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Zodiak

DIGITAL PRODUCTION SWITCHER

User Manual

SOFTWARE VERSION 5.0

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Preface

About This Manual

This *Zodiak User Manual* is designed for operators of Zodiak systems.

Standard Documentation Set

The standard Zodiak documentation set consists of a:

- User Manual,
- Installation and Service Manual, and
- Release Notes.

The *Zodiak User Manual* contains background information about the Zodiak Digital Production switcher and describes operating procedures. This manual can be used while learning about Zodiak and for enhancing your basic knowledge of the system.

The *Zodiak Installation and Service Manual* contains information about installing, configuring, and maintaining the system.

The *Zodiak Release Notes* contain information about new features and system enhancements for a specific software version, and also includes software installation procedures. Always check the release notes for your current system software before you begin operating your system.

Other Documentation

The *Kalypso/Zodiak Protocols Manual* is available for developers and software engineers to use to design editor and other external interfaces to the Zodiak system.

The *Kalypso/Zodiak Remote Aux Panel Update Instruction Manual* explains how to update the software of older 32-Crosspoint Remote Aux panels.

Section 1

System Overview

Introduction

The Zodiak Digital Production Switcher is optimized for mobile, post-production and broadcast facilities that need compact, easy to use, highly creative, real-time tools for video switching, effects creation and run-time device control. Powerful digital video switching, mixing, and keying with E-MEM are standard features of Zodiak, in addition to internal Still Store capability.

The switcher is available in 2.5-M/E or 3-M/E models with or without Transform Engines (internal DPMs). Zodiak's architecture provides an easy upgrade path from a 2.5-M/E to a 3-M/E; requiring the addition of a M/E module and power supply to the Video Processor frame and keycap changes to the Main panel. Reduced frame processor size (7 RU) and power consumption along with a smaller panel, sized to replace older analog Grass Valley Group switchers, make this switcher system an ideal replacement or addition to any existing or new facility.

Features

2.5-M/E System Standard Features

The standard features for the 2.5-M/E system are:

- 64 auto-timed SMPTE 259M inputs (configured as single inputs or video/key pairs),
- Nine Aux buses plus switched preview — up to four Aux buses can be utilized for two Effects Send pairs,
- 24 Source Selection buttons including Shift on each M/E, Key, PWV/AUX and PGM/PST bus rows,
- Program and preview outputs per M/E,
- Look ahead and other preview modes configured per each M/E,
- Two full M/Es, each with dedicated E-MEM (100 registers),

- One Utility bus per full M/E for video in borders, video wipe patterns, or masking,
- Four full function keyers with dedicated key controls per M/E,
- Two complex and four simple (in each keyer) wipe generators per M/E,
- Solarization, posterization, mosaic capabilities and YUV color correction as part of the video processors on each full M/E bus,
- Input freeze for each M/E key source and fill buses,
- PGM and PST buses with E-MEM, Downstream Keyers (DSK) with three simple linear or luminance keyers, and programmable Clean Feed,
- One pair of floating Chroma Keyers for use on any full-function keyer,
- 100 frame Still Store,
- Redundant power supplies for the Main panel and Video Processor frame,
- Four optional Transform Engines (internal DPMs) each on M/E 1 and M/E 2,
- Hot swapable Video Processor frame modules (including frame power supplies)
- Touch screen Menu Display, and
- CD-ROM (internal to the Menu panel), external USB-powered Zip drive and two Floppy drives (one in the Main panel and one in the Video Processor frame for emergency recovery procedures).

3-M/E System Standard Features

The standard features for the 3-M/E model are the same as the 2.5-M/E system in addition to the following:

- A third full M/E (replacing PGM/PST) with two complex and four simple wipes and four full function keyers plus three linear DSK keyers, and
- 13 Aux buses total plus switched Preview — up to eight Aux buses can be utilized for four Effects Send pairs.

Zodiak System Options

The options listed below are for all models of Zodiak, except those dedicated to M/E 3. Selected sets of options may be combined into packages for initial purchase. Individual options can be purchased and added to a Zodiak system at a later time. Some Zodiak system options contain hardware components and some are software enabled.

The options are:

- Upgrade Kit (2.5-M/E only) adds a third full M/E (replacing PGM/PST) by changing keycaps to the Main panel, and installing a M/E module (M/E 3) and additional Video Processor frame power supply in the Video Processor frame,
- Four Transform Engines (internal DPMs) each for M/E 1, M/E 2 and M/E 3 (3-M/E only),
- KlipCache increased StillStore capacity,
- Additional floating Chroma Key pairs for use on any full-function keyer,
- RGB Color Correction for all keyer, background, and utility buses on M/E 1, M/E 2, and M/E 3 (3-M/E only),
- AMP protocol control of VDRs,
- 24– and 32–Crosspoint Remote Aux panels,
- Spare Video Processor frame power supply,
- Menu Panel Flush Mount and Adjustable Console Bracket mounting kits, and
- NetCentral SNMP Agent.

External Interfaces Supported

All Zodiak systems have the following control interfaces:

- Ethernet Facility LAN connections allowing error reporting and upload/download capability for configurations, E-MEMs and images,
- Video Processor frame GPI interface with eight opto-isolated inputs and eight relay outputs,
- Main panel GPI interface with four opto-isolated inputs and four relay outputs,
- 32 programmable tally contact closures and serial tally,
- Two USB ports on the Menu panel (one connecting to the external Zip drive, and one spare),
- Six RS-422 serial ports for interfacing to 24- and 32-Crosspoint Remote Aux panels, Peripheral Bus II devices, edit controllers and CPL for external DPM (Krystal, GVeous) interface.

System Components

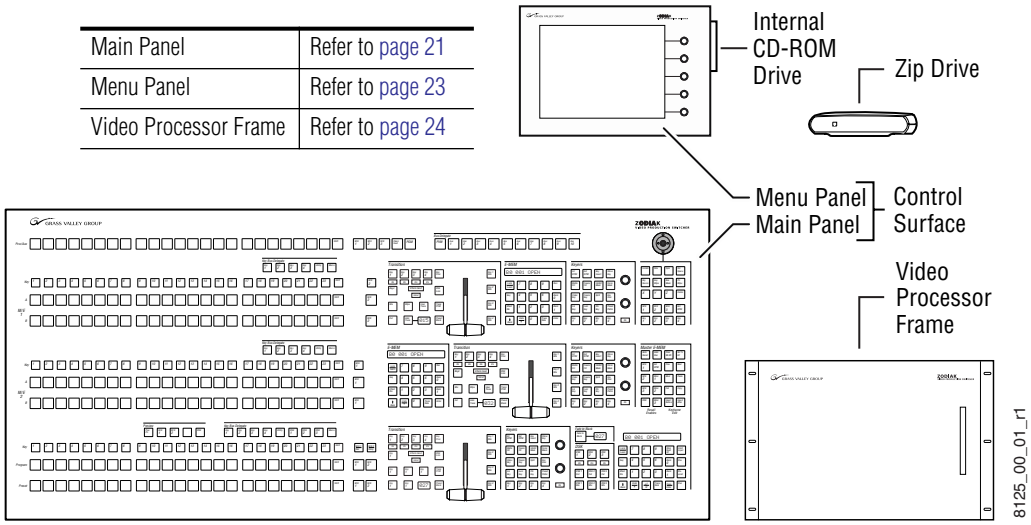
A Zodiak system consists of a Main panel, Menu panel, Video Processor frame, CD-ROM (internal to the Menu panel), external USB-powered Zip drive, and two standard 1.4 MB 3.5 in. floppy disk drives (one in the Main panel (see Figure 3) and one in the Video Processor frame (see Figure 5).

CAUTION The floppy drives are used exclusively for emergency boot procedures. A 2-floppy set is provided for the Main panel and a single floppy is provided for the Video Processor frame. The boot floppies are not interchangeable between the Main panel and Video Processor frame. The boot floppies are not to be used in other facility or personal equipment as they are designed to reformat the Main panel and Video Processor frame hard drives.

The Zodiak 2.5 M/E system components depicted in Figure 1 are also common to 3 M/E systems. Both systems use the same Video Processor frame and Main and Menu panels.

Figure 1. Zodiak System Components

Main Panel	Refer to page 21
Menu Panel	Refer to page 23
Video Processor Frame	Refer to page 24



Control Surface

A group of panels available to a single operator is called a Control Surface. A Control Surface consists of at least two components, a Main panel and a Menu panel. The Zodiak Control Surface provides real time access to the full function M/Es through the Main panel. In addition, the Menu panel allows custom user configuration of special effects and matte settings not requiring real time operation. Optional 24- and 32-Crosspoint Remote Aux panels are also available.

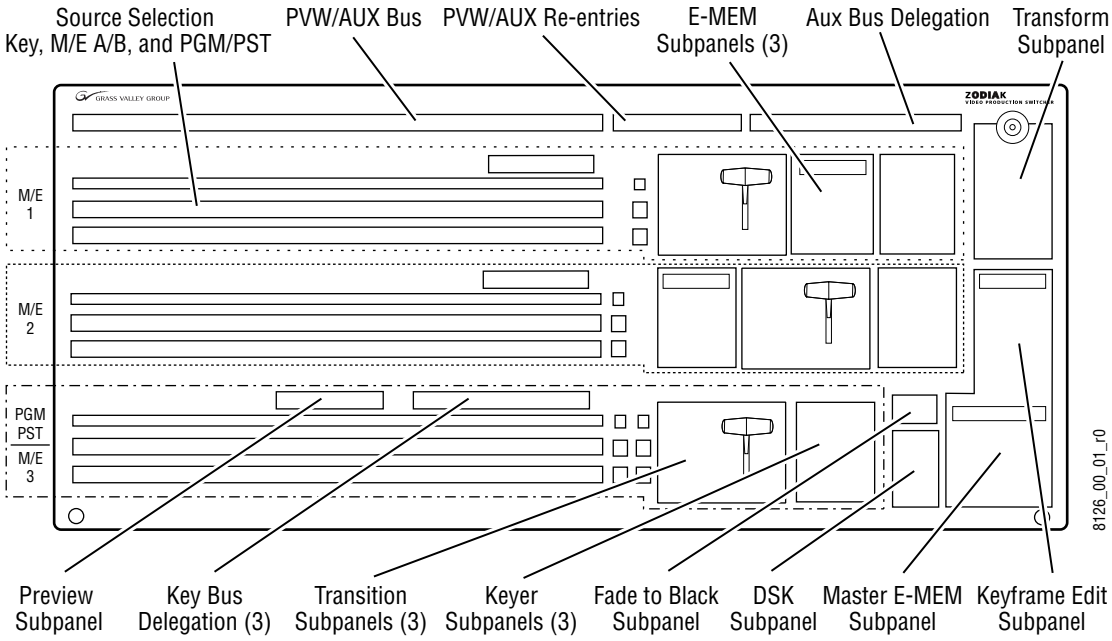
Main Panel

The panel is organized into subpanels that contain groups of related controls (Figure 2).

The 3-M/E Main panel provides real time button, knob, and lever arm control of three full function mix/effects (PGM/PST with full M/E capability). The panel is identical to the 2.5-M/E panel except for keyer and wipe functionality in the PGM/PST rows.

The 2.5-M/E Main panel provides real time button, knob, and lever arm control of two full function mix/effects and one PGM/PST with three simple Downstream Keyers (DSKs).

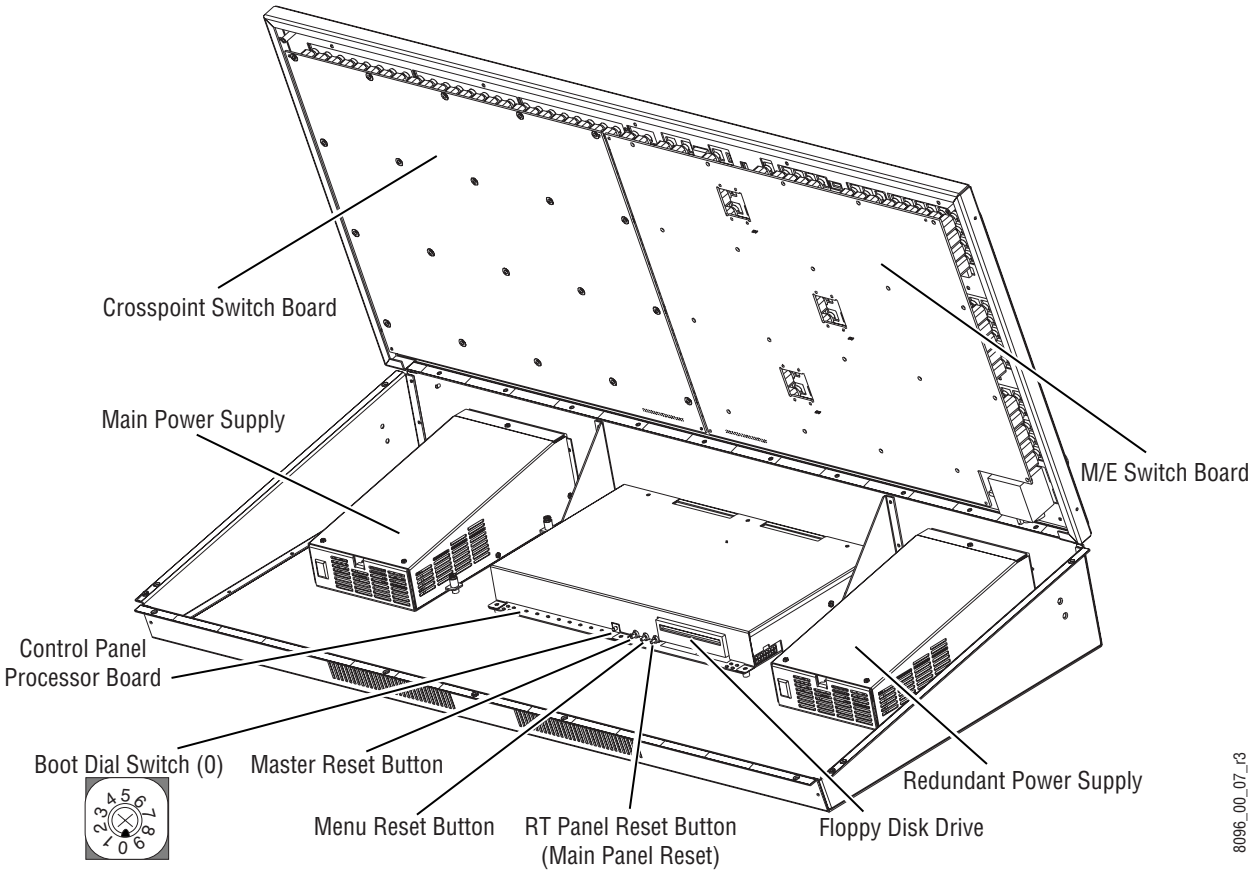
Figure 2. Zodiak Main Panel (2.5 and 3 M/E)



Connectors to the Zodiak Video Processor frame and to other components of the Zodiak Control Surface are located on the rear of the Main panel. The Main panel provides power to the separate Menu panel.

The Main panel power switches, fuses, reset buttons, and floppy drive are accessed by lifting the top of the Main panel (Figure 3).

Figure 3. Main Panel Inside View

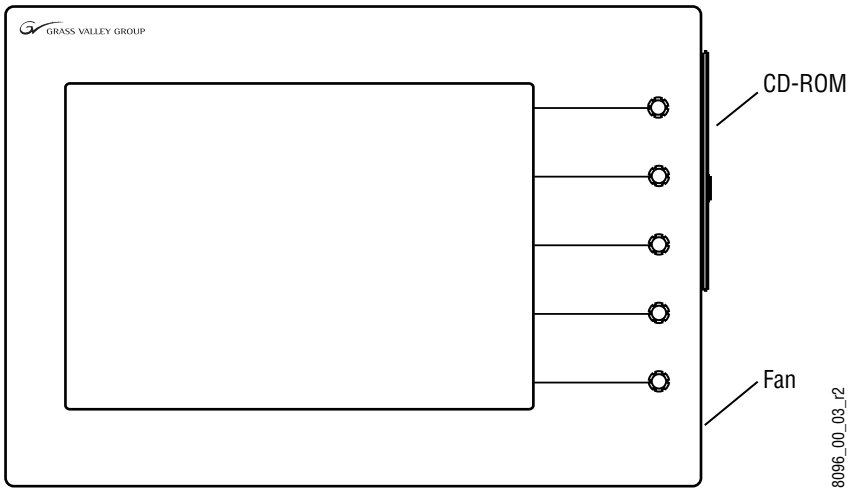


Menu Panel

The Menu panel provides access to additional system controls that generally do not require real time adjustment. The panel includes a touch screen display, control processor, five knobs for adjusting parameter values, built-in cooling fan, and a CD-ROM (Figure 4 on page 23).

The Menu panel can be installed behind, above, or to either side of the Main panel, and should be oriented so the screen directly faces the operator. The Menu panel can be mounted using the standard adjustable console mounting bracket or an optional flush mount kit that allows for rack mounting or mounting into a console cutout.

Figure 4. Menu Panel, Front View



Connectors to the Zodiak Main panel, Video Processor frame, an external Zip drive, and other devices are located on the bottom of the Menu panel.

Panel Options

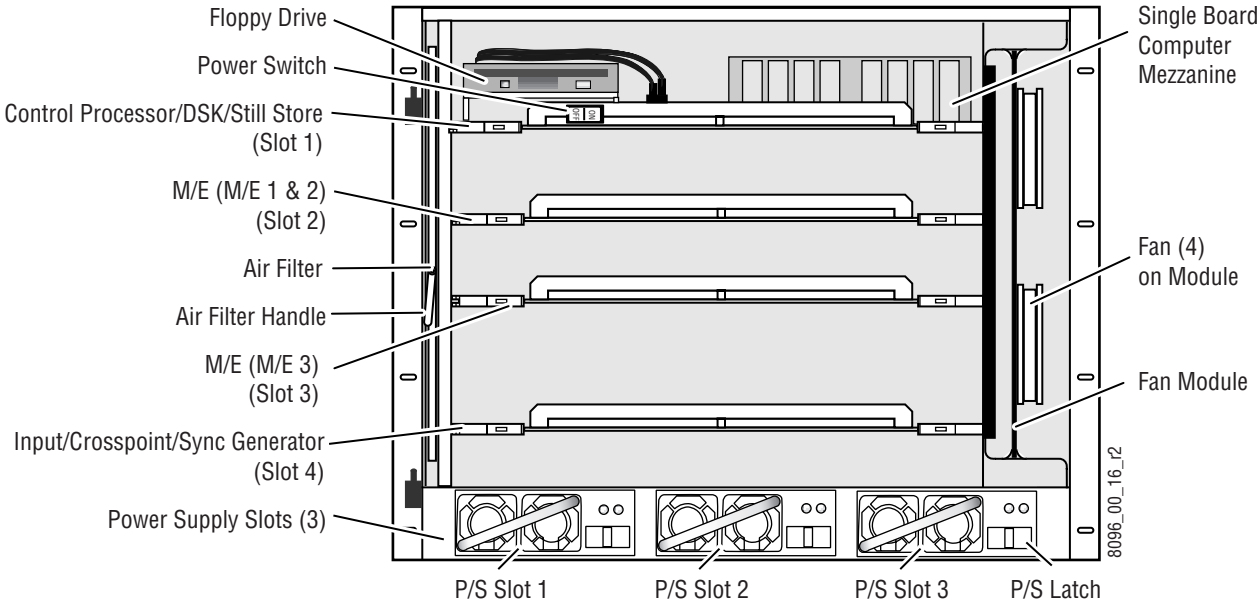
Remote Aux Panels

Remote Aux panels provide control of selected Zodiak Aux buses from a remote location. Three 24-Crosspoint and two 32-Crosspoint Remote Aux panel types are available for Zodiak systems. Any combination of these aux panels can be used in a Zodiak system. See *Section 2 – Installation* of the *Zodiak Installation and Service Manual* for additional information.

Video Processor Frame

The Zodiak Video Processor frame houses most of the system electronics, with horizontal slots that hold individual system control, video routing, and signal processing modules. A built-in fan system allows cooling of the frame. A fully loaded 3-M/E system is shown in Figure 5.

Figure 5. Fully Equipped Zodiak Video Processor Frame Front View (Door Removed)



The Zodiak system has been designed for easy maintenance. Modules and power supplies can be removed and replaced safely from the front of the frame with the power on, simplifying troubleshooting to the module level.

The standard 2.5-M/E Zodiak Processor frame includes the following:

- Floppy disk drive,
- Control Processor/Still Store/DSK module,
- M/E module (M/E 1 and M/E 2),
- Input/Crosspoint/Sync Generator module,
- Two Video Processor frame power supplies, and
- Air filter and Fan module.

The standard 3-M/E Zodiak Processor frame includes the same modules as the 2.5-M/E system in addition to the following:

- M/E module (M/E 3), and
- Redundant power supply.

The rear of the Zodiak Processor frame provides the reference, video and system control connectors for the system.

Video Processor Power Supply

The Zodiak Video Processor frame houses up to three slide-in modules rated at 400 watts each. (Figure 5 on page 24). Two hot-swappable power supply modules (primary and redundant) are standard with the 2.5-M/E system, and three power supply modules are standard with the 3-M/E system.

The power supplies load share such that a supply can fail and the Video Processor frame will continue to operate on the other supply/supplies.

It is recommended that each module's AC input be connected to a separate AC supply circuit. Any module(s) for which a separate supply circuit is not available can be connected to an uninterrupted power supply (UPS).

Video Processor Frame Options

Transform Engine Option

The Zodiak Transform Engine option available per keyer provides the following internal DPM capability:

- 2-D effects in 3-D space with perspective,
- Page turn,
- Border, outline, and extrude effects,
- Independent drop shadow,
- Glow and defocus effects, and
- Output recursive effects (such as star trails and montage).

RGB Color Correction

In addition to the standard solarization, posterization, mosaic capabilities and YUV color correction, RGB color correction can be added to all M/E buses (background, keyer, and utility).

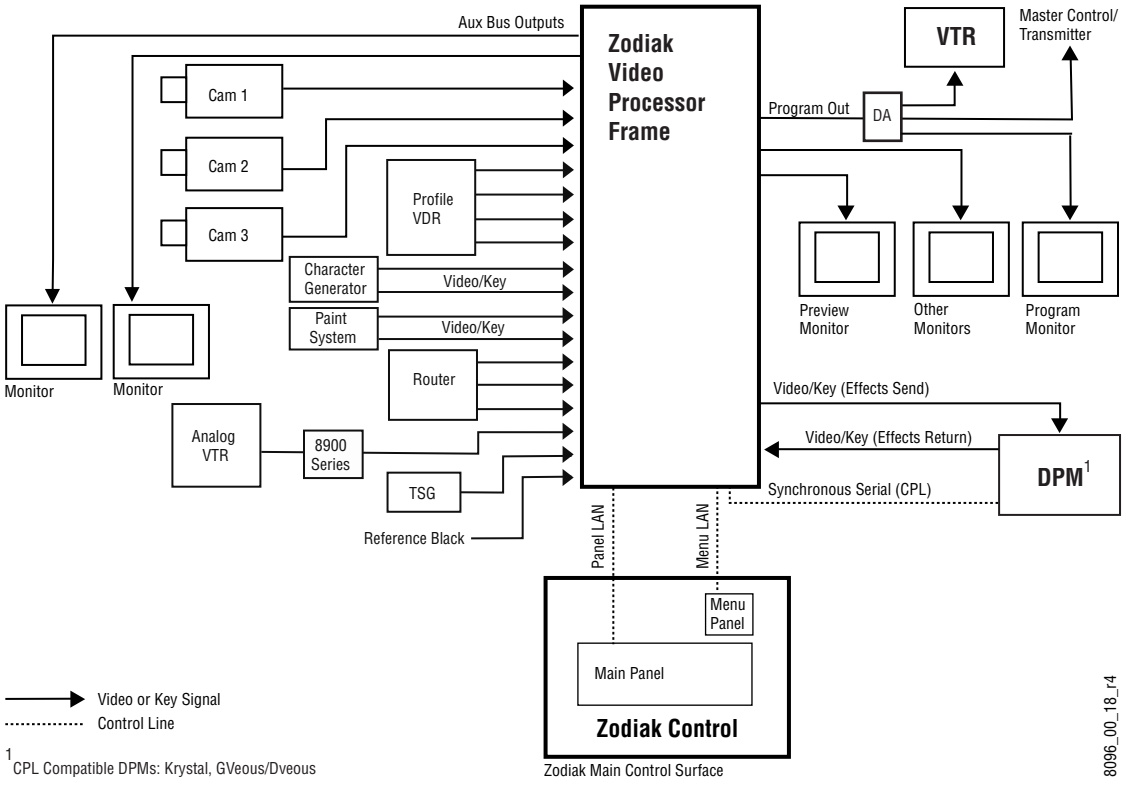
Chroma Keyers

In addition to the two standard chroma keyers, two optional floating chroma keyers may be added to the system via software.

Zodiak Facility Example

A basic facility configuration example of a Zodiak system is shown in Figure 6. Numerous types of sources can be fed to the Video Processor frame. Each M/E, Keyer and Utility bus has internal video processing capability to correct color (including optional RGB color correction) and add effects. In addition to the optional internal Transform Engine capabilities available on each keyer, this facility also utilizes an external DPM system configured for Effects Send.

Figure 6. Basic Facility Configuration Example



Functional Overview

Video Signal Flow

The basic system architecture (Figure 7) of the Zodiak system has been designed for operational flexibility. For example, all the outputs from every M/E and the PGM/PST are routed back to the video crosspoint matrix, making all these signals accessible to the entire system.

The 2.5-M/E system has two full M/Es and a PGM/PST with DSK. The 3-M/E system has three full M/Es in addition to three simple DSKs and the ability to link DSK keys to any M/E.

