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Ross Video Limited



**CrossOver  
User Manual**

**Software Issue: v1.4**



## ➤ CrossOver • User Manual

- Ross Part Number: **4801DR-002**
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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 below 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.



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



### Warning

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.



### Warning

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.



### Warning

19. **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.
20. **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.
21. **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.
22. 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.

23. 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.
24. 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.
25. To reduce the risk of fire, replacement fuses must be the same type and rating.
26. Use only power cords specified for this product and certified for the country of use. Refer to the Product Power Cord Requirement section that follows.
27. The safe operation of this equipment requires that the user heed and adhere to all installation and servicing instruction contained within the equipment's User Manual.

## EMC Notices

### Unites 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.



**Notice** — 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.



**Notice** — 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.

## ➤ 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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# ➤ Introduction

The CrossOver 6 and CrossOver 12 combine professional switcher quality with an easy to use and mobile design. They can be easily integrated into your workflow to create professional style broadcasts.

## ➤ About This Manual

Before operating your switcher, please read this manual carefully and store it in a safe and accessible place for future reference.

This manual is designed to familiarize the user with switcher layout, menu navigation, basic and advanced operation.

Several switcher functions are customizable. When using this manual, consider your requirements and style when adjusting items that involve colors, patterns, and effects. The manual provides instructions on how to adjust these items but you can tailor their use to your production requirements.

## ➤ Documentation Terms

- “**Switcher**” refers to the CrossOver 6 or the CrossOver 12 switcher.
- “**Operator**,” “**User**,” and “**You**” refer to the person who uses the switcher.
- “**HD-SDI**” refers to High Definition Serial Digital Interface, a digital video signal that is distributed via a single coaxial cable with BNC connectors.
- “**Setup**” refers to a group, or set, of values that are stored together either on the switcher or USB drive. Setups can be stored and recalled to quickly configure the switcher for different productions.

### Abbreviations

The following abbreviations are used throughout the manual:

- **AUX** (Auxiliary)
- **HD** (High Definition)
- **HD-SDI** (High Definition Serial Digital Interface)
- **MD** (Multi-Definition)
- **PGM** (Program)
- **PST** (Preset)
- **PV** (Preview)
- **SD** (Standard Definition)

## ➤ 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 any time. 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.

- **Technical Support:** (+1) 613-652-4886
- **After Hours Emergency:** (+1) 613-349-0006

## Switcher Installation

### Control Panel

The switcher control panel is designed to sit on a desk or table. Alternately, it may be mounted in-desk or rack-mounted, both of which require the addition of a rackmount kit. Contact your dealer or Ross Video for information on the Rackmount kit.

### Switcher Frame

Under normal conditions, mounting the frame to the front of a standard equipment rack with four rack screws is sufficient to carry the load, including the weight of the accompanying cables. The support bars and brackets are specifically engineered to compensate for extra load stress associated with certain applications, such as mobile truck installations.

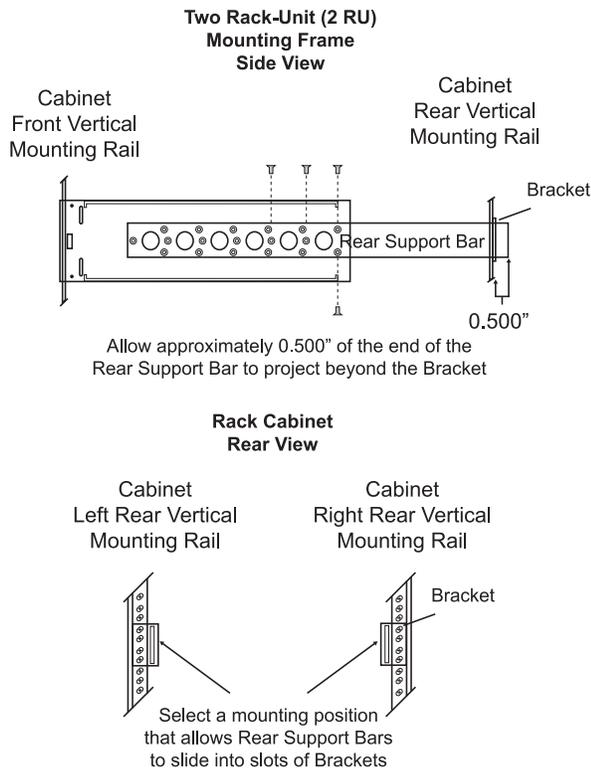


Figure 1.1 Installing the Frame in an Equipment Rack

#### To install the rear support brackets to your frame:

1. The rear support bars can be attached to the frame in one of the possible positions illustrated in (Figure 1.1). Choose the position that suits the cabinet depth that will give approximately 1/2 inch projection beyond the rear vertical mounting rails.
2. Using four screws per bar, fasten one bar to each side of the frame.

3. Mount the frame to the front rails of the rack cabinet using four rack screws fastened through the front mounting flanges.
4. At the rear of the cabinet, slide the bracket slots over the rear of the support bars and secure to the cabinet rear rails with two rack screws each.

### Cabling

Refer to the *Getting Started Guide* for instructions on connecting all cables to your switcher control panel and frame.

## Control Panel Overview

The CrossOver 12 and CrossOver 6 control panels offer similar functionality. The CrossOver 12 control panel is equipped with additional source buttons, key control buttons, and a positioner for additional control of wipes and patterns.

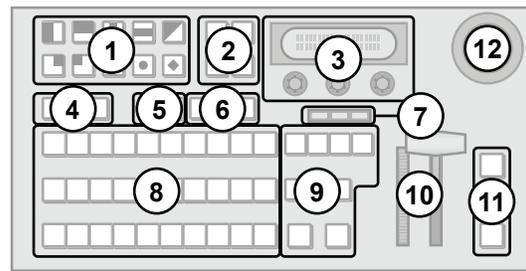


Figure 1.2 CrossOver 12

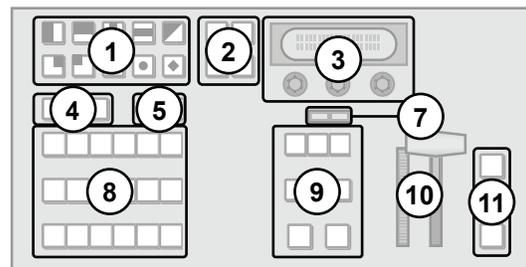


Figure 1.3 CrossOver 6

1. Pattern Select Buttons
  - Press buttons in the pattern group to select wipe patterns.
2. Menu and Memory Control Buttons
  - Press **MENU** to access the menu system. Press one of the Pattern Select buttons to select the corresponding menu.
  - Press **NEXT** to cycle through the available menus.
  - Press **STORE** and **RECALL** to save and load memory registers.

3. Menu Screen and Knobs
  - Rotate a knob to change the menu option displayed above it.
  - Press the knob to select a menu item.
4. Key Type Buttons
  - Selects key type for all keys.
  - Assigns Key/Aux bus to Key 1.
5. Key 2 and 3 Select buttons
  - Assigns the Key/Aux bus to Key 2 or 3 when button is pressed (CrossOver 12 only).
  - Assigns the Key/Aux bus to Key 2 or Aux bus 1 when button is pressed (CrossOver 6 only).
6. AUX Bus Buttons
  - Assigns the Key/Aux bus to selected Aux bus when button is pressed (CrossOver 12 only).
  - Aux bus assignment is done through the menu interface on CrossOver 6 switchers.
7. On-air LEDs
  - The LEDs light to indicate which keys are on-air.
8. Key/Aux, Program, and Preset Bus
  - Press source buttons on the Key/Aux, Program, or Preset bus to select video sources on each bus.
  - Selected source buttons glow with a user-definable color. Sources that are on-air glow red.
9. Next Transition Area
  - Selects the elements (background, keys) to include in the next transition.
  - Selects the transition type.
  - Performs an automatic transition or a cut.
10. Fader
  - Use the Fader to manually control transitions.
11. Key Transition Shortcut Buttons
  - Performs a transition of the selected key.
12. Positioner
  - Use the positioner to control wipes, borders, and washes (CrossOver 12 only).

## Control Panel Rear Connections Overview

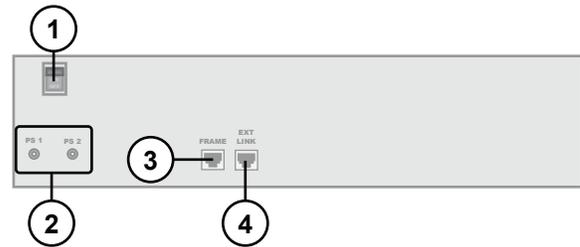


Figure 1.4 CrossOver 12 and 6

1. Power Switch
  - Turns the control panel on and off.
2. Power Connectors (Primary and Redundant)
  - Connects the control panel to the DC power supply.
  - Second power connector is for redundant power supply (optional).
3. Frame Port
  - Connects the control panel to the frame.
4. External Link Port
  - Reserved for future expansion.

## Frame Overview

The frame contains the video processing hardware and provides the inputs and outputs for the switcher. The control panel connects to the frame via the Panel Port on the frame and the Frame Port on the control panel.

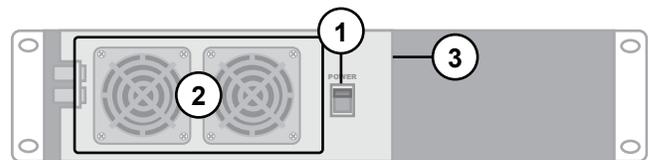


Figure 1.5 CrossOver Frame (Door Removed)

1. Power Switch
  - Turns the frame on and off
2. Cooling Fans
  - The fans provide airflow to cool the electronic components in the frame.
3. USB Port
  - Plug a USB drive into the USB port to load and store memories and to perform software upgrades.

## ➤ Frame Rear Connections Overview

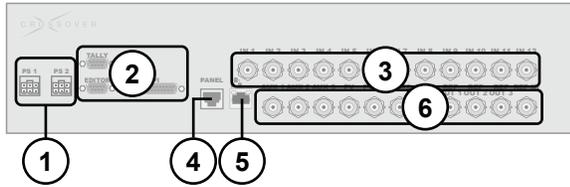


Figure 1.6 CrossOver 12

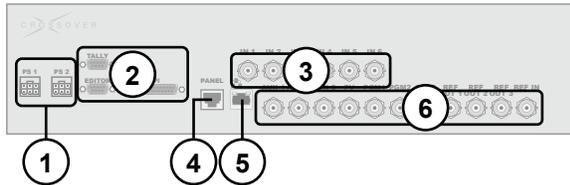


Figure 1.7 CrossOver 6

1. Power Connectors (Primary and Redundant)
  - Connects the frame to the DC power supply.
  - The second power connector is for redundant power supply (optional).
2. Editor, Tally, and GPI Ports
  - The ports allow your switcher to be controlled by external editors, control tally lights, and respond to GPI commands.
3. Input BNCs
  - 12 or 6 High Definition serial digital video inputs.
4. Panel Port
  - Connects the frame to the control panel.
5. Ethernet Port
  - Enables the switcher to connect to your network.
6. Output and Reference BNCs
  - 1 analog video output.
  - 2 High Definition serial digital video Program Bus outputs.
  - 1 High Definition serial digital video Preview Bus output.
  - 3 High Definition serial digital video Aux Bus outputs.
  - 1 External Tri-level or Black Burst reference input.
  - 3 Internal Reference outputs.

## ➤ Removing the Frame Door

You must remove the frame door to access the USB port. Once you are finished working with the USB

port, replace the frame door to ensure proper airflow through the frame.

### To remove the frame door:

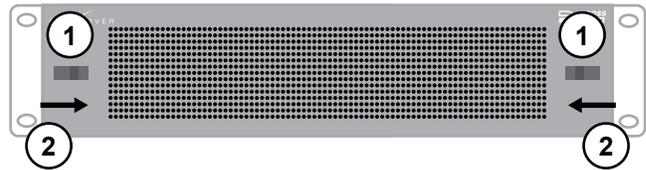


Figure 1.8 Removing the Frame Door

1. Using both hands, grasp the door tabs.
2. Gently pull the door tabs towards the center of the door, releasing the door from the frame.
3. Pull the door towards you and place it on a clean, flat, static-free surface.

### To attach the frame door:

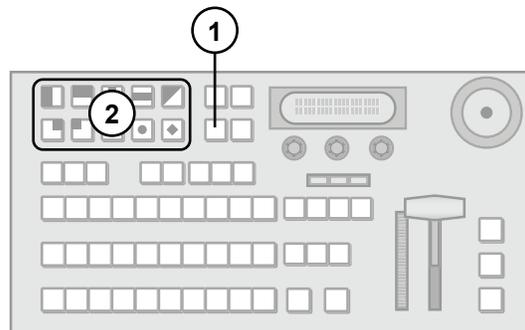
1. Using both hands, slide the door onto the frame ensuring that the door tabs engage sides of the frame.
2. Pull and release the door tabs to ensure the frame door is securely attached to the frame.

## ➤ Menu System

There are two ways to access the menu system:

- Pressing **MENU**
- Using Auto-follow

### To access a menu using the MENU button:



1. Press **MENU**. The Wipe Pattern buttons illuminate.
2. Press a Pattern button to select the corresponding menu.

### Auto-Follow

Auto-follow is a feature that displays the menu for a selected function when the button for that function is pressed. Auto-follow is always active — when you press any button on the control panel that has a

corresponding menu, the menu is automatically displayed.

## Menu Navigation

Some menus have multiple pages. When the **NEXT** button is lit, multiple menu pages exist. Press **NEXT** to move to the next menu page. Press and hold **NEXT** and then press **MENU** to move to the previous menu page.

Some menus contain sub-menus. Press the knob corresponding to the sub-menu to access it. Press and hold the **NEXT** button and then press the **RECALL** button to return from the sub-menu.

If you wish to return to the first page of a top-level menu, Press and hold the **NEXT** button and then press the **STORE** button.

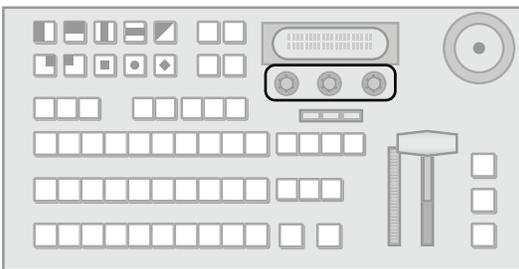
### Note:

- You can exit the menu system by pressing any button other than a Wipe Pattern or source button while the menu system is active.

## Knobs

The control panel has three continuously rotatable pushbutton knobs located below the display screen. The knobs are used to select and alter menu options.

### To use the knobs:



- Rotate the knob to adjust the corresponding value.

### To default a value using the knobs:

- Double-press a knob to default the value currently associated with that knob.

## Buttons

The buttons illuminate to indicate one of four states:

- Glow** — When a button on the board is lit with the Panel Glow color, it is in a resting state. All buttons are lit with the Panel Glow color unless selected, turned on, in use, or on-air.
- On-air** — Source buttons corresponding to on-air sources are red.
- Menu** — A button is green when the associated menu is displayed.

- On/Selected** — Several buttons are On/Off buttons. If the button feature is turned off, it is lit with the Panel Glow color. If the button feature is turned on, the button is lit with a brighter shade of the Panel Glow color.

### For More Information on...

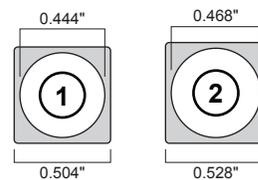
- adjusting the panel glow, refer to the section “Customizing the Panel Glow” on page 2-8.

## Button Inserts

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

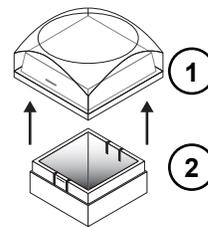
### Installing Your Own Insert Films

All inserts must be cut to the dimensions indicated for small (1) or large (2) buttons. **Using insert films that do not meet the recommended criteria may damage the button cap and diffuser.**

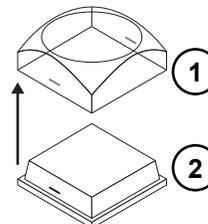


### To install switcher button inserts:

- Remove the Cap Assembly (1) from the Switch Assembly (2) by grasping it firmly and pulling away from the control panel surface.

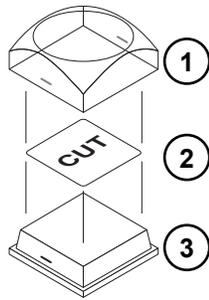


- Remove the Lens (1) from the Diffuser (2) by using your fingernail, or common end micro screwdriver, to pry the two apart.

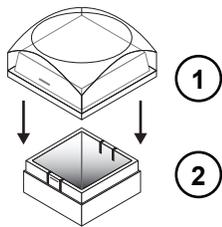


- Place the Insert Film (2) into the Lens (1) so the readable side is facing up. The notches on the

sides of the Lens must be at the sides of the text on the Insert Film.



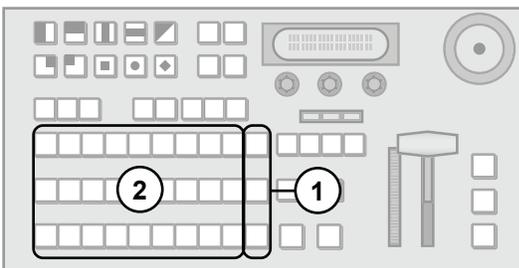
4. Aligning the notches on the sides of the Lens (1) and Diffuser (3), press the Lens and Diffuser together until they click.
5. Aligning the notches on the sides of the Cap Assembly (1) to the tabs on the side of the Switch Assembly (2), press Cap Assembly down onto the Switch Assembly with a rolling motion until they click together.



## ➤ Shift

Shifting allows access to the secondary sources for each source button.

**To shift a bus and access the secondary sources:**



1. Press and hold **SHIFT**.
2. Press the required source button to access the secondary source.

## ➤ Fader

The Fader is used to manually perform a wipe or dissolve transition. Move the Fader handle from one limit to the other to perform a transition.

## Transitions

The progress of the transition is shown on the Progress Bar to the left of the Fader handle. As the Fader handle moves from one limit to the other, the Progress Bar indicates the progress of the transition.

## ➤ Positioner

The CrossOver 12 has a joystick positioner for positioning wipes, patterns, and washes. The CrossOver 6 does not have a positioner.

## ➤ Selecting Colors

Functions such as mattes, and Panel Glow have options for adjusting the appearance of a selected color. Individual adjustments for colors are:

- Luminance
- Hue
- Saturation

### Luminance

Luminance affects the brightness of the video signal. Increasing luminance gives a brighter color while decreasing luminance gives a darker color.

### Hue

Hue controls the shade of color (red, yellow, green, blue, etc.).

### Saturation

Saturation affects the vividness of a color. Increasing saturation produces a more vivid color while decreasing saturation produces a less vivid color. Fully decreasing the saturation produces gray.

