViewer (**MV1** or **MV2**) that you want to assign to ViewControl.
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 # CUT** or **KEY # 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 # CUT** or **KEY # 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 MLE 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.

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 (C2X/C2S)

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 Recall Behavior (C10/C1)

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

To Set the Memory Recall Behavior

1. Press **MENU** > **PERS** > **NEXT**.
2. Use the **MLESel** knob to select how you want memories to recall.
   - **Hold** — you must select the MLE that the memory is recalled on
   - **Follow** — memories are recalled on the MLE 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 35 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.

Program Row (C2/C2M/C2X/C2S)

The switcher can be set to have the bottom or top control panel row used for the Program MLE (MLE 2).

To Set the Program Row

1. Press **MENU** > **PERS** > **NEXT**.
2. Use the **PGMRow** knob to select which row on the control panel is used for the Program MLE (MLE 2).
   - **Top** — the top row is used for the Program MLE
   - **Bottom** — the bottom row is used for the Program MLE

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.

Switcher Resources

The switcher has a number of resources that it must share across keyers or MLEs. How these resources are shared, and what happens when a resource is needed by another keyer or MLE can be set to ask if you want to steal the resource from another keyer or MLE, float the resources across all keyers and MLEs, or lock the resources to a particular keyer or MLE.

Switcher Resources

Note: *Memory Recall Mode cannot be set to MemAI or Memory to be able to set the resource sharing.*

1. Press **MENU** > **SYSTEM** > **Rsrc Mode**.
2. Use the **Resrc** knob to select the resource that you want to assign.
   - **CRKEY#** — UltraChrome™ chroma keys
   - **DVE#** — DVE channels
3. Use the **Mode** knob to select how the resource is assigned.
   - **M#:K#** — assign to specific MLE keyer
   - **M#:TR** — assign to specific MLE transition area
   - **FLOAT** — float across all MLEs and keyers (you are prompted to take resources if a resource is already in use by another on-air key)
   - **ASK** — float across all MLEs and keyers (you are prompted to take the resource if a resource is already in use by another on-air, or off-air key)

   If a chroma key resource is being taken from a keyer, the key type is changed to Auto Select and it is cut off-air.
4. Press **Mode**.
5. Press **Confrm** to accept the new resource settings.

DVE Resource Capture

Capturing a DVE resource for a new key or transition takes the DVE resources from the following sources in order of availability:

1. **Transition Area** — if a DVE transition is not in progress
2. **Off-Air DVE key** — highest number resource is taken first
3. **On-Air DVE key** — current DVE Key is converted to an Auto-Select key and taken off-air
4. **Transition Area** — if a DVE transition is in progress, the transition is converted to a dissolve

Chroma Key Resource Capture

Capturing a Chroma Key resource for a new key causes the following to occur:

- The current Chroma Key is converted to an Auto-Select Key
- If the current Chroma Key is on-air, it is taken off-air

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.

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.

To View the Current Network Settings

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

1. 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.
2. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **IP Addr**.
3. 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
4. Press the **Edit** knob.
5. Use the **Value** knob to select **DHCP**.
6. Press the **Value** knob.
7. 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.

1. 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.
2. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT IP Addr**.
3. 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
4. Press the **Edit** knob.
5. Use the **Value** knob to select **Static**.
6. Press **NEXT**.
7. 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.
8. 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.
9. 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.
10. Press the **Gatwy** knob.

11. 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 Video 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`

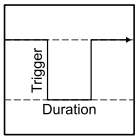
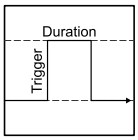
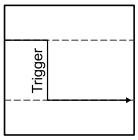
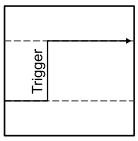
GPI Control

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 4: Trigger Types

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

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 MLEs (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 MLE (use the **Value** knob to select the MLE)
   - **MAuto** — perform a background auto transition on the selected MLE (use the **Value** knob to select the MLE)
   - **KCut** — perform a key cut on the selected MLE and Key
     - use the **Prop** knob to select **MLE** and the **Value** knob to select the MLE number
     - use the **Prop** knob to select **Keyer** and the **Value** knob to select the keyer number
   - **KAuto** — perform a key auto transition on the selected MLE and Key
     - use the **Prop** knob to select **MLE** and the **Value** knob to select the MLE number
     - 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.

   If you select a negative value, the switcher will take the video source on-air, wait for the pre-delay time, and then trigger the GPI output.

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.

To Manually Trigger a GPI Output

The GPI must already be set up as a output and the Next button functionality must be set to GPO before you can manually trigger it.

1. Press and hold the **NEXT** button.

While holding the Next button, the mnemonic/pattern buttons light for each GPI output that is currently triggered.

2. Press the mnemonic/pattern button for the GPI output you want to trigger. The number of the GPI is shown on the mnemonics of the buttons. The numbers on the pattern buttons on the C10/C1 correspond to the GPI.

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
- **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

Switcher Status

The Config tab of the **Carbonite eXtreme** node provides a read only overview of the state of a number of important switcher components and equipment.

The following status items are shown on the Config tab:

- **Reference Signal Type** — the video format that the switcher is operating in
- **Chassis Fan Speed** — the table shows the speed (RPMs) of each fan in the frame
- **Chassis Fan Errors** — the table shows the current status of each of the fans in the frame
  - 0 — good
  - 1 — start-up speed warning
  - 2 — start-up speed failure
  - 4 — running speed warning
  - 8 — running speed failure
  - 16 — stopped (failure)

The following alarms are shown on the Config tab:

- **Reference** — the switcher detects a reference signal (green) or not (yellow)
- **Matrix** — the power going to and from the matrix is within tolerances (green) or not (red)
- **RCP Power** — the power detected on the T-Bus connector is within tolerances (green) or not (red)
- **I/O** — the signal present LED indicators on the input and output cards are good (green) or at least one indicator is failing (red)
- **Fan Heartbeat** — the fans are operating normally (green) or at least one fan is failing (red)
- **PSU 1** — the first power supply is operating normally (green), is failing (red), or not present (red)
- **PSU 2** — the second power supply is operating normally (green), is failing (red), or not present (red)
- **Temperature** — the switcher is operating within temperature tolerances (green) or not (red)

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. The clock can be set for either 12 or 24-hour reporting.

To Set the System Real-Time Clock

1. Press **MENU** > **CONFIG** > **NEXT** > **Clock**.
2. Use the **24Hour** knob to select a 24-hour (**On**) or 12-hour (**Off**) clock.
3. Press **Edit**.
4. Use the **Hour**, **Minute**, and **Second** knobs to select the current time.
5. Press the **Hour** knob.
6. 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 17: 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 5: 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 40 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 the frame. Refer to *Network Setup* on page 33 for more information.
4	This DIP switch prevents software upgrades. It must be in the up (off) position to upgrade the switcher.

DIP	Description
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 6: Switcher Error Messages

Error	Description	Solution
DDR 0 Not Found; DDR 1 Not Found; or DDR 0 & 1 Not Found	There is a problem with the switcher DDR memory. The switcher may be used but many features will be limited or disabled.	Re-start your switcher. If the problem persists, contact 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.

Operating Temperature

The Carbonite switchers have been qualified at an operational temperature range of **0-40°C (32-140°F)**.

Video Input Specifications

Input Specification	Value
Equalization (using Belden 1694 cable)	>100m @ 1.5 Gb/s
	>300m @ 270 Mb/s (5°-40°C)
Impedance	75 ohms, terminating
Video Inputs, SDI	SMPTE 259M/292M 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	>17dB @ 1.5GHz
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 serial digital

Audio Specifications

Specification	Value
Audio Depth	24-bit AES3 in HD (20-bit in SD)
Sample Rate	48kHz
Channels	8 Stereo Pairs (16 channels)
Synchronization	Locked to Video
File Format	Multi-channel Waveform Audio File (.wav)

Power Rating

Table 7: Input Voltage

Component	Power Rating
Panel	100-120V~
	220-240V~
	47-63Hz
Frame, Carbonite eXtreme	100-240V~
	50-60Hz
	6.25-3.15A

Table 8: Power Consumption

Component	Power Consumption
C10	24W 2.0A 12V
C1	24W 2.0A 12V
C1-A	30W 2.5A 12V
C1M	30W 2.5A 12V
C2	42W 3.5A 12V
C2M	50W 4.2A 12V
C2S	54W 4.5A 12V
C2X	65W 5.5A 12V
Frame, Carbonite eXtreme	500W 34A 14.6V

Maximum Cable Lengths

Table 9: Maximum Cable Length

Cable	Max. Length
Panel to Frame Connection	200m
T-Bus Connections	100m

Serial Port

The serial port on the breakout panel 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 GPI I/O connectors on the breakout panel support 34 GPI I/O pins.