The 64 video inputs to the Video Processor frame can be mapped to any of the 46 crosspoint buttons (23 unshifted and 23 shifted sources). Internally-generated black and two backgrounds are also available sources, as are the four Still Store outputs. This source-to-button mapping is done through a touch screen menu and can be stored as a user profile for any number of individual users. Button mapping is the same on all buses.

The selected video on each bus is deserialized and reclocked before entering the video processing circuitry. Video processing is available for each separate M/E background, Key, and Utility bus, providing built-in solarization, posterization and mosaic effects. In addition, contrast, brightness, and hue can be adjusted on a bus-by-bus basis.

Each full M/E has four full-function keyers with optional internal Transform Engine effects. Each keyer has access to its own simple wipe generator as well as a pair of standard floating chroma keyers which may be assigned to any keyers in the system. Two complex wipe generator serve each M/E, providing a wide range of wipe choices with modulation, rotation and multiplication of each one. Wipe signals can also be taken from the Utility bus on each M/E.

The outputs from each M/E Program and Preview are fed to dedicated BNCs and sent back to the crosspoint circuitry for reentry selection in the other M/Es. Either Program/Preset output can be programmed as a clean feed output or with any combination of DSK 1, 2 and 3 keyers active.

Nine Aux buses are available in the 2.5-M/E system; thirteen in the 3-M/E system. The Aux bus outputs can be utilized in a number of ways, including configuration as Effects Send pairs for interfacing to external digital effects systems.

Figure 7. Simplified Video Flow Diagram — Top Half

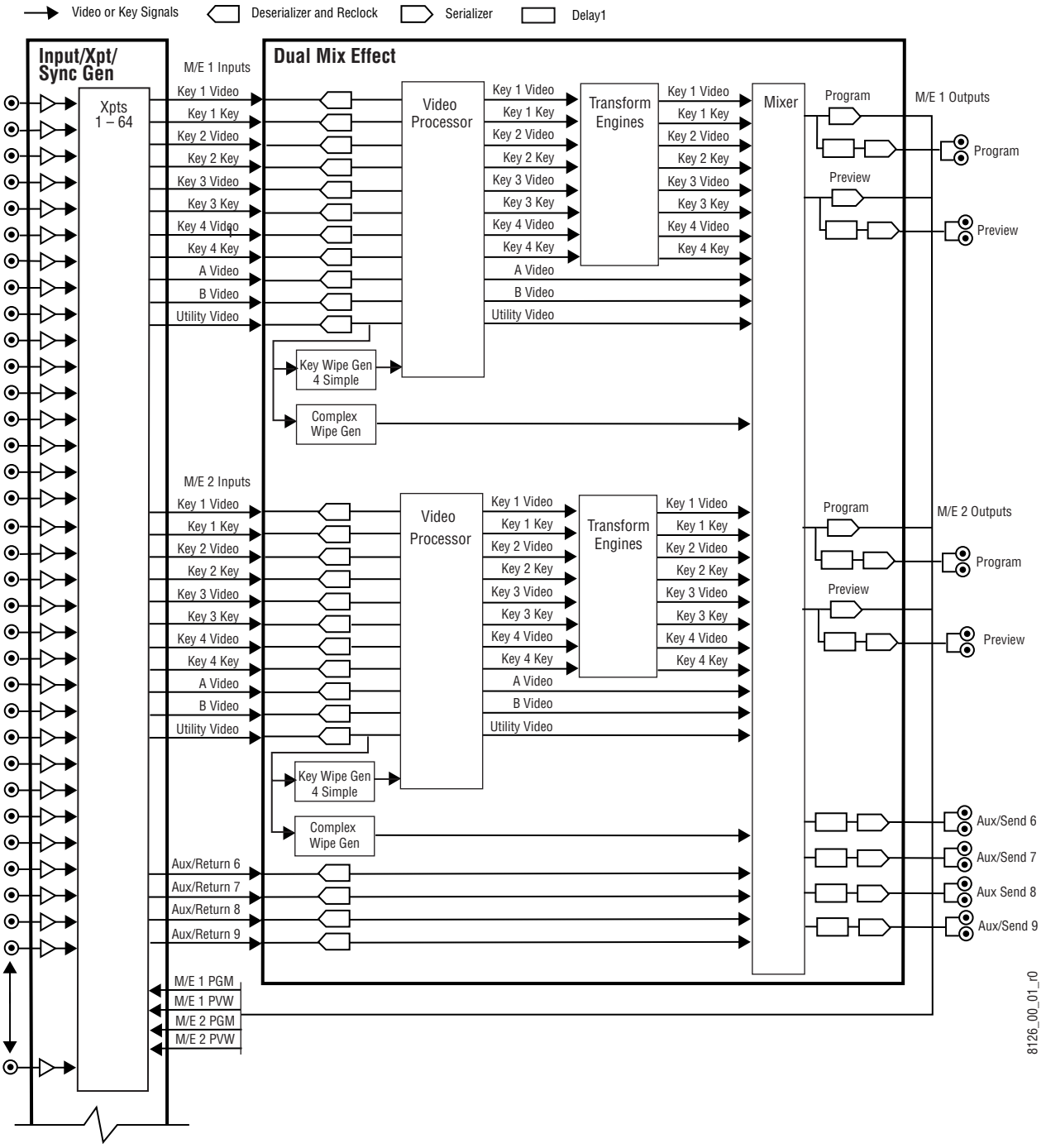
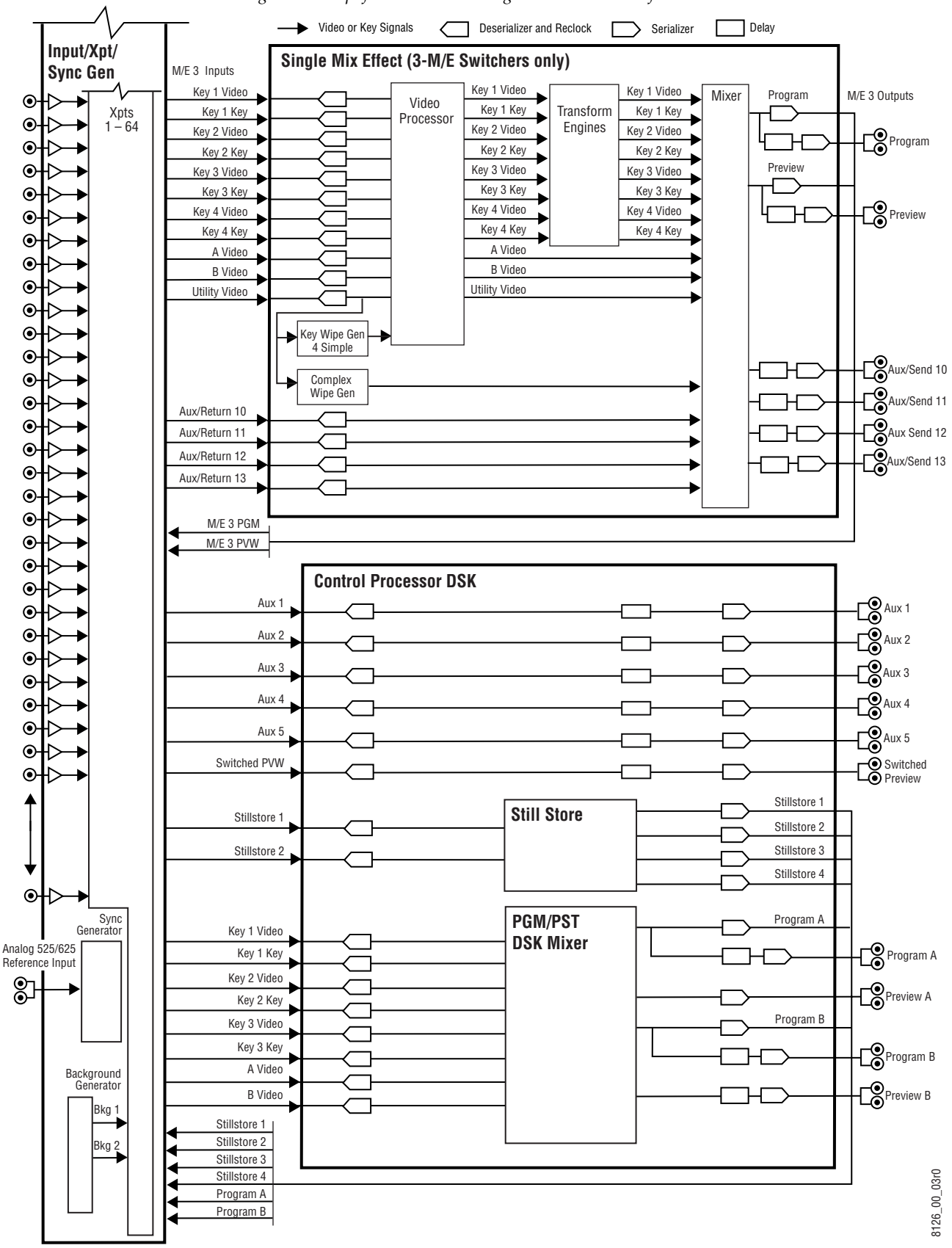


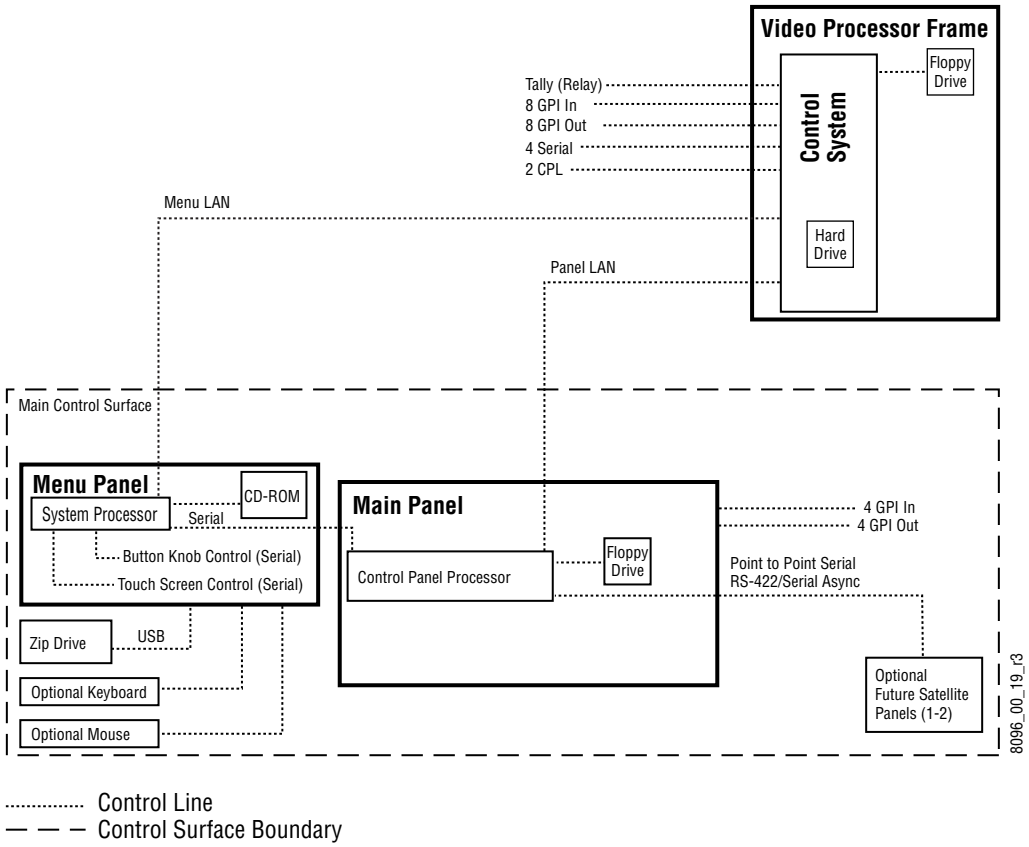
Figure 8. Simplified Video Flow Diagram — Bottom Half



System Control

Zodiak system control is designed for flexibility and simplicity. Ethernet, serial, parallel, and USB are used for system component interconnections. Tally and GPI control are available. Windows 2000 drives the Menu panel touch screen. An overview of Zodiak system control is shown in Figure 9.

Figure 9. Zodiak System Control



NOTE: Main Panel, Menu LAN, Panel LAN 10Base-T or 100Base-T Ethernnet

Section 2

Concepts

Introduction

In general, any video switcher receives multiple video inputs, performs signal processing on selected input signals, and then outputs the processed video. Efficient real time switcher operation is essential for live production, and can save valuable time in post production environments as well.

Several innovative concepts are employed in the Zodiak Digital Production Switcher to enhance its operational speed and flexibility. Understanding these concepts, as well as basic switcher fundamentals, will help you take full advantage of the exceptional power of the Zodiak system.

Zodiak System Configuration Overview

The Zodiak Digital Production Switcher is designed for operational flexibility, and can be configured to fit various applications. Different Zodiak systems can have different capabilities, or the same Zodiak system can be re-configured to have different capabilities at different times.

The way a Zodiak Digital Production Switcher is wired into your facility affects the Zodiak system's capabilities. For example, the number and types of sources physically connected to the system obviously determines what video the system can handle. However, because Zodiak system video/key inputs and Aux Bus outputs can be configured, once video cables are physically connected they need not be moved. Configuration settings also control many other capabilities that affect Zodiak system behavior.

Zodiak Digital Production Switcher configuration information is divided into three areas, to simplify and increase the speed of reconfiguring the system. The basic areas of Zodiak configuration are:

- Engineering Setups (settings established by the engineer in charge that affect the entire system, which never need to be changed by operators),
- Suite Preferences (settings for a suite that affect all the operators working in that suite, that are designed to suit a particular show or production style and ensure a consistent working environment), and
- User Preferences (settings that give the operator the ability to customize his individual work surface to meet his personal preferences).

All Zodiak configuration settings are non-volatile. Disk save and load operations are available that allow users to store configuration information on removable media for easy transport and for use as backup copies.

Engineering Setups

Engineering Setups control how the Zodiak Digital Production Switcher's major components behave and interact, and how the Zodiak system interacts with the rest of the facility.

Engineering Setups are not likely to change on a daily basis and so are grouped separately from the Suite and User Preferences. Facility maintenance personnel or the engineer in charge of a production truck generally manages Engineering Setups. These parameters are usually set during installation.

Engineering Setups information includes:

- Networking (IP addresses),
- Source definition (described later in this section),
- External device interfaces (DDRs, VTRs, DPM, Router, etc.),
- Control surface and suite definitions (identifying the operating panels present and their relationships to one another), and
- Various other system functions.

Suite Preferences

Suite Preferences define how the control surfaces associated with a Zodiak suite behave. Suite Preferences can substantially change system behavior, not just a user's view of the system. Suite Preferences are intended for day-to-day or session-to-session changes in Zodiak system operating behavior and so are open for modification by operators.

Suite Preferences include:

- Preview preferences,
- Safe title, preview behavior, etc.,
- Video specifications (525/60, 625/50, aspect ratio, etc.),
- Default Source Memory (initial keying and video processing settings used for each source on each bus),
- Default Keyframe (initial settings for many other user controls), and
- Various other suite functions.

User Preferences

User Preferences allow users to customize a Zodiak control surface to suit their personal operational style. User Preferences do not change Zodiak system capabilities.

User Preferences include:

- Source to button mapping (described later in this section),
- Aux Bus delegation mapping,
- Clip control preferences
- Shift preferences, and
- Various other user functions.

Signal Routing

Inputs and Sources

Incoming video signals are connected to the Zodiak system via BNC connectors on the rear of the Zodiak Digital Processor frame. All inputs are serial digital (SMPTE 259M, CCIR 601). Signals from external devices not operating in this standard will need to be converted.

Some devices (for example, a camera providing serial digital output) may provide a video signal that can be received on a single connector. However, other devices may output multiple signals.

For example, a character generator usually provides a signal with two components (commonly called *video* and *key*). Some incoming signals may also originate from devices the Zodiak system can control (Router, DPM, DDR).

For a Zodiak Digital Production Switcher, the term *source* refers to all the video signals and other attributes associated with a device. This is a fundamental concept. The Zodiak system is based on sources, not input signals or crosspoints. Each source can be given a descriptive name, but has an ID number for absolute identification. The Zodiak system uses ID numbers, not source names or input connectors, to identify each source. Defining each source is an important aspect of the Zodiak system.

Source Definition

When the Zodiak system is first configured, all sources are defined so the incoming signals from each device can be used effectively. This is usually done by engineering personnel, not operators, and once set these definitions are not changed.

A source definition data file tells the system how many signals a source has (video only, or video and key), which physical input(s) to route whenever a particular source is selected, the default processing of the source's key signal (if present), and what external devices (if any) are associated with that source. Tally is another important attribute of a source. On-air tally relays are related to sources, not physical inputs or source select buttons.

The source definition process includes assigning a name to each source. Once sources are defined, the user is able to select the source by name, and the Zodiak system automatically manages all the necessary signals, performs any default processing, and enables any additional control capabilities associated with that source.

Source definition data is stored as a part of Engineering Setups. Only one set of source definition data can be active on a Zodiak system at a time. Note that source definition is separate from source memory, which specifies what processing is to be applied to the source and can dynamically change during system operation.

Source to Button Mapping

Source to button mapping makes it possible to organize sources on Zodiak control panels in a preferred order. For example, cameras can be placed on the left side or the right side of the button row, whichever is preferred.

Source mapping is distinct from source definition, as source mapping only involves the location of sources on the control panel and does not affect any capabilities defined for the sources. Note that E-MEM effects store the source IDs, not the source select buttons, so remapping sources will not change the appearance of recalled effects.

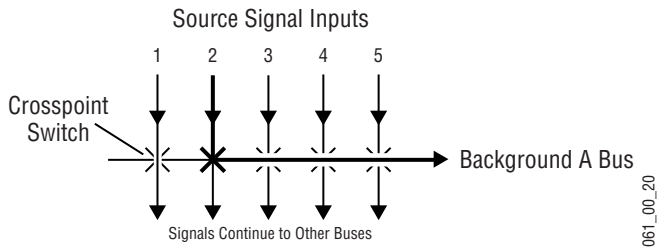
Source Memory

Keying and other parameters can be saved to a separate source memory for every Zodiak system source. These parameters can be applied automatically whenever that source is selected. See *Source Memory* on page 72 for specific information.

Buses and Crosspoints

A *bus* is technically defined as a signal path where one of several available inputs can be selected to feed a single output. A *crosspoint* is an electronic switch that allows a signal to pass when the switch is closed. On video switchers, a bus can be constructed containing a series of crosspoints, which permits selecting which one of several incoming signals will be sent out the bus. In Figure 10, source 2 has been selected on the background A bus. This signal can now be called *background* video is available for further processing.

Figure 10. Buses with Crosspoints



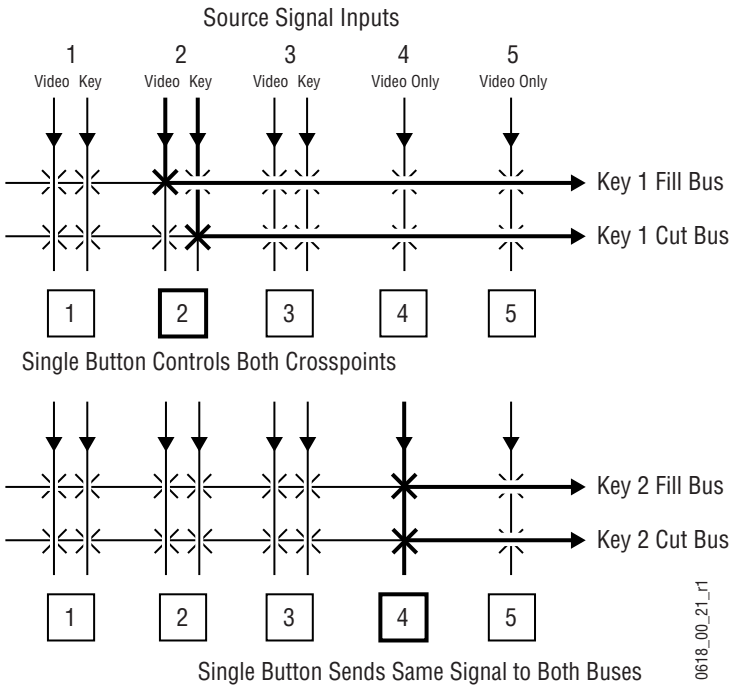
Buttons on a control panel can be used to control the switching of crosspoints. The buttons are usually arranged horizontally, making it easy to imagine the available signals coming in from the top, and the single bus output signal going out the right side.

In earlier generation switchers, the terms *crosspoint button* and *crosspoint bus* have been used in reference to control panel source selection. For a Zodiak system, the terms *source button* and *source bus* will be used. These terms better reflect a system operating philosophy that is source rather than crosspoint based. The Zodiak system does not directly associate a source select button with a physical crosspoint. The association goes first through source to button mapping, then through source definition to find the physical inputs.

On the Zodiak system, a single source button can control crosspoints on different buses simultaneously. For example, during keying on an M/E, both the video and key signals of a source can be selected with a single button press. In this case two different crosspoints on separate buses (key fill bus and key cut bus) are actually switched when the button is pressed.

In the upper part of Figure 11, the *video* component of source 2 in the figure has been selected on the key fill bus and becomes the *key fill* signal for subsequent keying. The key component of source 2 selected on the key cut bus becomes the *key cut* signal for keying. The lower part of Figure 11 shows how the same source (source 4) can be selected for both the key fill and key cut signals.

Figure 11. Multiple Crosspoint Control



Shifted Sources

An operator may need to quickly access many sources during a production. However, a control panel has size limitations, since all the source selection buttons must remain within reach. The Zodiak system provides shifted buttons to allow access to more input sources from the control panel.

On a 2.5- or 3-M/E Zodiak system, up to 46 sources can be mapped at one time, 23 to the unshifted source selection, and 23 to the shifted buttons. A dedicated **Shift** button is provided as the farthest right crosspoint button (Crosspoint 24) for every bus. Two shift modes are available: Normal and Latched.

In Normal mode, shifted or unshifted status of the bus is indicated by the state of the **Shift** button light. Holding down the **Shift** button while pressing a source button always selects the shifted source for that bus. The **Shift** button will light when the row of buttons to its left are shifted.

In Latched mode, the **Shift** button toggles on and off in a manner similar to the Caps Lock button on a standard keyboard. When on, it lights to indicate that the subsequent selection(s) on the crosspoint selector row will be made from the shifted set of sources (24 through 46). When off, the subsequent selection(s) come from the unshifted set (1 through 23). If the user toggles the **Shift** button to the state that is opposite from the shift state for the currently selected input, then the crosspoint selector button blinks to indicate an Out of Sync condition.

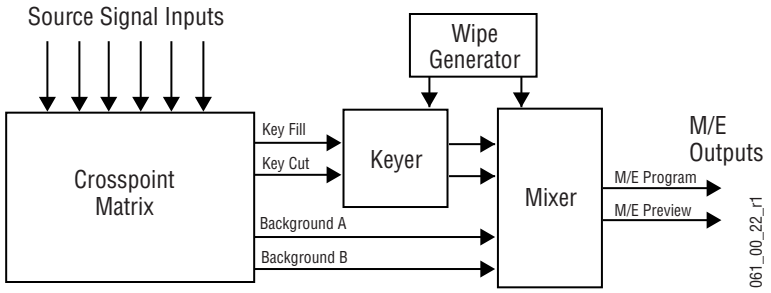
A useful configuration is to have sources normally used for backgrounds (e.g. VTRs) mapped to unshifted buttons, and sources normally used as keys (e.g. character generators) mapped to shifted buttons. Then you can then set all the background buses to an unshifted preference, and all the key buses to a shifted preference. All normal source selections can then be made without having to use the shift modifier buttons.

Mix/Effects (M/E)

An M/E is a subsystem of a video production switcher that can create a composite of two or more pictures. An M/E includes multiple source selection buses and provides transition (mix and wipe) and keying capabilities on the selected signals. An M/E can be organized with the keying circuitry separate from the mixing circuitry, which permits Effect Send capabilities (see *Effects Send* on page 39 for more information).

A simple basic M/E used in a typical switcher will be used as an example in the following discussion. A Zodiak M/E has added capabilities, but the basic principles described here will apply. See Figure 7 on page 28 for a simplified diagram of the actual Zodiak M/E architecture.

Figure 12. Simplified Mix Effects (M/E) Subsystem



The basic M/E shown in Figure 12 has an A and a B background bus. These buses select the background video signals sent to the output of the M/E. Generally the source on the background A bus is the current background output, and the source on the background B bus is the background video that will be used next. During most transitions, portions of both backgrounds are output simultaneously. The keyers in the M/E allow the inclusion of additional material over the background. Wipe generators also exist, which create patterns used by the mixer for wipe transitions, or used by the keyers to modify the signals it sends the mixer. See *Transitions* on page 42 and *Keying* on page 46 for more information. The processed signal in an M/E is then sent to an M/E output, typically program or preview.

A video production switcher can have more than one M/E. For example, a 3-M/E Zodiak system has three (M/E 1, M/E 2, and M/E 3). Each Zodiak M/E produces two outputs, M/E Program and Preview.

Re-Entry

Switchers with multiple M/Es generally have re-entry capabilities. Re-entry permits the switcher to select the output of one M/E for use as an input source to another M/E. The signals are routed internally.

The Zodiak system supports M/E re-entry. For example, an output of M/E 1 can be sent to M/E 2 or M/E 3 (PGM/PST), and an output of M/E 2 can be sent to M/E 1 or M/E 3 (PGM/PST).

Alternate Buses and Delegation

Many earlier generation switchers had M/Es equipped with two keyers, and each M/E could accept two background sources. This permitted mixing or wiping between two backgrounds, and keying up to two additional sources over the background. Dedicated rows of control panel buttons were used to select these key and background signals.