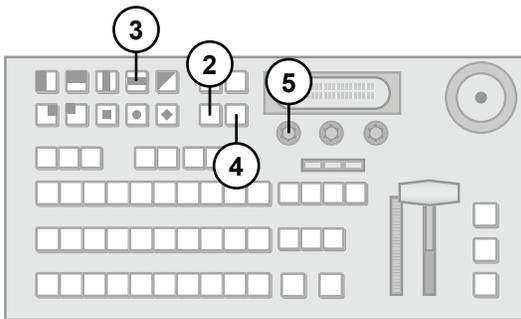
# Configuration

This chapter describes how to configure your switcher to meet your requirements. Setup and switcher personality options are discussed.

## Reference Type

The switcher supports both external and internal reference types.

**To set the reference type:**



1. If you are using an external reference signal, ensure that it is connected to the **REF IN** input.
2. Press **MENU**.
3. Press the **REF Wipe Pattern** button.
4. Press **NEXT** until **RefSrc** is displayed.
5. Use the **RefSrc** knob to select the reference source. You can choose from the following:
  - **Ext** — Use an external reference source.
  - **Int** — Use the internal reference generator.
6. Press the **RefSrc** knob to save the selection.

### Note:

- If the external reference is lost, the switcher will automatically switch to internal reference.

## Switcher Video Format

There are separate standard definition and multi-definition versions of the switcher.

### Standard Definition Video Formats

Standard definition switchers support the following video formats:

- 480i (4:3 and 16:9) at 59.94Hz
- 576i (4:3 and 16:9) at 50Hz

### Note:

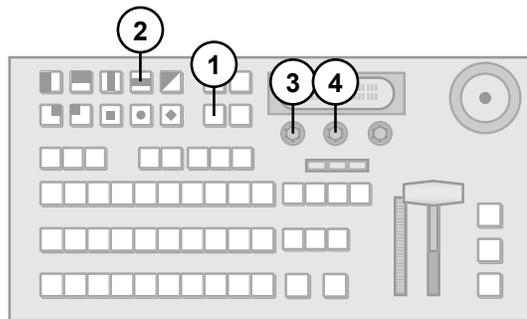
- 59.94Hz is displayed as 60Hz to save display space.

### Multi-Definition Video Formats

Multi-Definition switchers support the following video formats:

- 480i (4:3 and 16:9) at 59.94Hz
- 576i (4:3 and 16:9) at 50Hz
- 720p at 50 or 59.94Hz
- 1080i at 50 or 59.94Hz

**To change the reference video format:**



1. Press **MENU**.
2. Press the **REF Wipe Pattern** button.
3. Use the **Format** knob to select the desired video format. You can choose from the following:
  - **480i**
  - **576i**
  - **720p** (Multi-Def switchers only)
  - **1080i** (Multi-Def switchers only)
4. Use the **Freq** knob to select the desired frequency. You can choose from the following:
  - **60 Hz** (59.94 Hz)
  - **50 Hz**
5. Press the **Format** knob to save the selection.

### Note:

- The 480i video format is locked to 59.94 Hz.
- The 576i video format is locked to 50 Hz.

## Format Conversion and Frame Sync

The switcher has four input format converter / frame synchronizer (FCFS) channels that can be used for the following:

- Converting incoming video to the current switcher video format. The format converters can convert input video from many formats to the current switcher video format according to Table 2.1
- Correcting mis-timed or drifting input signals in any of the supported video formats. The frame synchronizers can not completely correct badly formatted video streams, mis-timed switches, signal dropouts, or similar issues..

**Table 2.1 Format Conversions**

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

### Assigning FCFS channels

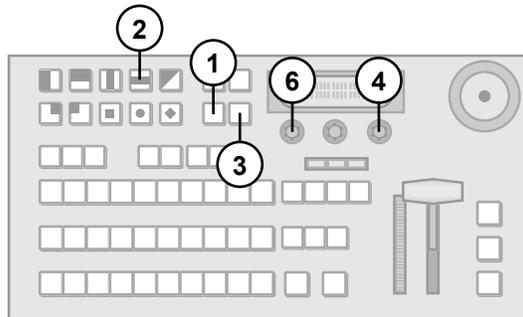
FCFS channels are assigned to either specific inputs or bus-pairs. Each bus-pair requires two FCFS channels. The bus pairs are as follows:

- PGM – Preset buses
- Key 1 Video – Key 1 Alpha buses
- Key 2 Video – Key 2 Alpha buses
- Key 3 Video – Key 3 Alpha buses
- Key 4 Video – Key 4 Alpha buses
- Aux 1 – not paired
- Aux 2 – not paired
- Aux 3 – not paired.

#### Note:

- Using an FCFS channel creates a one frame delay for the input video being processed.

To assign an FCFS channel:

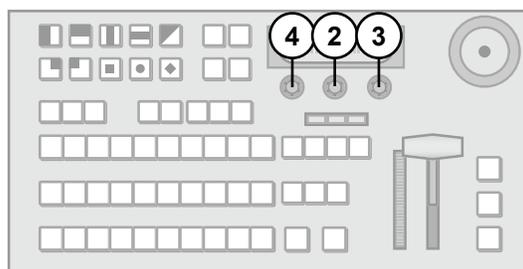


1. Press **MENU**.
2. Press the **REF** Wipe Pattern button.
3. Press **NEXT** until **Fcfs** is displayed.
4. Use the **Fcfs** knob to select the FCFS channel you wish to assign.
5. Press the **Fcfs** knob to display the **FCFS** menu.
6. Use the **Fcfs1-4** knob to assign the FCFS channel. You can choose from the following:
  - **Off** — The FCFS channel is not assigned.
  - **Input** — The FCFS channel is assigned to a single input.
  - **Bus** — The FCFS channel is assigned to all inputs on a specific bus.

### Configuring FCFS Channel Modes

Once an FCFS channel has been assigned, you must configure the conversion behavior depending on the mode you set the FCFS channel to.

To configure an FCFS channel set to Input mode:



1. Assign an FCFS channel to a specific input.
2. Use the **Input** knob to select which input the FCFS channel is assigned to.
3. Use the **Aspect** knob to set the aspect ratio conversion mode. You can choose from the following:
  - **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.

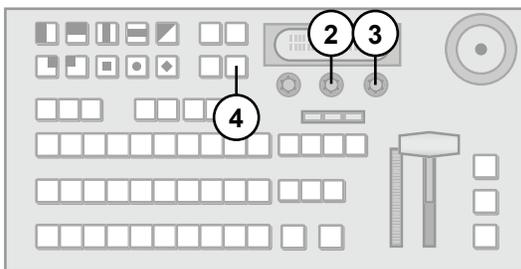
- **Zoom** — The central portion of the video signal is zoomed to fill the display of the new video format. No aspect distortion is introduced.
- **LttrBx** — Black bars are added to the top and bottom of a 16:9 image to display correctly in a 4:3 video format.
- **PllrBx** — Black bars are added to the right and left of a 4:3 image to display correctly in a 16:9 video format.

4. Press the **Fcfs1-4** knob to save the changes.
5. Press the **Confrm** knob to commit the change and exit the **FCFS** menu. Press the **Cancel** knob to return to the **FCFS** menu for further editing.

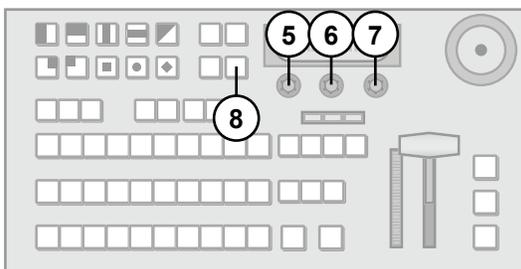
**For More Information on...**

- Assigning an FCFS channel, refer to the procedure “To assign an FCFS channel:” on page 2-2

**To configure an FCFS channel set to Bus mode:**



1. Assign an FCFS channel to a specific bus.
2. Use the **Bus** knob to select which bus the format converter / frame synchronizer is assigned to.
3. Use the **2ndCh** knob to select the FCFS channel to assign to the paired bus.
4. Press **NEXT**.



5. Use the **Convrt** knob to select the type of conversion. You can choose from the following:
  - **SD->HD** — only available when running in an HD video format
  - **HD->SD** — only available when running in an SD video format
  - **SD->SD** — only available when running in an SD video format
6. Use the **InFmt** to select the video format of the incoming video to convert. All video signals on the bus must be in this video format or the switcher reference video format. You can choose from the following:
  - **480i**
  - **576i**
  - **720p**
  - **1080i**
7. Use the **Aspect** knob to set the aspect ratio conversion mode. You can choose from the following:
  - **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.
  - **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.
8. Press **NEXT**.
9. Press the **Fcfs1-4** knob to save the changes.
10. Press the **Confrm** knob to commit the change and exit the **FCFS** menu. Press the **Cancel** knob to return to the **FCFS** menu for further editing.

**Note:**

- Aux buses are do not have assigned pairs when using Bus mode.
- If one FCFS channel in a Bus mode pair is turned off, the paired FCFS channel is also turned off.
- If you change the switcher video format, frequency, or aspect ratio, all FCFS channels are turned off.

- The switcher is set to switch on the first field when using Bus mode.
- 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.

#### For More Information on...

- switch on Field/Frame settings, refer to the section “Switch on Field or Frame” on page 2-11
- assigning an FCFS channel, refer to the procedure “To assign an FCFS channel:” on page 2-2
- switcher video formats, refer to the section “Switcher Video Format” on page 2-1

## ➤ Output Reference Sync

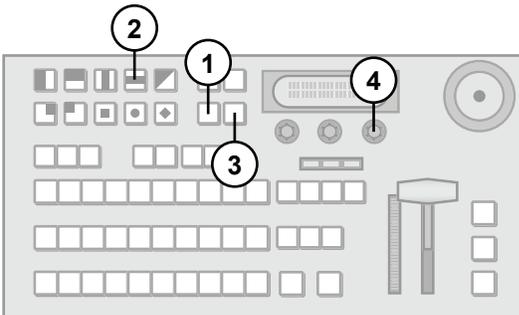
The switcher has three reference outputs that can be configured independently.

### Setting the Output Reference Sync

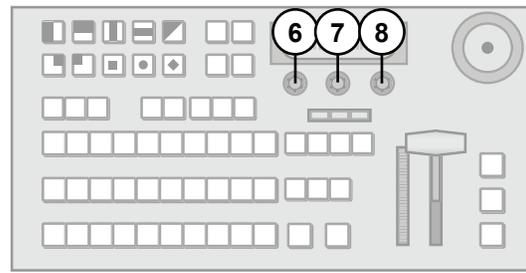
If you are using one of the output references to time external devices, ensure that they are connected to the appropriate **REF OUT 1**, **REF OUT 2**, or **REF OUT 3** outputs.

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

#### To set the output reference sync:



1. Press **MENU**.
2. Press the **REF Wipe Pattern** button.
3. Press **NEXT** until **OSync** is displayed.
4. Use the **OSync** knob to select the reference output you wish to configure. You can choose from the following:
  - **OSync 1** — Configure reference output 1.
  - **OSync 2** — Configure reference output 2.
  - **OSync 3** — Configure reference output 3.
5. Press the **OSync** knob to display the **Output Sync** menu.

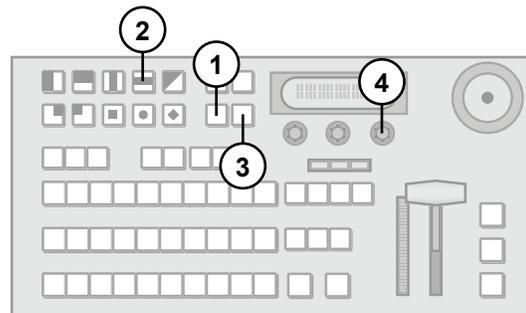


6. Use the **OSync1-3** knob to set the output reference format. You can choose from the following:
  - **NTSC/PAL** — Reference format is set to standard definition.
  - **720p** — Reference format is set to 720p.
  - **1080i** — Reference format is set to 1080i.
  - **Off** — No output reference signal is generated.
7. Use the **Mode** knob to configure the different delay settings for the selected output reference formats. You can choose from the following:
  - **V** — Configure vertical delay (lines).
  - **H** — Configure horizontal delay (pixels).
  - **F** — Configure frame delay (frames) (NTSC/PAL output reference format only).
8. Use the **Value** knob to set the selected delay value.
9. Press the left knob to save the changes.
10. Press the **Confirm** knob to commit the change and exit the **Output Sync** menu. Press the **Cancel** knob to return to the **Output Sync** menu for further editing.

### Resetting the Output Reference Sync

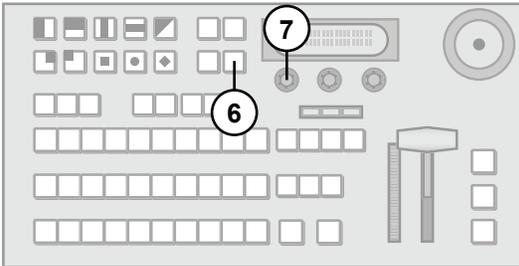
You can quickly reset the output reference sync values to the default settings.

#### To reset the output reference sync values:



1. Press **MENU**.
2. Press the **REF Wipe Pattern** button.

3. Press **NEXT** until **OSync** is displayed.
4. Use the **OSync** knob to select the reference output you wish to reset. You can choose from the following:
  - **OSync 1** — Reset reference output 1.
  - **OSync 2** — Reset reference output 2.
  - **OSync 3** — Reset reference output 3.
5. Press the **OSync** knob to display the **Output Sync** menu.

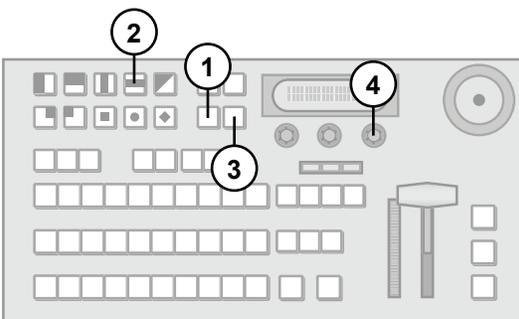


6. Press **NEXT**.
7. Press the **Reset** knob to reset the output sync values to default settings.
8. Press the **Confirm** knob to commit the change and exit the **Output Sync** menu. Press the **Cancel** knob to return to the **Output Sync** menu for further editing.

## ➤ Aspect Ratio

The switcher supports both 4:3 and 16:9 aspect ratios when running in the 480/576i video format.

**To change the aspect ratio:**



1. Press **MENU**.
2. Press the **REF** Wipe Pattern button.
3. Press **NEXT** until **Aspect** is displayed.
4. Use the **Aspect** knob to select the desired aspect ratio. You can choose from the following:
  - **4:3**
  - **16:9**

5. Press the **Aspect** knob to save the selection.

### Note:

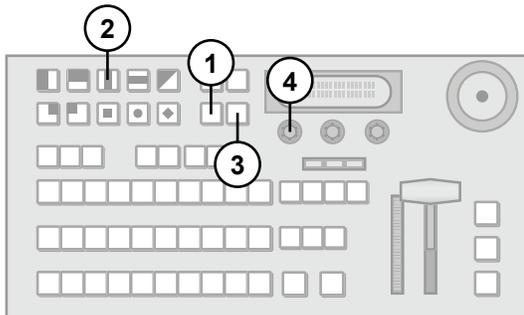
- The aspect ratio is locked to 16:9 when operating in 720p or 1080i video formats.

## ➤ Ancillary Data

Ancillary data is information such as closed captioning or embedded audio. The switcher can be configured to pass this data or strip it from the output video. The following parameters are available:

- **Normal Strip** — Ancillary data is stripped from all outputs.
- **Normal Pass** — Any ancillary data is passed unmodified.
- **Long Strip** — Ancillary data and the first several lines of active picture are stripped from all outputs.
- **Long Pass** — Ancillary data and the first several lines of active picture are passed unmodified. This is useful to ensure data such as timecodes and standard definition closed captioning remains intact.

**To configure ancillary data parameters:**



1. Press **MENU**.
2. Press the **SYSTEM** Wipe Pattern button.
3. Press **NEXT** until **Ancly** is displayed.
4. Use the **Ancly** knob to select an ancillary data parameters. You can choose from the following:
  - **N Strip** — Remove ancillary data from the video signal.
  - **N Pass** — Pass ancillary data without modification.
  - **L Strip** — Remove ancillary data and the first several lines of picture from the video signal.
  - **L Pass** — Pass ancillary data and the first several lines of picture.

## Input BNC Configuration

Many video sources have an associated video source that contains alpha (transparency) information. You must configure the switcher to use the correct alpha source. Once you associate a video and alpha source, they are linked and used for Auto-Select keying.

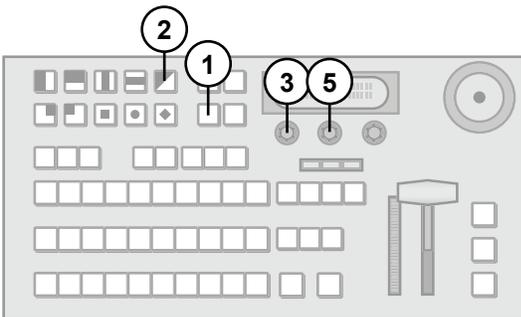
Alpha sources are designated as shaped or linear (unshaped). Shaped sources convert partial transparency to either fully transparent or fully opaque, giving the video signal well-defined edges.

Linear (unshaped) sources use the full range of transparency in the alpha channel to give smooth transitions between transparent and opaque areas. Use linear if you are unsure which setting to use.

### For More Information on...

- Auto-Select keys, refer to the section “Keying Overview” on page 3-3.

### To associate video and alpha inputs:



1. Press **MENU**.
2. Press the **CONFIG** Wipe Pattern button.
3. Press the **Input** knob to display the **Input** menu.
4. Use the left knob to select the input you wish to configure.
5. Use the middle knob to select the desired input that will provide the alpha (transparency) signal. You can choose from the following:
  - **None** — Do not use an associated alpha signal.
  - **Lin1 - Lin12** — The selected input is used as an unshaped (linear) alpha source.
  - **Shpd1 - Shpd12** — The selected input is used as a shaped alpha source.

Table 2.2 Default Alpha Channel Mappings

Input	Default Alpha Input
<b>CrossOver 6</b>	
5	6
<b>CrossOver 12</b>	
9	11
10	12

### For More Information on...

- fine-tuning the Auto-Select Key features, refer to the section “Auto-Select Key Fine Tuning” on page 4-8.