Tally Port

The Tally connectors on the breakout panel support 34 fixed tallies.

Table 11: Tally Rating

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

Glossary

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).

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 or 1080i) 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 allow 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.

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Carbonite Cutsheets

CARBONITE

Yamaha 01V96

01V96 Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Yamaha 01V96 connects to the switcher through an openGear SMC-9901 Serial to MIDI Converter connected directly to the switcher over RS-422, or through a Comtrol DeviceMaster over ethernet. For information on connecting using a DeviceMaster, refer to the DeviceMaster Setup Sheet.

SMC-9901 Cable Connections

A serial Interface Cable is used to connect the switcher to the SMC-9901 Serial to MIDI Converter, and then standard MIDI cables are used to connect the SMC-9901 to the audio mixer.

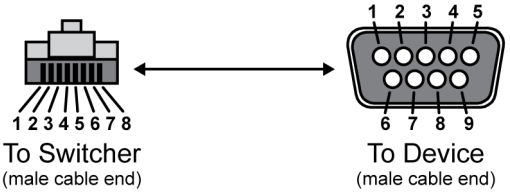

Figure 1: Switcher to SMC-9901

Table 1: SMC-9901 Cable Connections

Carbonite (Serial Port)	SMC-9901 (Serial Port)
1 (Tx+)	3 (Rx+)
2 (Tx-)	8 (Rx-)
3 (Rx+)	7 (Tx+)
6 (Rx-)	2 (Tx-)
7 (Ground)	5 (Gnd)

FlexDevice Installation

The FlexDevice™ driver for this device is included in the current software release.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.

   If you are editing, or deleting, an existing device, use the **Add** knob to select the device and press the **Edit**, or **Delete**, knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **AudioMixer**.
5. Press **NEXT**.
6. Use the **SubType** knob to select **01V96_1.0**.
7. Press **NEXT**.
8. Use the **Option** knob to select **Baud**.
9. Use the **Value** knob to select **38400**.
10. Use the **Option** knob to select **Parity**.
11. Use the **Value** knob to select **None**.
12. Press the **Option** knob.
13. Press the **Confrm** knob.

To Assign an Audio Channel to a Video Input

Repeat this procedure to add multiple audio channels to a video source. You can assign up to xx audio channels to a single video source.

1. Press **MENU** > **Config** > **Input** > **NEXT** > **NEXT**.
2. Use the **Input** knob to select the video source that you want to assign audio channels to.
   - **1-24** — video sources
   - **BK** — black
   - **BG** — color background
   - **M1-M4** — Media-Store channels
   - **MV1-MV2** — MultiViewers 1 and 2
3. Press the **Audio** knob.
4. Press the **Add** knob.

If you are editing, or deleting, an existing audio channel assignment, press the **Edit**, or **Delete**, knob.

5. Use the **Mixer** knob to select the audio mixer that you want to assign an audio channel from.
6. Use the **Chan** knob to select the audio channel that you want to assign to the video source.
7. Press **NEXT**.
8. Use the **Option** knob to select **Level**.
9. Use the **Value** knob to select the default audio level for the selected audio channel.
10. Use the **Option** knob to select **Latch**.
11. Use the **Value** knob to select whether the switcher brings an audio channel on at the same level it was last set to for the selected video source (**Yes**), or it always uses the default audio level (**No**).
12. Press the **Chan** knob.
13. Press the **Confrm** knob to save your changes.

01V96 Setup

1. Press the **DIO/SETUP** function button on the **Display Access Group**.
2. Press the **MIDI/HOST** tab.
3. Use the cursor buttons to navigate to the following (you must press **ENTER** after each selection):
   a) Set **Tx PORT** to **MIDI**.
   b) Set **Rx PORT** to **MIDI**.
4. Press the **MIDI** function button on the **Display Access Group**.
5. Press the **SETUP** tab.
6. Use the cursor buttons to navigate to the following:

	Tx	Rx	Omni	Echo	Value
Channel	1	1	--	--	--
Program Change	ON	ON	OFF	OFF	--
Control Change	OFF	OFF	OFF	--	--
Param Change	ON	ON	--	OFF	--
Bulk	--	OFF	--	--	--
Other Commands	--	--	--	OFF	--
Fader Resolution	--	--	--	--	LOW

Audio Mixer Control

The switcher interface allows you to control the channel levels on an audio mixer connected to the switcher. These can be either preset levels set at installation, or manually overridden.

Keep the following in mind when controlling an audio mixer:

- Audio level overrides are not retained for the next time that audio channel is taken on-air unless the Latch feature is turned off.
- If multiple audio channels are assigned to a video source, you cannot adjust them individually.

To Override Audio Channel Levels

Tip: *Double-press the video source button that the audio channels you want to adjust are assigned to. This takes you directly to the audio override controls.*

1. Press **MENU** > **System** > **NEXT** > **NEXT** > **Device Config** > **NEXT** > **Audio**.
2. Use the **Chan** knob to select the audio channels that you want to edit.
3. Use the **Level** knob to adjust the audio level of the selected channels.
4. Use the **Pan** knob to adjust the pan left or right for the selected channels.

CARBONITE

Yamaha DM1000

DM1000 Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Yamaha DM1000 connects to the switcher through an openGear SMC-9901 Serial to MIDI Converter connected directly to the switcher over RS-422, or through a Comtrol DeviceMaster over ethernet. For information on connecting using a DeviceMaster, refer to the DeviceMaster Setup Sheet.

SMC-9901 Cable Connections

A serial Interface Cable is used to connect the switcher to the SMC-9901 Serial to MIDI Converter, and then standard MIDI cables are used to connect the SMC-9901 to the audio mixer.

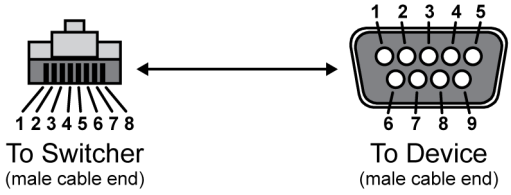

Figure 1: Switcher to SMC-9901

Table 1: SMC-9901 Cable Connections

Carbonite (Serial Port)	SMC-9901 (Serial Port)
1 (Tx+)	3 (Rx+)
2 (Tx-)	8 (Rx-)
3 (Rx+)	7 (Tx+)
6 (Rx-)	2 (Tx-)
7 (Ground)	5 (Gnd)

FlexDevice Installation

The FlexDevice™ driver for this device is included in the current software release.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.

   If you are editing, or deleting, an existing device, use the **Add** knob to select the device and press the **Edit**, or **Delete**, knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **AudioMixer**.
5. Press **NEXT**.
6. Use the **SubType** knob to select **DM1000_1.0**.
7. Press **NEXT**.
8. Use the **Option** knob to select **Baud**.
9. Use the **Value** knob to select **38400**.
10. Use the **Option** knob to select **Parity**.
11. Use the **Value** knob to select **None**.
12. Press the **Option** knob.
13. Press the **Confrm** knob.

To Assign an Audio Channel to a Video Input

Repeat this procedure to add multiple audio channels to a video source. You can assign up to xx audio channels to a single video source.

1. Press **MENU** > **Config** > **Input** > **NEXT** > **NEXT**.
2. Use the **Input** knob to select the video source that you want to assign audio channels to.
   - **1-24** — video sources
   - **BK** — black
   - **BG** — color background
   - **M1-M4** — Media-Store channels
   - **MV1-MV2** — MultiViewers 1 and 2
3. Press the **Audio** knob.

4. Press the **Add** knob.

   If you are editing, or deleting, an existing audio channel assignment, press the **Edit**, or **Delete**, knob.

5. Use the **Mixer** knob to select the audio mixer that you want to assign an audio channel from.
6. Use the **Chan** knob to select the audio channel that you want to assign to the video source.
7. Press **NEXT**.
8. Use the **Option** knob to select **Level**.
9. Use the **Value** knob to select the default audio level for the selected audio channel.
10. Use the **Option** knob to select **Latch**.
11. Use the **Value** knob to select whether the switcher brings an audio channel on at the same level it was last set to for the selected video source (**Yes**), or it always uses the default audio level (**No**).
12. Press the **Chan** knob.
13. Press the **Confrm** knob to save your changes.