Each Zodiak system M/E actually has four keyers, each handling a fill and a key signal, and each M/E can accept three background sources (A, B, and Utility). Providing individual source selection rows for each M/E is

impractical, as the panel would become too large for an operator to reach all the buses. For ease of use, Zodiak panels have alternate buses accessed by delegation, using Key and PVW/AUX delegation subpanels.

Utility Buses

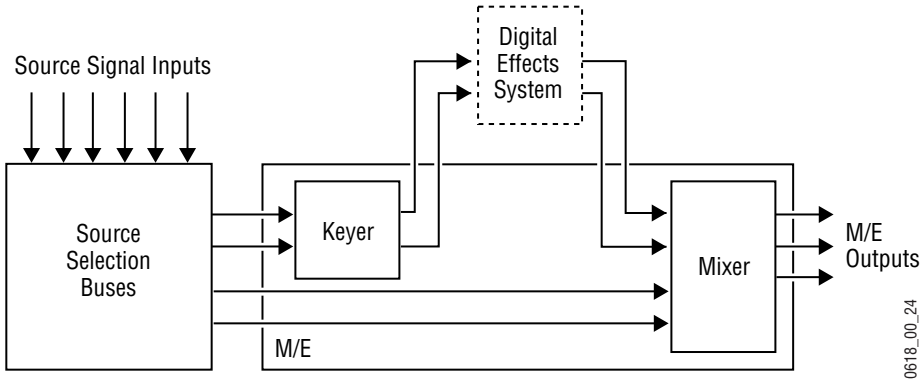
Besides the standard A and B background inputs, each Zodiak M/E also accepts Utility inputs. The Utility bus can be used to select signals for special purposes, and has no relation to the background buses. For example, a video signal selected on the Utility bus can be used to feed a custom pattern into a wipe generator, or create a custom border wash pattern.

Effects Send

Effects Send provides a method of integrating digital effects devices into an M/E subsystem. Effects Send switches the key cut and key fill outputs of the keyer of an M/E to a digital effects device for manipulation. The manipulated key cut and key fill outputs are then received and sent directly to the inputs of the mixer circuits of the M/E. Effects Send allows you to process a key effect as though the digital effects circuits were located inside the M/E itself.

On the Zodiak system, Effects Send is integrated into each M/E and is an extension of the keying control system (Figure 13).

Figure 13. Effects Send Diagram



The Zodiak system supports external Effects Send. External Effects Send routes the key fill and key cut output signals from an M/E keyer to a separate, external digital effects system, like a Krystal DPM. The signals are manipulated by the external device and then sent directly back to that M/E's mixer inputs. If the Zodiak system is equipped with the optional Transform Engine option, the effects become part of the internal M/E's mixer.

Outputs

Video production switchers generate several different video outputs (Program, Preview, etc.). A final program output from PGM is typically sent to the transmitter for broadcast and/or to output devices for recording. Individual M/E program and preview outputs and an additional switched preview output are sent to monitors in the control room. These outputs may also be routed elsewhere in the facility. Aux Bus outputs may also be used for special purposes.

M/E, Program and Preview Output Buses

The Zodiak system has dedicated BNC output connectors for the following signals:

- M/E 1 PGM and PVW,
- M/E 2 PGM and PVW,
- M/E 3 PGM and PVW (3-M/E systems only),
- Program A and B (with configurable clean feed),
- Preview A and B, and
- Switched Preview, selectable on the control panel from PVW PRI, ME 1, ME 2, ME 3 (3-M/E system only), PGM A or PGM B.

Aux Buses

Video production switcher Aux Buses can be used to select and route sources to specific destinations. For example, a source selected on an Aux bus can be sent to an ISO recorder for instant replay. This can be done directly by the Technical Director while she switches the program.

Remote Aux panels can be used to give different operators control over one or more Aux buses. It is also possible to assign control of an Aux bus to an external device, like a DPM, and allow that device to directly switch sources as required.

Resource Sharing and Point Of Use

The Zodiak system can share some resources for use at different locations. The location where a resource is being used is called a *point of use*. Different types of resources are shared differently.

Floating resources (like Chroma Keyers) move between points of use, and the parameters controlling these resources are considered part of the point of use. These resources are used at only one point of use at a time. When the resource floats to the new location, its behavior changes. For example, A Chroma Keyer set for specific parameters in M/E 1 Key 1 can be assigned to another keyer and have different settings applied.

Other Zodiak system resources behave differently. For example, wipe pattern generator resources can be used for an M/E wipe transition, as a preset pattern, as a mask, or at other points of use. It is also possible to assign the output of the same wipe pattern generator to different points of use at the same time.

For efficient operation, the Zodiak system has divided the parameters controlling wipe pattern generators and related utility bus functions into two categories*; shared generator parameters* and *point of use parameters*. The set of parameters for the shared generator are used by all points of use, so changing one of these parameters will affect all locations where that wipe pattern generator is being used at that time. Separate sets of point of use parameters, however, are maintained for each Zodiak system point of use (same as Chroma Keyers described above). These settings are used only by each individual points of use, so changing them will not affect any other point of use.

For example, a wipe shape (box, circle, etc.) is a generator parameter, but the softness of the shape's edges is a point of use parameter. If the same wipe generator is used by both an M/E wipe transition and a preset pattern, adjusting softness at one point of use will not affect the other's softness settings. However, changing the pattern shape affects both locations.

Zodiak systems differ from the Grass Valley Group Model 4000 switchers in the division between wipe pattern generator and point of use. In the 4000, the edge is created as part of the generator so all points of use have the same softness and border width. The Zodiak system duplicates this circuitry allowing each point of use to have a different edge on the same basic wipe pattern shape.

Transitions

A transition is a change from one image to another. The Zodiak system supports four (three basic and one optional) types of transitions:

- Cut
- Mix
- Wipe
- DVE (optional)

A transition can be applied to the entire picture, or to only the background or keyed elements of the picture, and can include multiple elements.

Cut

A *cut* is an instantaneous switch from one image to another (between successive video fields or frames). The simplest type is a *hot cut*, accomplished by selecting a different source on a bus feeding an M/E output. This only changes that bus's contribution to the output, and does not change what elements may be involved in the output (the same buses are involved).

The Zodiak system also provides cut transitions, where the elements involved in a composite can be changed instantaneously. Different buses can be included or excluded, causing changes in the resulting composite image. Background cut transitions on an M/E are first selected on the Background B bus to allow previewing the upcoming picture before it is cut on-air.

Mix

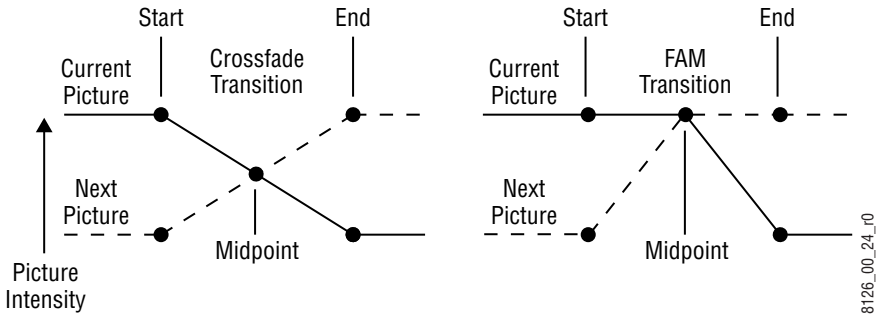
A *mix* is a transition from one picture to another where the new picture fades in as the existing picture fades out. During a standard mix transition a superimposition of both pictures, each at a lower intensity, is visible.

The Zodiak system allows mixing from one background to another and to mix up to four separate keys on or off over a background. Background and key mixes can be done separately or simultaneously.

Full Additive Mix

Full Additive Mix (FAM) is a special mix transition that the Zodiak system supports besides normal crossfade transitions. Picture elements in FAM transitions are composited differently through the time of the transition(Figure 14).

Figure 14. Normal and FAM Mixes



FAM transitions first fade a new picture to full intensity and then fade the old picture out, but both full intensity pictures are mixed together to the output during the transition. The resulting signal is clipped at white level to prevent generating illegal video.

Wipe

A *wipe* is a transition from one picture to another in which the edge of a shape moves across the screen, revealing the new picture. Wipe transitions can be applied to backgrounds, to keys, or to both simultaneously. A wipe transition shape can be selected from a variety of patterns, and these patterns can be adjusted in several ways (position, aspect ratios, edge attributes, etc.).

Each Zodiak M/E has two separate wipe systems, each of which can be assigned a different wipe pattern and be adjusted independently. These systems can each use one of the two available complex wipe pattern generators with advanced capabilities. It is also possible to combine these wipes to create extremely complicated wipe transition shapes, and generally this is used only by advanced operators. Utility bus video signals can also be used to generate a custom pattern for a wipe transition or other purposes.

Other Wipe Pattern Generator Uses

Wipe pattern generator circuitry can be used for purposes that do not involve transitions. Each Zodiak M/E has the two complex wipe pattern generators described above, and each of its four Keyers also has a simple pattern generator and a box pattern generator, making a total of six. These pattern generators can also be used for Preset Pattern, Masking, and Matte Washes.

Preset Black

Preset Black is a special type of transition, where the picture transitions to black, and then transitions out of black to the new picture. Preset Black is really two transitions, one to and one from black, and so requires two oper-

ator commands to complete. Preset Black can be used with any transition type (cut, mix, or wipe). The entire picture goes to black, even if all the transition elements involved in the picture were not selected.

Fade to Black

The Fade to Black control in the DSK allows the Program output of the switcher to be brought down to black at a predetermined transition rate.

Transition Rate

Cut transitions are instantaneous, but mix and wipe transitions have durations. Transition durations can be set in advance to a specific transition rate, and be initiated by pressing a button the control panel. It is also possible to manually control transitions using a lever arm.

On the Zodiak system, one transition rate can be assigned to the main transition of each M/E. This type of transition can be controlled by that M/E's lever arm. Each of the four keyers on each M/E can also be assigned its own transition rate, initiated with a separate Key Mix button on that M/E.

Flip Flop Background Buses

At the completion of a transition, the background buses swap their source selections (flip flop). This makes the upper bus always act as the on-air bus, and the lower bus act as a preset bus. The operator can reliably setup the next source on the lower bus without disturbing the source selected on the on-air upper bus.

For example, if a transition begins with source 1 on Background A and goes to source 2 on Background B, as soon at the transition to source 2 completes, source 2 will be taken to the Background A bus (without disturbing the output of that M/E). The source 1 selection will also be immediately taken to the Background B bus.

Look Ahead Preview

If a preview monitor is configured for Look Ahead Preview mode, the end result of the upcoming transition can be viewed on that monitor. This lets the operator know in advance what will occur for that next transition. The mode you select for each preview monitor depends on the number of monitors available and the individual requirements of the facility.

Current and Next Stack

Zodiak uses a current and next stack approach for transitions that involve multiple elements. The current stack is the current M/E output including any keys that are on. The next stack is defined by the current stack and whatever next transition elements have been selected. Look ahead preview always displays the next stack. Next transition elements affecting stacks are Keys 1 - 4, background, and key priority.

Zodiak transitions always occur from the current stack to the next stack. For example, if the current stack has Key 1 over Background A, and the next stack specifies Key 2 over Background B, a mix transition will occur between the composites (Key 1 over A to Key 2 over B). This is different from mixing Key 1 off, Key 2 on, and mixing between A and B at the same time, which would cause the keys to go transparent over their background during the transition.

On the Zodiak system, opacity is retained throughout the transition, so midway through this example Key 1 remains fully keyed over Background A, and Key 2 is fully keyed over Background B. The transition occurs between these two fully keyed composites.

Key Priority and Transitions

The four keyers on a Zodiak M/E can be assigned priorities. This determines the layering of the keys. The highest priority key appears on top, while keyers with lower priority may be partially or fully hidden behind those with higher key priorities. The backgrounds always have the lowest priority. Changes in key priority can be included as a part of a transition. Like any other transition, the current stack will transition to the key priority of the next stack. For example, suppose the current stack has Keys 1, 2, and 3 in that key priority order over Background A, and the next stack specifies key priority order 3, 2, 1. A mix transition will occur between the 1, 2, 3 composite order to the 3, 2, 1 composite order. All three keys will remain fully keyed over the background, and will mix to their new key priority order.

Keying

Keying inserts part of one picture into another to create a composite picture. Keying involves three signals:

- Background,
- Key cut, used to specify where to cut a hole in the background, and
- Key fill, used to fill the hole in the background. The fill can be an incoming video signal or it can be an internally generated matte.

A separate key cut input signal is not necessarily required for keying. For example, a self key (also called a video key) uses the same input signal for both key cut and key fill.

The Zodiak system supports the following types of keys:

- Linear Key (fixed and adjustable)
- Luminance Key
- Preset Pattern
- Chroma Key

The Zodiak system also supports self keys and split keys.

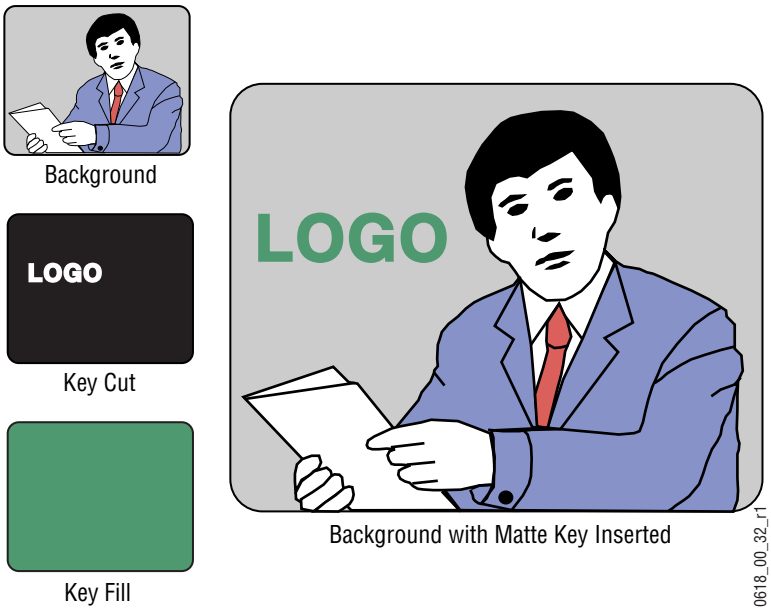
Matte Fill Key Example

One of the earliest keying techniques was to use an art card and camera to perform a luminance key with a matte fill. This type of key is a good example for explaining basic keying principles because three separate and independent incoming signals are used.

To insert a green logo into background video, the logo can be printed in white on black paper and a camera can be focused on it. The signal from the camera can be selected as the key cut signal and green matte video can be selected as the key fill signal sent to the keyer. The key cut signal is then adjusted (clipped) to ignore the black paper and use only the white logo shape to cut a hole in the background video. The keyer then shapes the key fill to precisely match the logo-shaped hole cut in the background and fills

it with green matte video. This creates a green logo inserted into the background (Figure 15). Because luminance values of the key cut signal are used to cut the hole in the background this is called a luminance key.

Figure 15. Matte Fill Luminance Keying Example



In this keying discussion illustrations rather than actual screen images are used for simplicity, and because the printing process has difficulty capturing the subtleties of soft key edges.

Shaping Video

In the matte key example above, the key fill signal was a full raster color that did not match the shape of the key cut signal. This key fill signal is accurately called *non-shaped* video, but may also be referred to as *unshaped* video since both signal types are processed identically during keying.

Some external devices (e.g., character generators) provide a key cut signal and an already processed companion key fill signal. A key fill signal that correctly matches the key cut signal is called *shaped* video. During keying, properly shaped key fill video can be summed with a background signal (with a hole cut) and achieve the desired result. When the shaping is performed by the source device, the Zodiak system can use a standard clip and gain setting defined during system configuration to create the key cut control signal, and so relieve the operator of having to adjust clip and gain manually.

If a key fill does not match the hole in the background (like in the matte key example above), the key fill needs to be shaped by the switcher. By multiplying the key fill signal with the key control signal the unwanted areas of the fill can be made black, shaping the video to match the hole before it is

summed with the background. Key fill video must be shaped using the key cut signal actually used to create the hole in the background. Video shaped with a different key cut signal will not key correctly.

The Zodiak system, as well as some external devices like DPMs, can also divide a shaped video signal by its own key signal. The result is called *unshaped* video. For optimum image quality, shaping and unshaping operations should be minimized. In general, devices should be installed and configured in a manner that prevents them from having to unshape incoming video just to reshape it again afterwards.

Specifying whether source signals are shaped or unshaped is part of the Zodiak system configuration process (source definition). Properly shaped video is an important aspect of keying. See *Properly and Improperly Shaped Video* on page 58 for more information.

Note that an unshaped signal viewed directly will show harsh edge artifacts due to dividing by a small number. This is normal and expected. Keying this signal will clean up its appearance.

Key Control Signal Adjustment

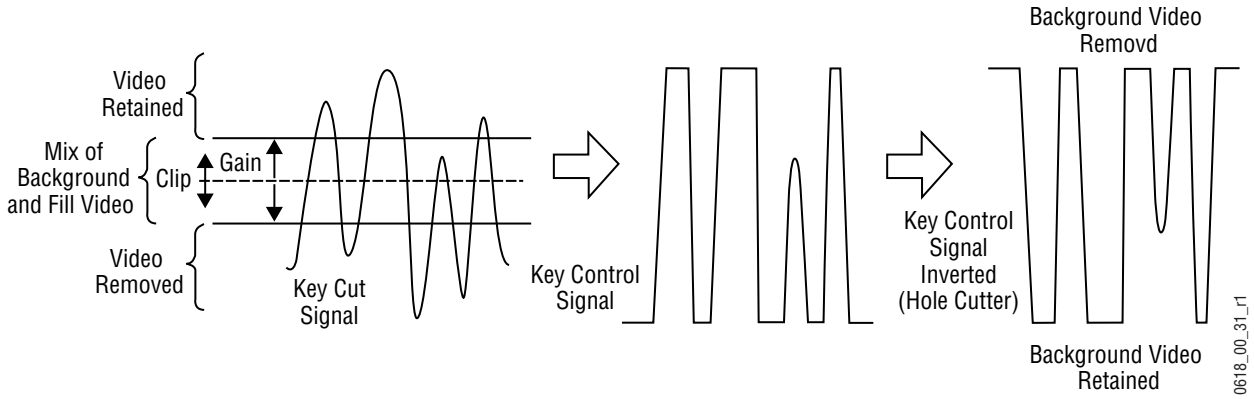
During keying, the selected key cut signal can be converted into a key control signal. It is the key control signal that actually cuts the hole in the background video. Adjusting the key control signal (Clip and Gain) is essential in the keying process. The art of setting up a good key is to use just enough Gain to suppress any imperfections in the incoming key signals. Setting Gain too high can cause ragged key edges.

The Zodiak system provides two methods for adjusting the key control signal, Clip and Gain, and Clip Hi and Clip Lo. Note that the same basic keying process is controlled by either of these methods.

Clip and Gain

The Clip and Gain operation selects a threshold of the selected key cut video that will be used to cut the hole in the background video. Clip controls the threshold, and Gain controls the softness of the key edges and any translucent areas. High portions of the key cut signal specifies what video is retained, and low portions determine what video is removed. Intermediate levels specify a soft blend of the background and fill video (Figure 16).

Figure 16. Key Clip, Gain, and Key Control Signal

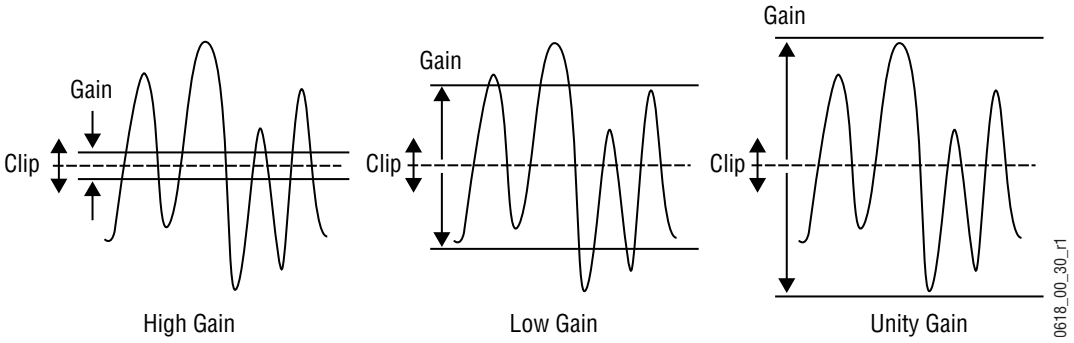


Clip and Gain control is appropriate for high gain keys (see below), to easily adjust where the relatively hard transition from background to fill occurs. In this mode, changing the Clip control moves the threshold up and down without affecting Gain, which is adjusted separately with its own Gain control.

High Gain, Low Gain, and Unity Gain

A high gain key has a narrow range, creating harder key edges. A low gain key has a wider range, creating softer key edges. Linear keys typically use minimal gain (also called unity gain) to completely preserve the soft edges of the keys (Figure 17). Note that the Zodiak system also supports keys that go below unity gain.

Figure 17. Keying Gain Values

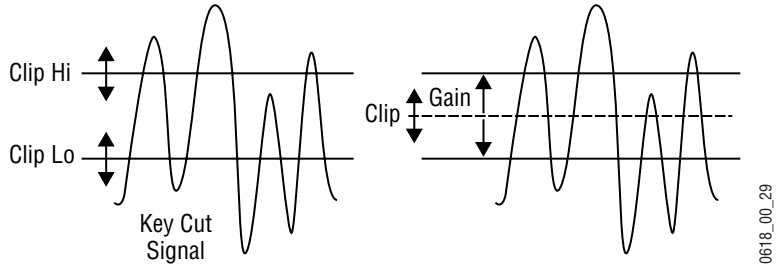


On the Zodiak system, Gain has a percentage value. A Gain value of 50% requires a luminance change of 50% of the distance between black and white to produce a keying signal ranging from transparent to opaque. A gain value of 100% (unity gain) uses the entire range between black and white for this transparent to opaque transition. A gain value of 0% produces the hard key edges (a high gain key).

Clip Hi and Clip Lo

The Zodiak system also supports a Clip Hi and Clip Lo mechanism. With Clip Hi and Clip Lo, two thresholds are established. The upper threshold specifies at what point video will be completely removed from the background, and the lower threshold determines at what point background video will be retained completely intact (Figure 18).

Figure 18. Key Hi, Clip Lo vs. Clip and Gain



In this mode, Gain changes when either control is adjusted. The difference between the upper and lower keying thresholds is equivalent to gain:

Clip Hi = Clip + Gain/2

Clip Lo = Clip – Gain/2

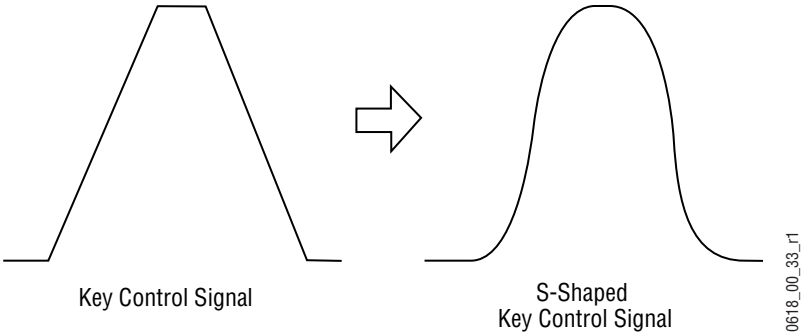
Clip Hi and Lo control is more appropriate for low gain keys, to allow independent control of the two thresholds. For example, when adjusting a linear key the operator wants to control where the fill becomes opaque (Clip Hi) and where the fill becomes transparent (Clip Low). In Clip Hi/Lo mode adjusting the point of opacity does not change the point of transparency, and vice versa.

Clip, Gain, Clip Hi and Clip Low adjustments always interact. Changing one always results in changes to two other values. Changing Clip Hi or Clip Low changes both Clip and Gain, not just Gain.

S-Shaped Key Signals

On the Zodiak system, an S-shaping function is applied to the edges of luminance keys. S-shaping smooths the sharp corners of a luminance key control signal, which helps prevent banding artifacts. S-shaping a signal minimally affects the key edges, and does not move key thresholds or affect the overall gain of the key (Figure 19).

Figure 19. S-Shaped Luminance Key Control Signal



S-shaping is generally not applied to linear keys because the external device usually applies an S-shaping function when it generates the key cut and key fill signals. S-shaping should not be applied twice.

Additional Keying Controls

The following additional controls are available for keying.

Key Invert

Keys can be inverted, causing holes to be cut in the background where a normal key retains the background, and vice versa. Key invert makes the white areas of the key cut signal produce transparency, and the black areas produce opacity, the opposite of a standard key.

Masking

Masking defines areas that are protected from keying (Inhibit Mask) or always key (Force Mask). The shape of the mask can originate from a wipe pattern generator or by a selected mask signal (typically a key fill signal delivered via one of the Utility buses).

With the Zodiak Still Store, the mask signal can be a frozen page of video or a key fill. Complex mask shapes are often easier to draw by hand than to create with multiple wipe patterns.

Opacity

The opacity of a key can be adjusted. When opacity is reduced below 100% some background video is allowed to show through areas where it is normally excluded. Key opacity is an adjustment to the overall intensity of the key, and is separate from Clip and Gain controls. Note that a common mistake is to set opacity to zero and forget that adjustment was made, which can cause confusion later when that key is selected but not visible.

Key Positioning

Key positioning allows slight adjustment of the horizontal position of the key cut signal relative to the key fill signal. This is useful if the timing of the two signals at the switcher inputs are not matched properly. This is generally only a problem if the cut or fill follow analog paths from source to switcher or if the source has video/key timing adjustments which have been set to compensate for other delays within the facility.

Key Size

Key size allows the key cut signal to be narrowed slightly. This can greatly enhance self keys and chroma keys that have been reshaped.