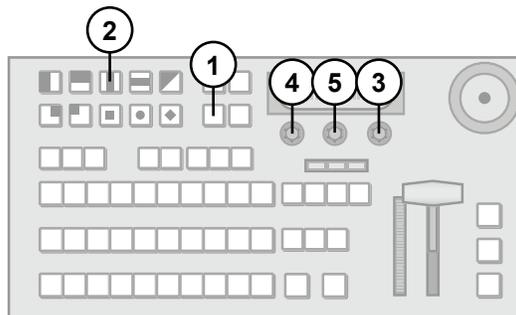
## Output Configuration

The switcher has the following outputs:

- 2 Program Out HD-SDI
- 1 Preview Out HD-SDI
- 3 Auxiliary Out HD-SDI
- 1 Analog (NTSC or PAL) Out

The analog output allows the switcher to output signals in NTSC and PAL formats. It can be routed from the Preview, Program, or any of the primary inputs. The analog output is not aspect ratio converted. Downconversions from 16:9 HD sources display as 16:9 SD video.

### To configure the analog output:



1. Press **MENU**.
2. Press the **SYSTEM** Wipe Pattern button.
3. Press the **Analog Out** knob to display the **Analog Out** menu.
4. Use the **AnOut** knob to select the source. You can choose from the following:
  - **Preview** — Preview bus output.
  - **Progrm** — Program bus output.
  - **Aux 1 - 3** — Aux bus 1-3 outputs.
  - **In 1 - 12** — Inputs 1-12 (CrossOver 12 only).
  - **In 1 - 6** — Inputs 1-6 (CrossOver 6 only).

- Use the **AnMode** knob to set the appearance of the analog output. You can choose from the following:

- **Full** — Full screen display.
- **LtrBox** — Letter box display.

**Note:**

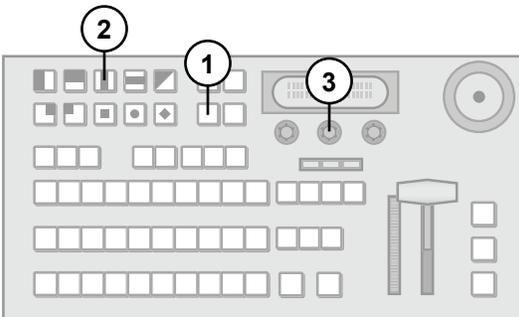
- If your switcher is operating in a 4:3 aspect ratio, you can not set the analog output to letter box.

## ➤ Clean Feed

The Clean Feed output provides a second program output that is derived from a different location than the standard program output. Using the Clean Feed allows you to remove particular keys without affecting the primary program output. Typical applications are:

- Multilingual and live-to-tape productions
- Recording call-in shows for later airing without telephone numbers displayed

**To configure the Clean Feed output:**



1. Press **MENU**.
2. Press the **SYSTEM Wipe Pattern** button.
3. Use the **CLEAN** knob to select where in the output stream the Clean Feed is derived. You can choose from the following:
  - **Key 1** — Clean Feed output is taken before any keys are added.
  - **Key 2** — Clean Feed output is taken after Key 1 but before Key 2 or 3 is added.
  - **Key 3** — (CrossOver 12 only) Clean Feed output is taken after Key 1 and 2 but before Key 3 is added.

## ➤ IP Address

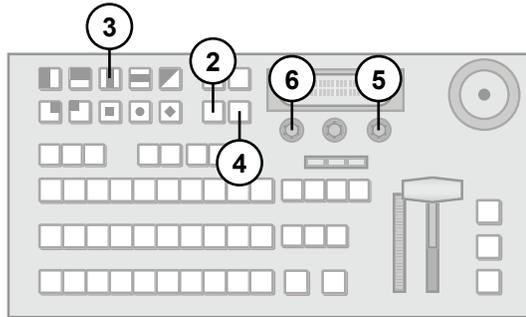
The switcher is equipped with an Ethernet port to allow remote access. By default, the switcher uses DHCP to automatically obtain an IP address. You can manually set an IP address, network mask, and

default gateway if your network does not have a DHCP server.

**Note:**

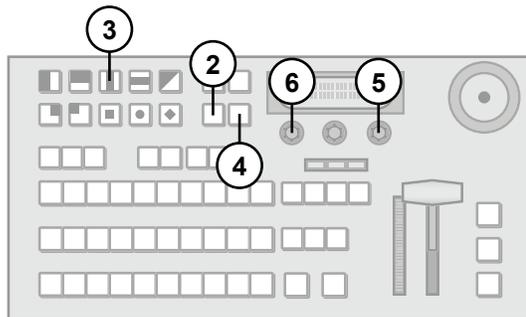
- You do not need to connect your switcher to a network for it to function.

**To configure a DHCP IP address for your switcher:**



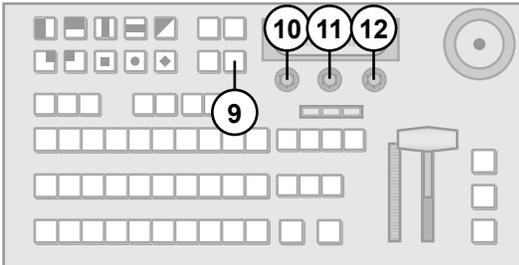
1. Ensure your switcher is connected to your network via the ethernet port.
2. Press **MENU**.
3. Press the **SYSTEM Wipe Pattern** button.
4. Press **NEXT** until **IP Addr** is displayed.
5. Press the **IP Addr** knob to display the **IP Address** menu.
6. Use the **IPMode** knob to select **DHCP**.
7. Press the **IPMode** knob to enter the selection.
8. Press the **Confirm** knob to commit the change. Press the **Cancel** knob to discard the change and return to the previous setting.

**To configure a static IP address for your switcher:**



1. Ensure your switcher is connected to your network via the ethernet port.
2. Press **MENU**.
3. Press the **SYSTEM Wipe Pattern** button.
4. Press **NEXT** until **IP Addr** is displayed.

5. Press the **IP Addr** knob to display the **IP Address** menu.
6. Use the **IPMode** knob to select **Static**.
7. Press the **IPMode** knob to enter the selection.
8. Press the **Confirm** knob to commit the change. Press the **Cancel** knob to discard the change and return to the previous setting.



9. Press **NEXT** until **IPAddr** is displayed.
10. Use the left knob to select the data to configure. You can choose from the following:
  - **IPAddr** — Configure the IP address (configure this first).
  - **Mask** — Configure the network mask.
  - **Gatwy** — Configure the default gateway.
11. Use the middle knob to select the fields in the address.
12. Use the right knob to modify the field value.
13. Repeat steps 9 to 12 for **Mask** (network mask), and **Gatwy** (network gateway).
14. Press the left knob to save all network settings.
15. Press the **Confirm** knob to commit the change. Press the **Cancel** knob to discard the change and return to the previous setting.

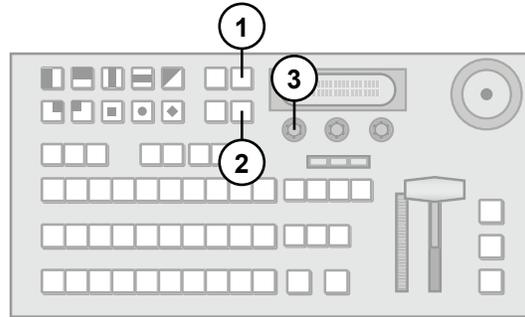
## Switcher Personality

The switcher has customizable features that allow you to tailor operation to your personal preferences.

### Aux Bus Memory Recalls

You can set the behavior of the Aux buses during a memory recall. The buses can be configured to hold inputs (overriding whatever input is saved in the recalled memory) or to change to the input saved in the recalled memory.

### To set the Aux Bus Recall Mode:



1. Press **RECALL**.
2. Press **NEXT** until **AuxMem** is displayed.
3. Press the **AuxMem** knob to set the Aux Bus Recall Mode. You can choose from the following:
  - **NoRecall** — Aux buses ignore the input saved with the recalled memory and retain the current input.
  - **Recall** — Aux bus inputs change to the input saved with the recalled memory.

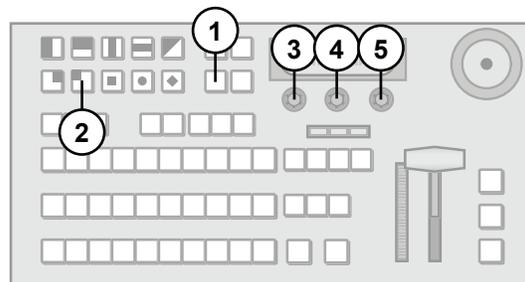
### For More Information on...

- saving and recalling switcher settings, refer to the section “Using the Memory System” on page 4-1.

### Customizing the Panel Glow

Panel buttons are set to a glow color which is used when the button is not selected. This glow color can be customized to your preference.

### To customize the Panel Glow color:



1. Press **MENU**.
2. Press the **USER Wipe Pattern** button.
3. Use the **HUE** knob to adjust the Panel Glow hue.
4. Use the **SAT** knob to adjust the Panel Glow saturation.
5. Use the **LUM** knob to adjust the Panel Glow luminance.

**Note:**

- It is not recommended to set the Panel Glow color to red. Red indicates a source is on-air.

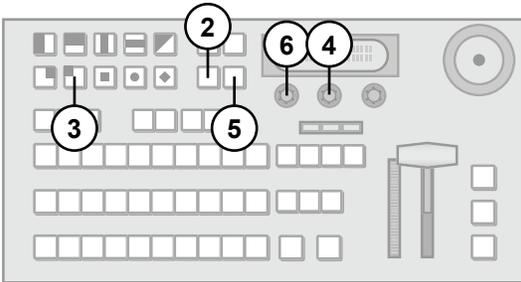
**For More Information on...**

- hue, saturation, and luminance, refer to the section “Selecting Colors” on page 1-6.

**Saving Color Schemes**

You can save a custom Panel Glow color scheme so that it may be recalled as needed.

**To save a custom Panel Glow color scheme:**

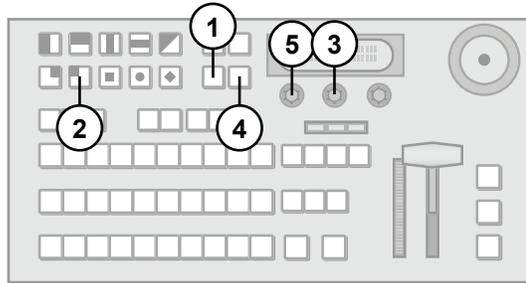


1. Modify the Panel Glow as described above, to obtain the desired appearance.
2. Press **MENU**.
3. Press the **USER** Wipe Pattern button.
4. Press the **Scheme** knob to display the **Color Scheme** menu.
5. Press **NEXT** until **Save** is displayed.
6. Rotate the **Save** knob to select the custom scheme you wish to save.
7. Press the **Save** knob to save the color scheme.
8. Press the **Confirm** knob to commit the save (if there was a color scheme saved to the selected custom scheme, it is overwritten). Press the **Cancel** knob to cancel the save.

**Loading Color Schemes**

You can load a custom color scheme or one of the preset color schemes that are included on your switcher.

**To load a custom Panel Glow color scheme:**



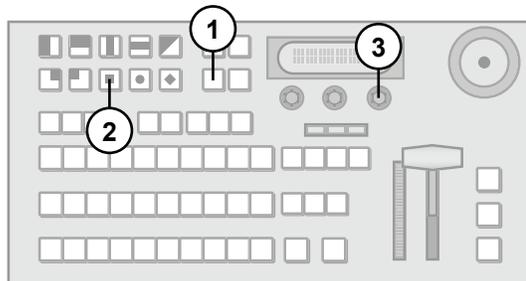
1. Press **MENU**.
2. Press the **USER** Wipe Pattern button.
3. Press the **Scheme** knob to display the **Color Scheme** menu.
4. Press **NEXT** until **Load** is displayed.
5. Use the **Load** knob to select the color scheme you want to load. You can select from a list of presets or one of the custom color schemes you have previously saved.
6. Press the **Load** knob to load the color scheme.
7. Press the **Confirm** knob to commit the load. Press the **Cancel** knob to cancel the load.

**Power-Save Mode**

The switcher goes into a Power-Save mode after a certain amount of time (20 minutes by default) without user interaction. Touching any control will wake the switcher. Any functionality associated with the touched control is ignored until the unit is active and all lights and display are turned on.

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

**To configure the power-save timeout:**



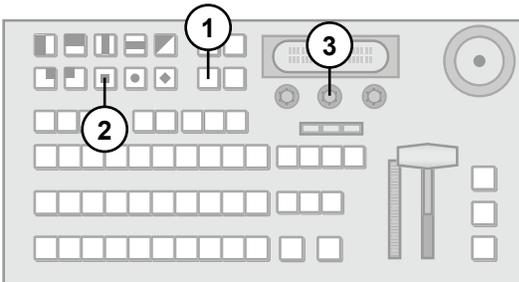
1. Press **MENU**.
2. Press the **PERS** Wipe Pattern button.

- Press the right knob to set the switcher power-save behavior. You can choose from the following:
  - PwrSve** — All buttons and the menu display turn off. The switcher conserves as much power as possible without affecting on-air video.
  - Sleep** — The menu display turns off. Buttons light and slowly fade in a raindrop pattern.
- Use the right knob to set the power-save timeout (in minutes). You can select a value from 0 (off) to 999 minutes.

### Transition Rate Units

You can select the units used to specify durations for various switcher transitions. Choose the units that you are most comfortable working with.

#### To select the units for switcher transitions:

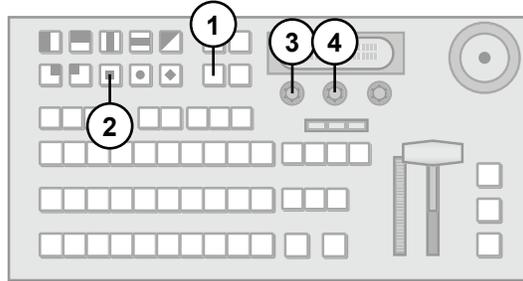


- Press **MENU**.
- Press the **PERS** Wipe Pattern button.
- Use the **Rate** knob to select the units used to specify switcher transition rates. You can choose from the following:
  - Frames** — Switcher transitions are specified in frames.
  - Secnds** — Switcher transitions are specified in seconds.

### 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. Find a value that is most comfortable for your operating style.

#### To set the switcher double press rate:

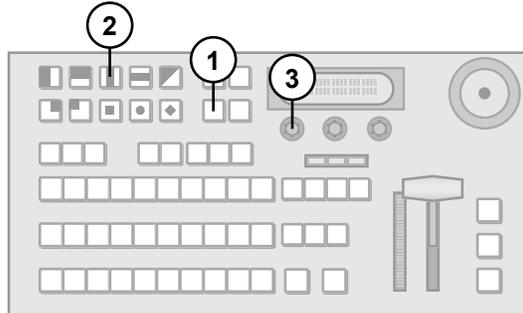


- Press **MENU**.
- Press the **PERS** Wipe Pattern button.
- Press the **DbIPrs** Speed knob.
- Double-press the middle knob at a rate you feel comfortable. This defines the double press rate.
- Press **MENU** to save the setting.

### Resource Sharing

The switcher can only use one Chroma Key at a time. You can specify how the Chroma Key is shared between the keys on your switcher.

#### To specify Chroma Key resource sharing:



- Press **MENU**.
- Press the **SYSTEM** Wipe Pattern button.
- Press the **Rsrc Mode** knob to display the **Resource Mode** menu.
- Use the **ChrKey** knob to select how the Chroma Key resource is shared between keys. You can choose from the following:
  - KEY1** — The Chroma Key is locked to Key 1. Only Key 1 can display a Chroma Key.
  - KEY2** — The Chroma Key is locked to Key 2. Only Key 2 can display a Chroma Key.
  - KEY3** (CrossOver 12 only) — The Chroma Key is locked to Key 3. Only Key 3 can display a Chroma Key.
  - FLOAT** — The Chroma Key can be used by any key. If a Chroma Key is on-air and you attempt to create a second Chroma Key, you

are asked if you wish to take the first Chroma Key off-air and use the Chroma Key resource for the new key.

- **ASK** — The Chroma Key can be used by any key. If a Chroma Key is in-use (on or off-air), you are asked if you wish to convert the original Chroma Key to an Auto-Select key, take it off-air, and use the Chroma Key resource for the new key.

5. Press the **ChrKey** knob to select the Chroma Key sharing mode.
6. Press the **Confirm** knob to commit the change. Press the **Cancel** knob to cancel the change.

#### For More Information on...

- creating and using Chroma Keys, refer to the section “Chroma Key” on page 3-4.

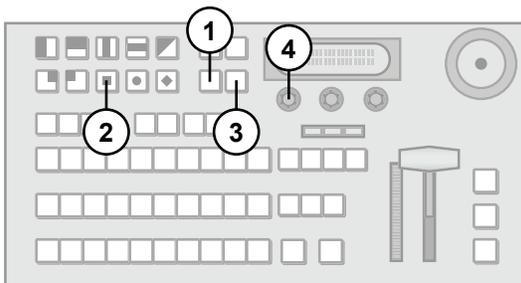
### Switch on Field or Frame

The Switch On feature allows you to select when the switcher triggers a transition from one video source to the next when you are running in an interlaced video format. Each interlaced video frame is composed of an odd field and an even field and you can specify that transitions are initiated on:

- even fields only
- odd fields only
- either even or odd fields

If you are running in a progressive scan video format, setting your switcher to transition on even or odd fields will cause the switcher to only allow transitions on every second frame.

#### To set when the switcher initiates transitions:



1. Press **MENU**.
2. Press the **PERS** Wipe Pattern button.
3. Press **NEXT** until **FldSwt** (**FrmSwt** if you are using a progressive scan video format) is displayed.
4. Use the **FldSwt** (**FrmSwt** if you are using a progressive scan video format) knob to select

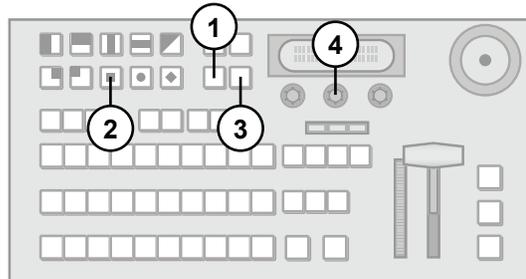
when transitions are initiated. You can choose from the following:

- **F1** — Field 1 (Odd Field) transitions are initiated after the odd field of the source video is drawn.
  - **F2** — Field 2 (Even Field) transitions are initiated after the even field of the source video is drawn.
  - **BOTH** — Transitions can be initiated on either even or odd fields or frames.
5. Press the **FldSwt** (**FrmSwt** if you are using a progressive scan video format) knob to commit the selection.

### Editor Control

Your switcher can be controlled by external editors using the GVG100 protocol. You can enable or disable external control.