DM1000 Setup

1. Press the **SETUP** function button on the **Display Access Group**.
2. Press the **MIDI/HOST** tab.
3. Use the cursor buttons to navigate to the following (you must press **ENTER** after each selection):
   a) Set **TO SERIAL HOST** to **PC-2**.
   b) Set **Rx PORT** to **MIDI**.
   c) Set **Tx PORT** to **MIDI**.
4. Press the **MIDI** function button on the **Display Access Group**.
5. Press the **SETUP** tab.
6. Use the cursor buttons to navigate to the **RECEIVE** section and set the following:

	Tx	Rx	Omni	Echo	Value
Channel	1	1	--	--	--
Program Change	ON	ON	OFF	OFF	--
Control Change	ON	ON	OFF	OFF	--
Param Change	ON	ON	--	OFF	--
Bulk	--	OFF	--	--	--
Other Commands	--	--	--	OFF	--
Fader Resolution	--	--	--	--	LOW

Audio Mixer Control

The switcher interface allows you to control the channel levels on an audio mixer connected to the switcher. These can be either preset levels set at installation, or manually overridden.

Keep the following in mind when controlling an audio mixer:

- Audio level overrides are not retained for the next time that audio channel is taken on-air unless the Latch feature is turned off.
- If multiple audio channels are assigned to a video source, you cannot adjust them individually.

To Override Audio Channel Levels

Tip: *Double-press the video source button that the audio channels you want to adjust are assigned to. This takes you directly to the audio override controls.*

1. Press **MENU** > **System** > **NEXT** > **NEXT** > **Device Config** > **NEXT** > **Audio**.
2. Use the **Chan** knob to select the audio channels that you want to edit.
3. Use the **Level** knob to adjust the audio level of the selected channels.
4. Use the **Pan** knob to adjust the pan left or right for the selected channels.

Ross Remote Aux Panel Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Ross CPS-AUX-053B connects to the switcher through the provided **Remote Aux Panel Cable Adapter**(4802CR-380) and the **Main** port on the back of the Remote Aux Panel. The **Remote Aux Panel Cable Adapter** connects to the **Serial** port on the back of the frame.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **AuxPanel**.
5. Pres **NEXT**.
6. Use the **SubType** knob to select **CPSAUX_1.0**.
7. Press the **SubType** knob.
8. Press the **Confrm** knob to save your settings.

Device Setup

You can connect up to 8 Remote Aux Panel to the switcher, each one connected to the one before it. Each Remote Aux Panel also has a dedicated power supply.

Figure 1: Remote Aux Panel Overview

- **Power** — An AC Adapter (90-264 VAC) is provided with each Remote Aux Panel to provide the +5 VDC power for the panel.
- **GPI** — The DB9 GPI connector is not used at this time.
- **Main** — The RJ-12 port connects to the switcher, or the previous Remote Aux Panel in the chain.
- **Echo** — The RJ-12 port connects to the Main port on the next Remote Aux Panel in the chain.

Remote Aux Panel Assignment

Each Remote Aux Panel must be manually assigned to the aux bus it will control. The switcher must put the Remote Aux Panel into programming mode. Once in programming mode, you must select the aux bus to control on the Remote Aux Panel.

To Assign the Remote Aux Panel to an Aux Bus

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Use the left knob to select ***xx*-CPSAUX_*x.x***.
3. Press **NEXT**.
4. Press **Program Start**.
   All aux panels are put into programming mode and the red on-air light on the aux panels flash.
5. Assign each aux panel to one or multiple aux buses as required.

   The first 8 source buttons on the aux panel represent the aux buses on the switcher.

   - **Regular (source light is on)** — The aux panel is assigned to the selected aux bus, allowing full control.
   - **Follow (source light is flashing)** — The aux panel is assigned to the selected aux bus, allowing you to view what sources are selected on that aux bus, but you cannot control the aux bus.
6. Press **Accept** to store the settings.
7. Press **Stop** when you are finished programming.

Ross RCP-NK1 Remote Control Panel Setup

This device was tested with Carbonite version **5.0.2**.

Cable Connections

The Ross RCP-NK1 connects to the switcher through a Ross NK-IPS to the switcher over ethernet. Refer to the documentation that came with the Ross RCP-NK1 for information on connecting the NK-IPS to the RCP-NK1.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.

   If you are editing, or deleting, an existing device, use the **Add** knob to select the device and press the **Edit**, or **Delete**, knob.
3. Use the **Slot** knob to select **Slot X**, where **X** is the number of the slot you want to use.
4. Use the **Type** knob to select **RouterPanel**.
5. Press **NEXT**.
6. Use the **SubType** knob to select **NK-IPS_1.0**.
7. Press **NEXT**.
8. Use the **Field** knob to select the segment of the IP address for the NK-IPS you want to edit.
9. Use the **Value** knob to select the number.

   Repeat this for each segment of the IP address.
10. Press **NEXT**.
11. Use the **Option** knob to select **Port**.
12. Use the **Value** knob to select the port on the NK-IPS that the RCP-NK1 is connected to.
13. Use the **Option** knob to select **Level**.
14. Use the **Value** knob to select which level on the RCP-NK1 is controlling the switcher.
15. Press the **Option** knob.
16. Press the **Confrm** knob.

Device Setup

Refer to the documentation that came with the Ross RCP-NK1 for information on setting up the NK-IPS to the RCP-NK1.

Remote Control Panel Interface

From the Ross RCP-NK1 Remote Panel, you can select video sources on Aux, Program, Preview, and Key buses on the switcher, and run custom controls.

To Select a Source on a Bus from the Remote Panel

1. Select the level on the Remote Control Panel that is assigned to the switcher.
2. Select the button on the output section of the Remote Panel that corresponds to the output BNC on the switcher. Refer to the table *Table 1: Router Control Panel Output Mapping* on page 1.
3. Select the button on the input section of the Remote Panel that corresponds to the source on the switcher you want to select. Refer to the table *Table 2: Router Control Panel Input Mapping* on page 2.

Selecting an input (or source) on the Remote Panel acts like a selection of that source on the bus of the switcher.

Table 1: Router Control Panel Output Mapping

Router Output	Switcher Source
1-8	Aux Buses
97	Program
98	Preview
99	Key 1 Video+Alpha
100	Key 2 Video+Alpha

Router Output	Switcher Source
101	Key 3 Video+Alpha
102	Key 4 Video+Alpha
105	Key 1 Alpha
106	Key 2 Alpha
107	Key 3 Alpha
108	Key 4 Alpha

Table 2: Router Control Panel Input Mapping

Router Input	Switcher Source
1-24	Video Inputs
149-152	Media-Stores
169	Black
170	Matte
176	Program Output
177	Preview Output
178	Clean Feed
179	Chroma Key Alpha

To Run, Stop, or Resume a Custom Control from a Remote Panel

1. Select the level on the Remote Control Panel that is assigned to the switcher.
2. Select the button on the output section of the Remote Panel that corresponds to the custom control bank that you want to run, stop, or resume a custom control on. Refer to the table *Table 3: Router Control Panel CC Bank Mapping* on page 2.
3. Select the button on the input section of the Remote Panel that corresponds to the custom control that you want to run, stop, or resume.

Refer to the table *Table 4: Router Control Panel CC Mapping* on page 2.

Table 3: Router Control Panel CC Bank Mapping

Router Output	Switcher Source
223	Custom Control Bank 1
224	Custom Control Bank 2
225	Custom Control Bank 3
226	Custom Control Bank 4

Table 4: Router Control Panel CC Mapping

Router Input	Switcher Source
1-24	Custom Controls

Trademarks

Camera Control

The switcher interface allows you to control a robotic camera connected to the switcher. This can be either by direct input using the positioner to pan, tilt, or zoom the camera, or by storing and loading shots for the camera.

Keep the following in mind when controlling a camera:

- You cannot recall a second shot while a shot is being recalled. Wait for the first recall to finish before attempting to recall another shot.
- When you store a memory register, the last recalled shot is stored in the memory register and is recalled when the memory register is recalled.

Direct Control

1. Press the source button for the camera you want to control.
2. Use the positioner, or the knobs, to adjust the pan, tilt, and zoom of the camera.
   - **Pan** – move the camera head left or right
   - **Tilt** – move the camera head up or down
   - **Zoom** – zoom the camera lens in or out
3. Press **NEXT**.
4. Press the **Focus** knob to toggle between auto and manual focus.
   - Use the **Focus** knob to manually focus the camera lens in manual mode.
5. Press the **Iris** knob to toggle between auto and manual iris.
   - Use the **Iris** knob to manually open and close the iris in manual mode.

Storing a Shot

1. Set up the camera how you want it to be later recalled.
2. Press the source button for the camera you want to store a shot for.
3. Press **NEXT** > **NEXT**.
4. Use the **Store** knob to select the shot register you want to store the camera shot in.
5. Press the **Store** knob to store the shot.