Coring

Coring helps reduce video noise in Chroma keys. Coring is used when a key fill signal has noise in areas that are supposed to be transparent. When noise exists in these areas it can appear in the background portion of the keyed composite. Coring replaces the noisy black areas outside the shaped fill with clean black before it is summed, eliminating the noise.

Show Key

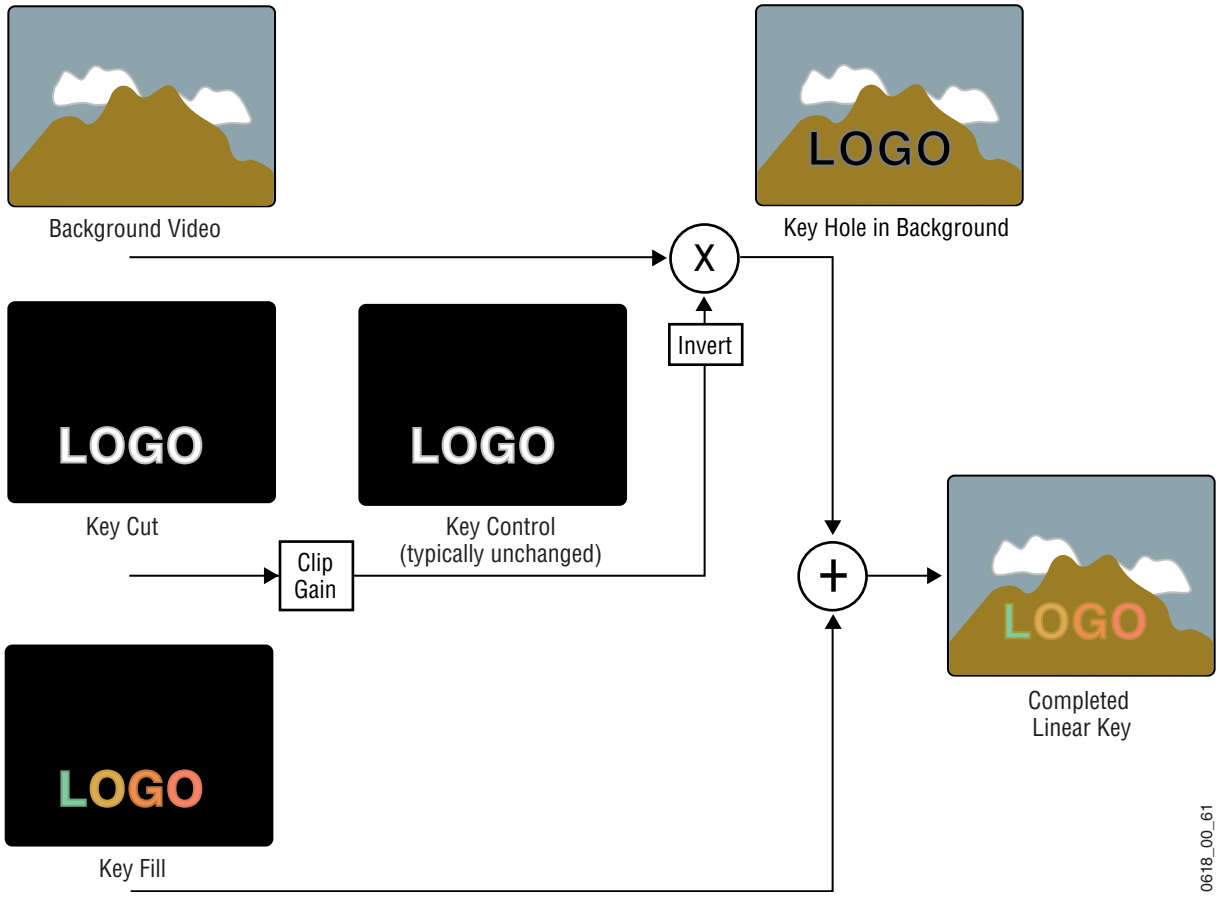
Although the key control signal is not directly visible in the final video output, this signal can be previewed as a black and white image using the Show Key function. White areas of a show key indicate areas of complete opacity, black indicate complete transparency, and gray areas indicate translucent areas of the key. The whiter the show key signal, the more opaque the key will be. This key preview signal reflects all the adjustments that have been made to the key control signal.

Linear Key

A linear key typically uses separate key cut and key fill input signals that are intended to be used for linear keying. The key cut and key fill are usually anti-aliased (soft edged) shaped signals created by a character generator or graphics system. There may also be translucent areas intended to allow some background to show through the key (watermarks). The level

of the key cut signal determines where and how deeply the hole will be cut into the background. The intended soft edge and translucency of the key can then be faithfully reproduced (Figure 20).

Figure 20. Linear Keying



Note The soft edges in the illustrations in this part of the manual are simulated. The key edges are actually gradients, which allows these edges to blend smoothly with the background.

Fixed and Adjustable Linear Keys

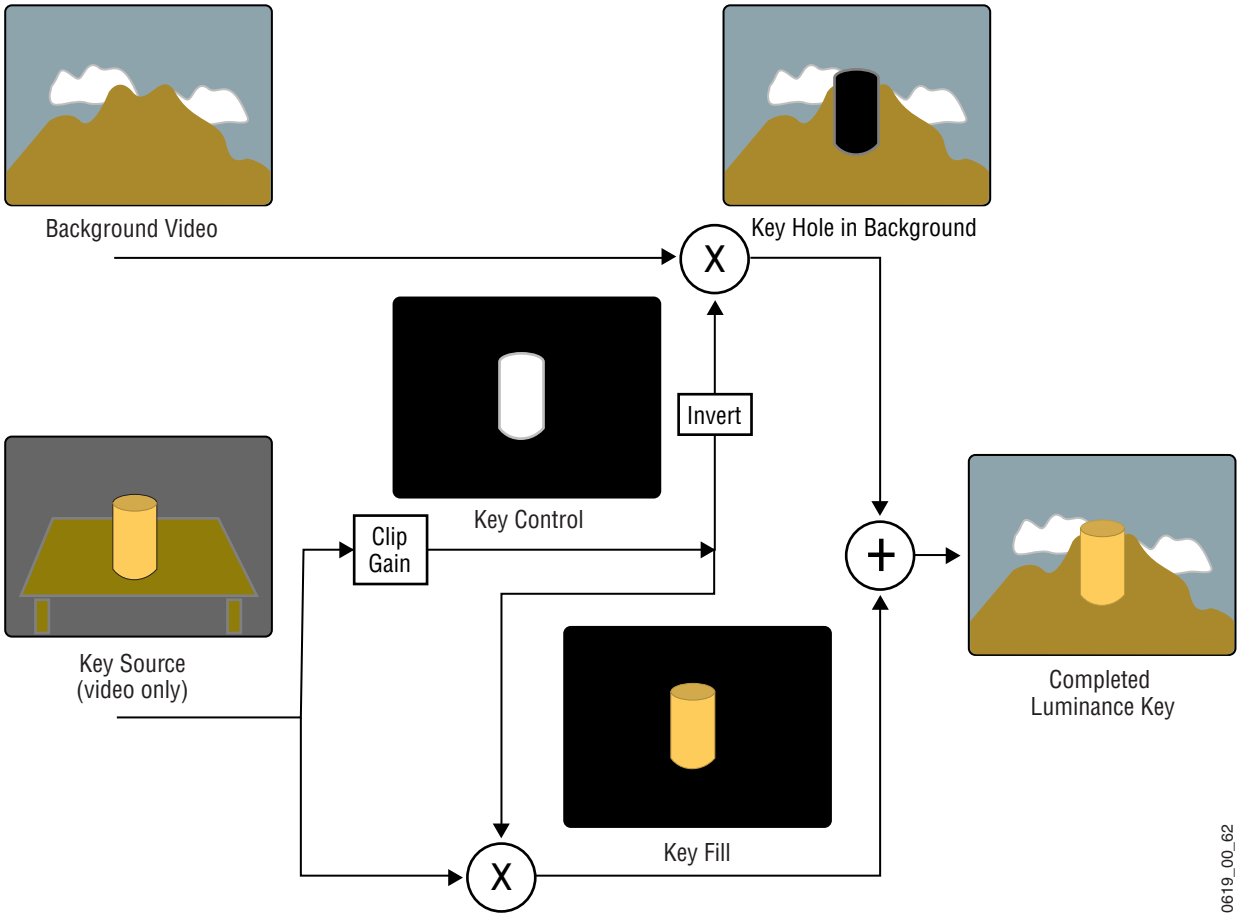
The Zodiak system supports both fixed and adjustable linear keys. A fixed linear key uses clip and gain values defined in system configuration to create the key cut signal. Typically these values are Clip 50% and unity Gain (equivalent to Clip Hi 100%, Clip Lo 0%). Once fixed linear key values are defined, these sources can be used easily without the operator having to set up the key every time it is used.

An adjustable linear key provides the operator limited control over Clip and Gain (or Clip Hi/Lo) values. This lets the operator fine tune the settings if the normal fixed linear values are not producing a good enough key.

Luminance Key and Self Key

A luminance key uses the luminance of an incoming source to specify where to cut the hole in the background. The earlier example of a matte fill key is a type of luminance key. Luminance keying is typically done on sources that do not have an accompanying key cut signal, like a video camera. The key cut signal must be generated from the incoming video signal, using clip and gain controls. When only one source is used for both key cut and key fill, the key is called a Self key or Video key. The same key source signal is multiplied by the key cut signal to create the key fill, and then the signals are summed (Figure 21).

Figure 21. Luminance Keying (Self Key)

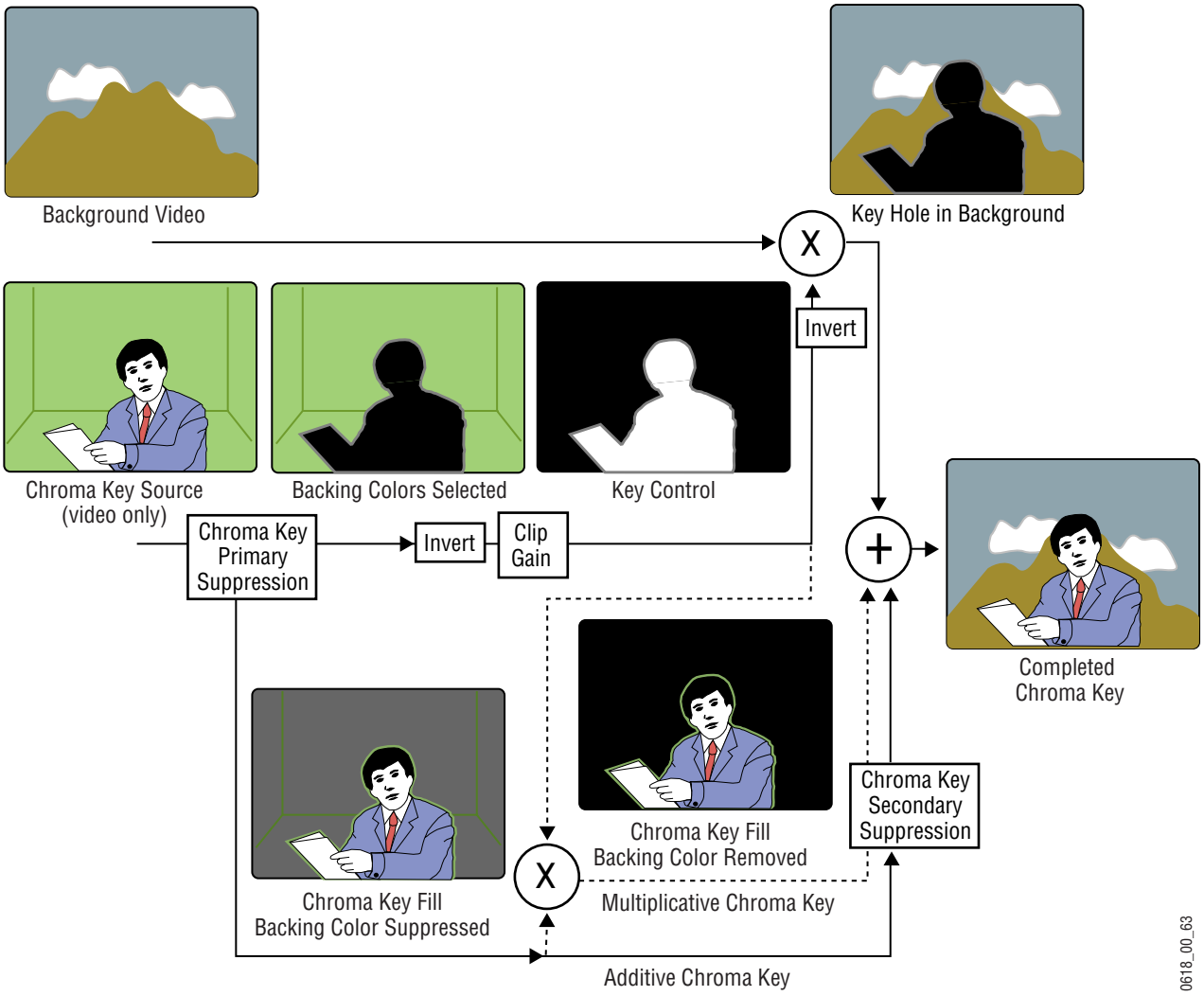


Clip and Gain (or Clip Hi/Lo) controls for luminance keys offer wide adjustment ranges. On the Zodiak system, an S-shaping function is also applied to the edges of luminance keys.

Chroma Key

A chroma key is a key that detects color (rather than luminance) in a video image and replaces it with a new background. For example, a reporter may be in a studio sitting in front of a backdrop with a blue or green backing color, and the new background can be a mountain scene. The completed chroma key consists the mountain scene replacing the backing color, creating the illusion that the reporter is sitting in front of the mountain (Figure 22).

Figure 22. Chroma Key (Additive or Multiplicative)



The terms foreground and background are often a source of confusion when used for chroma keys. Foreground refers to the people or objects in a chroma key scene that are in front of the colored backdrop. Background refers to the scene that will replace the backing color (same as a linear or luminance key) in the final picture. Background does *not* refer to the backdrop of the foreground scene.

Chroma keys are performed by suppressing the backing color in the foreground scene, cutting a hole in the background, and then combining the two processed signals. When conditions are ideal, complete suppression of the backing color is possible and the hole cut in the background will match the suppressed foreground, permitting these two signals to be added successfully. This is called an additive chroma key (used when the Zodiak system Foreground Reshaping feature is off). When conditions do not permit adequate backing color suppression, the foreground with its backing color suppressed can be multiplied by the keying signal to prevent contaminating areas of the background outside the keyed area. This is called a multiplicative chroma key (used when the Zodiak system Foreground Reshaping feature is on). Setting up a successful chroma key setup involves many more adjustments than other keys. No amount of adjustment, however, can overcome problems caused by an improperly set up studio chroma key scene.

Primary and Secondary Color Suppression

As described above, chroma key primary color suppression replaces the old backing color with black before replacing it with the new background video. It usually has a very low selectivity and therefore suppresses a wide range of colors. The goal is to suppress as much of the backing color as possible without affecting foreground regions.

Secondary suppression is essentially a second chroma keyer that can be used to deal with areas where the backing color passes through some translucent portion of the foreground object, like smoke or liquid. This also includes hair since fine detail often mixes with the backing color. The goal of secondary suppression is to restore the natural color of the foreground object. In general, medium to high selectivity values will be used.

Primary and secondary suppression adjustments are used to select the hue to be replaced and for adjusting the luminance and chrominance levels in the areas of the picture where suppression is applied.

Flare Suppression

Flare suppression can be used to compensate for backing color reflected onto foreground objects, or for lens flare (backing color reflections within the camera lens). In these cases, the foreground object will take on a slight greenish or bluish tint. Flare suppression subtracts a slight amount of the primary suppression color from the foreground.

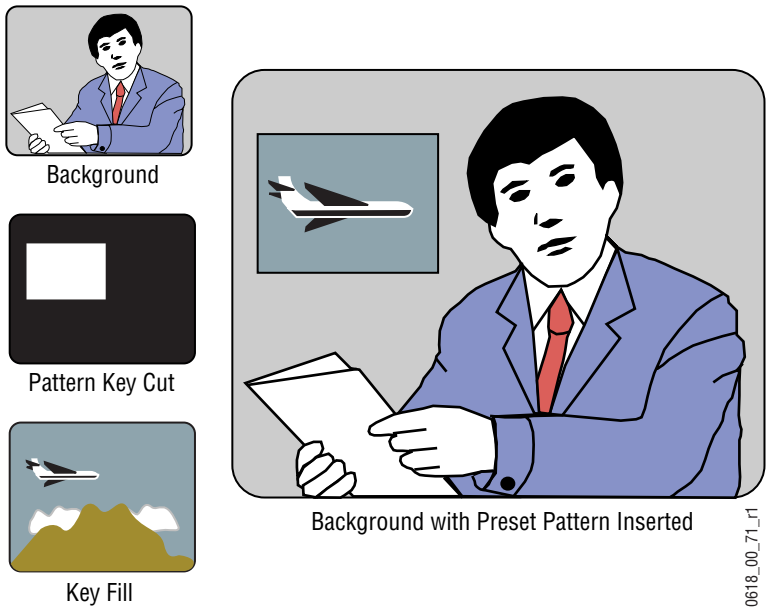
Chroma Key Shadow Generator

The Zodiak system has a shadow generator that can be used to include shadows that fall on the backing area of the scene in the background. Shadow offset, range, and density controls are also available that offer control over the placement and appearance of the added shadow.

Preset Pattern

A preset pattern uses a wipe pattern generator, rather than an incoming key cut signal to define the hole cut in the background. Key clip and gain controls are not available for a preset pattern, but controls over the location, size, border, opacity, and edge softness are available.

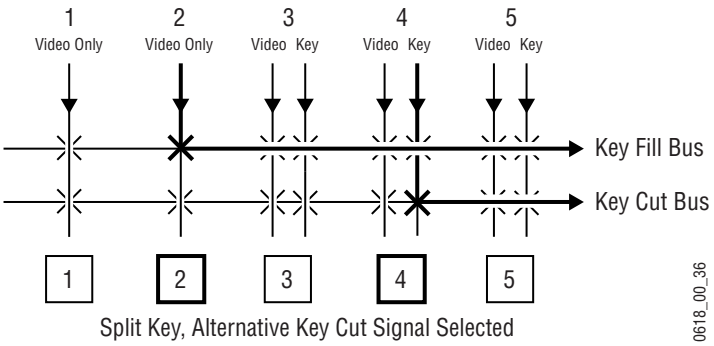
Figure 23. Preset Pattern



Split Key

A split key uses an alternative key cut signal for keying. On the Zodiak system, a key split is performed by selecting the desired key fill signal, then selecting an alternative signal to be used as the key cut (Figure 24).

Figure 24. Split Key

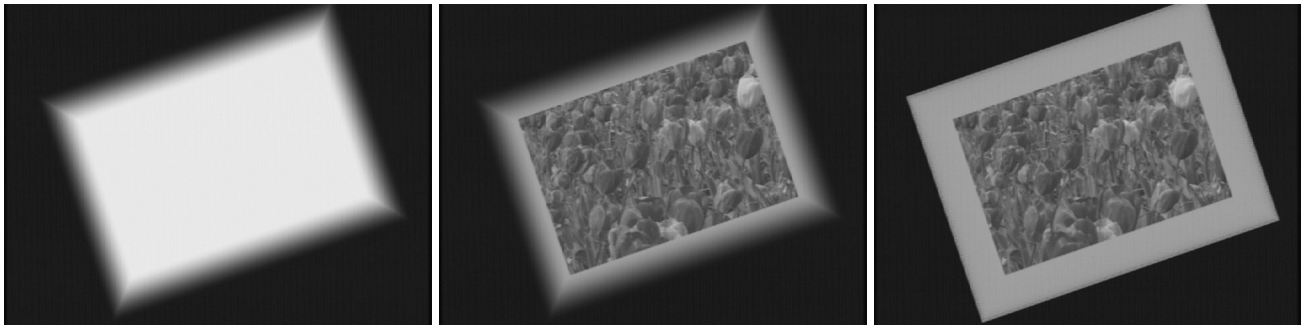


Note that if the key fill video has been shaped by an external device, this previously shaped video will not match the different key cut signal selected for the split key. Split keys normally treat the fill as unshaped since by definition a split key uses a fill that is not related to the cut. The Zodiak system gives the operator the ability to override this assumption for use when a cut and fill are brought into the switcher from two separate sources, such as a pair of DDRs producing related video and key signals.

Properly and Improperly Shaped Video

The following illustrations show the results of using correctly and incorrectly shaped video. In these examples, the video fill comes from a DPM that provides both a key signal and a fill video signal (a linear key). The DPM's key signal, fill video that has been set as a shaped output, and fill video set as unshaped is shown in Figure 25.

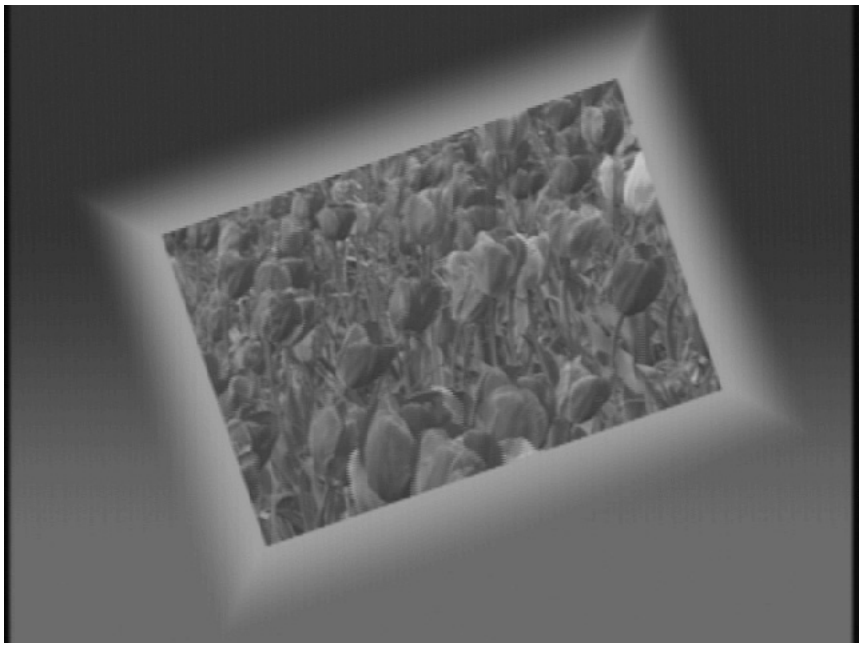
Figure 25. Video and Key Signals from DPM



DPM Key Signal | DPM Shaped Key Fill | DPM Unshaped Key Fill

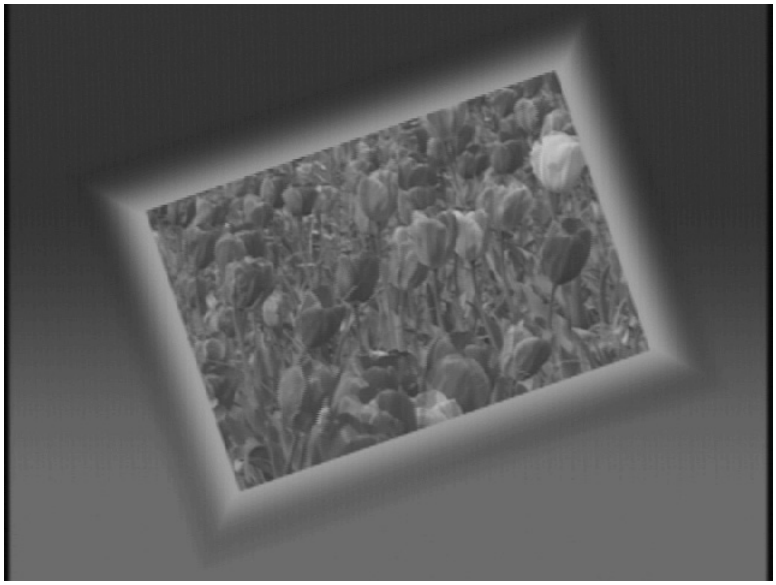
When the shaping is configured properly (using either shaped or unshaped key fill) the desired output is the result (Figure 26).

Figure 26. Correctly Shaped DPM Key Example



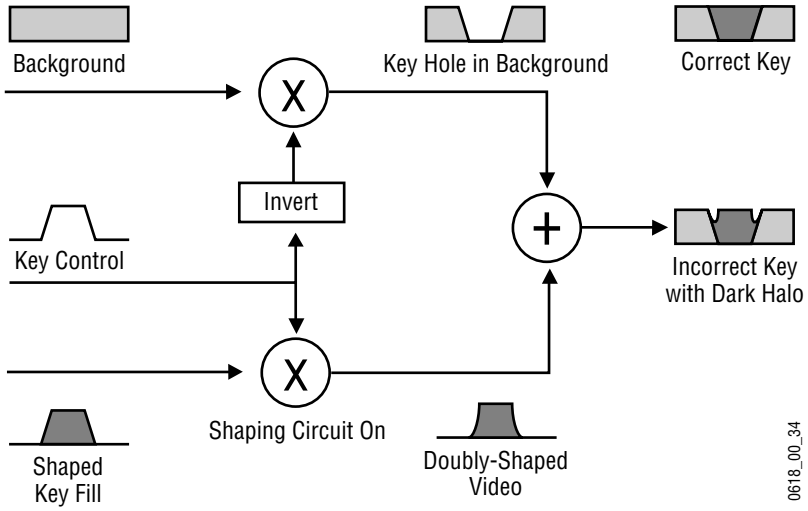
When the DPM provides a shaped video output but the key is processed as though it were unshaped, the shaped video does not completely fill the key hole in the background so a dark halo appears around the key (Figure 27).