#### To enable or disable external editor control:



1. Press **MENU**.
2. Press the **PERS** Wipe Pattern button.
3. Press **NEXT** until **Editor** is displayed.
4. Use the **Editor** knob to enable or disable external editor control. You can choose from the following:
  - **GVG100** — Editor control is enabled.
  - **G100L** — Legacy editor control is enabled.
  - **Off** — Editor control is disabled.

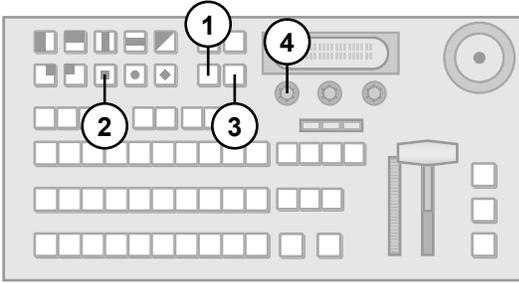
#### For More Information on...

- external editor control, refer to the section “Editor Port” on page 4-14.

### Next Transition Area Reset

You can choose the state of the Next Transition area after a transition is performed.

### To set the Next Transition area reset behavior:

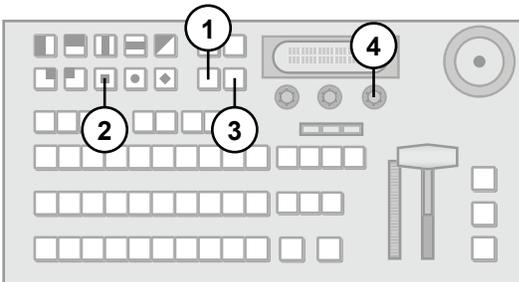


1. Press **MENU**.
2. Press the **PERS** Wipe Pattern button.
3. Press **NEXT** until **Trans** is displayed.
4. Use the **Trans** knob to set the behavior of the Next Transition area after a transition is performed. You can choose from the following:
  - **Reset** — The Next Transition area is reset to a background dissolve transition
  - **NotRst** — The Next Transition area is not reset.

### Transition Resume Direction

You can choose which direction a paused transition proceeds in when it is re-started.

### To set the transition resume direction:

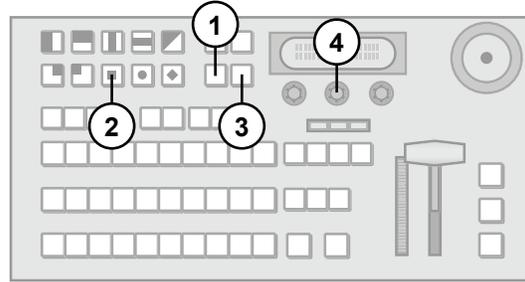


1. Press **MENU**.
2. Press the **PERS** Wipe Pattern button.
3. Press **NEXT** until **Resume** is displayed.
4. Use the **Resume** knob to set the transition direction used when a paused transition is re-started. You can choose from the following:
  - **Fwd** — The transition completes as originally set.
  - **Rev** — The transition reverses and the switcher returns to the on-air state it was in before the transition was started.

### Next Transition Key Behavior

You can choose whether a Key remains in the Next Transition area or is removed if a dedicated key transition is performed.

### To set the Next Transition Key behavior:



1. Press **MENU**.
2. Press the **PERS** Wipe Pattern button.
3. Press **NEXT** until **ARKey** is displayed.
4. Use the **ARKey** knob to set whether a Key remains or is removed from the Next transition area after a dedicated key transition is performed. You can choose from the following:
  - **Off** — The Key is removed from the Next Transition area after a dedicated key transition is performed.
  - **On** — The Key remains active in the Next Transition area after a dedicated key transition is performed.

# Basic Operation

This chapter describes the general operation of your switcher. Basic information is provided to help get you up and running quickly.

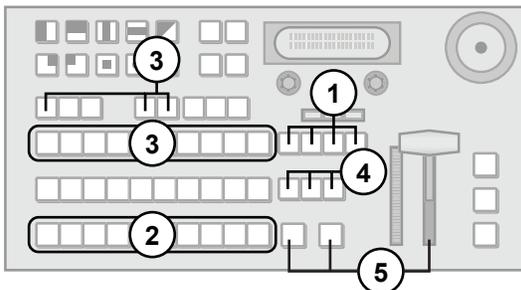
## Transition Overview

Transitions allow you to replace the on-air video source with another source. During a transition, the source you selected on the Preset bus becomes active on the Program bus and the source that was active on the Program bus is now on the Preset bus.

You can perform three types of transitions:

- **Cuts** — The video image instantly switches between selected sources.
- **Dissolves** — The video image gradually fades from the on-air source to the selected source.
- **Wipes** — The selected source wipes over the on-air source using a user-specified pattern and direction.

To perform a transition:



1. Select the elements to include in the next transition by pressing and one of the following:
  - **BKGD**
  - **KEY 1**
  - **KEY 2**
  - **KEY 3** (CrossOver 12 only)
2. Select the source on the Preset bus (when **BKGD** is selected as part of the next transition), that you want to take on-air. The selected source appears on your preview monitor.
3. If you selected any keys for the transition in step 1, select Keyers and sources on the Key/Aux bus.
4. Choose the type of transition you wish to perform:
  - Press **DISS** to select a dissolve transition.

- Press **WIPE** to select a wipe transition.
5. Perform the transition by choosing one of the following:
    - Press **CUT** to immediately cut the selected source on-air (selected transition type is ignored).
    - Press **AUTO TRANS** to have the switcher perform a smooth transition.
    - Move the Fader from one limit to the other to perform a manual transition..

**Note:**

- You can select multiple elements for the next transition by pressing and holding the button for the first element, then pressing one or more of the other next transition buttons.
- While still holding the first element button, press an element button again to remove it from the next transition.

**For More Information on...**

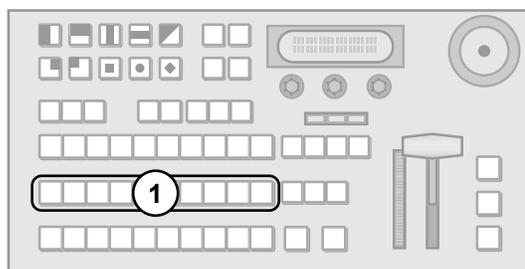
- including keys in transitions, refer to the section “Key Transitions” on page 3-3.
- the Next Transition area state after a transition, refer to the section “Next Transition Area Reset” on page 2-11.

## Cutting on the Program Bus

Cuts are the simplest transition, performing an instantaneous change between sources. You can perform a cut transition as described in the previous section, or you can perform the transition directly on the Program bus.

This also applies to keys. If a key is on-air, you can select alternate sources on the Key/Aux bus and have them instantly cut on-air.

To cut on the Program bus:



1. Select the source you want to take on-air by pressing a source button on the Program bus.

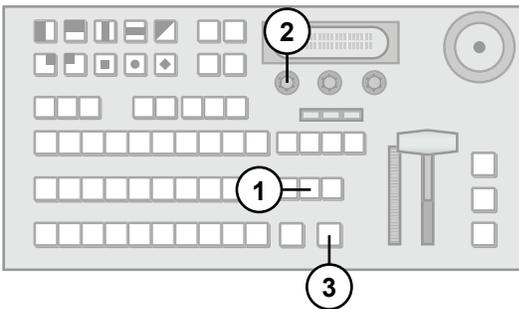
**Note:**

- You can not preview the next source on your preview monitor when cutting on the Program Bus.

### ↘ Configuring the Auto Trans Rate

You can control the amount of time a dissolve or wipe transition takes to complete when you press the **AUTO TRANS** button. Transitions performed with the Fader are not affected.

**To change the rate for automatic transitions:**



1. Prepare a transition using **DISS** or **WIPE** as the type of transition, but do not perform the transition.
2. Use the **Time** knob to change the transition duration. The duration is specified in frames.
3. Press **AUTO TRANS** to perform the transition.

**Note:**

- You can set different transition rates for the dedicated **KEY TRANS** buttons.

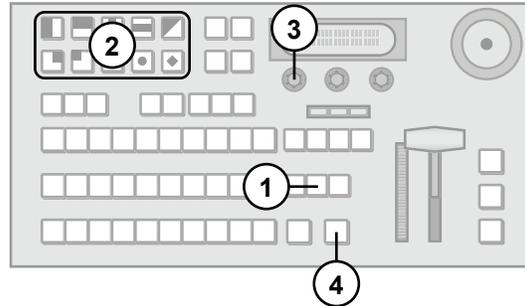
**For More Information on...**

- dedicated key transitions, refer to the section “Dedicated Key Transitions” on page 3-4.

### ↘ Wipe Transitions

You can select from a number of predefined patterns and control the amount of time a wipe transition takes to complete.

**To select a wipe transition pattern:**



1. Prepare a transition using **WIPE** as the type of transition, but do not perform the transition.
2. Select the pattern you wish to use for the wipe.
3. Use the **Time** knob to change the transition duration.
4. Press **AUTO TRANS** to perform the dissolve.

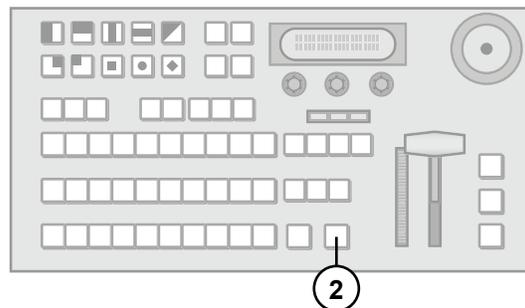
**For More Information on...**

- preparing transitions, refer to the section “Transition Overview” on page 3-1

### ↘ Pausing a Transition

You can pause a dissolve or wipe transition while it is in progress.

**To pause and resume a transition in progress:**



1. Prepare a dissolve or wipe transition.
2. Press **AUTO TRANS** to start the transition.
3. Press **AUTO TRANS** again to pause the transition.
4. Press **AUTO TRANS** to resume the transition.

**Note:**

- The transition will continue or reverse based on the setting of the **Resume** personality option.

**For More Information on...**

- setting the behavior of a resumed transition, refer to the section “Transition Resume Direction” on page 2-12.

## Keying Overview

Keying allows you to insert portions of one scene into another. Keys appear as overlays over the background image.

The switcher supports three key types:

- **Auto-Select Key** — Key alpha (transparency) is provided on one input and key fill video is provided on a second input (character generators and graphics systems typically provide fill and alpha on separate channels).
- **Self Key** — Key transparency is derived from the luminance of the key fill video.
- **Chroma Key** — A user defined color hue is selected for transparency (such as blue or green-screen applications).

The CrossOver 6 supports 2 keys. The CrossOver 12 supports 3 keys.

### Video Layering

Video is layered as shown in (Figure 3.1).

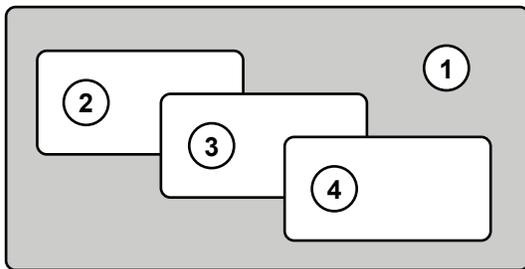


Figure 3.1 Video Layering

1. Program
2. Key 1
3. Key 2
4. Key 3 (CrossOver 12 only)

## Key Transitions

Key transitions are similar to background transitions. You can perform key and background transitions simultaneously.

### Selecting Keys

Selecting a key allows you to configure the key type and select a source for that key.

#### To select a key:

- Select a key by pressing one of the key select buttons. You can choose from the following:
  - › **SELF KEY**, **AUTO SEL**, or **CHR KEY** — selects Key 1 and sets the key type.

- › **KEY 2 SEL** — selects Key 2.
- › **KEY 3 SEL** — selects Key 3 (CrossOver 12 only).

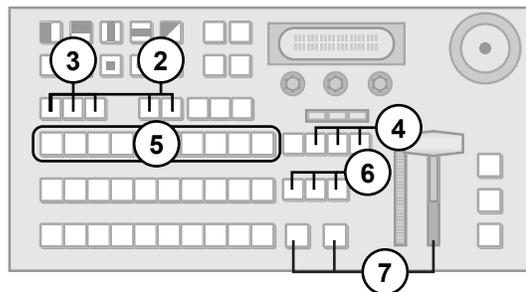
#### Note:

- If you select Key 1, you are selecting a key and key type simultaneously.

### Performing Key Transitions

Key transitions are performed similarly to background transitions. All transition types are available for key transition.

#### To perform a key transition:



1. Ensure the key you are using in the transition is not on-air.
2. Select the key you wish to use.
3. Select the key type by pressing one of the following:
  - **CHR KEY** to create a Chroma Key.
  - **AUTO SELECT** to create an Auto-Select Key.
4. Press the corresponding key button in the Next Transition area to include the key in the transition. You can choose from the following:
  - **KEY 1** to include Key 1.
  - **KEY 2** to include Key 2.
  - **KEY 3** to include Key 3 (CrossOver 12 only).
5. Select a source on the Key/Aux bus that you want to take on-air. The selected source appears on your preview monitor over the background image.
6. Choose the type of transition you wish to perform:
  - Press **DISS** to select a dissolve transition.
  - Press **WIPE** to select a wipe transition.
7. Perform the transition by using one of the following methods:

- Press **CUT** to immediately cut the selected source on-air (selected transition type is ignored).
- Press **AUTO TRANS** to have the switcher perform a smooth transition.
- Move the Fader from one limit to the other to perform a manual transition.

**Note:**

- To include multiple keys in the transition, push the desired combination of **KEY 1**, **KEY 2**, and **KEY 3** buttons simultaneously.
- When a key is on-air, the tally above the on-air key glows red.

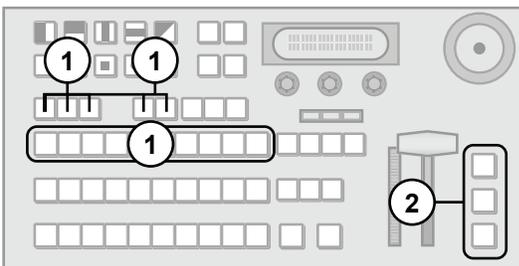
For More Information on...

- selecting keys, refer to the section “Selecting Keys” on page 3-3.

### ➤ Dedicated Key Transitions

If an immediate transition is required or an unexpected transition needs to be performed, the switcher allows for a dedicated key transition. Dedicated key transition buttons for this purpose are located to the right of the Fader. Only dissolve transitions can be performed with the dedicated key transition buttons.

**To perform a dedicated key transition:**



1. Ensure that a key, key-type, and source are selected.
2. Take the desired key on or off-air by performing one of the following:
  - Press **KEY 1 TRANS** to transition Key 1.
  - Press **KEY 2 TRANS** to transition Key 2.
  - Press **KEY 3 TRANS** to transition Key 3 (CrossOver 12 only).

**Note:**

- When a key is on-air, the appropriate dedicated key transition button glows red.

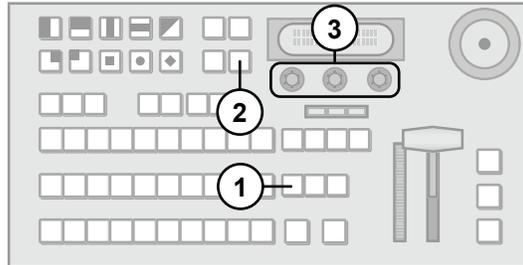
**For More Information on...**

- selecting Keys, refer to the section “Selecting Keys” on page 3-3.

### Setting the Transition Rate for Dedicated Key Transitions

You can set the transition rate for the dedicated key transition buttons independently of the other switcher transition rates.

**To change the transition rate for dedicated key transitions:**



1. Press **DISS**.
2. Press **NEXT**.
3. Use the **Key 1-3** (1-2 on CrossOver 6) knobs to change the transition rate for the specified key.

**Note:**

- If the transition rate is set to **CUT** and a transition is in progress, pressing a dedicated key transition button immediately cuts the associated key to the previous state (either on or off-air). The rest of the transition proceeds.

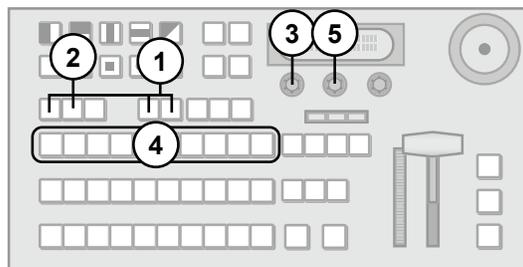
**For More Information on...**

- the Next Transition area behavior, refer to the section “Next Transition Key Behavior” on page 2-12.

### ➤ Chroma Key

The Chroma Key masks a specified color allowing you to quickly extract a foreground subject from a controlled-color background. The switcher can mask the following colors: blue, green, red, cyan, magenta, and yellow. The default color is blue.

**To create a Chroma Key:**



1. Select the key you wish to use.
2. If you are not using Key 1, press **CHR KEY** to set the selected Key to a Chroma Key.

3. If you have already assigned a Chroma Key to one of the other keyers and the Chroma Key share mode is set to **FLOAT** or **ASK**, you are asked whether you want to steal the Chroma Key resource to use on the new key. You can choose from the following:
  - Press the **Confirm** knob to steal the Chroma Key resource for the new key. The old Chroma Key is taken off-air and converted to an Auto-Select Key.
  - Press the **Cancel** knob to cancel the new Chroma Key and leave the resource with the key it is currently assigned to.
4. Select the desired source on the Key/Aux bus.
5. Use the **Color** knob to select the color to make transparent. You can choose from the following:
  - **Blue** (default)
  - **Cyan**
  - **Green**
  - **Yellow**
  - **Red**
  - **Magenta**
6. Press **Init**.

#### For More Information on...

- selecting Keys, refer to the section “Selecting Keys” on page 3-3.
- Chroma Key sharing, refer to the section “Resource Sharing” on page 2-10.
- modifying Chroma Key settings, refer to the section “Chroma Key Fine Tuning” on page 4-10.
- taking a Chroma Key on-air, refer to the section “Key Transitions” on page 3-3.

## ➤ Mattes

A Matte is a solid color signal that is generated by the switcher and can be adjusted for hue, saturation, and luminance. It can also be adjusted for position, size, aspect, border, and softness.

#### For More Information on...

- setting hue, saturation, and luminance, refer to the section “Selecting Colors” on page 1-6.

### Using a Matte

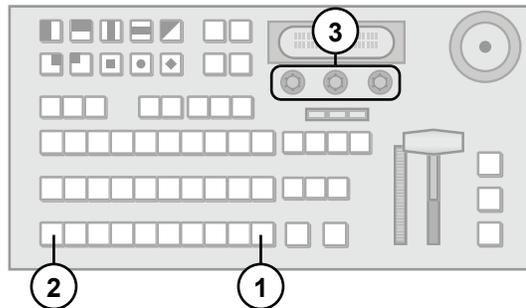
Mattes can be a solid color or a wash. A wash fills the matte with one of the 10 patterns. The wash is off by default and the pattern is set to the first pattern button by default. If the wash is turned off, the pattern does not appear.