Recalling a Shot

1. Press the source button for the camera you want to recall a shot for.
2. Press **NEXT** > **NEXT**.
3. Use the **Recall** knob to select the shot register you want to recall the camera shot from.
4. Press the **Recall** knob to recall the shot.

Trademarks

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XPression RossTalk Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Ross Video XPression connects to the switcher over ethernet.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **Slot #**, where # is the number of the slot you want to use.
4. Use the **Type** knob to select **RossTalk**.
5. Pres **NEXT**.
6. Use the **SubType** knob to select **XPression_1.0**.
7. Press **NEXT**.
8. Use the **Field** knob to select the segment of the IP address you want to edit.
9. Press **NEXT**.
10. Use the **Option** and **Value** knobs to set the options for this character generator.
    - **Port** — set the port on the device that you are connecting to
    - **PreRoll** — set the number of the frames that switcher waits after sending the play command to a character generator before taking the source on-air
    - **RollClp** — turn the Roll Clip feature on or off (the Roll Clip button must be on for this setting to apply)
    - **RollCmd** — select whether the Take Next command (**Next**) or GPI trigger (**GPI*X***) is sent for a Roll Clip event
11. Press the **Option** knob.
12. Press the **Confrm** knob to save your settings.

To Assign a Character Generator Channel to a Video Input

1. Press **MENU** > **Config** > **Input** > **NEXT**.
2. Use the **Input** knob to select the input BNC that is connected to the character generator.
3. Press the **Device** knob.
4. Use the **Device** knob to select the character generator you set up for the input BNC.
5. Press **NEXT**.
6. Use the **Option** and **Value** knobs to set the options for this character generator.
    - **Channel** — select the channel on the character generator that you want to control
7. Press the **Option** knob.
8. Press the **Confrm** knob to save your changes.

XPression Setup

1. Click **Edit** > **Hardware Setup**.
2. Click the **GPI Boards** tab.
3. Click **Add**.
4. In the **Brand** list, click **RossTalk**.
5. Click **OK**.
6. In the **State** list, click **Enabled**.
7. Click **TCP**.
8. In the **TCP Port** list, click **7788**.

XPression RossTalk Control

The switcher interface allows you control a number of aspects of XPression, including move up and down in the sequencer, take the current item, as well as selecting and controlling different channels.

To Control XPression

All the XPression controls can be recorded to a custom control on the switcher.

1. Double-press the video source button that XPression channel you want to control is assigned to.
2. Select the command you want to send to the default channel on XPression.
   - **Up/Down** — move up or down in the sequencer
   - **Take** — read the current scene in the sequencer and take it to air
   - **Next** — read the current scene in the sequencer, take it to air, and move down one scene in the sequencer
3. Press **NEXT**.
4. Resume or clear a channel as follows:
   a) Use the **Chan** knob to select the channel you want to control.
   b) Use the **Layer** knob to select the layer you want to control.
      For the **Clear** command, you can press the **Layer** knob to select all layers.
   c) Use the **Action** knob to select the command you want to send to XPression.
      - **Clear** — clear the scene on the selected layer
      - **Resume** — resume the scene on the selected layer
   d) Press the **Action** knob to send the command to XPression.
5. Press **NEXT**.
6. Read a scene to air or clear a scene from air as follows:
   a) Use the **TakeID** knob to select the scene you want to control.
   b) Use the **Layer** knob to select the layer you want to control.
      Press the **Layer** knob to select all the layers that are active in the scene.
   c) Use the **Action** knob to select the command you want to send to XPression.
      - **Read** — load the selected scene on-air
      - **Tk Off** — take the selected scene off-air
      - **Focus** — focus the sequencer on the selected scene
   d) Press the **Action** knob to send the command to XPression.
7. Press **NEXT**.
8. Take a scene on-air as follows:
   a) Use the **TakeID** knob to select the scene you want to control.
   b) Use the **Chan/L** knob to select the channel you want to control.
   c) Press the **Chan/L** knob.
   d) Use the **C/Layr** knob to select the layer you want to control.
   e) Press the **Take Action** knob to take the selected scene on-air.
9. Press **NEXT**.
10. Manually trigger a GPI input on XPression as follows:
    a) Use the **GPI** knob to select the GPI you want to trigger. This is the GPI input on XPression, and not the GPI output on the switcher.
    b) Press the **Trig Action** knob to trigger the selected GPI.

Comtrol DeviceMaster Setup

This device was tested with Carbonite version **5.0**.

The Comtrol® DeviceMaster® connects to the switcher over Ethernet and provides a number of RS-232/422/485 serial ports that can be used to connect multiple serial devices to the switcher without using the single serial port on the switcher. This document describes how to set up the switcher and the DeviceMaster to work together. To connect a device to the switcher through the DeviceMaster, you need the serial connection information for that device.

Switcher Setup

To Set Up Communications

A port must be set up on the DeviceMaster for every external device you want to control from the switcher.

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.

   If you are editing, or deleting, an existing device, use the **Add** knob to select the device and press the **Edit**, or **Delete**, knob.
3. Use the **Slot** knob to select the **Slot #** you want to use. Slots are virtual network channels on the switcher used to identify devices that are being controlled over Ethernet.
4. Use the **Type** knob to select the type of device you are connecting to the DeviceMaster.
5. Press **NEXT**.
6. Use the **SubType** knob to select the FlexDevice™ driver for the device.
7. Press **NEXT**.
8. Use the **Field** knob to select the segment of the DeviceMaster IP address you want to edit.
9. Use the **Value** knob to select the number.
10. Press **NEXT**.
11. Use the **Option** knob to select **Port**.
12. Use the **Value** knob to select the port on the DeviceMaster that the device is connected to.
13. Press the **Option** knob.
14. Press the **Confrm** knob.

To Assign a Device to a Video Input

Refer to the Ross Video External Device Setup Sheet for the device you are setting up on the DeviceMaster for specific information on assigning that device to a video input.

DeviceMaster Setup

Refer to the documentation that came with the DeviceMaster™ for information on using the Comtrol® PortVision® software to set up the DeviceMaster.

If you are using a Cisco Systems® brand router, or switch, to connect the Comtrol DeviceMaster to the switcher, you must disable the BPDU Guard on the router, or switch, to ensure proper communications.

To Set Up a DeviceMaster

1. On your computer, open your Web Browser and, in the address bar, enter the IP address of your DeviceMaster and press **Enter**.

   The default address is 192.168.250.250.
2. Click **Configure Network**.
3. Click **Use static configuration below:** and enter the IP Address, Netmask, and Gateway you want to use.

   A static IP Address is required for the switcher to connect to the DeviceMaster.
4. Click Save.

   Changes do not take effect until the DeviceMaster is rebooted.
5. Click **Port x**, where **x** is the port on the DeviceMaster you are connecting a device to.
6. Enter the Serial Configuration information for your device:

   - **Mode** — set for device
   - **Baud** — set for device

- **Parity** — set for device
- **DTR** — off
- **EOL** — disabled

Note: *If you are connecting a device using the RAP protocol to the DeviceMaster, you must have Listen unchecked and enter the IP address of the Master Panel in the **Connect To:** field, as well as the Local IP Port in the **To Port:** field. The Local IP Port is found on the **Device Network Setup** Menu.*

7. Enter the TCP Connection Configuration information for your device:

   - **Enable** — selected
   - **Listen** — selected
   - **Port** — Ross Video suggests that you start numbering the ports at 1001
   - Leave all other setting at their default values.

Comtrol DeviceMaster Pinouts

Pin	RS-232	RS-422
1	CD	n/c
2	Rx	Rx-
3	Tx	Tx-
4	DTR	n/c
5	Gnd	n/c
6	DSR	n/c
7	RTS	Tx+
8	CTS	Rx+
9	RI	n/c

Trademarks

CARBONITE

Thomson Grass Valley GVG100 Protocol

GVG100 Setup

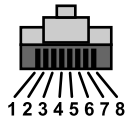
This protocol was tested with Carbonite version **5.0**.

Cable Connections

A GVG100 Editor can connect to the switcher either directly using an RS-422 connection, or through an RS-422 to RS-232 converter or a Comtrol DeviceMaster. For information on connecting using a DeviceMaster, refer to the DeviceMaster Setup Sheet.

Cable Connections

Serial Interface Cables are used to connect the switcher to the editor, either directly or though the RS-233/422 converter.



To Switcher
(male cable end)

Figure 1: RJ-45 Connector

Table 1: Cable Connections

Carbonite (EDITOR Port)
1 (Tx+)
2 (Tx-)
3 (Rx+)
6 (Rx-)
7,8 (Gnd)

FlexDevice Installation

The FlexDevice™ driver for this device is included in the current software release (v5.0).