Figure 27. Incorrect Key with Dark Halo



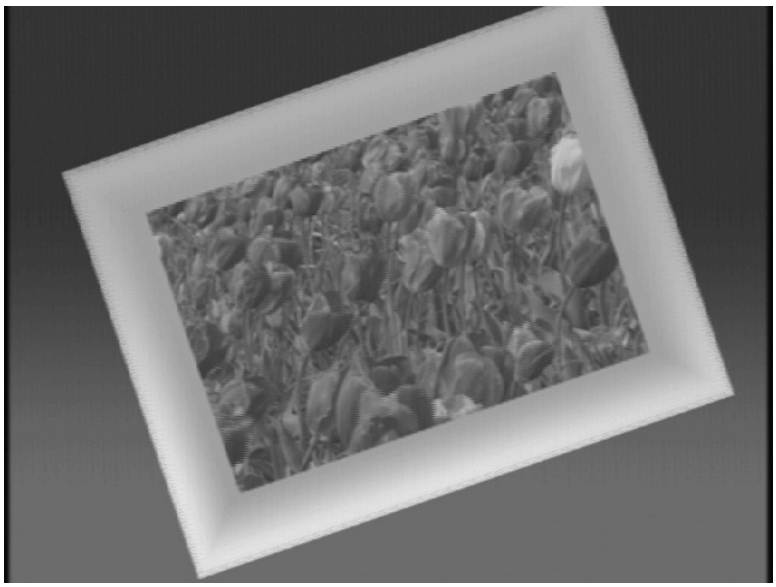
In this case the shaped input is incorrectly shaped again, sometimes called a double-multiply (Figure 28).

Figure 28. Incorrect Keying with Shaped Input



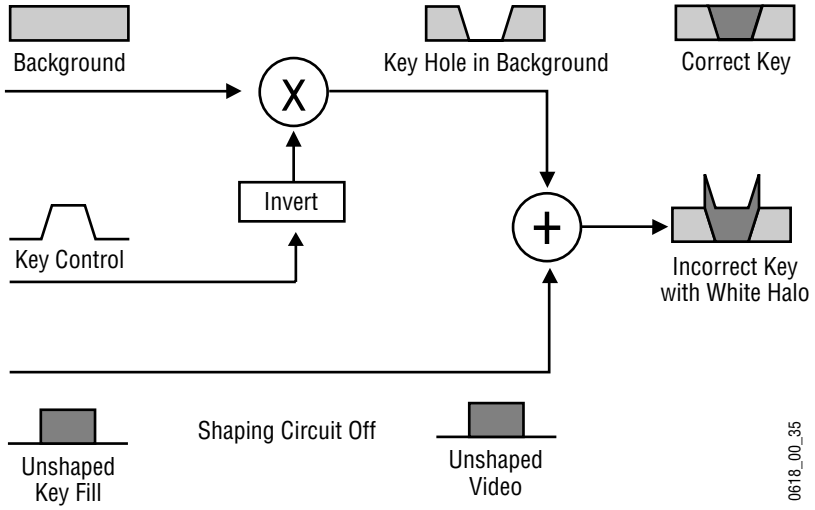
When the DPM provides an unshaped video output but the key is processed as though it were shaped, excessive luminance occurs where the key fill video and key hole edges overlap, producing a white halo around the key (Figure 29).

Figure 29. Incorrect Key With White Halo



In this case the unshaped video fails to be shaped at all (Figure 30)

Figure 30. Incorrect Keying with Unshaped Key Fill



Recognizing the appearance of improperly shaped video helps you know how to correct the problem should it occur.

E-MEM (Effects Memory)

Grass Valley Group developed the E-MEM (Effects Memory) system to provide a way of storing effects for later use. An effect defines parameter settings that determine how the selected video sources are processed. An E-MEM effect is *learned* into an effect *register*, and can then be *recalled* at a later time with a single button press. Effects can be edited after they have been learned, and effect data can also be saved to and loaded from disk.

Work Buffer

The *work buffer* is a fundamental aspect of system operation. The work buffer contains the current state of the system, specifying the sources selected and the video processing applied to those sources. The work buffer tracks all the system parameters, including those that do not have controls delegated. As the operator delegates and alters control panel and menu settings, the associated parameters in the work buffer change. If any altered work buffer parameters affect the video outputs of the switcher, the appearance of these outputs will change accordingly.

Keyframe

A single set of processing control settings can be called a *keyframe*. A keyframe defines the state of all or a portion of the switcher. Keyframes are stored in E-MEM effect registers. Two types of information are associated with a keyframe:

- On/off settings, including source selections, and
- Parameter settings (variable adjustments).

For example, an effect can consist of a keyframe specifying source 1 on M/E-1's background A bus, source 2 on its background B bus, a horizontal wipe transition type, and a border. These are button settings, as they can be turned on and off. The border could be thick and colored red. These are parameter settings because a range of continuous values are available.

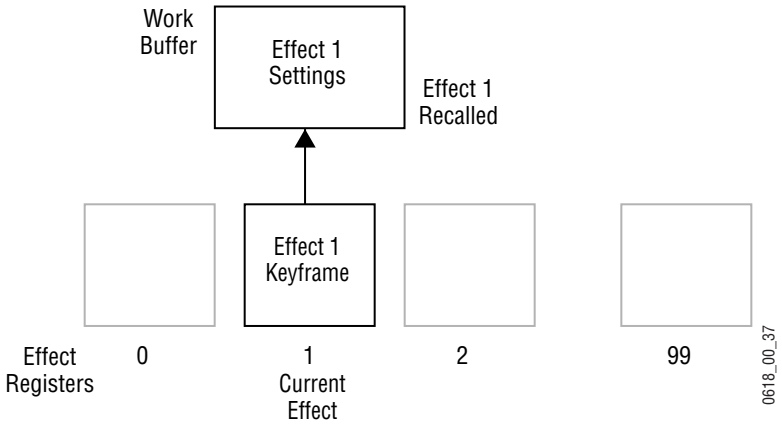
Note that this effect could be learned as a 30 frame effect dissolve (described later in this section), which also has a time value.

Effect Register, Work Buffer, and Current Effect

For clarity, the following description uses single keyframe effects. Multiple keyframe effects are discussed later (see page 64).

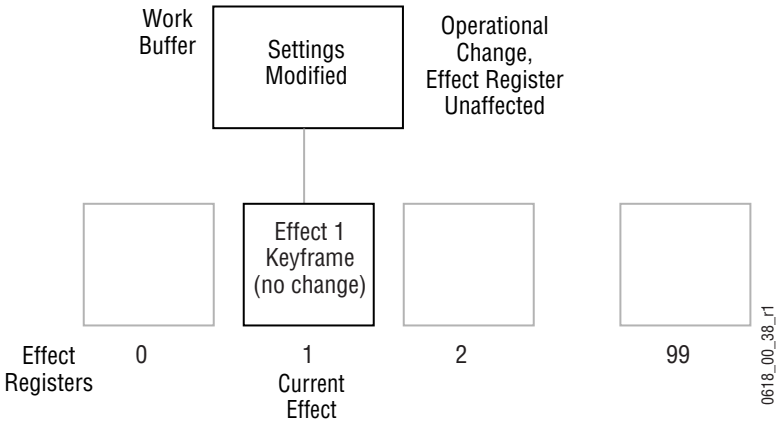
The Zodiak system has 100 E-MEM registers (numbered 0 - 99) able to store operational settings for immediate recall. Effect register data must be applied to the work buffer before these settings can affect the system. When an effect register is recalled, keyframe data is loaded into the work buffer, and that register number becomes the current effect (Figure 31). The current effect is an important concept, as it defines a relationship between the effect registers and the work buffer. Only a current effect can be run or edited.

Figure 31. Work Buffer and Current Effect



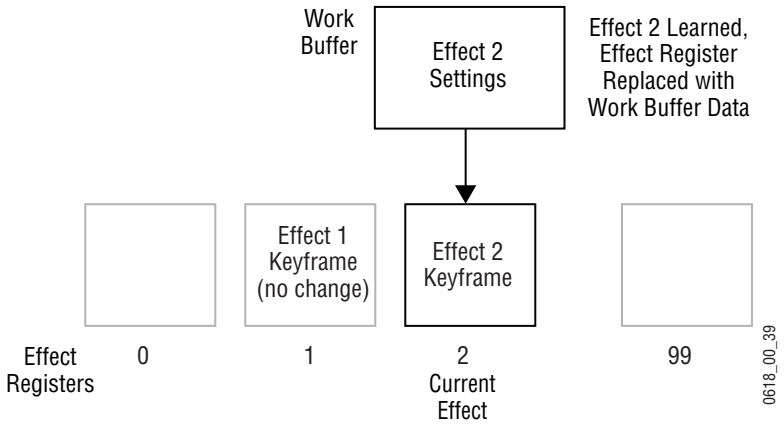
The work buffer actually holds a copy of some of the effect register information. When an operator changes a control setting manually, the work buffer settings change but the effect register data itself remains unaltered (Figure 32).

Figure 32. Work Buffer Operational Change



When an effect is learned, the current operational settings in the work buffer are loaded into the specified effect register, overwriting any information that was in that register. If a register different from the current effect is learned, the information is loaded into it and that register becomes the current effect. In this case the original effect register will not be altered, and can be instantly recalled to return the system to its earlier state. (Figure 33).

Figure 33. Learn Operation Changes Effect Register



Effect registers can be locked to prevent them from being altered, and they can be saved to disk and reloaded and recalled for use at a later time.

Banks and Registers

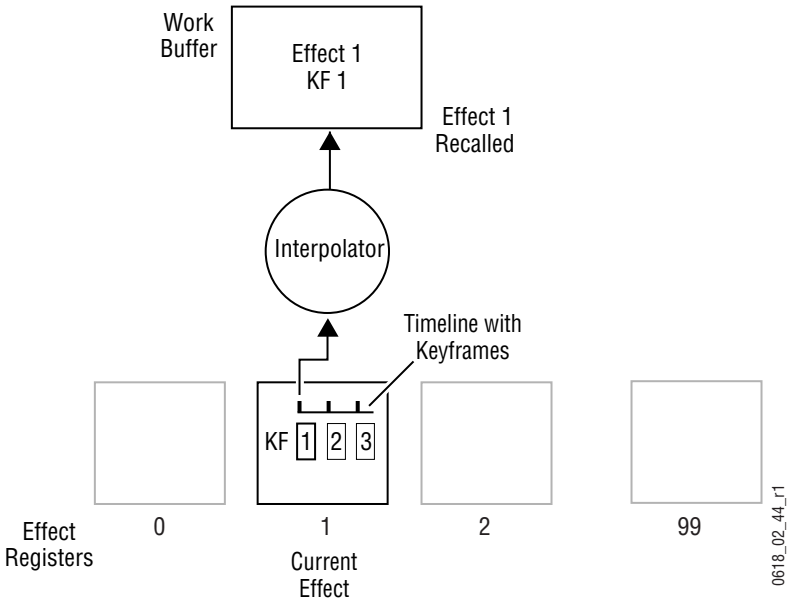
The Zodiak E-MEM and Master E-MEM control panels are optimized for rapid recall of effects during live production. The Zodiak system's 100 effect registers can be thought of as being organized into banks (numbered 0 to 9), with each bank containing ten registers (also numbered 0 to 9). For example, register 46 means bank 4, register 6. This organization is for user convenience, to allow immediate single button effect recall from ten different registers, and for clearing, copying, and saving to and from disk banks of registers with a single operation.

Multiple Keyframes and Timelines

A *timeline* is an arrangement of keyframes in linear time order. A multiple keyframe effect contains a series of two or more keyframes on a timeline. Each keyframe has a position on the timeline, specifying its location in time in the effect. The timespan from one keyframe to the next keyframe can be considered that keyframe's *duration*. The sum of these durations generally determine the total duration in time of the effect.

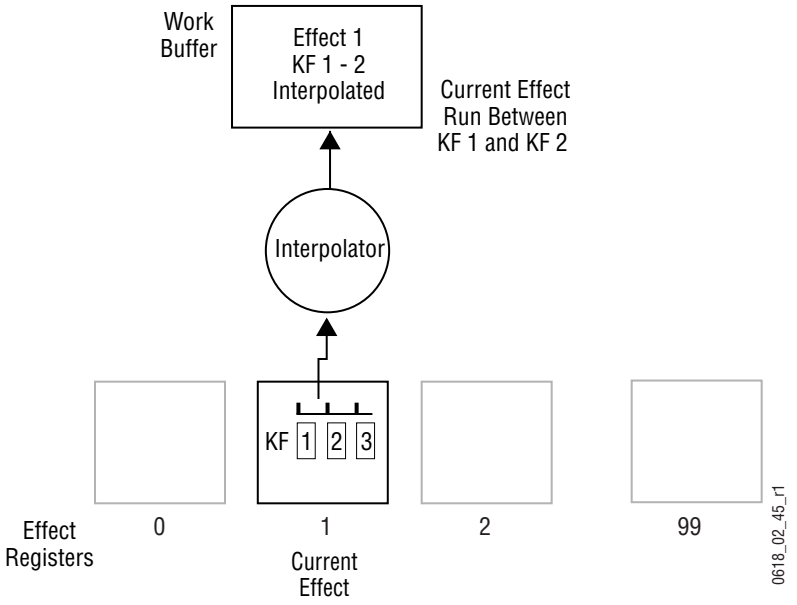
When a multiple keyframe effect is recalled from an E-MEM register, only its first keyframe is loaded into the Work Buffer (Figure 34). This is exactly the same as the recall of a single keyframe effect.

Figure 34. Keyframe Effect



The only difference between a single and multiple keyframe effect is a multiple keyframe effect can be run after it has been recalled. Running an effect changes the state of the system from keyframe to keyframe. During the effect run the values between the keyframes are usually interpolated (Figure 35).

Figure 35. Keyframe Effect Run



The interpolated Work Buffer values created during the effect run do not exist in the effect register. Instead, *path* information saved in the effect determines the type of interpolation to be used between each pair of keyframes.

As each keyframe location is encountered on the timeline, the Work Buffer values at that moment in time will exactly match those specified by that keyframe in the effect register. Note that this is very similar to an effects dissolve and effects sequence of multiple registers, but keyframing uses only one register and also offers path control.

A keyframe in an effect can be changed by applying Work Buffer values back to the current effect register (Modify). The new values can modify an existing keyframe, or they can be inserted between keyframes (called *inserting on the path*). It is also possible to Learn, rather than Modify, an existing effect. However, the Learn operation overwrites all existing keyframes in the effect with one new set of work buffer values. A single keyframe effect is the result, and all the other keyframes in that effect are lost.

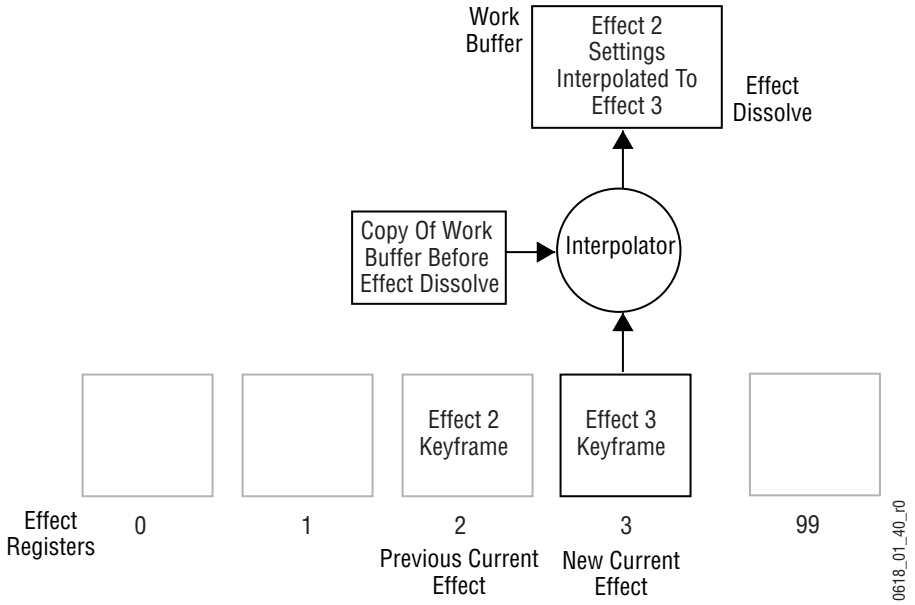
Effect Dissolve

Effect dissolve produces a smooth transition from the current state of the work buffer to the state defined in a recalled register. Effect dissolve first takes to the source and other button settings specified as a starting point in the effect register. The parameter settings in the work buffer then smoothly change so they match the settings of the recalled effect register. Effect dissolve can also simultaneously perform a transition to the specified ending sources at a specified duration.

An interpolator is used to smoothly change the parameters settings involved in an effect dissolve. Before performing an effect dissolve, source and other button settings in the work buffer should be compatible with those in the effect dissolve register. This prevents an abrupt change when the new button settings are taken, and so permits smooth transitions between sources. One way this can be accomplished is by using two different, but complimentary, effect registers.

For example, if register 2 contains compatible button settings, it can be recalled into the work buffer. If an effect dissolve is then performed to register 3, the transition occurs and the parameters from register 2 in the work buffer are interpolated to those of register 3. Register 3 becomes the new current effect (Figure 36).

Figure 36. Effect Dissolve

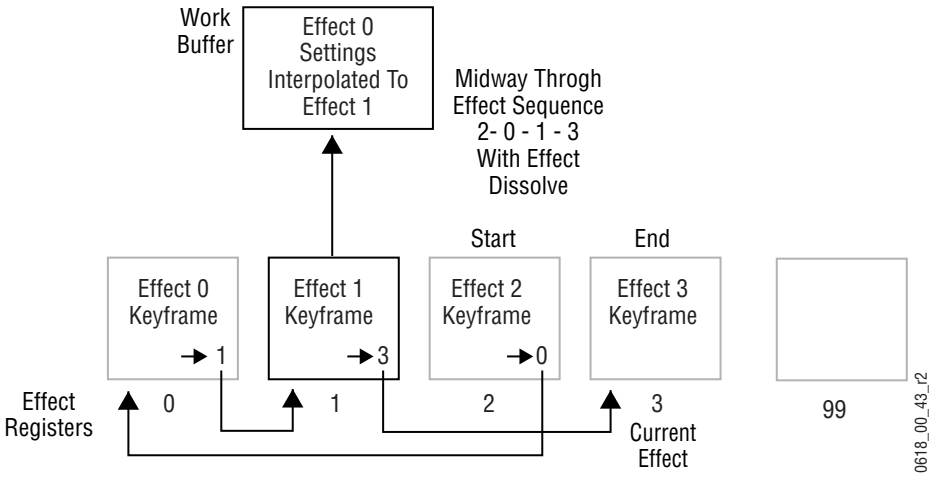


Note that the effect dissolve does not occur directly between two registers, and the transition aspect is handled separately from the interpolated parameter values. If work buffer parameter settings are changed before an effect dissolve, the current modified work buffer values (but not the source and button settings) will be smoothly interpolated to the new register values.

Effect Sequence

Effect sequence allows the operator to chain a set of specified effect registers together. Recalling the first register can initiate a sequential recall of all the registers in the sequence. As each register is recalled, its settings will be applied to the work buffer and the appearance of the system's output signals will change if they are affected. Delays can be programmed that determine when the next register in the sequence will be recalled. Effect dissolves can also occur as each register is recalled, though this is not required (Figure 37).

Figure 37. Effects Sequence



In the above example, recalling effect 2 as a sequence will proceed from register 2 to register 0 to register 1 to register 3. A sequence can begin from any of the effect registers in the sequence. For example, in the above example if register 0 is recalled, the sequence will proceed from register 0 to register 1 to register 3.

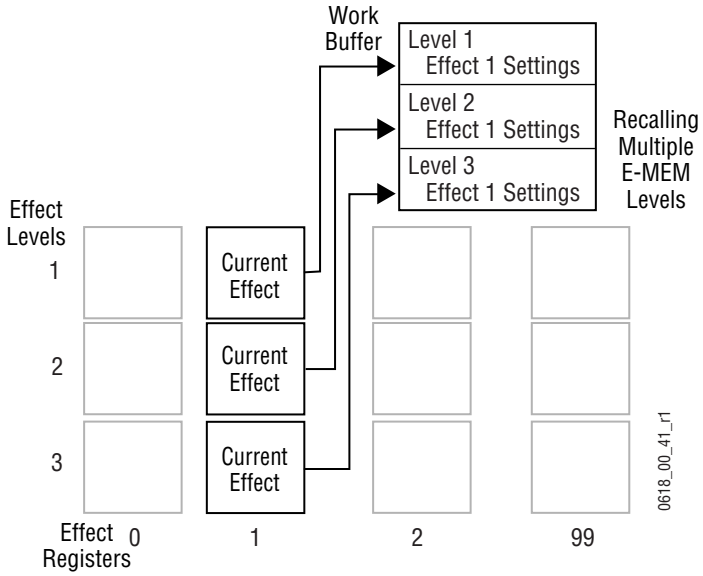
Effect dissolves can occur within a sequence. The interpolator described earlier is used to smoothly change to the next register in the sequence.

E-MEM Levels

The E-MEM system is divided into functional areas, called *levels*. Each effect level corresponds to a specific set of system operational controls, or to an individual interface to an external device. Effect levels are used to allow the operator to store and recall settings for specific system control areas without disturbing settings for other control areas. For example, on a 2-M/E Zodiak system each M/E has its own level. Each level also has its own set of effect registers. The settings for M/E 1 can be recalled without changing the settings for M/E 2, or PGM PST. The work buffer is actually divided into sections that correspond to each effect level.

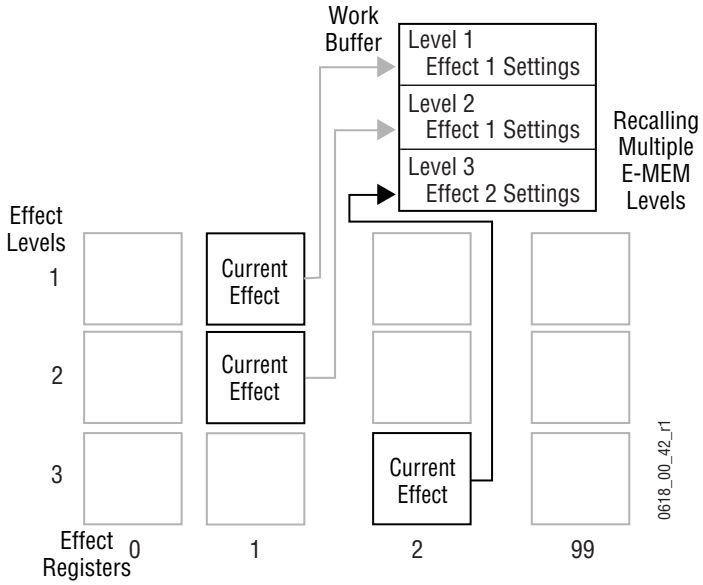
The earlier E-MEM discussion was simplified to explain basic concepts. Actually, register learn and recall operations and work buffer modifications apply to each level of an effect, though multiple levels of an effect can be changed simultaneously. Settings for each level's E-MEM register is applied to the corresponding level of the work buffer (Figure 38).

Figure 38. E-MEM Levels



If only one effect level is selected for a recall, the resulting change is only applied to its level in the work buffer. The other levels of the work buffer remain unaltered. Note that this makes is possible to have current effects from different registers, also called a *skewed effect* (Figure 39).

Figure 39. Single Level Recall

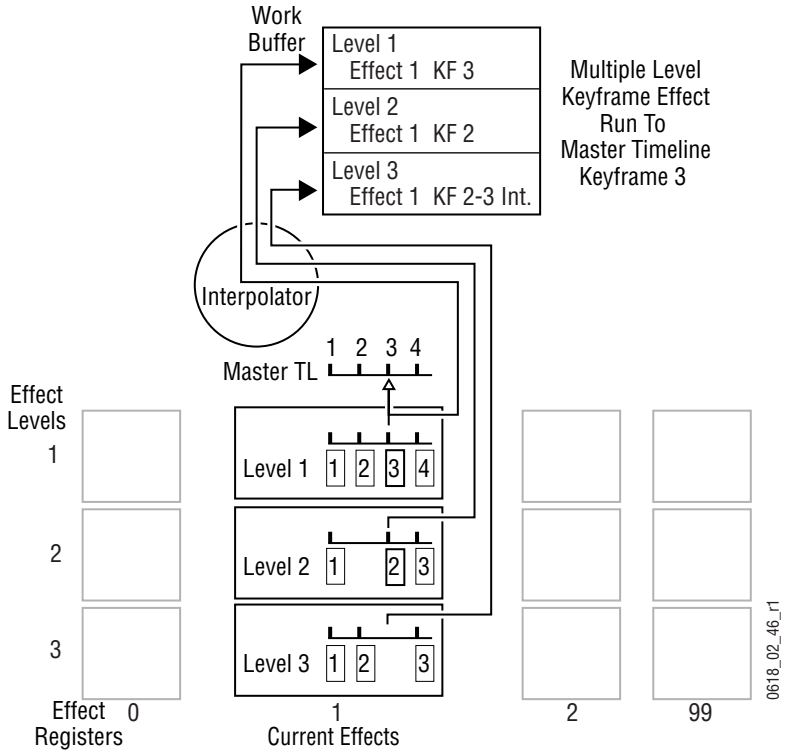


Master Timeline and Multiple Level Keyframe Effects

A *master timeline* exists to coordinate the activity of the individual level timelines. The master timeline contains a master timeline keyframe at every point in time where a keyframe exists on any of the level timelines. Keyframes from the levels are projected to the master timeline. If more than one level has a keyframe at a particular time, only one keyframe is projected to the master timeline. The master timeline keyframe can be considered a representation of the sum total of all the parameters in all the timelines that have keyframes at that point in time. However, the master timeline and its keyframes are an organizational tool only. Master timeline keyframes are not saved to a register or to the Work Buffer. The master timeline is constructed in real time, depending on what levels are in use by the effect.