### Selecting a Matte Color

You can use two methods to select a matte color:

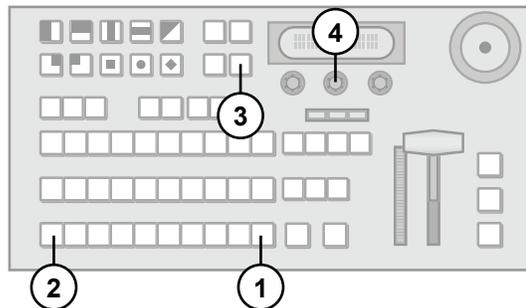
- Specify hue, saturation, and luminosity
- Load a preset color

#### To select a matte color by specifying hue, saturation, and luminosity:



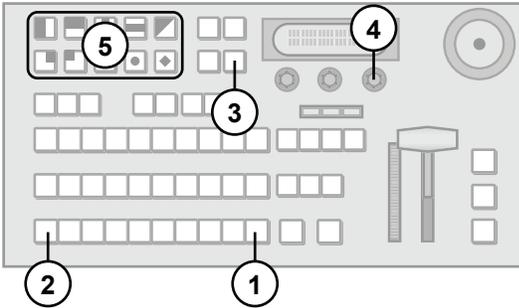
1. Press and hold **SHIFT**.
2. Press **BLACK/MATTE** to display the **Matte** menu.
3. Use the corresponding knob to adjust the Hue (**Hue1**), Saturation (**Sat1**), and Luminance (**Lum1**) to the desired effect.

#### To select a matte color by loading a preset:



1. Press and hold **SHIFT**.
2. Press **BLACK/MATTE** to display the **Matte** menu.
3. Press **NEXT**.
4. Rotate the **Load** knob to select the preset color you wish to use.
5. Press the **Load** knob to load the preset color.

### To change the pattern:



1. Press and hold **SHIFT**.
2. Press **BLACK/MATTE** to display the **Matte** menu.
3. Press **NEXT** until **WASH** is displayed.
4. If the **WASH** knob is **Off**, toggle it **On** by pressing the **WASH** knob.
5. Use the Pattern buttons to select the desired pattern.

#### Note:

- If the wash is turned off, the pattern does not display.

### Using other Adjustments

Mattes can also be adjusted by using these modifiers:

- **Size** — Size
- **X-Pos, Y-Pos** — Position
- **Aspect** — Aspect Ratio
- **Border** — Border Appearance
- **Softness** — Edge Softness
- **Hue 2, Sat 2, and Lum 2** — Secondary Color

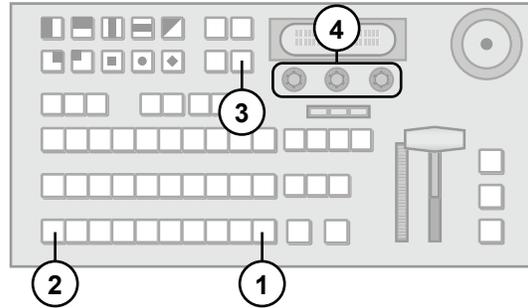
The **Aspect** function allows you to alter the shape of the selected wash pattern. For example, if you want the wash to be oval shaped, select the circular pattern and adjust the aspect ratio until the desired oval is created.

Borders are effects created around the selected pattern for the wash. The **Border** function allows you to adjust the appearance of the border.

The **Softness** function controls the edge of the wash. It is a pattern edge effect produced by mixing key source and key fill signals such that the edge of the pattern can be sharp or blurred.

The **Hue 2, Sat 2, and Lum 2** functions control the secondary color. If you are creating a wash and want to add a second color, adjusting these options will generate and modify another color set within the pattern.

### To apply other adjustments:



1. Press and hold **SHIFT**.
2. Press **BLACK/MATTE** to display the **Matte** menu.
3. Press **NEXT** until the desired modifier is displayed.
4. Adjust the desired modifier by rotating the corresponding knob.

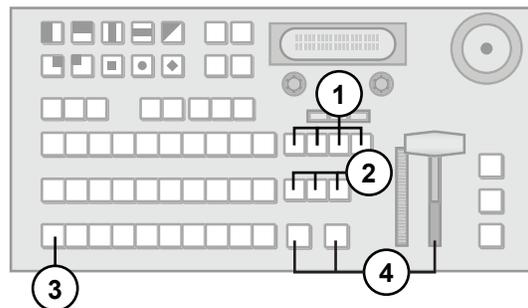
#### Note:

- The wash pattern and the key pattern mask are shared. Any adjustments affect both patterns.

### ➤ Fade to Black

Fade to Black is achieved by selecting the black source and performing a transition.

#### To fade to black:



1. Press **BKGD** and all on-air key buttons simultaneously to include them in the transition.
2. Select a transition type.
3. Press **BLACK/MATTE** on the Preset bus.
4. Fade to black by sliding the Fader, pressing **CUT**, or pressing **AUTO TRANS**.

# Advanced Operation

This chapter describes advanced operating concepts for your switcher. Advanced topics and information on modifying basic concepts to fit your requirements are discussed.

## Using the Memory System

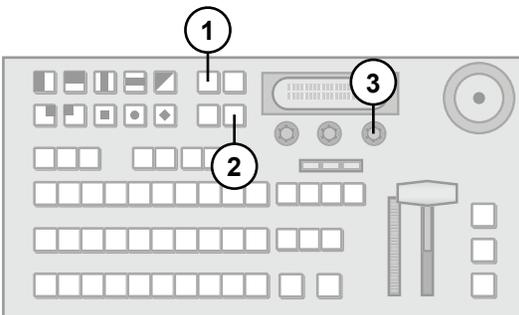
The built-in memory system can store up to 100 switcher memories (10 banks of 10 memory locations). This allows you to save the settings for a later time without having to make the adjustments again.

### Choosing a Memory Access Mode

There are two ways to access the memory system:

- **Direct Access Mode** — You can access any of the 100 memories by pressing two buttons (one for the bank and one for the memory location).
- **Bank Mode** — You pre-select a bank and then access any of the 10 memories in that bank with a single button press.

To select the memory access mode:

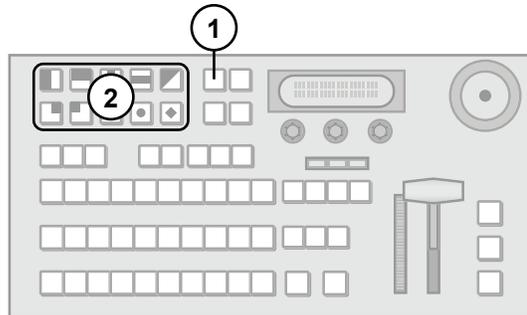


1. Press **STORE**.
2. Press **NEXT**.
3. Press the right knob to toggle between memory access modes. You can choose from the following:
  - **DirAcc** — Use Direct Access Mode.
  - **Bank** — Use Bank Mode.

### Storing Memory Registers

Storing settings to a memory register allows you to save an effect for re-use.

To store a setting to a memory register:



1. Press the **STORE** button.
2. Select the storage area you wish to save to as follows:
  - If you are using Bank Mode, select a pattern button to designate the memory register in the selected bank. You may also use the **Bank** knob to change the selected bank before storing.
  - If you are using Direct Access Mode, select a pattern button to designate the desired bank and then select a second pattern button to designate the memory register

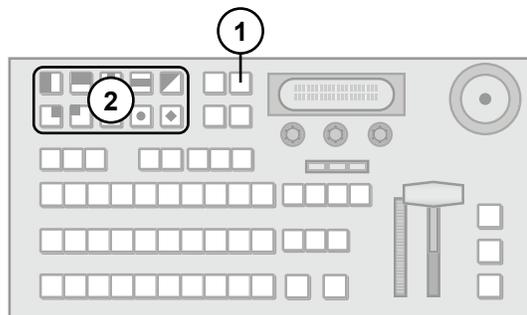
**Note:**

- You can exit without storing a memory register by pressing any button other than a Wipe Pattern, dedicated key transition, **CUT**, **AUTO TRANS**, or source button.
- The switcher is placed in recall mode immediately after storing a memory register.

### Recalling Memory Registers

Recalling the memory register allows you to quickly re-use the effect you previously stored.

To recall a setting from a memory register:



1. Press **RECALL**.
2. Select the memory register you wish to recall from as follows:
  - If you are using Bank Mode, select a pattern button to designate the memory register in the selected bank. You may also use the **Bank** knob to change the selected bank before recalling.
  - If you are using Direct Access Mode, select a pattern button to designate the desired bank and then select a second pattern button to designate the memory register.

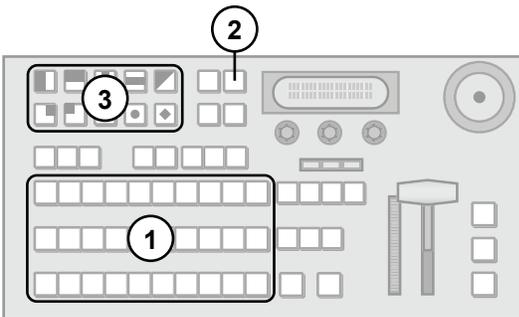
**Note:**

- Recalling a memory register that requires a new image to be loaded from a USB drive into a Media-Store channel may result in the currently loaded image being displayed for a few frames while the new image is loaded.
- 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.

**Bus Hold**

You can choose to have a bus remain unaffected by a memory recall (the selected source on the bus is not replaced with the source stored in the memory).

**To perform a Bus Hold:**



1. Press and hold the desired source button on the desired Program, Preset, or Key/Aux bus.
2. Press **RECALL**.
3. Select the memory register you wish to recall from as follows:
  - If you are using Bank Mode, select a pattern button to designate the memory register in the selected bank. You may also use the **Bank** knob to change the selected bank before storing.
  - If you are using Direct Access Mode, select a pattern button to designate the desired bank

and then select a second pattern to designate the memory register.

The source on the bus you selected will not change when the memory is recalled (the source setting stored in the memory for that bus is ignored).

➔ **Memory AI and Recall to Preview**

The switcher can be set so that recalling a memory does not affect what is currently on-air. There are two modes you can choose from:

- **Recall to Preview** — The switcher only recalls those elements from the memory register that are not currently on-air. Background elements are recalled to the Preset bus.
- **Memory AI** — The switcher uses the contents of the memory register to configure the Next Transition area and the Preview bus. The switcher is configured such that the next transition will make the on-air state the same as the state saved in the memory register.

**Memory AI and Keys**

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.

**For More Information on...**

- Resource sharing, refer to the section “Resource Sharing” on page 2-10.

**Memory AI and Recall to Preview Examples**

Table 4.1 shows the contents of a memory register and the state of the switcher in various scenarios.

**Table 4.1 Recall to Preview Scenarios**

Element	Memory Register	Scenario	
		1	2
<b>PGM Bus</b>	Input 3	Input 1 (on-air)	Input 1 (on-air)
<b>Key 1</b>	Input 4	Input 2 (on-air)	–
<b>Key 2</b>	Input 5	–	–
<b>Key 3</b>	–		

Depending on the Recall to Preview setting, the elements recalled are as follows:

### Recall to Preview Off

- Scenario 1
  - › Input 3 is recalled to the Program bus (on-air image instantly cuts to Input 3).
  - › Input 4 is recalled to Key 1 (on-air image instantly cuts to Input 4).
  - › Input 5 is recalled to Key 2 (on-air image not affected as Key 2 is off-air).
  - › Input 1 is selected on the Preview bus.
- Scenario 2
  - › Input 3 is recalled to the Program bus (on-air image instantly cuts to Input 3).
  - › Input 4 is recalled to Key 1 (on-air image is not affected as Key 1 is off-air).
  - › Input 5 is recalled to Key 2 (on-air image is not affected as Key 2 is off-air).
  - › Input 1 is selected on the Preview bus.

### Recall to Preview On

- Scenario 1
  - › Input 3 is recalled to the Preset bus (on-air image is not affected).
  - › Input 4 is not recalled to Key 1 as Key 1 is on-air (on-air image is not affected).
  - › Input 5 is recalled to Key 2 (on-air image is not affected as Key 2 is off-air).
- Scenario 2
  - › Input 3 is recalled to the Program bus (on-air image instantly cuts to Input 3).
  - › Input 4 is recalled to Key 1 (on-air image is not affected as Key 1 is off-air).
  - › Input 5 is recalled to Key 2 (on-air image is not affected as Key 2 is off-air).
  - › Input 1 is selected on the Preview bus.

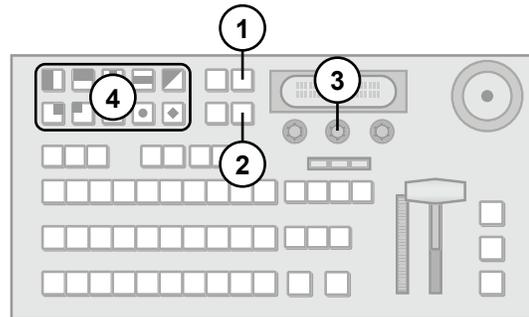
### Memory AI

- Scenario 1
  - › Input 3 is recalled to the Preset bus (on-air image is not affected).
  - › Input 4 is recalled to Key 2 as Key 1 is on-air (on-air image is not affected).
  - › CrossOver 12: Input 5 is recalled to Key 3 as Key 2 is now in-use (on-air image is not affected).
  - › CrossOver 6: Input 5 is not recalled as both keys are now in use.

- › Next Transition area is set to transition background, Key 1 off-air, Key 2 on-air, and Key 3 on-air (CrossOver 12 only).

- Scenario 2
  - › Input 3 is recalled to the Preset bus (on-air image is not affected).
  - › Input 4 is recalled to Key 1 (on-air image is not affected).
  - › Input 5 is recalled to Key 2 (on-air image is not affected).
  - › Next Transition area is set to transition background, Key 1 on-air, and Key 2 on-air.

### To set the Recall to Preview mode:



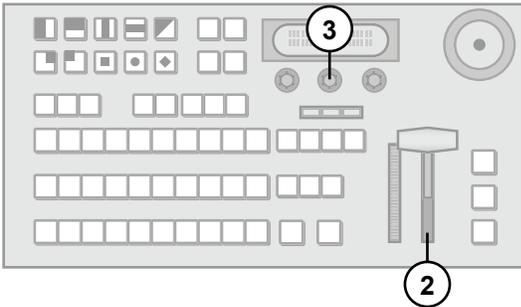
1. Press **RECALL**.
2. Press **NEXT**.
3. Push the **RcIPv** knob to select the Recall to Preview Mode. You can choose from the following:
  - **On** — Recall to Preview mode.
  - **Off** — Recall to Preview and Memory AI modes off.
  - **MemAI** — Memory AI mode.
4. Select the memory register you wish to recall from as follows:
  - If you are using Bank Mode, select one of the 10 pattern buttons to designate the memory register in the selected bank. You may also use the **Bank** knob to change the selected bank before storing.
  - If you are using Direct Access Mode, select one of the 10 pattern buttons to designate the desired bank and then select a second pattern to designate the memory register.

### ➤ Transition Limit

You can stop a transition at a preset position between the two Fader limits. With the transition limit enabled, an automatic transition or a transition

performed with the Fader will stop when it reaches the defined limit.

**To define the transition limit point:**



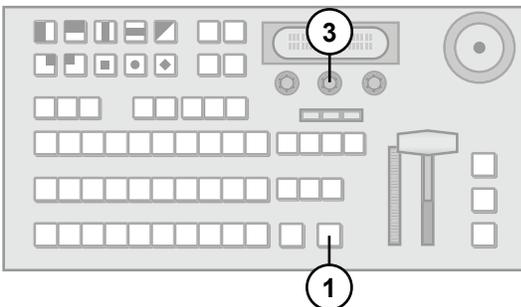
1. Press **DISS** or **WIPE**.
2. Move the Fader to the desired position you wish to set as a transition limit.
3. Press the **Limit** knob.

The Progress Bar next to the Fader flashes to indicate the defined transition limit.

**Note:**

- Ensure that you are not on-air when setting the transition limit as you will be moving the Fader handle to define the preset position.

**To perform a transition with a transition limit set:**



1. Initiate a transition by pressing **AUTO TRANS**.  
When the transition reaches the defined limit, it will stop.
2. To reverse the transition, press **AUTO TRANS**.
3. To continue the transition, press the **Limit** knob to turn off the transition limit.
4. Press **AUTO TRANS** to complete the transition.

**To Quickly Reset the Transition Limit**

- Double-press the **Limit** knob.  
The transition limit is reset to 50% and the trans limit feature is turned off.

➤ **Reset Options**

You can restore the entire switcher or individual settings to default values. Menu items can also be reset.

You can also capture the state of the switcher as a user-defined default, allowing you to reset to those settings at any time.

Your switcher is shipped with the following default settings:

- The selected source on each bus is black.
- Each key is set to Auto-Select.
- Clip is set to linear.
- Gain is set to linear.
- The Transition Limit is cleared.
- Keys are off-air.
- The Matte is set to Hue: 30.5%, Sat: 100%, Lum: 50% Size: 0.0%.
- The Wash turned off.
- The selected Wipe pattern is the **STATUS** wipe pattern button.
- Wipe parameters are defaulted
- The Next Transition is set to dissolve.
- Masks are turned off .
- The Fader is disabled if it is off limit.
- The main Transition rate is set to:
  - > 15 frames for 59.94 Hz video formats.
  - > 13 frames for 50 Hz video formats.
- The Key Transition rate is set to:
  - > 8 frames for 59.94 Hz video formats.
  - > 7 frames for 50 Hz video formats.
- The Chroma Key is set to Edge: 0.0%, Shadow: 100.0%, Gain: 100.0% Spill: 0.0%.
- The Output Sync is turned off.
- The Frame Sync is turned off
- The Power Save timeout is set to 20 minutes.

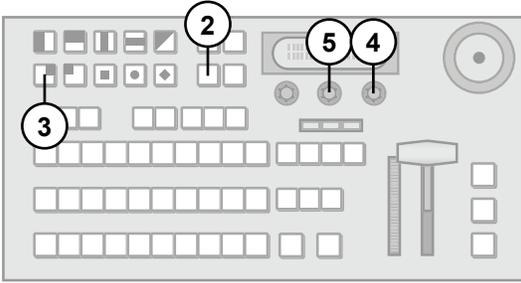
**Note:**

- Default transition rates vary depending on the frequency of the selected video format.

**Configuring Default Settings**

You can customize any of the default parameters and save them as a user-defined default.