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.

   If you are editing, or deleting, an existing device, use the **Add** knob to select the device and press the **Edit**, or **Delete**, knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **Editor**.
5. Press **NEXT**.
6. Use the **SubType** knob to select the GVG100 command set you want to use.
   - **GVG100L_1.0** — supports the legacy set of GVG100 editor commands
   - **GVG100_1.0** — supports the custom Ross Video superset of GVG100 editor commands
7. Press the **SubType** knob.
8. Press the **Confrm** knob.

GVG100 Editor Setup

Refer to the documentation that came with your editor for information on setting up your editor to communicate with the switcher. To communicate with the switcher, you must use the following communication settings:

- 38.4k Baud
- 8 Data Bits
- 1 Stop Bit
- Even Parity

Trademarks

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GVG100 Protocol Supported Switcher Commands

The switcher can be controlled from a remote device or computer via GVG100 commands. These commands can either be sent to the switcher over a serial connection, or over a Telnet connection.

Sending GVG100 LUA Commands to the Switcher

The switcher accepts direct injection of GVG100 commands using LUA via a Telnet connection. This allows you to perform various functions such as querying the switcher for the state of buttons, or sending commands to the switcher, such as transitioning a key.

GVG100 Command Modes

The switcher supports two modes of operation, a **Legacy mode** for basic GVG100 commands, and a **Ross mode** for additional Ross-specific extensions to the protocol.

- **Legacy Mode** — allows basic control over a single MLE (MLE 1) and the first two keyers (Key 1 and Key 2) on that MLE
- **Ross Mode** — allows advanced control over multiple MLEs, keyers, and aux buses.

To Send GVG Commands to the Switcher

1. Create a connection to the switcher.
   - **Telnet** — Create a Telnet connection to the switcher on port **2100**. The default IP address of the switcher is 192.168.0.123.
   - **Serial** — Open a serial connection to the switcher editor port. Refer to the *Thomson Grass Valley GVG100* setup sheet for information on connecting to an editor over a serial connection.
2. At the `gvg100>` prompt, enter the commands you want to run.
   - `injectGVG100command()` — Sends a GVG100 command to the switcher.
   - `print()` — Prints the value of any arguments as strings, or prints "nil" if an argument is not a string.
   - `printhelp()` — Prints detailed help on all available commands.
   - `printhex()` — Prints the value of number arguments as hex strings. If the argument is not a number then "nan" is printed. If the argument is not an unsigned integer (a float or a negative number) then "notUInt" is printed.
   - `setGVG100legacymode()` — Switches between GVG100 legacy mode (**true**) and Ross mode (**false**) command interpretation.

Supported GVG100 Commands

The switcher supports a number of GVG100 commands. The exact commands and how the switcher reacts to the commands is outlined in the following tables.

Keep the following in mind when controlling the switcher via GVG100 commands:

- When using Ross mode, the effects address byte is split up as follows. Note that MLE and keyer are 0-based in Ross mode (use 0 to control MLE 1, 1 to control MLE 2, etc.).
  - bits 0-3 determine the MLE
  - bits 4-6 determine the keyer
  - bit 7 flags the MLE as an Aux MLE
- When performing a memory store or recall, the MLE is set using the effects address, where 00 is all MLEs, and specific MLEs are set using the effects address as a bitfield. For example an effects address of 02 (0000 0010) is MLE 2, and 13(0001 0011) is MLEs 1, 2 and 5.
- When using Legacy mode, the effects address of 1 means keyer 1 and effects address of 0 means keyer 2. Using this interpretation, only keyers 1 and 2 of MLE 1 are accessible. Only MLE 1 is accessible.
- The table of supported GVG100 commands shows whether the command uses the MLE bits, the MLE

and keyer bits, or neither. This only applies in Ross mode.

Table 1: Carbonite Video Source Mapping

Map-To	Source
0	Black
1-24	Input BNC 1-24
100	Matte
110-113	Media-Store channels 1-4
150	Program
151	Preview
152	Clean Feed
153	Chroma Key Alpha

Table 2: CrossOver 12 Video Source Mapping

Map-To	Source
0	Black
1-8	Input BNC 1-8
9	--
10	Matte
11-14	Input BNC 9-12
15-16	--
17-18	Media-Store channels 1-2
19	Program (Aux only)
20	Preview (Aux only)
21	Clean Feed (Aux only)
22	Chroma Key Alpha (Aux only)

Table 3: CrossOver 6 Video Source Mapping

Map-To	Source
0	Black
1-4	Input BNC 1-4
5	--
6	Matte
7-8	Input BNC 5-6
9-10	Media-Store channels 1-2
11	Program (Aux only)
12	Preview (Aux only)
13	Clean Feed (Aux only)
14	Chroma Key Alpha (Aux only)

Table 4: Supported GVG100 Commands

Name	MLE / Keyer	Length	Byte Code	Data / Notes	
Read MLE Program Bus	MLE	2	41	--	
Read MLE Preset Bus	MLE	2	42	--	
Read Keyer Bus	Keyer	2	43 / 44	--	
Write MLE Program Bus	MLE	3	C1	<xpt>	An invalid xpt request returns a protocol error.
Write MLE Preset Bus	MLE	3	C2	<xpt>	An invalid xpt request returns a protocol error.
Write Keyer Bus	Keyer	3	C3 / C4	<xpt>	An invalid xpt request returns a protocol error.
Read Analog	--	3	45	<control>	
Write Analog	--	5	C5	<control> <lsb> <msb>	
Read Light On / Off	MLE / Keyer	3	46 / 47	--	
Write Lights On / Off	MLE / Keyer	3	C6 / C7	<lamp>	
Read Wipe Pattern	MLE	2	48	--	
Write Wipe Pattern	MLE	3	C8	<wipe>	Valid wipes are 0-9, as per the wipe pattern buttons. An invalid wipe number returns a protocol error.
Read Transition Mode	MLE	2	4A	--	
Write Transition Mode	MLE	3	CA	<mode>	Last 5 bits used; bit 0:key1, 1:key2, 3:BKGD, 4:key 3, 5:key4.
Read MLE Auto Transition Rate	MLE	2	4C	--	
Read Keyer Mix Rate	Keyer	2	4D		

Name	MLE / Keyer	Length	Byte Code	Data / Notes	
Read Fade to Black Rate	MLE*	2	7D	--	*Currently MLE Specific.
Write MLE Auto Transition Rate	MLE	5	CC	**	
Write Keyer Mix Rate	Keyer	5	CD	**	
Write Fade to Black Rate	--*	5	FD	**	*Currently not Supported. Fade to Black = Transition Rate
Read Key Settings	Keyer	2	53	Not yet implemented	
Write Key Settings	Keyer	62	D3	Not yet implemented	
Learn Into Memory	--	3	DA	<mem#>	Supports memories 0-255. MLEs are set with a bitfield, where the least significant bit is MLE 1 and the most significant bit is MLE 8. All MLEs are selected with 00.
Recall From Memory	--	3	DB	<mem#>	Supports memories 0-255. MLEs are set with a bitfield, where the least significant bit is MLE 1 and the most significant bit is MLE 8. All MLEs are selected with 00.
Read Software Version	--	2	6C	--	
Read Field Mode	--	2	6D	--	Field Mark Only.
Write Field Mode	--	3	ED	0 or 1	Field Mark Only.
All Stop	--	3	F2	D0*	*Data byte is unused.
Read Lamp Status	--	3	78	0	
Write Lamp Status	--	13	F8	--	Included for GVG100 spec completeness only.
Write Button Press	Any	3	FB	<button>	
Send Memory To Editor	--	3	7E	Not yet implemented	
Load Memory From Editor	--	73	FE	Not yet implemented	

Table 5: **Transition Rates

Data Byte	Bit	Notes
1	7	0=select elements, 1=select elements and perform transition
	4-6	4=select key 1, 5=select key 2, 6=select BKGD
	0-3	binary coded decimal (meaning valid values are b0-b1001, or 0-9)
2	6-7	unused
	4-5	4=select key 3, 5=select key 4
	0-3	binary coded decimal (meaning valid values are b0-b1001, or 0-9)
3	4-7	unused
	0-3	binary coded decimal (meaning valid values are b0-b1001, or 0-9)

Here is an example commands based on the Transition Rate information:

- a command of 05 01 CC 50 14 05 means “select BKGD and keys 2 and 3 for the next Autotrans, with a rate of 45”

Table 6: Supported Lamps

Name	MLE / Keyer	Bytes	Notes
Program Bus 0-9	MLE	0x00-0x09	Trying to turn off results in a protocol error.
Program Bus On-Air	MLE	0x0A	Trying to turn off results in a protocol error.
Auto Trans	MLE	0x0B	
Key Auto	Keyer	0x0C	
Key Cut	Keyer	0x0D	
Wipe (transition)	MLE	0x0E	
Dissolve (transition)	MLE	0x0F	
Preset Bus 0-9	MLE	0x10-0x19	Trying to turn off results in a protocol error.
Preset Bus On-Air	MLE	0x1A	Trying to turn off results in a protocol error.