When a multiple level keyframe effect is run, each level generally runs simultaneously, guided by the location of a *time cursor* on the master timeline. The time cursor represents the *current time* of the effect. As the time cursor moves, the Work Buffer is updated with the changing parameters. Figure 40 shows an effect with its time cursor located on master timeline keyframe 3.

Figure 40. Keyframe Effect and Master Timeline



An *edit cursor* is also available, which can be used during effect editing. Usually the time and edit cursors are superimposed together and move as one. When separated, editing actions occur at the edit cursor location.

Number and Types of E-MEM Levels

The Zodiak system supports a large number of E-MEM levels because of the many different sets of operating controls available. E-MEM levels for the following functional areas exist.

- Each M/E primary partition
- Each Background Matte Generator
- Each Aux Bus
- Each External Digital Effects System
- Each DDR, VTR, Character Generator, and Graphics System
- Each GPI output
- Each Zodiak Still Store output
- Each PBus 2 address
- Each MIDI device (in development)
- R-MEM (in development)

The actual number of levels in a particular system will vary, depending on the Zodiak configuration settings and the number of external devices.

Enable Groups

During system configuration (Suite Preference) E-MEM levels are assigned to 8 Enable control panel buttons, which are then used to control when their assigned levels are active, or enabled. More than one level can be assigned to each Enable button. The group of levels enabled by a single button is called an *enable group*. This mechanism allows the control grouping to be changed to meet different applications, and permits control of multiple related levels with a single button.

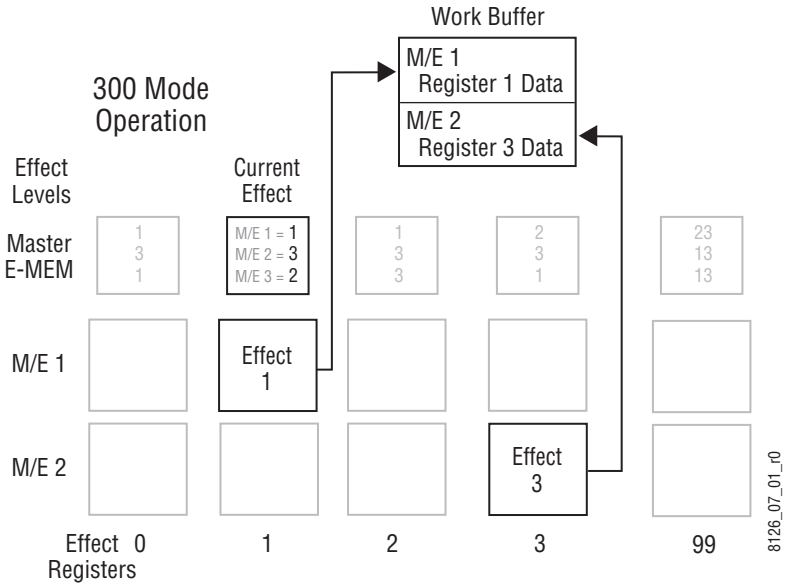
Auto Recall and Effect Levels

The Zodiak system has an Auto Recall feature. This feature makes a recalled effect automatically enable all the levels that were involved in that effect when the effect was learned. This is a useful feature, since is can be difficult to remember all the levels involved in every learned effect, and time is required to manually enable levels before recall. The Auto Recall feature is on by default, but can be turned off to permit manual level enabling.

300 Mode E-MEM Operation

The proceeding discussion explained the Normal E-MEM operating mode. 300 Mode is an alternative Master E-MEM method of operation that mimics the behavior of the Grass Valley Group Model 300 switcher. In this mode, Master E-MEM Learn operations store the register numbers of the individual M/Es, allowing the recall of different combinations of M/E registers with a single button press (Figure 41).

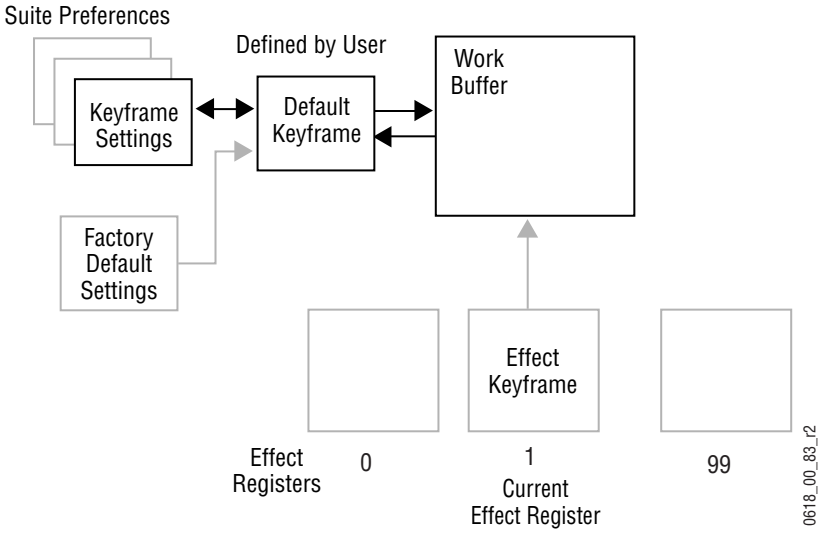
Figure 41. E-MEM 300 Mode Diagram



Default Keyframe

An important E-MEM concept is the Default Keyframe. A Default Keyframe is a standard collection of effect settings. When the work buffer is cleared, the initial settings it receives will be those defined as the Default Keyframe. The Default Keyframe does not alter effect registers and does not change current source selections or panel delegations, which should only be changed directly by the operator (Figure 42).

Figure 42. Default Keyframe



The operator can define exactly what these default settings should be (Suite Preference), and these settings can be stored and reused to meet varying requirements. A separate set of factory default settings also exist that cannot be changed, but may be loaded to the Default Keyframe and then to the work buffer, typically for system test and initial system installation.

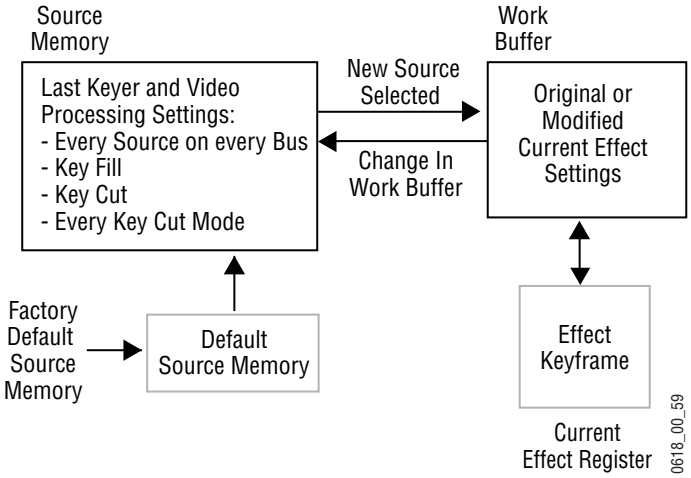
Source Memory

Source memory is a Zodiak system feature that retains the last settings of keying and video processing parameters used for each source on each bus. Source memory permits the operator to hot cut from one key to another and retain the settings for each source. Source memory keying settings include Clip, Gain, Mask, and many other parameters used for various keying functions. Video processing (proc amp) settings include Luminance, Chrominance, DC Offset, etc. The source memory feature can be turned on and off by the operator.

Work Buffer, E-MEM, and Source Memory

When source memory is on, it tracks the work buffer's source selection for each bus. Whenever a new source is selected on a bus, the last settings used by that new source are loaded into the work buffer from source memory. Source memory settings are automatically updated when corresponding values in the work buffer are changed. For example, suppose Source 1 has a clip level of 50%, and Source 2 has a clip level of 70%. Selecting Source 1 applies its last used source memory setting to the work buffer (50%). Adjusting its Clip level to 40% in the work buffer also modifies the corresponding source memory of Source 1. Selecting Source 2 recalls its last used source memory settings (70%), not those used by Source 1. Selecting Source 1 again applies its modified setting of 40%, not its earlier setting or the setting used by Source 2 (Figure 43).

Figure 43. Source Memory and Work Buffer

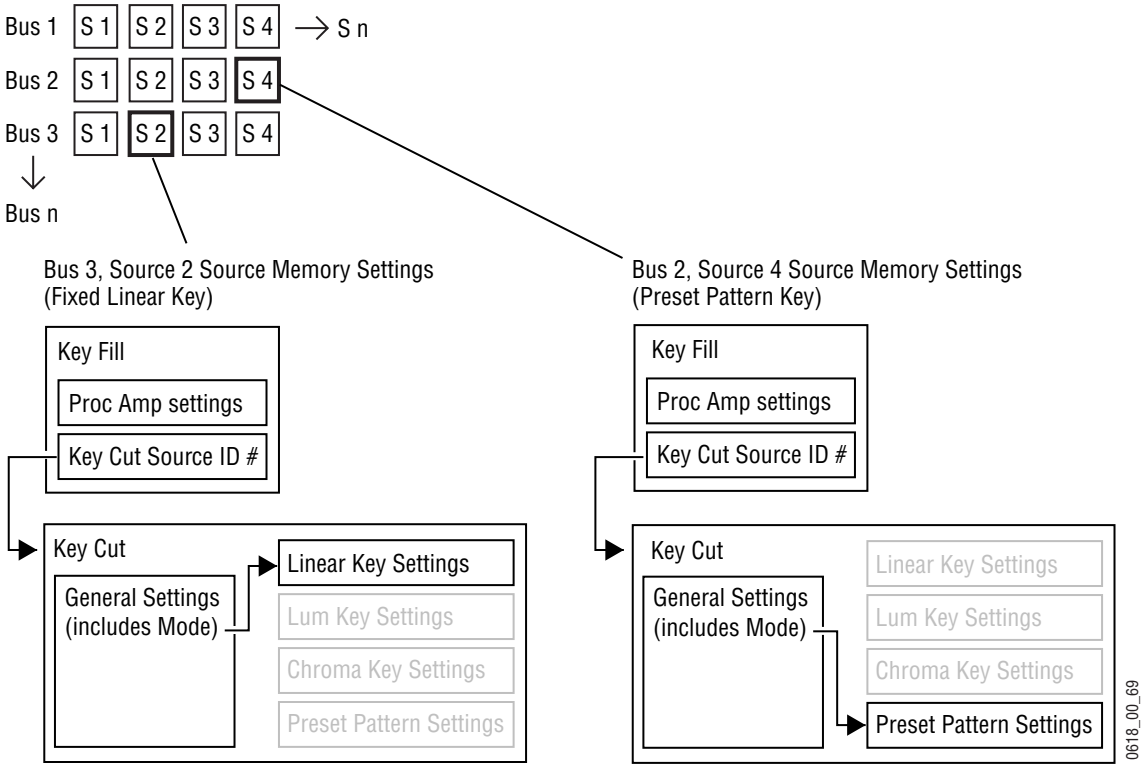


Source memory is separate from the E-MEM system, though they are related to one another through the work buffer. When an effect is learned to a register, the keyer and video processing settings for the sources involved are saved to that register. When an effect register is recalled, the sources selected on a bus will use settings from the recalled register, not from source memory. This recall changes the work buffer. When source memory is on, the source memory for each source involved in the recall is updated with the changed work buffer values, and so each source memory will initially have the same values as the recalled register. Subsequent changes to work buffer settings will update the source memory of each source, but these changes are only saved to an E-MEM register if the effect is relearned.

Source Memory Organization

Each source on each Zodiak bus has its own source memory. Source memory parameters for each source are organized into groups to allow some settings to be remembered and applied independently to meet different requirements (Figure 44).

Figure 44. Source Memory Organization



Because a Zodiak source may have two signals (key cut and key fill), different groups of source memory parameters are associated with each signal. The Zodiak system key buses always have key cut and key fill signals. The background A and B buses that do not have key cut signals do not use the key cut group of source memory parameters.

Source memory for the key fill signal has video processing (proc amp) parameters, and also specifies which key cut signal to use. Source memory for the key cut signal contains all the keying parameter settings. Some of these keying parameters are in turn organized into four subgroups, or key modes. These modes correspond to linear key, luminance key, chroma key, and preset pattern. A parameter specifying which of the four modes is being used is included in the key cut portion of source memory. This means with source memory on, selecting a source with a key fill and a key cut signal will automatically apply any proc amp settings to the key fill, select the last used key cut signal which specifies the key mode, and the last used

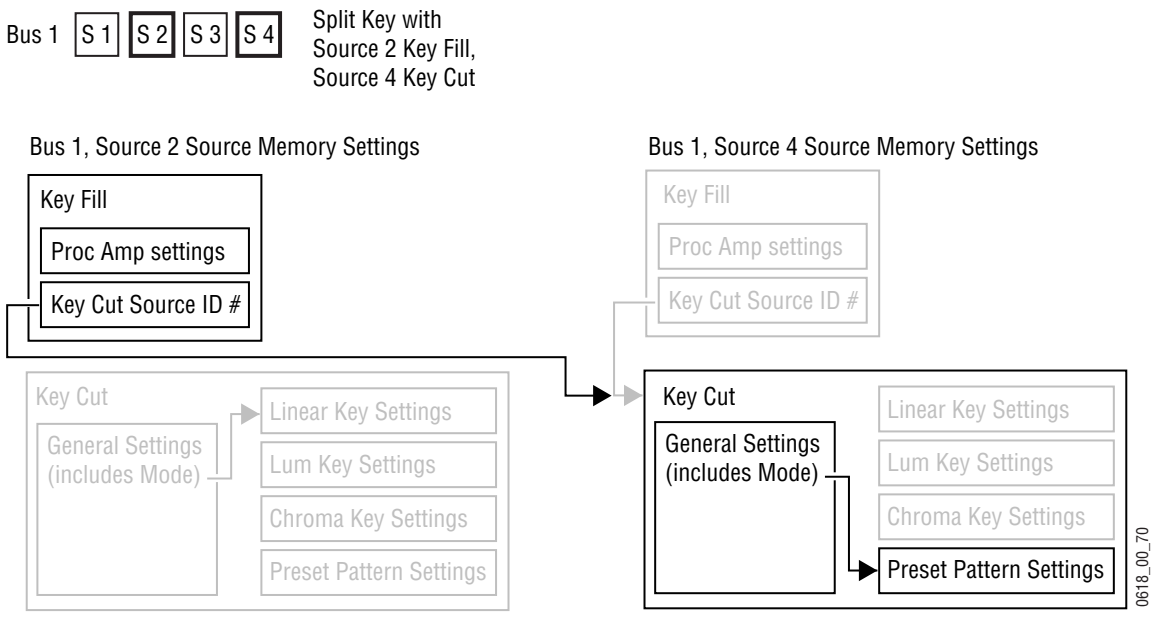
key memory settings for that key mode will be applied to the key cut signal. This organizational structure allows source memory to retain different settings for the same source, and it also accommodates split keys.

Because each source on each bus has its own source memory, different settings can be used for the same source on different buses. For example, Camera 1 on M/E 1 Key 2 can be set up as a chroma key. At the same time, Camera 1 on M/E 1 Key 3 can be set up as a luminance key with a black and white proc amp setup. Calling up that same source on different buses provides different keying effects.

Different source memory settings are retained for the different key modes. These different settings can be applied to the same source on the same bus, as needed. For example, a camera source on M/E 1 Key 1 can be setup for both a chroma key and a preset pattern. The operator can choose the key type for that source as the session requires. Choosing a chroma key will recall its latest chroma key source memory settings, which can then be altered without changing the preset pattern source memory settings. Choosing preset pattern on that same source and bus later in the session will recall its unaltered source memory settings.

When a key split is performed a different key cut signal is selected for use. On a Zodiak system with source memory on, that new key cut source's key mode and keyer settings will be used for the split key (Figure 45). This is different from the Grass Valley 4000 switcher, which associated its source memory only with the key fill signal.

Figure 45. Source Memory and Split Key



Default Source Memory and Factory Default Source Memory

Default source memory settings can be set for every Zodiak source, and these defaults can be restored by an operator when desired (Figure 43). The defaults for a source are not bus specific. The same default values for a source are used on every Zodiak bus. Default source memory is a Suite Preference.

A fixed factory default source memory that cannot be changed by the end user is also included in every Zodiak system. Factory default source memory is provided to be a starting point for building a custom source memory set.

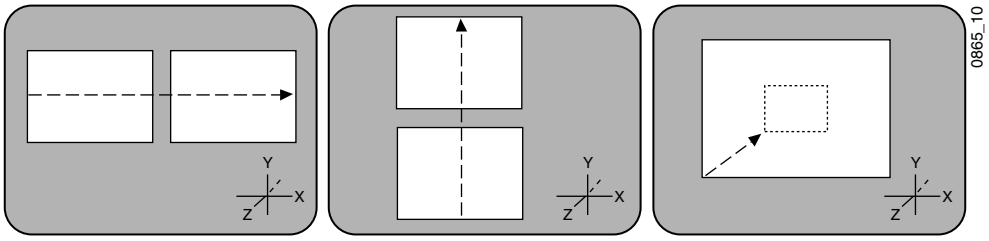
3-D Digital Effects Concepts

The Zodiak Transform Engine options provide 3-D planar image translation and transformation from within the Zodiak system. Image translation has special basic concepts and terminology you should understand in order to get the most out of using the option.

Translation and Transformation

Translation is a subset of transformation, and involves picture movement along the X, Y, and Z axis. The picture is simply relocated to a different place and does not change in actual size or shape (Figure 46).

Figure 46. Picture Translation

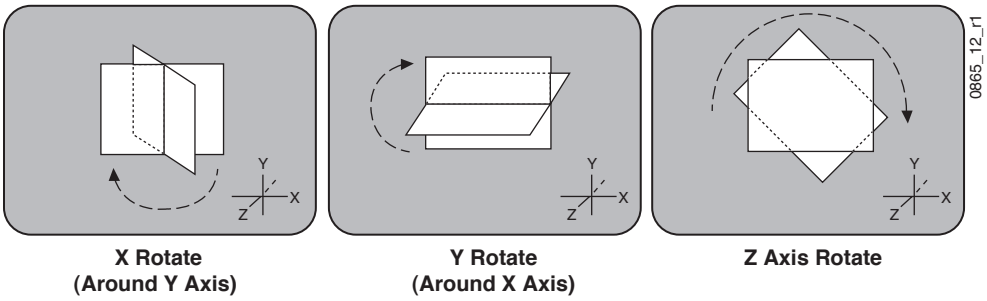


Transformation includes translation, and also includes these other functions:

Size — Enlargement and reduction of the picture area while it remains in the same plane in 3-D space. This is different from picture translation in the Z axis, where the picture retains its original size, but appears smaller when moved away, and larger when moved closer.

Rotate — Picture rotation about the reference axis in the X, Y, and Z dimensions (Figure 47). Rotate is limited to ± one half revolution, and will always take the shortest path to the new position. Rotate uses Quaternian math to calculate the move with increased accuracy. Multiple rotations are performed with the Spin function.

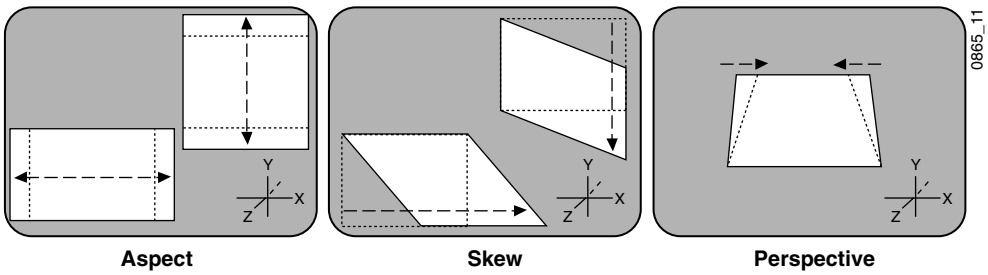
Figure 47. Rotate



Spin — Supports multiple rotations about the reference axis in the X, Y, and Z directions. Spin supports fractional values, and is similar to Rotate when the move is less than ±. one half revolution. Spin uses Euler math to calculate the move, which is not quite as precise as Quaternian, but permits multiple rotations. Spin applies transform values in Z, X, Y order, so editing effects in this axis order provides the best control of the effect.

Note Following broadcast conventions, moving the Joystick froward or back along the Joystick's Y axis rotates the top of the picture forward or back (a rotation about the X reference axis). Similarly, moving the Joystick left or right along the Joystick's X axis rotates the side picture left or right (a rotation about the Y reference axis).

Figure 48. Aspect, Skew, Perspective



Aspect — Scaling the X or Y components of the picture. X axis changes affect horizontal size, Y axis changes affect vertical size (Figure 48). Z axis changes affect both X and Y dimensions, and is the same as Size.

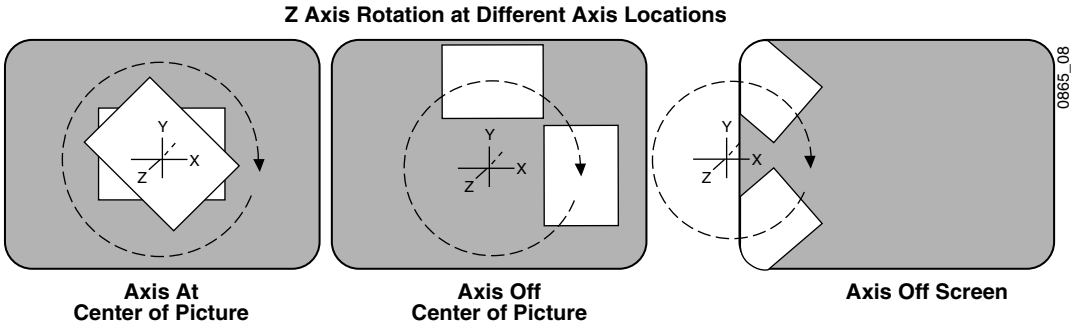
Skew — Slanting the picture in the X (horizontal) and Y (vertical) directions (Figure 48).

Perspective — Changing the viewer's apparent viewpoint of a picture. This only applies when a picture is tilted so part of it is farther from the viewer. The farther portion appears smaller than the closer portion, and the amount of perspective controls how much smaller the distant part is (Figure 48). Multi-channel perspective is discussed later in this section.

Axis Location

The axis location of the channel determines the center point of translations, spins, and rotations for that channel. You can move the axis to a new location to change the behavior of that channel. The axis location can be within or outside the screen area (Figure 49).

Figure 49. Frame of Reference Axis Locations



Source and Target Space

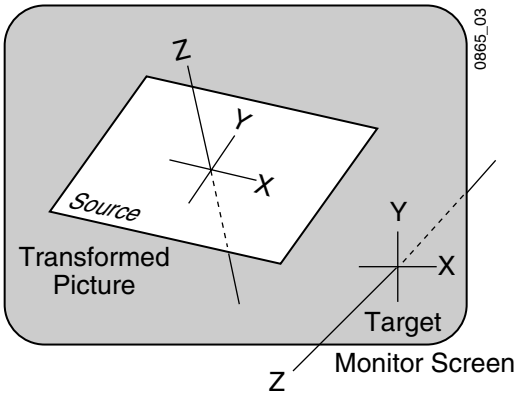
The Zodiak Transform Engine uses source and target space frames of reference.

- Source space for a control channel uses that channel's coordinate system for reference.
- Target space for a channel uses the next higher level's coordinate system for reference.

Being able to use both source and target space can help make effects editing easier. One frame of reference may offer a simple and easy to understand context for a picture transform, while in another frame of reference the same transform may be difficult to understand and control. Zodiak Transform Engine effects can also employ both source and target space directed transforms simultaneously, which can create complex and beautiful effects.

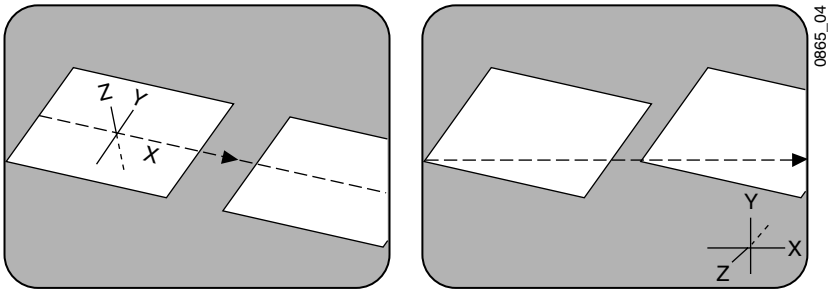
The simplest example for source and target space concerns a channel that has been rotated while the global channel remains unchanged (Figure 50).

Figure 50. Source and Target Space



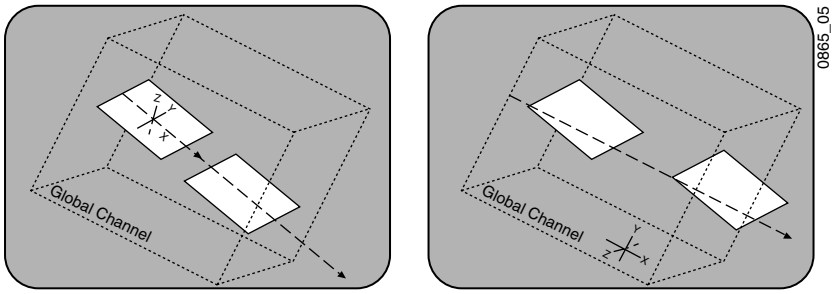
In this example the source space for the channel is referenced to the picture itself (tilted back at an angle) while the target space is referenced to the monitor screen (straight). X axis translations will move this picture differently, depending on whether source or target space is being used (Figure 51).