### To configure user-defined defaults:

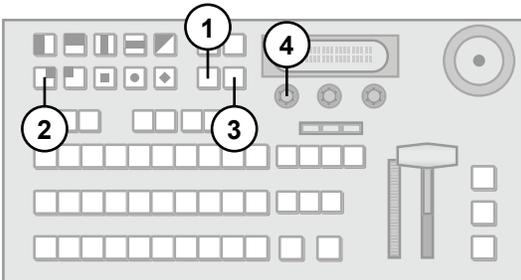


1. Configure any of the settings in the previous list as desired. This will become the new default state.
2. Press **MENU**.
3. Press the **RESET Wipe Pattern** button.
4. Press the **Aux** knob to toggle between including or excluding the Aux buses in the reset.
5. Press the **RState Save** knob to save the new default settings.
6. Press the **Confirm** knob to commit the save. Press the **Cancel** knob to cancel the save and return to the previous setting.

### Restoring Default Settings to Factory State

You can restore user-defined default settings to a factory state. This is useful if you wish to begin creating a new user-defined default from a known starting configuration.

#### To restore user-defined default settings to the factory state:

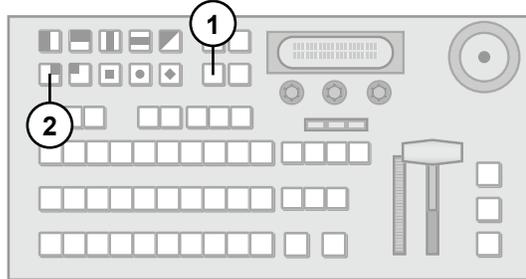


1. Press **MENU**.
2. Press the **RESET Wipe Pattern** button.
3. Press **NEXT**.
4. Press the **Default RState** knob to restore the user-defined defaults to factory settings.
5. Press the **Confirm** knob to commit the change. Press the **Cancel** knob to cancel the change and return to the previous setting.

### Resetting the Switcher

Resetting the switcher restores the user-defined default settings..

#### To reset the switcher:



1. Press and hold **MENU**.
2. Press the **RESET Wipe Pattern** button.

#### To reset the switcher using an Alternate Method:

1. Press **MENU**.
2. Press the **RESET Wipe Pattern** button.
3. Press the **RState Load** knob.

All switcher settings are restored to the default values.

### Shared Parameters

Some parameters are shared between features and if reset in one area, are reset in all areas that share that parameter. The shared parameters are:

- **Time** — This value is shared between dissolves and wipes.
- **Limit** — This value is shared between dissolves and wipes.
- **Pattern (Patrn)** — This value is shared between wipes and mattes.

### Resetting Individual Settings

You can reset individual settings to default values rather than resetting the entire switcher.

#### To reset wipes:

1. Press and hold down **WIPE**.
2. Press the **RESET Wipe Pattern** button.

#### To reset dissolves:

1. Press and hold down **DISS**.
2. Press the **RESET Wipe Pattern** button.

#### To reset Key 2 or 3:

1. Press and hold down **KEY 2 SEL** (or **KEY 3 SEL** on the CrossOver 12).
2. Press the **RESET Wipe Pattern** button.

When resetting a key, the selected Chroma Key color and any Split Key assignments are not reset.

#### To reset Aux buses:

1. Press and hold down **AUX SEL** (CrossOver 6) or **AUX 1** or **AUX 2** or **AUX 3** (CrossOver 12).
2. Press the **RESET** Wipe Pattern button.

#### To reset the Chroma Key:

1. Press and hold down **CHR KEY**.
2. Press the **RESET** Wipe Pattern button.

#### Note:

- The selected color is not reset.

#### To reset an Auto-Select Key:

1. Press and hold down **AUTO SEL**.
2. Press the **RESET** Wipe Pattern button.

### Resetting Menu Items

The values for particular parameters can be reset individually. This allows you to restore the default setting if you are unsatisfied with the adjusted values.

Some parameters are shared between features and, if reset in one area, will be reset in all areas that share that parameter.

#### To reset individual menu items:

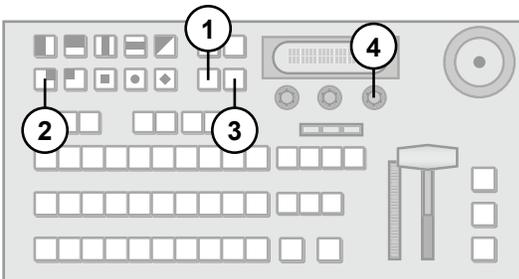
1. Select the menu for the value you wish to reset.
2. Double press the knob associated with the value.

### Restoring to Factory Defaults

You can restore your switcher to the factory default settings. You may wish to do this when troubleshooting problems with your switcher.

Restoring to factory defaults resets the entire switcher. Save any configuration information to a memory register if you wish to re-load it after performing the factory default.

#### To restore factory defaults:



1. Press **MENU**.
2. Press the **RESET** Wipe Pattern button.
3. Press **NEXT**.
4. Press the **Factory Reset** knob.
5. Press the **Confirm** knob to perform the reset. Press the **Cancel** knob to cancel the reset.

### USB Storage

You can use the USB port to:

- Save and load memory sets to a USB drive
- Perform software upgrades

These files and settings can be copied and backed-up on a standard computer.

#### Note:

- Wait 5 seconds after inserting a USB drive into the USB port before using it.

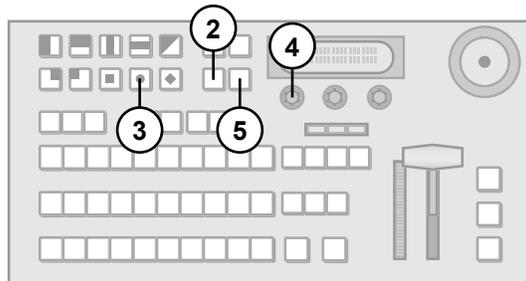
#### For More Information on...

- performing software upgrades, refer to the section “Software Upgrades” on page 4-8.

### Saving Memory Banks and Registers

You can save up to 9 sets of up to 100 memory registers on a USB drive.

#### To save memory registers to a USB drive:



1. Insert a USB drive into the USB port.
2. Press **MENU**.
3. Press the **SAVE** Wipe Pattern button.
4. Press the **Mems** knob to display the **Save Memory** menu.
5. Press **NEXT** to cycle through the sets.
6. Press the knob for the set you want to save the memory registers to.

7. Use the left knob to select which memory registers you wish to save. You can choose from the following:

- **All** — All memory banks and registers are stored to the selected set on the USB drive.
- **Bank** — You can specify which memory bank is stored and which memory bank to store to the selected set on the USB drive.
- **Indiv** — You can specify which memory register is stored and which memory register to store to the selected set on the USB drive.

8. If you selected **Indiv** or **Bank**, select the memory bank or register to store as follows:

- If you selected **Indiv**, use the **Local** knob to select the memory register you wish to save. The selected register is indicated as **X.Y** where **X** is the memory bank and **Y** is the memory register. Use the **USB** knob to select the memory register on the USB drive you wish to save to.
- If you selected **Bank**, use the **Local** knob to select the memory bank you wish to save. Use the **USB** knob to select the bank on the USB drive you wish to save to.

9. Press the left knob to commit the save.

10. Press The **Confirm** knob to perform the save. Press the **Cancel** knob to cancel the save.

**Note:**

- You do not need to store memory banks or registers to the same memory banks or registers on the USB drive.
- If you save an empty memory bank or register, the destination bank or register on the USB drive is erased.

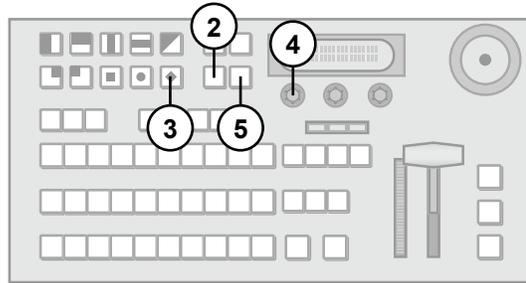
**For More Information on...**

- accessing the USB port, refer to the section “Frame Overview” on page 1-3.

**Loading Memory Banks and Registers**

Once the memory registers are loaded, you can recall them for use.

**To load memory registers from a USB drive:**



1. Insert a USB drive into the USB port.
2. Press **MENU**.
3. Press the **LOAD** Wipe Pattern button.
4. Press the **Mems** knob to display the **Load Memory** menu.
5. Press **NEXT** to cycle through the sets.
6. Press the knob for the set you want to load the memory registers from.
7. Use the left knob to select which memory registers you wish to load. You can choose from the following:

- **All** — All memory banks and registers are replaced with the stored memory banks and registers from the selected set on the USB drive.
- **Bank** — You can specify which memory bank to load from the USB drive and which memory bank on the switcher to replace with the loaded values.
- **Indiv** — You can specify which memory register to load from the USB drive and which memory register on the switcher to replace with the loaded values.

8. If you selected **Indiv** or **Bank**, select the memory bank or register to load as follows:

- If you selected **Indiv**, use the **Local** knob to select the memory register you wish to replace with the loaded data. The selected register is indicated as **X.Y** where **X** is the memory bank and **Y** is the memory register. Use the **USB** knob to select the memory register on the USB drive you wish to load.
- If you selected **Bank**, use the **Local** knob to select the memory bank you wish to replace with the loaded data. Use the **USB** knob to select the bank on the USB drive you wish to load.

9. Press the left knob to commit the load.

10. Press the **Confirm** knob to perform the load.  
Press the **Cancel** knob to cancel the load.

**Note:**

- You do not need to load memory banks or registers on the USB drive to the same memory banks or registers on the switcher.
- If you load an empty memory bank or register from a USB drive, the destination bank or register on the switcher is erased.

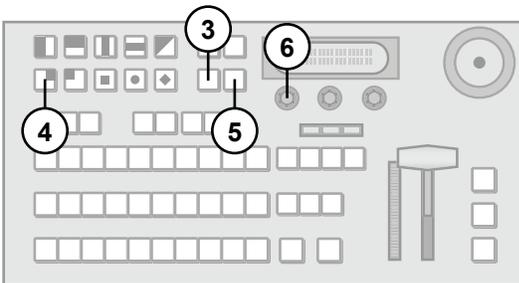
**For More Information on...**

- using the memory system, refer to the section “Using the Memory System” on page 4-1.
- accessing the USB port, refer to the section “Frame Overview” on page 1-3.

## ➤ Software Upgrades

Software upgrades stored on a USB drive can be uploaded to the switcher.

**To upgrade the switcher software:**



1. Copy a software upgrade file onto a USB drive. Do not store multiple upgrade files on the same USB drive.
2. Insert the USB drive with the software upgrade file into the USB port.
3. Press **MENU**.
4. Press the **RESET** Wipe Pattern button.
5. Press **NEXT** until **Run Software Upgrade From USB** is displayed.
6. Press the left knob.
7. Press the **Confirm** knob to initiate an upgrade. Press the **Cancel** knob if you do not wish to perform an upgrade.

The menu displays a message indicating the software upgrade is in progress. The Upgrade LED on the rear of the switcher is lit, indicating an upgrade is in progress.

**Note:**

- Copy the upgrade file to the root level of the USB drive. Do not copy the upgrade file into a folder.
- Upgrades can take several minutes to complete.

**For More Information on...**

- accessing the USB port, refer to the section “Frame Overview” on page 1-3.

## Completing a Software Upgrade

When the software upgrade is complete, the menu displays a message indicating the software upgrade was successful, the Upgrade LED on the rear of the switcher turns off, and the switcher performs an automatic restart.

Once the switcher restarts, it is ready to use. You can safely remove the USB drive.

**Note:**

- If you are upgrading a switcher as a result of a corrupt configuration or a previously failed upgrade, you may need to reconfigure the network address and reload switcher memories.

## ➤ Advanced Keying

The Auto Select, Chroma Key and Wipes can be modified to give them more distinct qualities and personalize your images.

### Auto-Select Key Fine Tuning

You can modify the alpha channel settings for Auto-Select Keys to control the blending of transparent areas.

**For More Information on...**

- how to associate alpha and video inputs, refer to the section “Input BNC Configuration” on page 2-6.

### Modifying Auto-Select Keys

If the Auto-Select Key is shaped or unshaped, the following parameters can be modified:

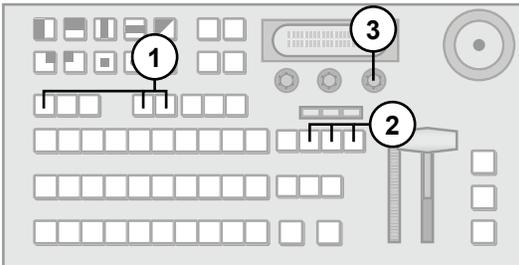
- Transparency
- Mask

The Transparency function allows you to adjust the transparency of the channel from completely opaque to completely transparent. As the level of transparency is adjusted, the graphic in the menu changes to represent the current percentage of transparency.

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

- Force (**M-Frc**) — forces the area inside the mask region to the foreground.
- Invert (**M-Inv**) — reverses the polarity of the mask.

**To modify the transparency:**

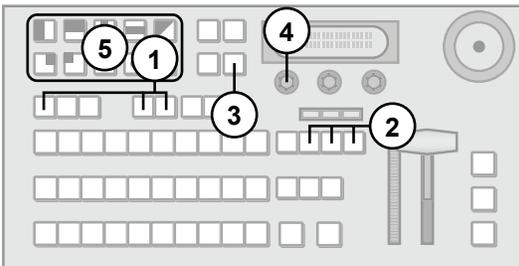


1. Select the key you wish to modify.
2. If necessary, press **KEY 1**, **KEY 2**, or **KEY 3** to include the key in the next transition and have it display on the Preview monitor.
3. Rotate the **Transp** knob until the desired effect is achieved.

**For More Information on...**

- selecting keys, refer to the section “Selecting Keys” on page 3-3.

**To apply a mask:**



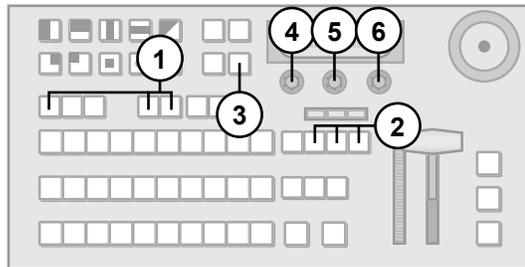
1. Select the key you wish to modify.
2. If necessary, press **KEY 1**, **KEY 2**, or **KEY 3** to include the key in the next transition and have it display on the Preview monitor.
3. Press **NEXT** until **Mask** is displayed.
4. Use the **Mask** knob to select the desired state. You can choose from the following:
  - **Off** — This is the default setting.
  - **Box** — This creates a box mask.
  - **Patrn** — This creates a pattern mask.
5. If you are creating a pattern mask, Press a Wipe Pattern button to select the desired pattern.

6. Press **NEXT** until **Size** is displayed.
7. Use the **Size** knob to modify the mask size.
8. Press **NEXT** repeatedly to access other mask modifiers. Use the knobs to modify mask attributes.

**For More Information on...**

- selecting keys, refer to the section “Selecting Keys” on page 3-3.

**To Modify a mask:**



1. Select the key you wish to modify.
2. If necessary, press **KEY 1**, **KEY 2**, or **KEY 3** to include the key in the next transition and have it display on the Preview monitor.
3. Press **NEXT** until **Mask** is displayed.
4. Use the **Mask** knob to select the mask source. You can choose from the following:
  - **Off** — This is the default setting.
  - **Box** — This creates a box mask.
  - **Patrn** — This creates a pattern mask.
5. Press the **M-Frc** knob to force the area inside the mask region to the foreground. Press again to return the mask to normal.
6. Press the **M-Inv** knob to invert the mask. Press again to return the mask to normal.

**Note:**

- The wash pattern and the key pattern mask are shared. Any adjustments affect both patterns.

**For More Information on...**

- selecting keys, refer to the section “Selecting Keys” on page 3-3.

**Modifying Other Attributes**

There are a number of other attributes you can modify to change the mask appearance. Press **NEXT** and use the knobs to access and change other attributes.

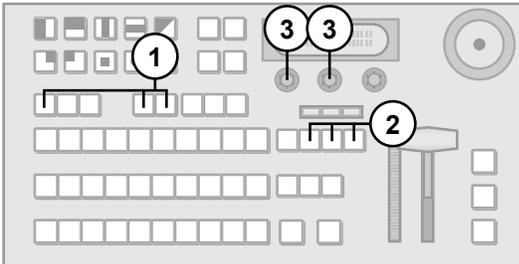
## Modifying Clip and Gain for Unshaped Auto-Select Keys

If an Auto-Select key is unshaped, you can also modify clip and gain.

The Clip function adjusts the threshold level of the key. Only areas of the source video that are higher than the setting of the threshold cut a hole in the background video.

Increasing Gain causes the color to become increasingly saturated.

### To modify the clip or gain:



1. Select the key you wish to modify.
2. If necessary, press **KEY 1**, **KEY 2**, or **KEY 3** to include the key in the next transition and have it display on the Preview monitor.
3. Rotate the **Clip** and **Gain** knobs until the desired effect is achieved.

### For More Information on...

- selecting keys, refer to the section “Selecting Keys” on page 3-3.

## Converting Between Shaped and Unshaped Auto-Select Keys

You can convert an unshaped Auto-Select Key to a shaped Auto-Select Key by using the Make Linear function. This defaults any modifiers to the selected key.

### To convert an unshaped Auto-Select Key to shaped:

1. Press **MENU**.
2. Press **NEXT** until **Make Linear** is displayed.
3. Press the **Make Linear** knob.

## Chroma Key Fine Tuning

You can control aspects of the Chroma Key using the **Chroma Key** menus. The following effects can be adjusted:

- Edge
- Shadow
- Gain
- Spill

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

### Using the Edge, Shadow, Gain and Spill Effects

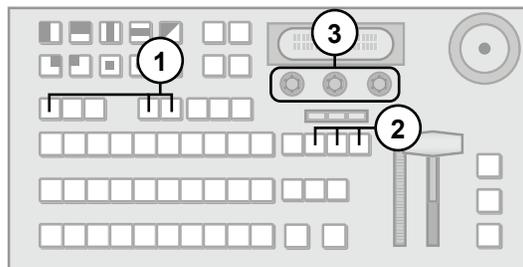
The Edge effect controls the sharpness of the key edge.

The Shadow effect allows you to include or removed any shadows that are cast on the Chroma Key background.

The Gain effect controls color saturation. Increasing the Gain causes the video signal colors to become increasingly saturated and vivid. Decreasing the Gain decreases the saturation until the image is black and white.

The Spill effect allows you to handle chroma key spill where the background color (the color being removed) spills onto the key object.

### To adjust the Edge, Shadow, Gain, and Spill:



1. Select the key you wish to modify (ensure it is set as a Chroma key).
2. If you have already assigned a Chroma Key to one of the other keyers and the Chroma Key share mode is set to **FLOAT** or **ASK**, you are asked whether you want to steal the Chroma Key resource to use on the new key. You can choose from the following:
  - Press the **Confirm** knob to steal the Chroma Key resource for the new key. The old

Chroma Key is taken off-air and converted to an Auto-Select Key.