Name	MLE / Keyer	Bytes	Notes
Aspect On	MLE	0x1B	Always on; trying to turn off results in a protocol error.
Positioner On	MLE	0x1C	Always on; trying to turn off results in a protocol error.
Reverse Wipe	MLE	0x1D	
DSK Preview	Keyer	0x1E	Always true; we don't have DSKs – all our keyers show on preview. Trying to turn off results in a protocol error.
Fade to Black	--	0x1F	
Key Bus 0-9	Keyer	0x20-0x29	Trying to turn off results in a protocol error.
Key Bus On-Air	Keyer	0x2A	Trying to turn off results in a protocol error.
Key Video Fill	Keyer	0x2F	Always true; trying to turn off results in a protocol error.
Wipe Type	MLE	0x30-0x39	Trying to turn off results in a protocol error.
Key Invert	Keyer	0x40	DSKs; Trying to turn off results in a protocol error.
Key Mask	Keyer	0x41	DSKs; Trying to turn off results in a protocol error.
Key AutoKey	Keyer	0x42	DSKs; Trying to turn off results in a protocol error.
Key SelfKey	Keyer	0x43	DSKs; Trying to turn off results in a protocol error.
Key Invert	Keyer	0x44	Trying to turn off results in a protocol error.
Key Mask	Keyer	0x45	Trying to turn off results in a protocol error.
Memory Mode Toggle	--	0x47	Toggles between memory mode and pattern mode (are we changing patterns, or saving / loading memories?).
Next Trans is Background	--	0x48	Trying to turn off results in a protocol error.
Next Trans is Key 1	--	0x49	Trying to turn off results in a protocol error.
Cut	MLE	0x4A	Trying to turn off results in a protocol error.
Key Self Key	Keyer	0x4C	Trying to turn off results in a protocol error.
Key Auto Key	Keyer	0x4D	Trying to turn off results in a protocol error.
Key Chroma Key	Keyer	0x4E	Trying to turn off results in a protocol error.
Editor Enable	--	0x4F	Editor control is always enabled; Trying to turn off results in a protocol error.
Key Active	Keyer	0x52	

Table 7: Supported Buttons

Name	MLE / Keyer	Bytes	Notes
Program Bus 0-9	MLE	0x00-0x09	Trying to turn off results in a protocol error.
Auto Trans	MLE	0x0B	
Key Auto	Keyer	0x0C	DSKs
Key Cut	Keyer	0x0D	DSKs
Wipe (transition)	MLE	0x0E	
Dissolve (transition)	MLE	0x0F	
Preset Bus 0-9	MLE	0x10-0x19	
Aspect On	MLE	0x1B	Always on; button press has no effect.
Positioner On	MLE	0x1C	Always on; button press has no effect.
Reverse Wipe	MLE	0x1D	Doubles as “memory store / recall toggle” when in memory mode.
DSK Preview	Keyer	0x1E	Always true; we don't have DSKs – all our keyers show on preview.
Fade to Black	--	0x1F	
Key Bus 0-9	Keyer	0x20-0x29	
Key Video Fill	Keyer	0x2F	Always true.
Wipe Type	MLE	0x30-0x39	
Key Invert	Keyer	0x40	DSKs
Key Mask	Keyer	0x41	DSKs
Key AutoKey	Keyer	0x42	DSKs
Key SelfKey	Keyer	0x43	DSKs
Key Invert	Keyer	0x44	
Key Mask	Keyer	0x45	

Name	MLE / Keyer	Bytes	Notes
Memory Mode Toggle	--	0x47	Toggles between memory mode and pattern mode (are we changing patterns, or saving / loading memories?).
Next Trans is Background	--	0x48	
Next Trans is Key 1	--	0x49	
Cut	MLE	0x4A	
Key Self Key	Keyer	0x4C	
Key Auto Key	Keyer	0x4D	
Key Chroma Key	Keyer	0x4E	
Editor Enable	--	0x4F	Editor control is always enabled.

Audio Mixer Control

The switcher interface allows you to control the channel levels on an audio mixer connected to the switcher. These can be either preset levels set at installation, or manually overridden.

Keep the following in mind when controlling an audio mixer:

- Audio level overrides are not retained for the next time that audio channel is taken on-air unless the Latch feature is turned off.
- If multiple audio channels are assigned to a video source, you cannot adjust them individually.

To Override Audio Channel Levels

Tip: *Double-press the video source button that the audio channels you want to adjust are assigned to. This takes you directly to the audio override controls.*

1. Press **MENU** > **System** > **NEXT** > **NEXT** > **Device Config** > **NEXT** > **Audio**.
2. Use the **Chan** knob to select the audio channels that you want to edit.
3. Use the **Level** knob to adjust the audio level of the selected channels.
4. Use the **Pan** knob to adjust the pan left or right for the selected channels.

Video Server Control

The switcher interface allows you to cue and play clips on a video server.

Keep the following in mind when controlling a video server:

- The **Cue** command asks for the currently cued clip on the video server channel and re-cues it.
- When **Cue** is recorded into a custom control, only the cue command for the clip id is recorded. This allows you to create a number of custom controls to cue different clips on the video server.
- The **Cue** command from a custom control will eject the contents of the channel before cueing the clip. If the contents of the channel is a playlist, the playlist will be ejected.

To Control a Video Server

The video server controls are intended to be used for creating custom controls. For example, manually load a clip on the video server and then create a custom control on the switcher with **Cue** followed by **Play**. This custom control will cue the clip that was cued on the video server when it was recorded and play it.

1. Double-press the video source button that the video server channel you want to control is assigned to.
2. Select the command you want to send to the video server.
    - **Cue** — asks the video server for the current clip id and then sends a cue command for that clip id
    - **Play** — tells the video server to play the currently cued clip

Sony BRC-H700 Robotic Camera Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Sony BRC-H700 connects to the switcher either directly to the switcher, or through a Comtrol DeviceMaster to the switcher over ethernet. For information on connecting using a DeviceMaster, refer to the DeviceMaster Setup Sheet.

Sony BRC-H700 Cable Connections

A serial Interface Cable is used to connect the switcher to the BRC-H700.

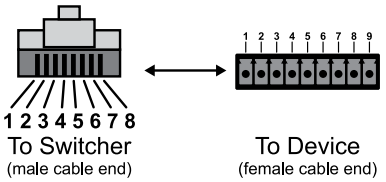

Figure 1: Switcher to BRC-H700

Table 1: Sony BRC-H700 Cable Connections

Carbonite (Serial Port)	BRC-H700 (VISCA RS-422 Port)
1 (Tx+)	6 (Rx+)
2 (Tx-)	7 (Rx-)
3 (Rx+)	8 (Tx+)
6 (Rx-)	9 (Tx-)

FlexDevice Installation

The FlexDevice™ driver for this device is included in the current software release.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **Camera**.
5. Pres **NEXT**.
6. Use the **SubType** knob to select **Sony_1.4**.
7. Press **NEXT**.
8. Use the **Option** knob to select **Baud**.
9. Use the **Value** knob to select **9600**.
10. Use the **Option** knob to select **Parity**.
11. Use the **Value** knob to select **None**.
12. Press the **Option** knob.
13. Press the **Confrm** knob to save your settings.

To Assign a Camera to a Video Input

1. Press **MENU** > **Config** > **Input** > **NEXT**.
2. Use the **Input** knob to select the input BNC that is connected to the camera.
3. Press the **Device** knob.
4. Use the **Device** knob to select the camera you set up for the input BNC.
5. Press **NEXT**.
6. Use the **Option** and **Value** knobs to set the options for this camera.
   - **Channel** — select the channel, or address, that the particular camera head you want to control is on
   - **Invert Tilt** — tilt control using the positioner is inverted (**Yes**) or not (**No**)
   - **Invert Pan** — pan control using the positioner is inverted (**Yes**) or not (**No**)
7. Press the **Option** knob.
8. Press the **Confrm** knob to save your changes.