Figure 51. Source and Target Space Translation



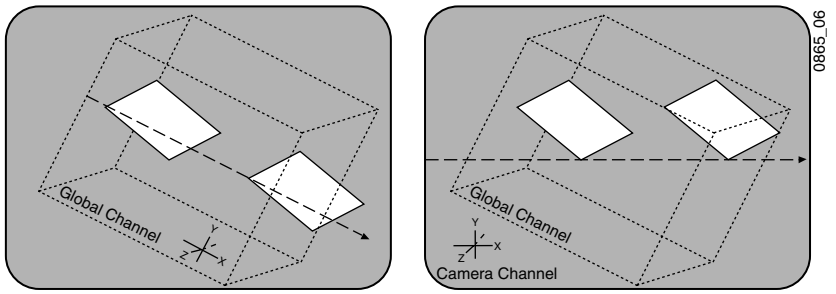
If the channel is controlled by a global channel, and the global channel itself has been rotated, an X axis translation will depend on whether the channel itself or the global channel is being manipulated, and whether source or target space is being used (Figure 52 and Figure 53). Note that the target translate of the channel is the same as a source translate of the global channel.

Figure 52. Channel Translate with Global Rotated



Logical Channel Source Translate Along X-Axis | **Logical Channel Target Translate Along X-Axis**

Figure 53. Global Channel Translate with Global Rotated

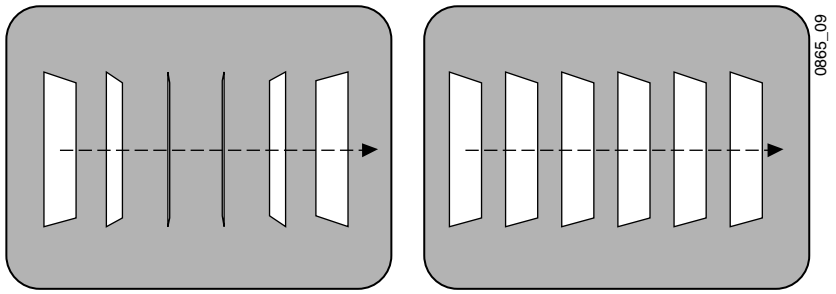


Global Channel Source Translate Along X-Axis | **Global Channel Target Translate Along X-Axis**

Post Transform Space

Post transform (**Post Xform**) is a special transform function that only affects size and location operations. It does not change the perspective of the image (Figure 54). This can be used as a convenient method to quickly project pictures onto new locations of the screen. For example, if an image has the right perspective but is partially off screen, it can be brought back on screen without changing the perspective.

Figure 54. Post Transform Translation



X Axis Translation with Locate 3-D | **X Axis Translation with Post Xform**

All post transform functions are made relative to the monitor screen frame of reference. For example, a positive X post transform always moves to the right side of the screen.

Front and Back, Near and Far

Pictures manipulated by a Zodiak Transform Engine have front and back sides, each of which is revealed in turn as the picture spins or rotates. After a picture has been translated it can be difficult to determine which side was originally on the front and which was originally on the back. This distinction can be important when, for example, different sources are being selected for different sides of an effect.

The Zodiak system uses a “Near” and “Far” convention to ease system operation. Near is always the side of the picture that is visible (facing toward the viewer), and Far is the hidden side of the picture (facing away from the viewer). The current Near side can be either the front side or the back side of the picture, depending on orientation. For example, to change the source on the visible image, just change the Near side. To change the source on the hidden side, change the Far side. You don’t need to know whether the image being changed is actually the front or back side.

Transform Numbering Systems

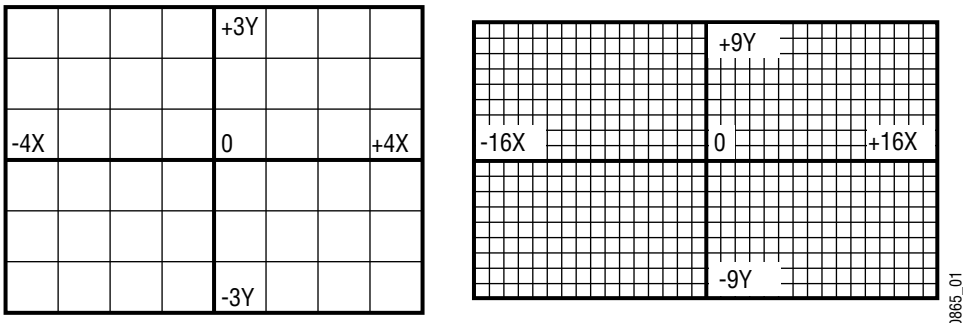
The Zodiak Transform Engine uses the following numbering systems to precisely define picture locations, picture size, and picture rotation and spin.

Screen Coordinates

The Zodiak Transform Engine accommodates two different aspect ratios, 4 x 3 and 16 x 9, selectable via the Video Standards menu. In 4 x 3 mode, the screen is six units high and eight units wide. In 16 x 9 mode, the screen is 18 units high and 32 units wide. The numbering system begins in the center of the screen, and has the standard horizontal X axis and the vertical Y axis (Figure 55). For simplicity, examples in this manual use the 4 x 3 aspect ratio.

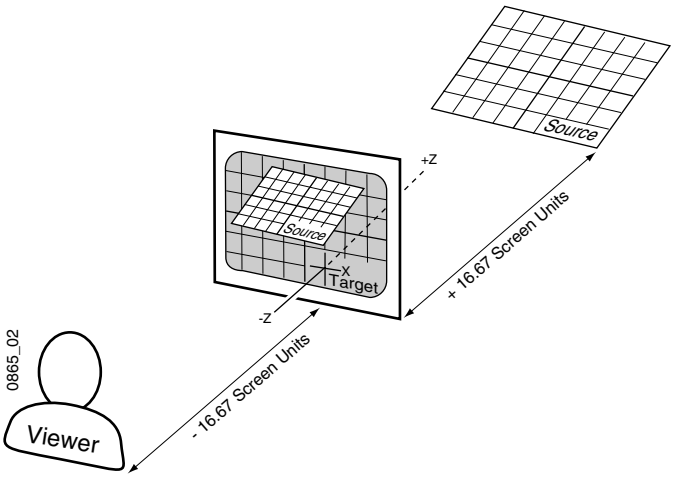
These coordinates can be used for monitor screen locations (channel target space with default global channel), or they can be applied to picture locations (channel source space).

Figure 55. Screen Coordinates



Screen units are also used to define Z axis dimension depth in 3-D space. Positive Z axis values are back behind the picture, and negative values are in front of the picture (Figure 56).

Figure 56. Viewer Location in 3-D Space



For perspective calculations the factory default viewpoint places the viewer -16.67 screen units from the monitor screen surface (4 x 3 aspect ratio). In this case, moving a full screen image 16.67 screen units back behind the screen makes the picture appear half its normal size to the viewer.

Size

Picture size is defined relative to picture screen units. A size of 0.50 indicates a picture is one-half its full size.

Rotation

Rotation is measured fractionally with respect to 360°. A value of 0.25 indicates a rotation of 90 degrees; 0.50 indicates 180 degrees (maximum rotation). Rotation values can be positive or negative, which determines the direction of rotation.

Spin

Spins are measured in number of 360° rotations (up to 999). Fractional spin values are also supported. A single axis 0.50 spin is the same as a single axis 0.50 rotation. Spin values can be positive or negative, which determines the direction of spin.

Skew

Skew supports values of ±999, though extreme values will probably rarely be used.

Aspect

Aspect values are in percentage of the original size, with 1.0 = 100%, 0.5 = 50%, etc.

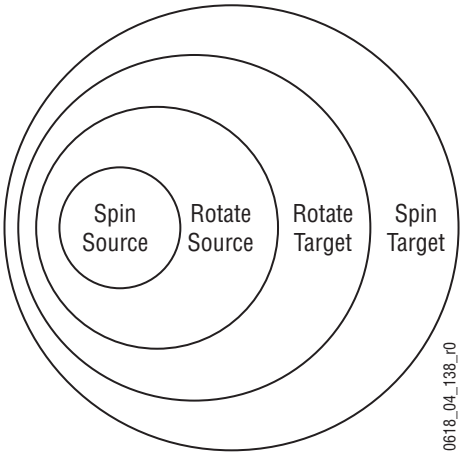
Perspective

Perspective supports values from 0-100, with 0.06 as the default.

Spin and Rotation Relationship

It is possible to use both Spin and Rotation at the same time in an effect. When both are used, the transforms are nested so that the values of one transform are applied after the previous transform values have been calculated. This nesting provides increased control of the effect dynamics. Source and Target space also affects the transform nesting order Figure 57.

Figure 57. Spin and Rotate Transform Nesting



Path Control

Paths

Keyframes specify parameter values at specific times in an effect. Most of the duration of an effect, however, occurs between these keyframes. The Zodiak system interpolates parameter values between keyframes (inbetweening). The trajectory, or path, a manipulated picture travels between keyframes is determined by how these inbetween values are interpolated. The Zodiak system offers you several path controls (Figure 58):

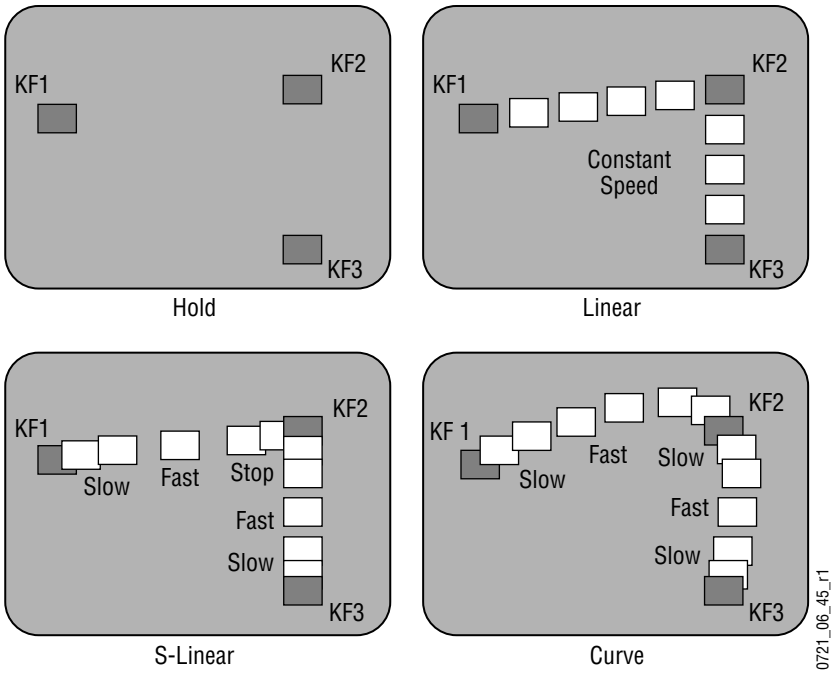
HOLD — No interpolation. Keyframes hold their values for their durations, then change all at once for the next keyframe.

LINEAR — Applies a linear interpolation between keyframes; no acceleration or deceleration is applied. Movement is mechanical with a constant velocity.

S-LINEAR — Applies a linear or straight line motion between keyframes, with acceleration and deceleration applied at the beginning and end of each keyframe.At each S-Linear keyframe the motion is stopped for two fields.

CURVE — This selection causes a rounded path through the keyframe. Paths are user adjustable with path modifiers (tension, continuity, and bias) described below.

Figure 58. Path Types



The path concept can also be applied to functions that do not move a picture across the screen, like matte hue changes. For these functions, the rate of change of the parameter follows the same path types above. For example, an S-Linear hue rotation will accelerate and decelerate the speed of the hue change at the beginning and end of the keyframe.

Tension, Continuity, and Bias Controls

When the **CURVE** parameter is selected, additional fine-tuning path controls become available:

TENSION — Controls the length of the tension vector. At a setting of 0.0, this imaginary line extends an equal distance into and out of the keyframe, and the path through the middle keyframe is curved.

CONTINUITY — Determines the angle of the path into and out of the keyframe.

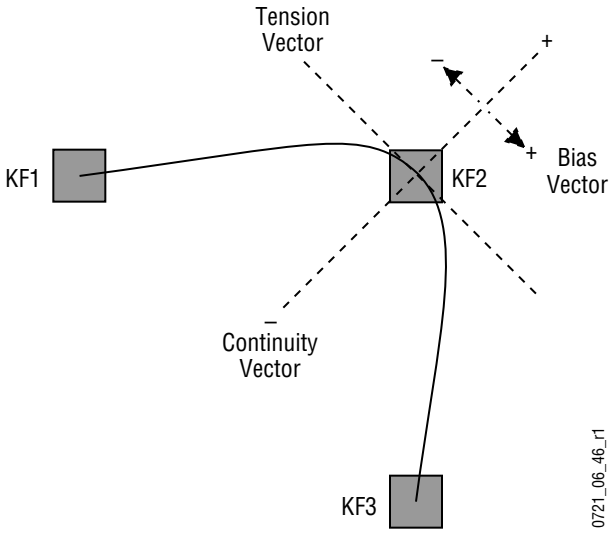
BIAS — Determines whether the path will be pulled towards the previous or the following keyframe.

In the following examples, a physical path is shown between three keyframes. The first keyframe (KF1) is the upper left square; the last keyframe (KF3) is the lower right square. The adjustments in these examples are applied to the middle keyframe only (KF2).

Path Vectors

With respect to the path between keyframes, each keyframe is made up of three vector parameters as shown below. The soft knob controls act on these vector parameters to adjust the path into (entry) and out of (exit) the keyframe. The path through KF2 is parallel to an imaginary line drawn between KF1 and KF3 (Figure 59).

Figure 59. Path Vectors



Vector Values

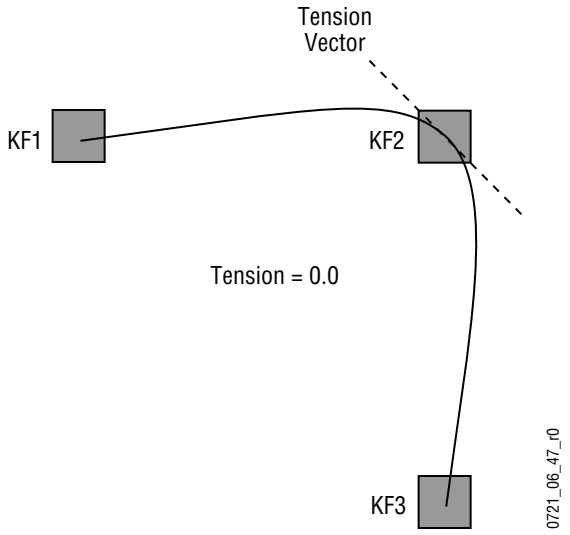
Path vector setting values of ± 1.0 are available, same as the Grass Valley Group Kaleidoscope DPM.

Tension Control

In the example below, the keyframes comprise a right angle, so the **TENSION** control operates on a 45° line drawn through the keyframe. This line is referred to as the Tension Vector and is parallel to a line drawn between adjacent keyframes (Figure 60).

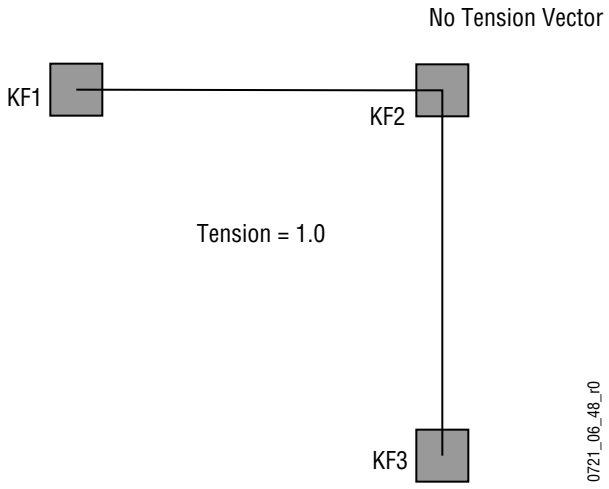
The **TENSION** soft knob controls the length of the tension vector. The length of the tension vector is inversely proportional to its parameter value. For example, at a Tension setting of 0 (zero), this imaginary line extends an equal distance into and out of the keyframe, and the path through the middle keyframe is curved. The unmodified KF2 is said to have a correction value of 0.0.

Figure 60. Tension Control Setting Zero



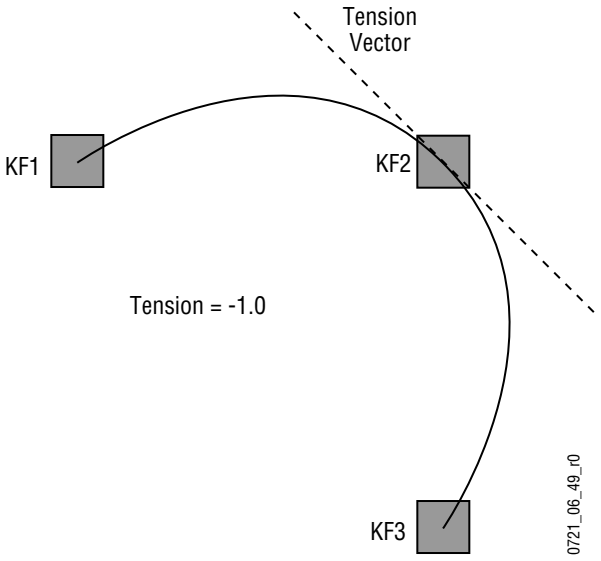
In the example below, the **TENSION** control is increased to 1.0, so that the Tension vector is shortened to non-existence through KF2 (Figure 61). The path enters and leaves the middle keyframe in a straight line as it takes on an S-Linear motion; decelerating as it enters the middle keyframe and accelerating as it leaves.

Figure 61. Tension Control Setting 1.0



In the example below, the **TENSION** control has been set to -1.0. This lengthens the Tension vector, causing the path through the middle keyframe to be longer and broader (Figure 62). The longer path will appear to make the image speed up through KF2 as it travels from KF1 to KF3.

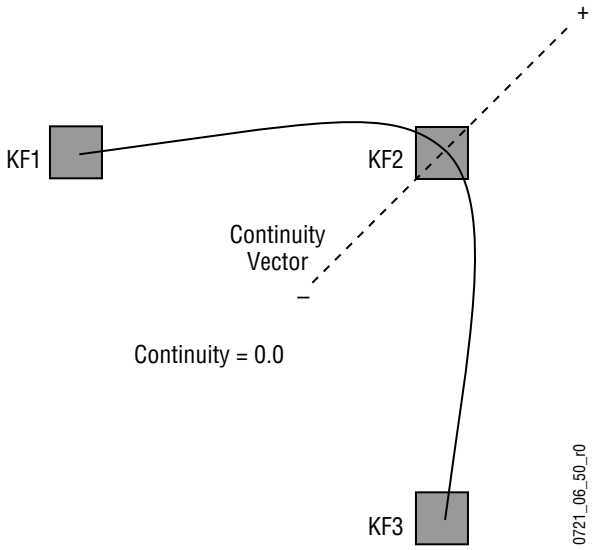
Figure 62. Tension Control Setting -1.0



Continuity Control

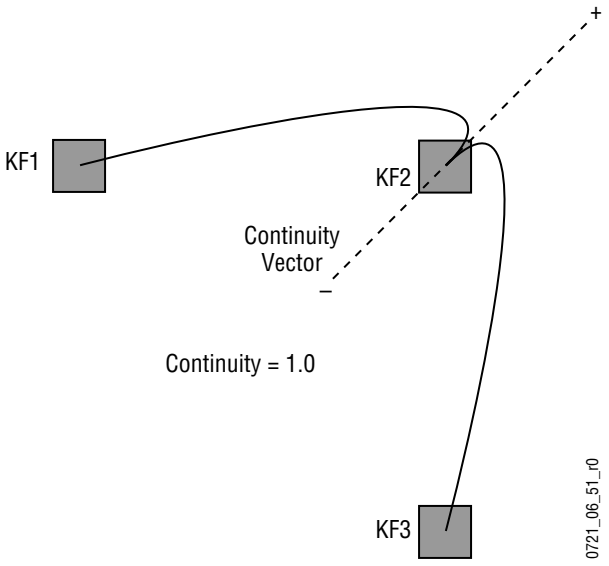
The continuity adjustment determines the angle of the path into and out of the keyframe. It is represented by a vector 90 degrees to the tension vector (Figure 63). The unmodified path shown is identical to the unmodified path of the other controls.

Figure 63. Continuity Control Setting Zero



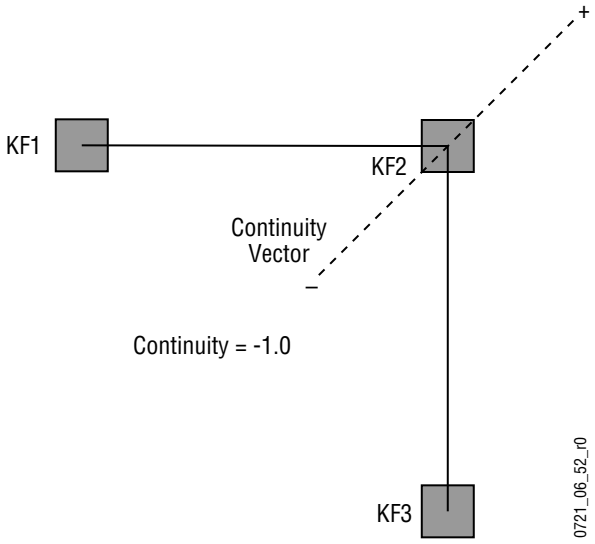
With continuity set to 1.0, the entry path through the keyframe is pulled positively along the continuity vector. The effect of 1.0 continuity is that of motion dropping into and then out of the keyframe, similar to a bouncing ball (Figure 63).

Figure 64. Continuity Control Setting 1.0



With continuity set to -1.0, the paths between the keyframes become straight lines, accelerating into the keyframe and decelerating as it leaves the keyframe (Figure 65).

Figure 65. Continuity Control Setting -1.0

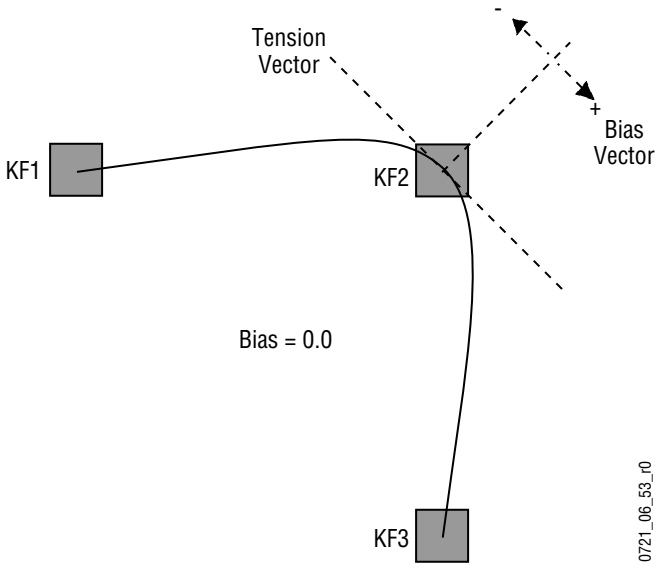


Bias Control

The **BIAS** control determines whether the path will be pulled towards the previous or the following keyframe. With extreme settings, all of the biasing will occur either before or after KF2. With bias set to 0 (zero), the curve through the keyframe is gentle as shown in Figure 66.

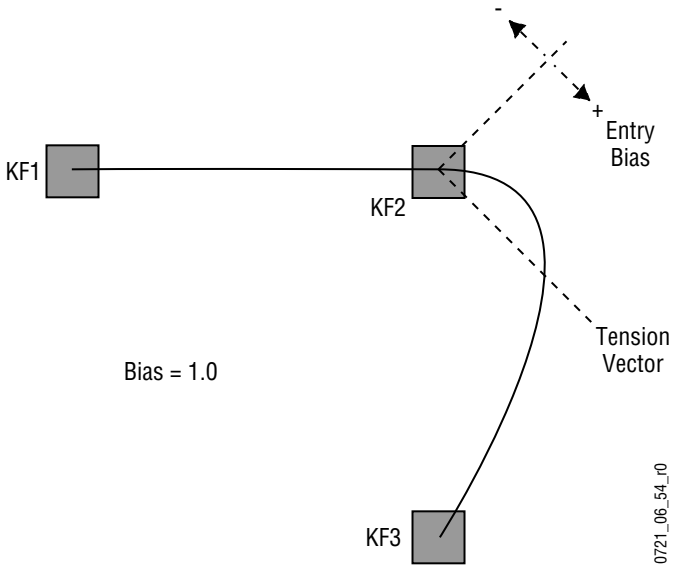
Note A Tension vector must be present for Bias control to be available.

Figure 66. Bias Control Setting Zero



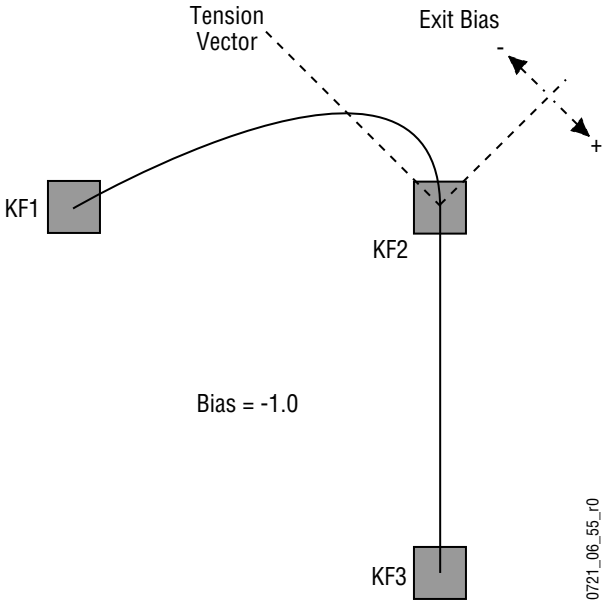
With the bias set to 1.0, the path is pulled towards the following keyframe. Entry into and exit from the keyframe is a straight line from the previous keyframe, and the path of the effect travels completely through KF2 before turning towards KF3 (Figure 67).