- Press the **Cancel** knob to cancel the new Chroma Key and leave the resource with the key it is currently assigned to.

3. Press **NEXT** until **Edge** is displayed.
4. Adjust the **Edge** value by rotating the corresponding knob until the desired effect is achieved.
5. Press **NEXT**.
6. Adjust the **Shadow**, **Gain**, **SPClip**, or **SpRjct**, value by rotating the corresponding knob until the desired effect is achieved.

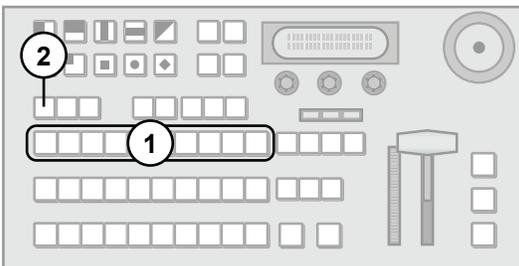
#### For More Information on...

- selecting keys, refer to the section “Selecting Keys” on page 3-3.
- setting the Chroma Key share mode, refer to the section “Resource Sharing” on page 2-10.

### 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.

#### To create a Split Key:



1. Select a source on the Key/Aux bus to act as the video fill (the source can be either an Auto-Select Key or a Self Key).
2. Press and hold the **AUTO SEL** button.
3. Select a source on the Key/Aux bus to act as the key alpha.

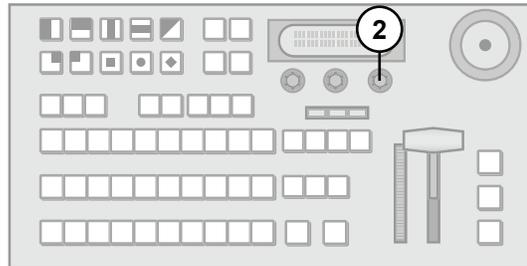
#### Note:

- Split Keys are initially created with clip set to 50% and gain set to 50%.
- While holding the **AUTO SEL** button to select the key alpha, the **SHIFT** button stays active when pressed. You do not have to hold down **SHIFT** to access shifted sources. Press **SHIFT** again to return to normal source selection.

### Modifying Split Keys

You can modify the appearance of a Split Key to suit your application.

#### To modify the appearance of a Split Key:



1. Create a Split Key. The **Key Menu** is displayed with a new first page.
2. Use the **Alpha** knob to select the input used for the key alpha.
3. Press the **Alpha** knob to accept the change.

#### Note:

- If you wish to use a matte for the key fill, press the **Matte** button on the Key/Aux bus to access the **Matte** menu.
- If you are using a Split Key with a matte key fill and you wish to turn the key into a Chroma Key, the switcher will default to black on that key.

#### For More Information on...

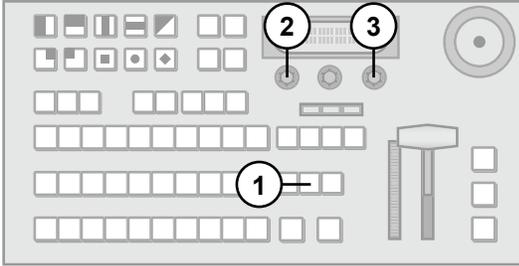
- creating a Split Key, refer to the section “Split Keys” on page 4-11.
- modifying the key alpha, refer to the section “Auto-Select Key Fine Tuning” on page 4-8.

### ➤ Modifying Wipes

Wipes can be modified to give more distinct qualities and personalize your transitions. The following effects can be adjusted:

- Time, Direction
- Pattern, Horizontal Multiplication, Vertical Multiplication
- X-Position, Y-Position, Aspect Ratio
- Border, Color, Soft
- Hue, Saturation, Luminosity
- Rotation

### To modify time and direction:



1. Press **WIPE** to display the **Wipe** menu.
2. Press **NEXT** until **Time** is displayed.
3. Use the **Time** knob to change the duration of the wipe.
4. Use the **Direction** knob to set the direction of the wipe. You can choose from the following:
  - **Fwd** — Wipe runs in the forward (default) direction.
  - **Rev** — Wipe runs in the reverse direction.
5. Press the **Direction** knob to alternately enable and disable the flip-flop direction feature. You can choose from the following:
  - **Enabled (FF)** — The first time a wipe transition is performed, it runs in the forward direction. Performing a second wipe transition runs in the reverse direction.
  - **Disabled** — Wipes always run in the direction specified in step 4 above.

### To change other wipe modifiers:

1. Press **WIPE** to access the **Wipe** menu.
2. Press **NEXT** to cycle through the available wipe modifiers.
3. Use the corresponding knob to change the following:
  - **Pattern (Pattn)** — to find and select a desired pattern.
  - **X Pos** or **Y Pos** — to position the wipe pattern.
  - **Aspect** — to adjust the aspect ratio.
  - **Border Size (Border)** — to adjust the size of the border.
  - **Image Softness (Soft)** — to blur or harden the border.
  - **Border color** (these options only appear if you set the Border Size greater than 0.0%)
    - › Use the **Load** knob to select a preset color. Press the **Load** knob to load the color.

- › Use the **BHue**, **BSat**, and **BLum** knobs until the desired color is achieved.
- **Rotation (Rot)** — to rotate the pattern.
- **Horizontal (HMult)** and **Vertical (VMult)** Multiplication — to create multiple instances of the pattern.

### Note:

- You can select a pattern using the Pattern Buttons. This also displays the **Wipe** menu.
- The **X Pos** and **Y Pos** can be adjusted using the positioner (CrossOver 12 only).
- Aspect adjustments are not available for all patterns.
- Circle, left square, right square, and diagonal patterns with aspect adjustments can not be rotated.

## ➤ Aux Buses

The switcher has three timed Aux buses which have access to the following sources:

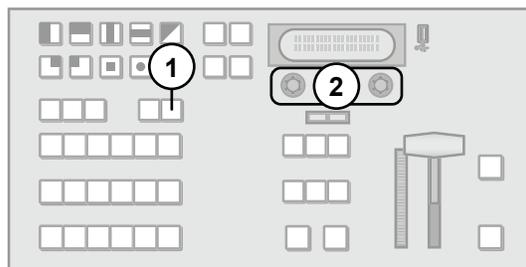
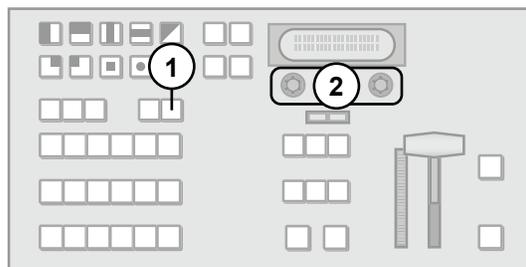
- Any primary source (including Media-Store)
- Program
- Clean Feed
- Preview
- Chroma Key Alpha

### Accessing the Aux Buses

CrossOver 12: The Aux buses can be accessed from control panel buttons.

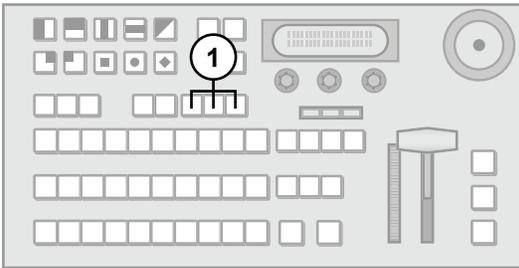
CrossOver 6: The Aux buses can be accessed through the menu system.

### To access Aux buses on the CrossOver 6:



1. Press **AUX SEL** to display the **Aux** menu.
2. Select an Aux bus by pressing the corresponding knob.

To access Aux buses on the CrossOver 12:



1. Select the desired Aux bus by pressing **AUX 1 - 3**.

### Selecting a Source for the Aux Buses

Once an Aux bus has been selected, you can change the source.

To select a source for an Aux bus:

1. Select the Aux bus you wish to choose a source on.
2. Press the desired source button on the Key/Aux bus.

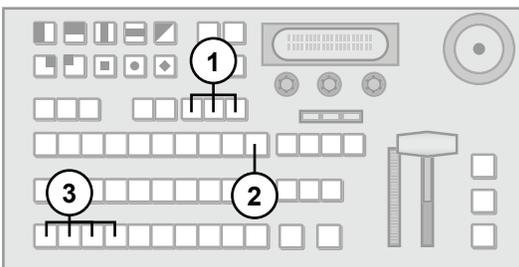
### Selecting a Special Source for the Aux Buses

You can select the following special sources by selecting them on the Preset bus:

- Program (**AUX PGM**)
- Preview (**AUX PV**)
- Clean Feed (**AUX CLN**)
- Chroma Key Alpha (fourth source button)

These special sources are found on the first four buttons on the Preset bus.

To select a special source for an Aux bus:



1. Select the Aux bus you wish to choose a source on.
2. Press and hold **SHIFT** on the Key/Aux bus.

3. Press any of **AUX PGM**, **AUX PV**, **AUX CLN**, or the fourth source button (to access Chroma Key Alpha) on the Preset bus.

## Tallies

The switcher has tally relays assigned to inputs as follows (pin 1 is the top right pin when looking at the Tally Port):



Figure 4.1 Tally Port

Pin	Input
1	1
2	3
3	5
4	7
5	Common Ground
6	2
7	4
8	6
9	8

When the corresponding input is on-air, the associated tally pin is closed, creating a contact closure.

### Note:

- Tally wiring can be difficult. Consult with your facility engineer before undertaking any tally wiring.

### For More Information on...

- port locations, refer to the section “Frame Rear Connections Overview” on page 1-4.

## General Purpose Interface (GPI)

The switcher has 24 GPI inputs that are used to trigger memory recalls, transitions, and Aux bus input changes.

The GPI inputs are assigned as follows (Pin 1 is the top right pin when looking at the GPI Port).



Figure 4.2 GPI Port

Pin	Trigger
1	Dissolve Key 1
2	Dissolve Key 2
3	Dissolve Key 3 (CrossOver 12 only)
4	Perform Auto Transition
5	Perform Program / Preset Bus cut
6	Perform Key 1 cut
7	Perform Key 2 cut
8	Perform Key 3 cut (CrossOver 12 only)
9	Perform Fade-to-Black
10	Set Aux Bus 1 to Input 1
11	Set Aux Bus 1 to Input 2
12	Set Aux Bus 1 to Input 3
13	Set Aux Bus 1 to Input 4
14	Set Aux Bus 1 to Input 5
15	Recall Memory 0 <sup>a</sup>
16	Recall Memory 1 <sup>a</sup>
17	Recall Memory 2 <sup>a</sup>
18	Recall Memory 3 <sup>a</sup>
19	Recall Memory 4 <sup>a</sup>
20	Recall Memory 5 <sup>a</sup>
21	Recall Memory 6 <sup>a</sup>
22	Recall Memory 7 <sup>a</sup>
23	Recall Memory 8 <sup>a</sup>
24	Recall Memory 9 <sup>a</sup>
25	Ground

- a. Only memory registers from memory bank 0 can be recalled with a GPI trigger.

### For More Information on...

- port locations, refer to the section “Frame Rear Connections Overview” on page 1-4.

## Editor Port

The switcher has an Editor port that allows you to control your switcher from a device that supports the GVG100 editor protocol. The pinout is as follows:



Figure 4.3 Editor Port

Pin	Input
1	Not Connected
2	Tx-
3	Rx+
4	Ground
5	Ground
6	Not Connected
7	Tx+
8	Rx-
9	Not Connected

### Supported Editors

The following editors have been tested::

- Editware LE-2000 Series
- Sony BVE-900/910
- Sony BVE-2000

### For More Information on...

- GVG100 protocol support, refer to the section “GVG100 Protocol Supported Commands” on page 6-2.
- port locations, refer to the section “Frame Rear Connections Overview” on page 1-4.

# Media-Store

This chapter describes the Media-Store operation. Your switcher has 2 Media-Store channels which allow you to display 2 images or animations (composed of a sequence of images) on-air simultaneously.

## Media-Store Overview

Images and animations are assigned unique Media numbers that allow the switcher to identify them. You can load images and animations into Media-Store channels in one of two ways:

- By browsing the internal file system of the switcher or USB drive.
- By using the Wipe Pattern buttons to specify Media numbers.

### Animations

Animations are a collection of individual image files (one file per animation frame) that are played in sequence.

#### Animation Naming Convention

Animation files share a common name with a sequential frame number appended at the end as follows:

- Anim001.tga
- Anim002.tga
- Anim003.tga
- ...
- Anim100.tga

These files are treated as a 100 frame animation named *Anim*.

#### Note:

- Files must be numbered sequentially.
- All files in an animation should be stored in the same directory.

### Transparency

The switcher supports images and animations with embedded transparency. You must set the second Media-Store channel as the alpha channel of the first Media-Store channel to have the switcher automatically load image data and transparency data into the appropriate Media-Store channels.

#### For More Information on...

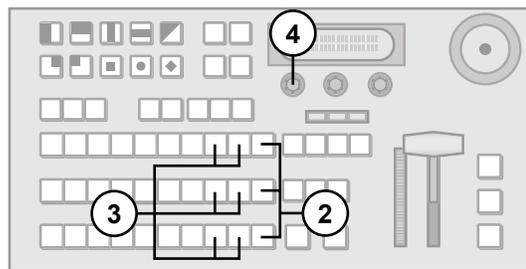
- Associating alpha channel inputs with video inputs, refer to the section “Input BNC Configuration” on page 2-6.

## Loading an Image or Animation by Browsing

You can browse the file system on the switcher or a USB drive to select images and animations to load.

**You must use this method the first time an image or animation is loaded in order for it to be assigned a unique Media number.**

**To load an image or animation by browsing the file system:**



1. If you are loading from a USB drive, insert it into the USB port on the switcher.
2. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
3. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel to load into.
4. Press the **Browse** knob.
5. Use the left knob to select <.> to move up to the top level of the file system.
6. Use the left knob to select the location you wish to browse. You can choose from the following:
  - **INT (0)** — internal storage (this feature not yet implemented)
  - **USB (1)** — USB drive (default)
7. Use the left knob to browse the file system. Turning the knob cycles through all the files and directory names at the current level in the file system.

8. Navigate to sub-directories by selecting a sub-directory name and then pressing the left knob. Sub-directories are displayed as follows:
  - <directory-name>
9. Return to a parent directory by selecting <..>.
10. Use the left knob to select the image or animation file you wish to load and press the left knob to load it into the selected Media-Store channel.

**Note:**

- Wait 5 seconds after inserting a USB drive into the USB port before using it.
- Turn the middle knob when browsing the file system to display the full text of long directory lists and filenames.
- If you select an animation, the number of frames is displayed next to the filename.

**For More Information on...**

- accessing the USB port, refer to the section “Frame Overview” on page 1-3.

## Understanding Media Numbers

Each image and animation is uniquely identified by a Media number. Media numbers are 4 digits and take the following form:

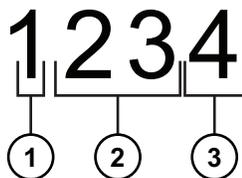


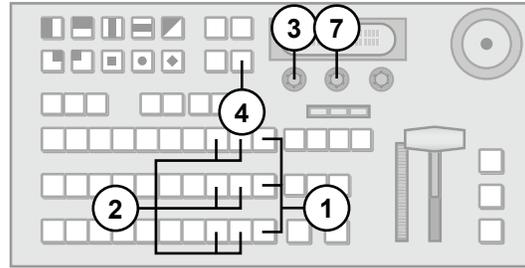
Figure 5.1 Media Number

1. Place — Location where image or animation is stored.
  - 0 — Internal Memory (this feature not yet implemented)
  - 1 — USB drive
2. Bank — There are 100 (0 - 99) banks where images can be stored.
3. Item Number — Each bank contains 10 (0 - 9) images.

### Entering Media Numbers

Media numbers are entered using the Wipe Pattern buttons. You can choose to lock the Place and Bank to specific values which allows you to quickly access a subset of images.

### To lock or unlock place and bank values:

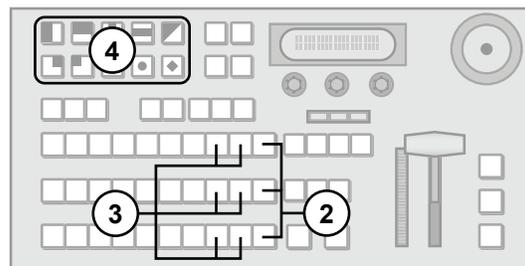


1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you may affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select a Media-Store channel.
3. Press the **Browse** knob.
4. Press **NEXT**.
5. Press the **Place** knob to lock or unlock the Place value. When locked, the Place value will be surrounded by brackets [ ].
6. If you locked the Place value, use the **Place** knob to select the locked value. You can choose from the following:
  - **INT (0)** — internal storage (this feature not yet implemented)
  - **USB (1)** — USB drive (default)
7. Press the **Media** knob to lock or unlock the Bank value. When locked, the Bank value will be surrounded by brackets [ ].
8. If you locked the Bank value, use the **Bank** knob to select the locked value.

## Loading an Image or Animation by Media Number

Once an image has been assigned a Media number, it can be quickly reloaded by typing the corresponding Media number using the Wipe Pattern buttons. The procedure is slight different if you have locked the Place and Bank values.

### To load an image or animation by Media number with a locked place and bank number:



1. If you are loading from a USB drive, insert it into the USB port on the switcher.
2. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
3. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel to load into.
4. Press the Wipe Pattern button corresponding to the item number (in the locked Place and Bank) of the image you wish to load.

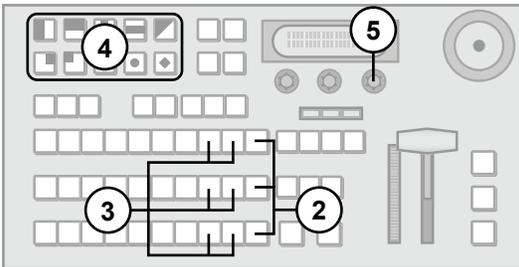
**Note:**

- Wait 5 seconds after inserting a USB drive into the USB port before using it.
- Entering a Media number of 000 clears the image from the selected Media-Store channel.

**For More Information on...**

- accessing the USB port, refer to the section “Frame Overview” on page 1-3.

**To load an image or animation by Media number without a locked place or bank number:**



1. If you are loading an image from a USB drive, insert it into the USB port on the switcher.
2. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
3. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel to load the image into.
4. Use the Wipe Pattern buttons to type the Media number corresponding to the image you wish to load. Type only the unlocked portion of the Media number (if the Place value is locked, do not type a Place value).
5. Press the Select knob to load the image.

**Note:**

- Entering a Media number of 000 clears the image from the selected Media-Store channel.