Robotic Camera Setup

The jumpers on the BRC-H700 that is connected to the switcher must be set as follows:

Table 2: Bottom Switches Settings

Switch	Value
1	No connection
2	Set to **ON** for RS-422 communications
3	Set to **OFF** for 9600 baud rate
4	Infra-red signal control (**OFF**) disables the control

Table 3: Camera Address Selector

Camera Address	1	2	3	4	5	6	7
Switch 1	ON	OFF	ON	OFF	ON	OFF	ON
Switch 2	OFF	ON	ON	OFF	OFF	ON	ON
Switch 3	OFF	OFF	OFF	ON	ON	ON	ON
Switch 4	not used						

If you are daisy chaining multiple Sony BRC-H700 Robotic Cameras together, use the following pinouts to connect the one camera to the next.

Table 4: Camera to Camera Cable Connections

VISCA Out	VISCA In
1 (DTR)	2 (DSR)
2 (DSR)	1 (DTR)
3 (Tx)	5 (Rx)
4 (Gnd)	4 (Gnd)
5 (Rx)	3 (Tx)

Sony EVI-HD1 Robotic Camera Setup

This device was tested with Carbonite version **5.0**.

Cable Connections

The Sony EVI-HD1 connects to the switcher either through an RS-422 to RS-232 converter to the switcher, or through a Comtrol DeviceMaster to the switcher over ethernet. For information on connecting using a DeviceMaster, refer to the DeviceMaster Setup Sheet.

RS-422/232 Converter Cable Connections

Serial Interface Cables are used to connect the switcher to the RS-422/232 Converter, and then from the RS-422/232 Converter to the camera.

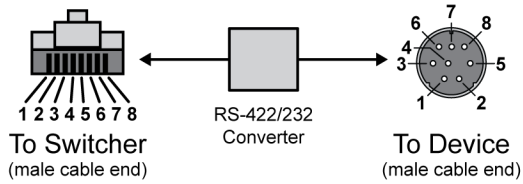

Figure 1: Switcher to Device using RS-422/232 Converter

Table 1: RS-422/232 Converter Cable Connections

Carbonite (Serial Port)		Robotic Camera (VISCA IN Port)
1 (Tx+)	RS-422/232 Converter	3 (Tx)
2 (Tx-)		5 (Rx)
3 (Rx+)		4 (Gnd)
4 (n/c)		
5 (n/c)		
6 (Rx-)		
7 (Gnd)		
8 (Gnd)		

FlexDevice Installation

The FlexDevice™ driver for this device is included in the current software release.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **Camera**.
5. Pres **NEXT**.
6. Use the **SubType** knob to select **Sony_1.4**.
7. Press **NEXT**.
8. Use the **Option** knob to select **Baud**.
9. Use the **Value** knob to select **38400**.
10. Use the **Option** knob to select **Parity**.
11. Use the **Value** knob to select **None**.
12. Press the **Option** knob.
13. Press the **Confrm** knob to save your settings.

To Assign a Camera to a Video Input

1. Press **MENU** > **Config** > **Input** > **NEXT**.
2. Use the **Input** knob to select the input BNC that is connected to the camera.
3. Press the **Device** knob.
4. Use the **Device** knob to select the camera you set up for the input BNC.
5. Press **NEXT**.
6. Use the **Option** and **Value** knobs to set the options for this camera.
   - **Channel** — select the channel, or address, that the particular camera head you want to control is on
   - **Invert Tilt** — tilt control using the positioner is inverted (**Yes**) or not (**No**)
   - **Invert Pan** — pan control using the positioner is inverted (**Yes**) or not (**No**)
7. Press the **Option** knob.

8. Press the **Confrm** knob to save your changes.

RS-422/232 Converter Setup

Refer to the documentation that came with your converter for setup information.

Robotic Camera Setup

The jumpers on the EVI-HD1 that is connected to the switcher must be set as follows:

Table 2: Jumper Settings

Jumper	Value
1	Infra-red signal control (OFF) disables the control
2	Set to OFF for 9600 baud rate
3	No connection
4	No connection

If you are daisy chaining multiple Sony EVI-HD1 Robotic Cameras together, use the following pinouts to connect the one camera to the next.

Table 3: Camera to Camera Cable Connections

VISCA Out	VISCA In
1 (DTR)	2 (DSR)
2 (DSR)	1 (DTR)
3 (Tx)	5 (Rx)
4 (Gnd)	4 (Gnd)
5 (Rx)	3 (Tx)

TSL UMD Protocol Setup

Version 3.1 of the TSL protocol was tested with Carbonite version **7.1**.

Cable Connections

The TSL UMD devices connect to the switcher either directly to the switcher, or through a Comtrol DeviceMaster to the switcher over ethernet. For information on connecting using a DeviceMaster, refer to the DeviceMaster Setup Sheet.

TSL Cable Connections

A serial Interface Cable is used to connect the switcher to the TSL device.

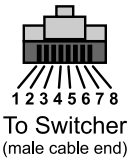

Figure 1: RJ-45 Connector

Table 1: Cable Connections

Carbonite (Serial Port)
1 (Tx+)
2 (Tx-)
3 (Rx+)
6 (Rx-)
7 (Ground)

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **SP**.
4. Use the **Type** knob to select **SerialTally**.
5. Pres **NEXT**.
6. Use the **SubType** knob to select **TSL-UMD_1.0**.
7. Press **NEXT**.
8. Use the **Option** and **Value** knobs to set the options for this UMD device.
   - **Center** — centers the text in the source label (**On**) or not (**Off**)
   - **FSLBL** — FSFC is shown on the source labels (**On**) or not (**Off**) when a FSFC is applied to the source
9. Press the **Option** knob.
10. Press the **Confrm** knob to save your settings.

TSL UMD Setup

Refer to the documentation that came with your TSL device for information on setting it up to communicate with the switcher. To communicate with the switcher, you must use the following communication settings:

- 38.4k Baud
- 8 Data Bits
- 1 Stop Bit
- Even Parity

TSL UMD Protocol

The TSL UMD protocol v3.1 with Carbonite supports 16 characters with two tally outputs. Tally 1 is preview and Tally 2 is program. Tallies 3 and 4 are always off.

Table 2: TSL UMD ID Mapping

ID	Description
0	unused
1-24	Input 1-24
25-64	unused
65-72	Aux 1-8
73-100	unused
101-104	Media-Store 1-4
105-109	unused
110	Program
111	Preview

ID	Description
112	Clean
113	MLE 1 PGM
114	MLE 1 PV
115	MLE 1 Clean
116-125	unused

AMP Video Server Setup

This protocol was tested with Carbonite version **5.0**.

Cable Connections

All video servers using the Advanced Media Protocol (AMP) connect to the switcher directly via ethernet.

FlexDevice™ Installation

The FlexDevice driver for this device is included in the current software release (v5.0).

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **Slot #**, where # is the number of the slot you want to use.
4. Use the **Type** knob to select **Server**.
5. Pres **NEXT**.
6. Use the **SubType** knob to select **AMP_1.0**.
7. Press **NEXT**.
8. Use the **Field** knob to select the segment of the IP address you want to edit.
9. Press **NEXT**.
10. Use the **Option** and **Value** knobs to set the options for this video server.
    - **PreRoll** — set the number of the frames that switcher waits after sending the play command to a video server before taking the source on-air
11. Press the **Option** knob.
12. Press the **Confrm** knob to save your settings.

To Assign a Video Server Channel to a Video Input

1. Press **MENU** > **Config** > **Input** > **NEXT**.
2. Use the **Input** knob to select the input BNC that is connected to the video server.
3. Press the **Device** knob.
4. Use the **Device** knob to select the video server you set up for the input BNC.
5. Press **NEXT**.
6. Use the **Option** and **Value** knobs to set the options for this video server.
    - **Channel** — select the channel on the video server that you want to control
7. Press the **Option** knob.
8. Press the **Confrm** knob to save your changes.

Trademarks

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CARBONITE

Ross Video BlackStorm (AMP-Ethernet)

BlackStorm Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Ross Video BlackStorm connects to the switcher over ethernet.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **Slot #**, where # is the number of the slot you want to use.
4. Use the **Type** knob to select **Server**.
5. Press **NEXT**.
6. Use the **SubType** knob to select **AMP_#.#**.
7. Press **NEXT**.
8. Use the **Field** knob to select the segment of the IP address you want to edit.
9. Press **NEXT**.
10. Use the **Option** and **Value** knobs to set the options for this video server.
    - **PreRoll** — set the number of the frames that switcher waits after sending the play command to a video server before taking the source on-air
11. Press the **Option** knob.
12. Press the **Confrm** knob to save your settings.