**For More Information on...**

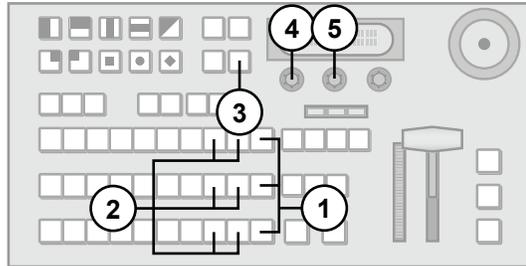
- accessing the USB port, refer to the section “Frame Overview” on page 1-3.

➤ **Modifying Media-Store Image Attributes**

You can alter the appearance of a Media-Store image by modifying display parameters. The parameters you can modify are:

- X and Y Position
- Shaped/Unshaped
- Media number

**To modify the position of a Media-Store image:**

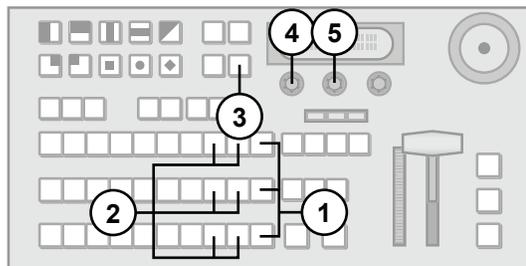


1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel with the loaded image..
3. Press **NEXT** until **Attrib** is displayed.
4. Use the **Attrib** knob to select **X-Pos**.
5. Use the **Value** knob to select the X position of the image.
6. Use the **Attrib** knob to select **Y-Pos**.
7. Use the **Value** knob to select the Y position of the image.

**Note:**

- You can use the positioner to modify the X and Y position (CrossOver 12 only).

**To change an image between shaped and unshaped:**

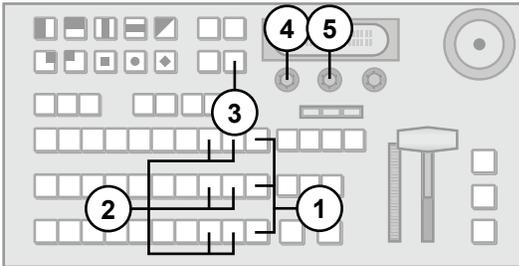


1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel with the loaded image..
3. Press **NEXT** until **Attrib** is displayed.
4. Use the **Attrib** knob to select **Shaped**.
5. Use the **Value** knob to select whether the images is shaped or unshaped. You can choose from the following:
  - **Yes** — Image is shaped.
  - **No** — Image is unshaped.

**For More Information on...**

- Shaped and Unshaped transparency properties, refer to the section “Input BNC Configuration” on page 2-6.

**To change the Media number for an image:**

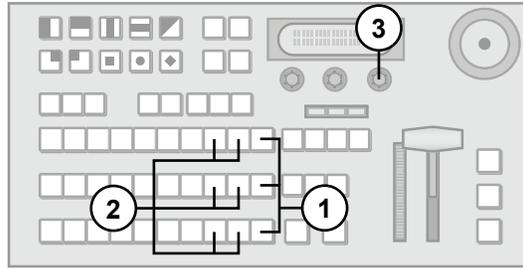


1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel with the loaded image..
3. Press **NEXT** until **Attrib** is displayed.
4. Use the **Attrib** knob to select **Media#**.
5. Use the **Value** knob to select a new Media number. Only available Media numbers are displayed.

➤ **Animation Control**

You can play an animation manually or automatically and also control the behavior of animation playback.

**To manually play an animation:**



1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select a Media-Store channel with a loaded animation..
3. Press the **Run** knob to start the animation playing.
4. Press the **Stop** knob to stop the animation before reaching the final frame.

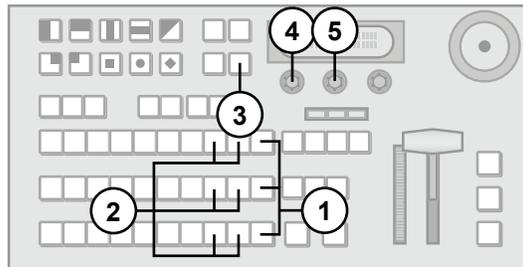
**Note:**

- You can manually cycle through frames by turning the **Run** knob while the animation is stopped.

**Modifying Animation Playback**

You can set an animation to playback automatically as well as control playback speed and direction.

**To modify animation playback:**



1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select a Media-Store channel with a loaded animation..
3. Press **NEXT** until **Attrib** is displayed.
4. Use the **Attrib** knob to select **Looping**.
5. Use the **Value** knob to set the looping behavior. You can choose from the following:
  - **yes** — The animation plays in a continuous loop until manually stopped.
  - **no** — The animation plays once.
6. Use the **Attrib** knob to select **Reverse**.

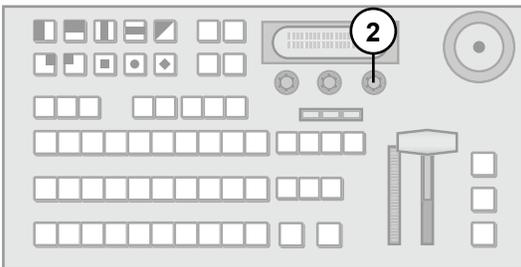
7. Use the **Value** knob to set the reverse playback behavior. You can choose from the following:
  - **yes** — The animation plays backwards.
  - **no** — The animation plays forwards.
8. Use the **Attrib** knob to select **AutoPly**.
9. Use the **Value** knob to set the auto playback behavior. You can choose from the following:
  - **yes** — The animation starts playing automatically when it is taken on-air.
  - **no** — Animation playback must be started manually.
10. Use the **Attrib** knob to select **Speed**.
11. Use the **Value** knob to set the playback speed. You can set a playback speed from:
  - **0.1x – 1.0x** in 0.1x increments.
  - **1x – 10x** in 1x increments.

## ➤ Saving and Reverting Attributes

You can save attributes for an image so they are automatically recalled the next time that image is loaded from a USB drive or internal memory.

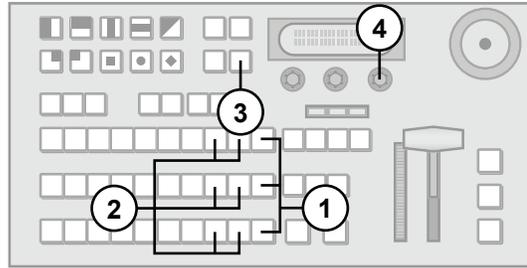
Image attributes that have been changed since they were last saved are marked with a ‘\*’.

### To save attributes for an image:



1. Modify the attributes for an image as necessary
2. Use the **Func** knob to save the attributes for that image. You can choose from the following:
  - **Save** — Saves the currently displayed attribute. Other saved attributes are not affected.
  - **SavAll** — Saves all attributes.

### To revert to saved attribute values:



1. Press and hold **SHIFT** on any bus. If you use the Program bus or on-air Key bus, you will affect on-air images.
2. Press **MEDIA 1** or **MEDIA 2** to select the Media-Store channel to load the image into.
3. Press **NEXT** until **Attrib** is displayed.
4. Use the **Func** knob to save the attributes for that image. You can choose from the following:
  - **Revert** — Reverts the currently displayed attribute to the previously saved value. Other attributes are not affected.
  - **RevAll** — Reverts all attributes to previously saved values.



# ➤ Specifications

## ➤ Dimensions

Frame:

- Width: 19" (fits standard equipment rack)
- Depth: 15.63"
- Height: 3.5" (2RU)

Control Panel:

- Width: 15.85"
- Depth: 10.64"
- Height: 3.5"

## ➤ Weight:

Frame:

- 16.4 lbs

Control Panel:

- CrossOver 6: 7.2 lbs
- CrossOver 12: 7.4 lbs

## ➤ Power Requirements

- Frame: DC 12V, 6 Amps Max
- Control Panel: DC 12V, 4 Amps Max

## ➤ Ports

### Tally Port

- Load voltage: 100Vdc max
- Load current: 120mA max at 85C, 150mA at 25C.
- On resistance: 8 mΩ max

### GPI I/O Absolute Maximum Ratings

- Input voltage range: -0.5V to 5.5V
- Output current: < ±10mA

### Editor Port DC Operating Conditions

- Maximum differential input voltage: ±5V
- Differential output voltage (5V circuit): 3.2V  
Typical across a 100 Ω load (2.3V for 3.3V circuit)

### Ethernet Port

- 10/100Mbps Ethernet using Cat 5 cables  
10BASE-T & 100BASE-Tx

## USB Port

- USB 1.1 compliant

## ➤ Video Formats

The switcher supports the following video formats:

### Standard Definition Version

- 480i (4:3 and 16:9) at 59.94 Hz (Default)
- 576i (4:3 and 16:9) at 50Hz

### Multi Definition Version

- 480i (4:3 and 16:9) at 59.94 Hz
- 576i (4:3 and 16:9) at 50Hz
- 720p at 50, 59.94Hz
- 1080i at 50, 59.94Hz (Default)

## ➤ Inputs/Outputs

### Inputs

- 6 or 12 inputs (depending on version)
- Internal Black and Matte Generators

### Outputs

- 2 Program out HD-SDI
- 1 Preview out HD-SDI
- Aux 1 out HD-SDI
- Aux 2 out HD-SDI
- Aux 3 out HD-SDI
- Analog (NTSC or PAL) output. NTSC 59.94 Hz video standards, PAL is 50 Hz video standard

### HD-SDI Input and Output Specifications

- SMPTE 292M/259M compliant
- Levels: 800mV (±10%) peak-to-peak
- Return loss: > -15dB to 1.485GHz
- Input Equalization (SD): 275m
- Input Equalization (HD): 110m

### Analog Output Specifications

- Video: NTSC or PAL, 1V p-p
- Output Return Loss: >30dB to 5MHz
- Output to Output Isolation: >45dB to 5Mhz
- DC offset: ±50 mV

## Reference Input and Output Specifications

### Tri-level Pulse

- Input Return Loss:  $\geq 30\text{dB}$  to 30 MHz
- Output Return Loss:  $\geq 23\text{dB}$  to 30 MHz
- Positive Peak:  $+300\text{mV} \pm 6\text{mV}$
- Negative Peak:  $-300\text{mV} \pm 6\text{mV}$
- Rise Times (10-90%):  $54\text{ns} \pm 20\text{ns}$
- Duration:  $593\text{ns} \pm 40\text{ns}$

### Bi-level Pulse

- Return Loss:  $\geq 30\text{dB}$  to 6 MHz
- Levels: NTSC:  $286\text{mV} \pm 14\text{mV}$  (40 IRE  $\pm 2$  IRE)  
PAL:  $307\text{mV}$  (43 IRE)
- Rise Times (10-90%): NTSC  $140\text{ns} \pm 20\text{ns}$  PAL:  $200\text{ns} \pm 20\text{ns}$
- Duration: NTSC:  $4.7\mu\text{s} \pm 0.1\mu\text{s}$  PAL:  $4.7\mu\text{s} \pm 0.2\mu\text{s}$

## ➤ GVG100 Protocol Supported Commands

The following tables list the Supported GVG100 commands and controls.

**Table 6.1 GVG100 Supported 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	MLE/Keyer	3	45	<control>	
Write Analog	MLE/Keyer	5	C5	<control>	<lsb>    <msb>
Read Light On/off	MLE/Keyer	3	46/47	—	
Write Light 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 button numbers. 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 is key 1, 1 is key 2, 3 is bkgd, 4 is key 3, 5 is key 4
Read Mle Autotrans Rate	MLE	2	4C	—	
Read Keyer Mix Rate	keyer	2	4D	—	
Read Fade To Black Rate	MLE*	2	7D	—	*Currently MLE-specific
Write Mle Autotrans Rate	MLE	5	CC	**	
Write Keyer Mix Rate	Keyer	5	CD	**	

**Table 6.1 GVG100 Supported Commands**

Name	MLE/Keyer	Length	Byte Code	Data/Notes	
Write Fade To Black Rate	—*	5	FD	**	*Currently not supported. Fade to black rate is the same as the transition rate.
Read Key Settings	Keyer	2	53	Not yet implemented	
Write Key Settings	Keyer	62(?)	D3	Not yet implemented	
Learn Into Mem	—	3	DA	<mem#>	Supports memories 0-9
Recall From Mem	—	3	DB	<mem#>	Supports memories 0-9
Read Software Version	—	2	6C	—	
Read Field Mode	—	2	6D	—	Field Mark only
Write Field Mode	—	2	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	—	3	F8	—	Included for GVG100 spec completeness only.
Write Button Press	Both	3	FB	<button>	
Send Mem To Editor	—	3	7E	Not yet implemented	
Load Mem From Editor	—	73	FE	Not yet implemented	

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<b>Data byte 1:</b>		
Bit 7: 0=select elements, 1=select elements and perform transition	Bit 4-6: 4=select key 1, 5=select key 2, 6=select bkgd	Bit 0-3: binary coded decimal (valid range is b0-b1001, or 0-9)
<b>Data byte 2:</b>		
Bit 6-7: Ignored	Bit 4-5: 4=select key 3, 5=select key 4	Bit 0-3: binary coded decimal (valid range is b0-b1001, or 0-9)
<b>Data byte 3:</b>		
Bit 4-7: Ignored	Bit 0-3: binary coded decimal (valid range is b0-b1001, or 0-9)	

**Table 6.2 GVG100 Supported Analog Controls**

Name	MLE/Keyer	Byte Code	Notes
Key Clip	Keyer	0x0A	
Key Gain	Keyer	0x0B	
Vert. Position	MLE	0x11	
Horz. Position	MLE	0x12	
Key Matte Fill Hue	MLE	0x14	Key mattes not supported
Pattern Size	MLE	0x15	
Chroma Key Hue	Keyer	0x17	Write not supported
Key Matte Border Hue	Keyer	0x18	Key mattes not supported
Key Matte Border Sat	Keyer	0x19	Key mattes not supported

**Table 6.2 GVG100 Supported Analog Controls**

Name	MLE/Keyer	Byte Code	Notes
Key Matte Border Lum	Keyer	0x1A	Key mattes not supported
Key Matte Fill Lum	Keyer	0x1B	Key mattes not supported
Aspect	MLE	0x1C	Aux MLEs not supported
Border Softness	MLE	0x1D	Aux MLEs not supported
Border Width	MLE	0x1E	Aux MLEs not supported
Key Matte Fill Sat	Keyer	0x1F	Key Mattes not supported
Rotate X	—	0x20	Not supported
Rotate Y	—	0x21	Not supported
Rotate Z	—	0x22	Not supported
3D Position X	—	0x23	Not supported
3D Position Y	—	0x24	Not supported
3D Position Z	—	0x25	Not supported
3D Border Softness	—	0x26	Not supported
3D Border Width	—	0x27	Not supported
Key Clip	Keyer	0x08	DSKs
Key Gain	Keyer	0x09	DSKs

**Table 6.3 GVG100 Supported Lamps**

Name	MLE/Keyer	Byte Code	Notes
Program Bus 0-9	MLE	0x00-0x09	Turning OFF results in a protocol error.
Program Bus On Air	MLE	0x0A	Turning OFF results in a protocol error.
Autotrans	MLE	0x0B	
Key Dissolve	Keyer	0x0C	
Key Cut	Keyer	0x0D	
Wipe Trans	MLE	0x0E	
Dissolve Trans	MLE	0x0F	
Preset Bus 0-9	MLE	0x10-0x19	Turning OFF results in a protocol error.
Preset Bus On Air	MLE	0x1A	Turning OFF results in a protocol error.
Aspect On	MLE	0x1B	Always on. Turning OFF results in a protocol error.
Positioner On	MLE	0x1C	Always on. Turning OFF results in a protocol error.
Reverse Wipe	MLE	0x1D	
Dsk Preview	Keyer	0x1E	Always true. All Keyers show on Preview. Turning OFF results in a protocol error.
Fade To Black	—	0x1F	
Key Bus 0-9	Keyer	0x20-0x29	Turning OFF results in a protocol error.

**Table 6.3 GVG100 Supported Lamps**

Name	MLE/Keyer	Byte Code	Notes
Key Bus On Air	Keyer	0x2A	Turning OFF results in a protocol error.
Key Video Fill	Keyer	0x2F	Always true. Turning OFF results in a protocol error.
Wipe Type	MLE	0x30-0x39	Turning OFF results in a protocol error.
Key Invert	Keyer	0x40	DSKs. Turning OFF results in a protocol error.
Key Mask	Keyer	0x41	DSKs. Turning OFF results in a protocol error.
Key Autokey	Keyer	0x42	DSKs. Turning OFF results in a protocol error.
Key Selfkey	Keyer	0x43	DSKs. Turning OFF results in a protocol error.
Key Invert	Keyer	0x44	Turning OFF results in a protocol error.
Key Mask	Keyer	0x45	Turning OFF results in a protocol error.
Memory Mode Toggle	—	0x47	Toggles between memory and pattern modes.
Next Trans Is Bkgd	—	0x48	Turning OFF results in a protocol error.
Next Trans Is Key 1	—	0x49	Turning OFF results in a protocol error.
Cut	MLE	0x4A	Turning OFF results in a protocol error.
Key Selfkey	Keyer	0x4C	Turning OFF results in a protocol error.
Key Autokey	Keyer	0x4D	Turning OFF results in a protocol error.
Key Chromakey	Keyer	0x4E	Turning OFF results in a protocol error.
Editor Enable	—	0x4F	Editor control is always enabled. Turning OFF results in a protocol error.
Keyer Active	Keyer	0x52	

**Table 6.4 GVG100 Supported Buttons**

Name	MLE/Keyer	Byte code	Notes
Program Bus 0-9	MLE	0x00-0x09	
Autotrans	MLE	0x0B	
Key Trans	Keyer	0x0C	DSKs
Key Cut	Keyer	0x0D	DSKs
Wipe Trans	MLE	0x0E	
Dissolve Trans	MLE	0x0F	
Preset Bus 0-9	MLE	0x10-0x19	
Aspect	MLE	0x1B	Always on. Button press has no effect.
Positioner On	—	0x1C	Always on. Button press has no effect.
Reverse Wipe	MLE	0x1D	Doubles as memory store/recall toggle when in memory mode

**Table 6.4 GVG100 Supported Buttons**

Name	MLE/Keyer	Byte code	Notes
Dsk Preview	—	0x1E	Always true. All 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	
Memory Mode Toggle	—	0x47	Toggles between memory mode and pattern mode.
Next Trans Is Bkgd	—	0x48	
Next Trans Is Key 1	—	0x49	
Cut	MLE	0x4A	
Key Selfkey	Keyer	0x4C	
Key Autokey	Keyer	0x4D	
Key Chromakey	Keyer	0x4E	
Editor Enable	—	0x4F	Editor control is always enabled.