To Assign a Video Server Channel to a Video Input

1. Press **MENU** > **Config** > **Input** > **NEXT**.
2. Use the **Input** knob to select the input BNC that is connected to the video server.
3. Press the **Device** knob.
4. Use the **Device** knob to select the video server you set up for the input BNC.
5. Press **NEXT**.
6. Use the **Option** and **Value** knobs to set the options for this video server.
    - **Channel** — select the channel on the video server that you want to control
7. Press the **Option** knob.
8. Press the **Confrm** knob to save your changes.

BlackStorm Setup

1. Open the **Configuration Client**.
2. Click on the **Remote Control** tab.
3. Click **Enable AMP over Ethernet**.
4. Click **Apply**.

Video Server Control

The switcher interface allows you to cue and play clips on a video server.

Keep the following in mind when controlling a video server:

- The **Cue** command asks for the currently cued clip on the video server channel and re-cues it.
- When **Cue** is recorded into a custom control, only the cue command for the clip id is recorded. This allows you to create a number of custom controls to cue different clips on the video server.
- The **Cue** command from a custom control will eject the contents of the channel before cueing the clip. If the contents of the channel is a playlist, the playlist will be ejected.

To Control a Video Server

The video server controls are intended to be used for creating custom controls. For example, manually load a clip on the video server and then create a custom control on the switcher with **Cue** followed by **Play**. This custom control will cue the clip that was cued on the video server when it was recorded and play it.

1. Press the video source button that the video server channel you want to control is assigned to.
2. Select the command you want to send to the video server.
   - **Cue** — asks the video server for the current clip id and then sends a cue command for that clip id
   - **Play** — tells the video server to play the currently cued clip

CARBONITE

Ross Video SoftMetal (AMP-Ethernet)

SoftMetal Setup

This device was tested with Carbonite version **6.0**.

Cable Connections

The Ross Video SoftMetal connects to the switcher over ethernet.

Switcher Setup

To Set Up Communications

1. Press **MENU** > **SYSTEM** > **NEXT** > **NEXT** > **Device Config**.
2. Press the **Add** knob.
3. Use the **Slot** knob to select **Slot #**, where # is the number of the slot you want to use.
4. Use the **Type** knob to select **Server**.
5. Press **NEXT**.
6. Use the **SubType** knob to select **AMP_#.#**.
7. Press **NEXT**.
8. Use the **Field** knob to select the segment of the IP address you want to edit.
9. Press **NEXT**.
10. Use the **Option** and **Value** knobs to set the options for this video server.
    - **PreRoll** — set the number of the frames that switcher waits after sending the play command to a video server before taking the source on-air
11. Press the **Option** knob.
12. Press the **Confrm** knob to save your settings.

To Assign a Video Server Channel to a Video Input

1. Press **MENU** > **Config** > **Input** > **NEXT**.
2. Use the **Input** knob to select the input BNC that is connected to the video server.
3. Press the **Device** knob.
4. Use the **Device** knob to select the video server you set up for the input BNC.
5. Press **NEXT**.
6. Use the **Option** and **Value** knobs to set the options for this video server.
    - **Channel** — select the channel on the video server that you want to control
7. Press the **Option** knob.
8. Press the **Confrm** knob to save your changes.

SoftMetal Setup

1. Open the **Configuration Client**.
2. Click on the **Remote Control** tab.
3. Click **Enable AMP over Ethernet**.
4. Click **Apply**.

Video Server Control

The switcher interface allows you to cue and play clips on a video server.

Keep the following in mind when controlling a video server:

- The **Cue** command asks for the currently cued clip on the video server channel and re-cues it.
- When **Cue** is recorded into a custom control, only the cue command for the clip id is recorded. This allows you to create a number of custom controls to cue different clips on the video server.
- The **Cue** command from a custom control will eject the contents of the channel before cueing the clip. If the contents of the channel is a playlist, the playlist will be ejected.

To Control a Video Server

The video server controls are intended to be used for creating custom controls. For example, manually load a clip on the video server and then create a custom control on the switcher with **Cue** followed by **Play**. This custom control will cue the clip that was cued on the video server when it was recorded and play it.

1. Press the video source button that the video server channel you want to control is assigned to.
2. Select the command you want to send to the video server.
   - **Cue** — asks the video server for the current clip id and then sends a cue command for that clip id
   - **Play** — tells the video server to play the currently cued clip

SoftMetal Video Server Setup

This device was tested with Carbonite version **5.0**.

Cable Connections

The Ross Video SoftMetal connects to the switcher through the GPI/O port on SMS to the GPIO port on the switcher.

An Interface Cable (DB37 to DB25) is used to connect the video server to the switcher.

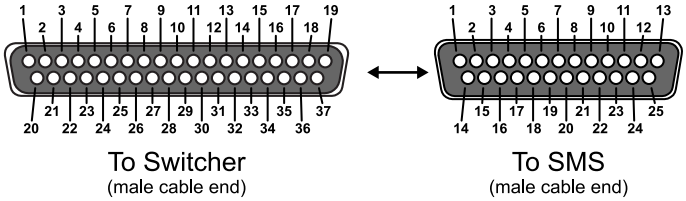

Figure 1: DB37 to DB25

Table 1: GPI I/O Cable Connections

Carbonite (GPIO Port)	SMS (GPI/O Port)
1	13 (GPI 1)
2	12 (GPI 2)
3	11 (GPI 3)
4	10 (GPI 4)
5	9 (GPI 5)
6	8 (GPI 6)
7	7 (GPI 7)
8	6 (GPI 8)
9	5 (GPI 9)
10	4 (GPI 10)
11	3 (GPI 11)
12	2 (GPI 12)
25	1 (GND)

The GPI inputs on SMS specify a particular command that is applied to a particular channel on the SMS. If you want to control multiple channels from the switcher, you need to assign separate GPIs for each command you want to assign to each channel.

Switcher Setup

Note: *Ross Video recommends using a High Edge GPI trigger type. If you require a different trigger type and polarity, remember that it must be set on both the switcher and the SMS.*

You can assign a GPI output to a video source. When RlClip is active for a transition, the switcher triggers the GPI to tell SMS to play the clip, and then takes the video source on-air with the transition.

To Set Up a 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** 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. Use the **Dur** knob to set the length of time (in frames) that the GPI edge output remains 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.

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.

   If you select a negative value, the switcher will take the video source on-air, wait for the pre-delay time, and then trigger the GPI output.

SoftMetal Setup

On SMS we are going to assign the GPI inputs from the switcher to commands on particular channels.

SMS Setup

1. Open the **SoftMetal Configuration Client**.
2. Click on the **GPI Configuration** tab.
3. On the **GPI** list, in the Trigger section, select **GPI 1**.
4. On the **Channel Type** list, in the Event section, select **Output**.
5. On the **Channel** list, select channel **1**.
6. On the **GPI Trigger Type** list, select **Edge**.
7. On the **Polarity** list, select **High**.
8. On the **Action** list, select **Play**.
9. Click **Apply**.
10. Repeat this procedure for each channel and action you want to control from the switcher. Refer to the *table* for a list of suggested configurations.

Note: *You must click **Apply** after configuring each GPI or the setting will not be saved.*

Table 2: GPI Command Mapping

GPI	Channel	Action
GPI 1	Channel 1	Play
GPI 2	Channel 1	Pause Playout
GPI 3	Channel 1	Rewind
GPI 4	Channel 1	FastForward
GPI 5	Channel 1	Eject
GPI 6	Channel 1	Cue Current
GPI 7	Channel 2	Play
GPI 8	Channel 2	Pause Playout
GPI 9	Channel 2	Rewind
GPI 10	Channel 2	FastForward
GPI 11	Channel 2	Eject
GPI 12	Channel 2	Cue Current

Switcher Control Interface

From the switcher, you can trigger a GPI output manually using the pattern buttons on the control panel, or automatically using the RlClip function.

Manually Triggering a GPI

You must have the secondary function for the Next button set to GPO. Refer to the documentation that came with your switcher for information on setting up this feature.

1. Press and hold the **NEXT** button.

   While holding the **Next** button, the mnemonic/pattern buttons light for each GPI output that is currently triggered.
2. Press the mnemonic/pattern button for the GPI output you want to trigger. The number of the GPI is shown on the mnemonics of the buttons. The numbers on the pattern buttons on the Carbonite 1 correspond to the GPI.

Table 3: Pattern Button Commands

	Play	Pause	Rewind	FF
Channel 1				
Channel 2				

Using the Roll Clip Function

1. Select the video source button for the video channel on the video server that you want to play.
2. Use the **RIClip** knob to select **On**.
3. Perform the transition. The switcher will trigger the GPI to tell the video server to play the selected clip, wait for the pre-delay (Predly), and then perform the transition.

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