Figure 67. Bias Control Setting 1.0



With the bias set to -1.0, the path is pulled towards the previous keyframe. Entry into and exit from the keyframe is a straight line to the following keyframe (Figure 68).

Figure 68. Bias Control Setting -1.0



Section 3

Control Surface Description

Introduction

A basic Zodiak system is equipped with a Main panel, a Menu panel, and removable media drives. These separate control panel components make up a Zodiak *control surface*. Interactions occur between the components of the control surface. For example, changing controls on the Main panel can change the status of soft buttons on the Menu panel, and vice versa. In this section the basic functions of the different parts of a Zodiak control surface will be discussed. Actual operational procedures and menu descriptions and are included elsewhere in this manual.

Many aspects of the behavior of Zodiak controls can be affected by the current system, suite, and user configuration settings. All the possible variations in operating behavior will not be covered in this section. As you become familiar with how the Zodiak system operates, you will be able to customize the system's behavior to meet special requirements.

Remote Aux Bus panels are also available as an option. These panels are configured as a separate control surface.

Button Behavior

Control panel buttons can exhibit the following behaviors:

- Single press
- Alternate action
- Momentary action
- Interlocked group
- Double press
- DPOP and SPOP (Double and Single Press Open)
- and some other specialized actions.

Single Press

The most basic button behavior is a single press, where pushing the button activates the labeled function immediately. These buttons light while its action is being performed, and then go off, permitting the function to be activated again. The **Cut** button is an example of a basic single press button. On some single press buttons, pressing the button again while the action is being performed (the button will be lit) halts the action. The **Auto Trans** button is an example of a single press button that can be halted.

Alternate Action

Some system functions have two states, and are turned on and off by a single alternate action button. Pressing the button when the function is off turns the function on, and vice versa. The **Key Invert** button in the Keyer subpanels is an example of an alternate action button.

Momentary Action

The momentary action button is one in which pressing and holding the button makes something happen and releasing the button stops the action. The **Show Key** button in the Keyer subpanels is an example of a momentary action button.

Interlocked Group

Many system functions have more than two states. Pressing a button in an interlocked group sets the function to the state indicated by that button's label.

Source selector buttons on a bus are an example of one type of interlocked group where selecting one button always turns off the previously selected button. Only one of the sources can be selected on a source selection bus at the same time. This is referred to as a radio button.

In some cases, more than one function can be selected simultaneously in an interlocked group. Holding down one button while pressing another button in the group will activate both functions. Pressing only one button in the group will turn off any other active functions in that group. If an individual button is pressed when off, it will go on, and if pressed when on it will stay on. The **Key 1 - 4**, **Bkgd**, and **Key Prior** buttons in the Transition subpanel are an example of this type of interlocked group.

In some special cases, an additional state may be selected by pressing pairs of buttons in an interlocked group. For example, no button exists in the Keyer subpanels for an adjustable linear keys. Pressing **Lin Key** and **Lum Key** simultaneously selects an adjustable linear key. Both button tallies will be lit in this state.

Double Press

Some buttons can be pressed twice rapidly to perform a different related function. For example, pressing the **Clear WkBfr** button once in the Effects Edit subpanel can clear basic work buffer parameters, but pressing **Clear WkBfr** twice can clear both the basic parameters and the source memory parameters from the work buffer.

Double Press Open (DPOP) is a variation on double press where the alternate action displays a specific menu. See *DPOP and SPOP Menu Delegation* on page 98 for more information.

Button Tally

The state of a panel button is indicated by the illumination of its internal tally LED. The following indicators exist:

- High tally
- Low tally
- Flashing
- Brief tally
- Off

Note that the button tally indicates the state of the function to which that button is currently delegated (see *Delegation* on page 96).

A high tally is used when the function associated with that button is active. For example, the source button currently selected on an M/E will be high tally when it is on-air.

A low tally is used when a third state exists for a button. For example, a source button selected on an M/E that is not on-air will be low tally. For other buttons, low tally can have different meanings. For example, low tally can indicate a function is available for use (the **Mod** button in the Keyframe Edit subpanel), it could mean an E-MEM level is enabled but not delegated (Master E-MEM subpanel), or it could report that a function is selected but disabled (Transition subpanel).

Flashing tally is reserved for situations where the operator needs to be aware that some expected panel behavior has been changed (see *Dialogs and Prompting* below).

Tallys will be off for buttons whose functions are off or not available. If a disabled button is pressed a warning notification occurs (audible beep and/or message on the Menu panel).

Dialogs and Prompting

Some operating procedures on the panel involve modifying button behavior until the procedure is completed or canceled. Prompting dialogs can be displayed to the operator during the procedure. One example is using the Master E-MEM key pad for numeric entry. The Master E-MEM number buttons normally recall registers with a single button press. When delegated for numeric entry (e.g. specifying an effect duration), a prompt message appears on the E-MEM readout. Pressing the keypad buttons under these conditions enters a numeric value, completed by pressing the **Enter** button, instead of recalling a register.

A group of buttons flashing is another type of prompt, indicating the user must select one of these buttons (see *Transition Rates* on page 113). Pressing a flashing button in this case is a form of delegation, and does not change the state of the pressed button.

Knob Behavior

The Zodiak system control knobs rotate freely without limits. A tone sounds when the logical limit of a knob parameter has been reached.

The knobs on the separate Menu panel can control different functions depending on the currently selected menu. These menu knobs are called soft knobs, as the functions they control vary from menu to menu. Legends on each menu indicate each knob's parameters. Direct numeric entry is also available for these parameters via a pop up keypad displayed on the Menu panel touch screen.

Delegation

Delegation permits a single group of buttons and knobs to control a large number of identical system functional areas, or *objects*. A Zodiak system actually has multiple keyers, wipe pattern generators, and matte generators, making dedicated controls for each object unfeasible. Delegation connects a group of controls, typically a subpanel, to a particular object. Delegation can greatly reduce confusion over which button to press or which knob to turn to control each object in the system.

Delegation on the Zodiak system provides exceptional ease of use and flexibility. The delegation mechanism has intelligent customizable automatic delegation, and individual delegation button groups. Together, these capabilities can automatically satisfy almost all of a user's delegation requirements, freeing the operator from manual delegation. Automatic delegation can be instantly disabled and enabled from the Main panel, and manual and momentary delegation remains available at any time.

The following areas of the Zodiak Main panel use delegation:

- Keyers subpanels
- Key bus source selection rows
- Joystick subpanel
- E-MEM numeric keypads in each M/E
- PVW/AUX bus source selection
- Menu panes

Automatic Subpanel Delegation

The Zodiak system is designed so that when an operator activates a particular object, one or more subpanels will automatically delegate to control the specific object involved. This allows the operator to quickly access the necessary controls without having to select them manually.

The subpanels that are auto delegated and the functions for initiating delegation are outlined in Table 1.

Table 1. Subpanel Delegation

Subpanel Delegated	Function Initiating Delegation
Keyer Subpanel	Putting a key on-air with **Key 1 – 4 Mix** button in Transition subpanel
	Selecting a keyer on Key Bus delegate subpanel (except for Util or Macro)
	Selecting a key as the next transition in a Transition subpanel
Key Bus Delegate Subpanel	Putting a key on-air with **Key 1 – 4 Mix** button in a Transition subpanel
	Delegating a keyer in the Keyers subpanel
	Selecting a key as the next transition in a Transition subpanel
Joystick Subpanel	Selecting the **Int DPM** button on a Keyers subpanel
	Delegating a Keyer subpanel with an active preset pattern
	Delegating a Keyers subpanel to key layer with active Transform Engine
	Activating a Transform Engine
	Activating a wipe with an active border

Momentary Delegation

An operator may sometimes have subpanel controls delegated to a certain object, but need to make a quick change to a different object. For example, a Keyers subpanel delegated to Keyer 1 may be temporarily delegated to Keyer 3 to make a quick adjustment. This is done by holding down the Keyer 3 button for a preset period. If the user makes an adjustment to Keyer 3 within the time allowed, the timer will reset, otherwise, after a period of no activity applied to Keyer 3, the delegation will return to the original delegation, Keyer 1. A user preference sets the hold down delay.

DPOP and SPOP Menu Delegation

DPOP stands for Double Press Open. This is a form of automatic delegation where a specific menu is displayed on the Menu panel when a panel button is pressed twice in rapid succession. A menu can contain controls that do not exist on the Main panel. DPOP makes these additional menu controls readily available. If further delegation exists within the menu, for example to a specific keyer, that delegation occurs as well. If the menu is already open, a single press performs the menu delegation (a second button press is not required).

SPOP stands for Single Press Open. SPOP buttons operate similar to DPOP, but only a single button press is required.

Active DPOP and SPOP buttons and their menus are listed in Table 2.

Table 2. DPOP and SPOP Buttons

DPOP Button	Subpanel	Menu Displayed
C1/C2 Wipe	Joystick	Wipe menu
Chroma Key	Keyers	Keyer Chroma Key menu
DSK 1	Key Bus Delegation	Keyer Mode menu
DSK 2	Key Bus Delegation	Keyer Mode menu
DSK 3	Key Bus Delegation	Keyer Mode menu
Force Mask	Keyers	Keyer Mask menu
Int DPM	Joystick	Transforms menu
Inhibit Mask	Keyers	Keyer Mask menu
Key Prior	Keyers	Keyer Priority menu
Locate 3D	Joystick	Transforms menu
Locate Size	Joystick	Transforms menu
Preset Pattern	Keyers	Wipe menu
Spin	Joystick	Transforms menu
Source	Joystick	Transforms menu
Wipe	Joystick	Wipe menu

Keypad Delegation

Each E-MEM and Master E-MEM has a keypad that can recall effects with a single numeric button press (see *Keypad Numeric Entry Buttons* on page 127 and *Master E-MEM Keypad* on page 133). These keypads are also used to enter numeric values. Pressing a numeric prefix button delegates the keypad to numeric entry for that function.

The numeric prefix buttons and controlled numeric functions are listed in Table 3.

Table 3. Automatic Keypad Delegation

Keypad Delegated	Function (Prefix) Initiating Delegation	Numeric Parameter Controlled
E-MEM keypads	Trans Rate	Time in seconds, frames, odd field
	Eff Dis	Time in seconds, frames, odd field
	Register sequence pause	Time in seconds, frames, odd field
Master E-MEM keypad	Trans Rate	Transition rate in seconds, frames, field
	↑ / Bank	Bank number

Time Value Entry

Time values are input on the Zodiak Main Control Panel E-MEM and Master E-MEM subpanels in seconds, frames, odd field format, using the **Undo/•** button the separator (indicated below as "•"**)** and the **Enter** button to complete the entry:

(seconds), •, (frames), •, (field), Enter

The default time entry is in frames. For example, a time of 15 frames (one half second on 60 hz systems) can be input simply by pressing:

15, Enter

Entries in seconds can be entered by adding one separator. For example, a time of 1 second is input by pressing:

1, •, Enter

An odd field is input by pressing **1** as the last entry. For example, a time of one second 15 frames and one field is input by pressing:

1, •, 15, •, 1, Enter

After an odd field has been entered, it is represented with an "f" in the E-MEM readout. For example, the completed time above appears as `1:15f`. It is possible to enter values other than 1 as an odd field. The system will calculate and display the correct number frames and a single odd field.

To enter only fields, use two separators before the number. For example, a time of 30 fields (one half second on 60 hz systems) is entered by typing:

•, •, 30, Enter

You can actually enter any combination of seconds, frames and fields. The Zodiak system will do the conversion and display the result in seconds, frame, field format.

Decimal values for other non-time parameters are also input on the Master E-MEM subpanel with the numeric keys, the **Undo/•** button for the decimal, and the **Enter** button to complete the entry. If a default value exists for an entry, it can be input without typing in a value by pressing:

•, Enter

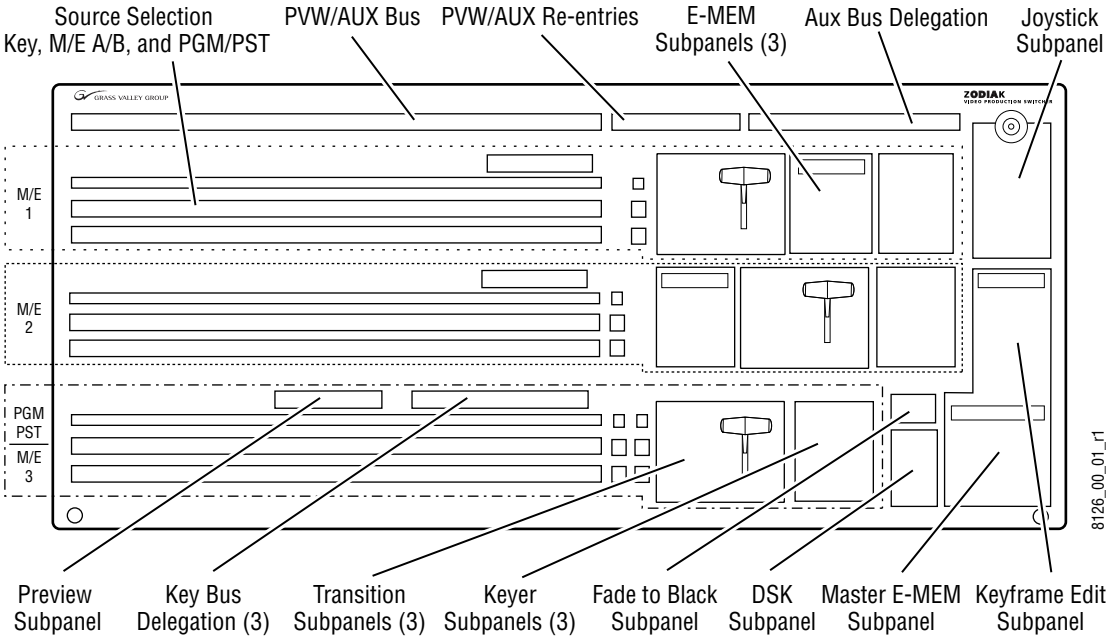
The Zodiak Menu panel also provides a touch activated keypad for entering values directly into menus, using similar procedures.

2.5-M/E and 3-M/E Main Panel

The Zodiak 2.5 and 3-M/E Main panel is designed as an intuitive, full-featured production system. Both panels are very similar, differing only in appearance by the presence of additional key caps in the 3-M/E system.

Sources are selected in the three M/E blocks on the left side of the panel (M/E 1, 2, and PGM PST or M/E 3). Transition, keying, and individual E-MEM control selections are made on the middle right. Delegated controls for various M/E modifiers are at the upper right. DSK, Fade to Black, Keyframe Edit, Master E-MEM and Transform controls reside on the lower right (Figure 69).

Figure 69. 2.5 and 3-M/E Main Panel and Subpanels



Source Selection

Sources are selected on the M/E or PGM/PST A, B and Key buses. Each M/E block has three rows of interlocked buttons, one row for key source selection (delegated between keyers, the Utility bus and a Macro function) and two rows for background source selection. Each row contains 23 source buttons and a **Shift button** (Crosspoint 24) and has re-entry buttons from the other M/Es (Figure 70 and Figure 71 on page 103).

Only one source at a time can be selected for each bus on the row of interlocked buttons. The left source will be selected if more than one button on a row is pressed simultaneously.

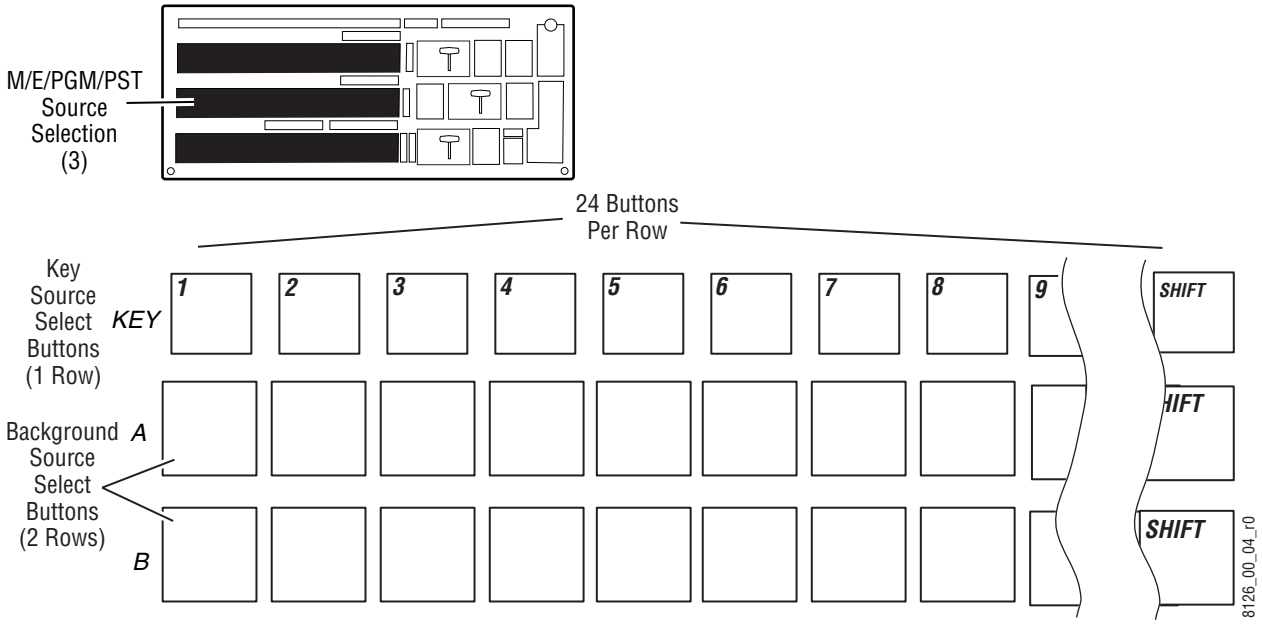
Holding down a source select button when recalling an E-MEM register performs a source override. That source will be held on that bus even if a register is recalled and/or run that specifies a different source.

Note Different types of control are available for choosing which sources are subject to change during a Recall: Source Holds (*E-MEM – Source Holds Menu* on page 243).

Unshifted and Shifted Sources

Of the available sources, up to 23 can be mapped to the unshifted source selection buttons, and 23 to shifted buttons (*Button Mapping Menu* on page 178). The remaining available sources can be selected via an E-MEM recall or using the Source Select menu. The re-entry buttons are fixed and cannot be mapped.

Figure 70. Zodiak System Source Selectors on Main Panel, Left Side



Three modes of shift operation are available, Normal, Latched, and No Shift, set in the Shift Preferences menu (see *Shift Preferences Menu* on page 179). In Normal mode, when the **Shift** button is not pressed, the row of source selection buttons accesses inputs assigned to crosspoints 1 to 23. When the **Shift** button is held down, it lights and the row of crosspoints now accesses inputs assigned to crosspoints 24 through 46. If a selection is made on the shifted bus, the **Shift** button remains lit to indicate the tallied input is shifted. If another selection is made without holding down the **Shift** button, the row returns to an unshifted state and the **Shift** button light goes off.

In Latched mode, when the **Shift** button is pressed it latches to the shifted state. This operation is similar to the Caps Lock function on a standard keyboard. Any subsequent crosspoint selections will be on the shifted bus until

the **Shift** button is turned off. If the user toggles the **Shift** button to the state that is opposite of the currently selected crosspoint, the button will blink, indicating this out of sync shift condition.

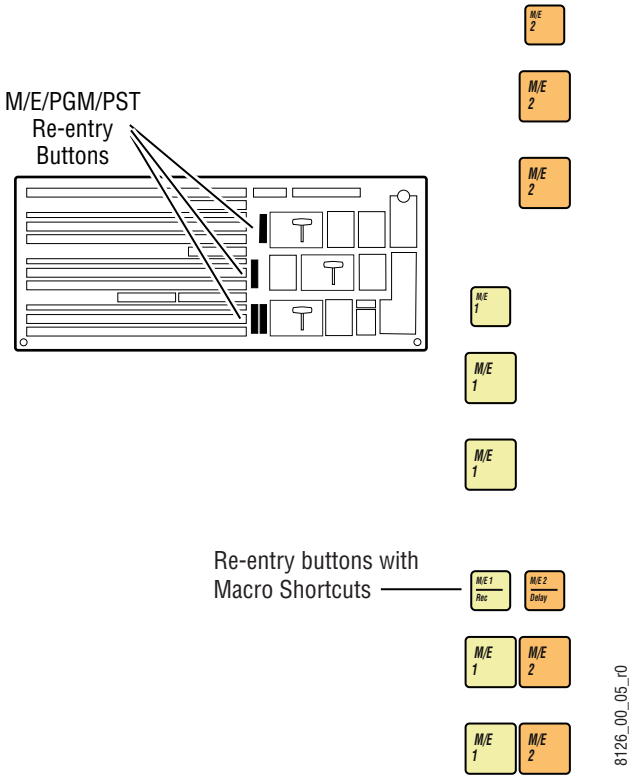
In No Shift mode the Shift button acts like a standard source selection button. In this mode no shifted sources are available on the bus.

Re-entry Buttons

The Re-entry buttons are used to select the output of one M/E for use as an input source to another M/E. The signals are routed internally. For example, an output of M/E 1 can be sent to M/E 2 or M/E 3 (PGM/PST), and an output of M/E 2 can be sent to M/E 1 or M/E 3 (PGM/PST).

The PGM PST KEY M/E re-entry buttons are labeled with additional macro capabilities (Figure 71). When macro delegation is on (**Macro** is illuminated), holding down one of these buttons momentarily activates that macro mode (either Record or Delay).

Figure 71. Zodiak System Re-entry Buttons on Main Panel



Background Buses

Pressing a button on an M/E or PGM/PST background A or B bus directly selects the source mapped to that button, and the source button will go high tally if on-air, or low tally if not. Crosspoint mapping is identical on all Background buses.

Key Buses

The Key buses in each M/E and the PGM/PST are delegated to the available keyers by the Key Bus Delegate subpanels in each section of the panel as described below.

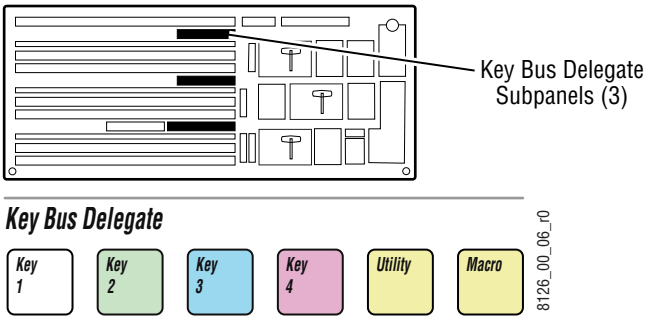
When a Keyer is selected in a subpanel, the currently selected source for that Keyer will light on the Key bus. Selecting a different crosspoint will change the key selection.

Selecting the **Util** button delegates the Key bus to be the Utility bus source selector. A crosspoint selected on the Utility bus can be used as a key signal.

Selecting the **Macro** button delegates the Key bus to be a set of macro function buttons.

The Key source selector buses in M/E 1 and 2 are delegated six ways to Key 1, Key 2, Key 3, Key 4, Utility, and Macro. Delegation of the Key bus is assigned with the M/E Key Delegate Bus subpanel (Figure 72 on page 104) in each M/E.

Figure 72. M/E Key Bus Delegate Subpanel

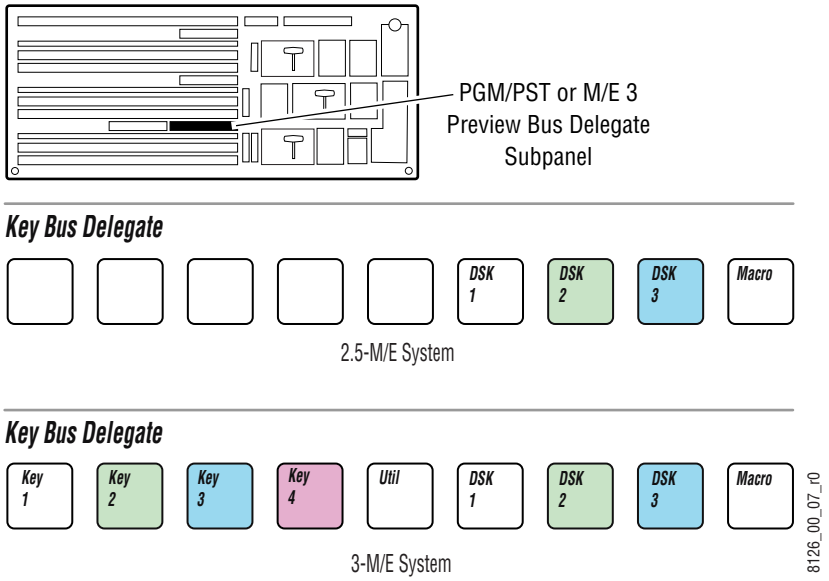


Within this delegation, the row of buttons can be unshifted and shifted in the same manner as the Background buses. In addition, the cut and fill signals assigned to a key crosspoint in button mapping can also be split using the **Key Split** button (see *Key Split Button* on page 117).

The Key Bus Delegate subpanel in the PGM/PST key row is delegated four ways in a 2.5-M/E system to DSK 1, DSK 2, DSK 3 and Macro (Figure 73). The Key Bus Delegation subpanel controls the key sources that will appear on the downstream keyer on the Program output of the switcher.

In a 3-M/E system, the PGM/PST key selector row is delegated nine ways to Key 1, Key 2, Key 3, Key 4, Utility, DSK 1, DSK 2, DSK 3, and macro (Figure 73). Downstream keyers DSK 1, 2 and 3 can be linked to an M/E key with the **DSK Link** button in the M/E 1, M/E 2, or M/E 3 Transition subpanel. (see *Transition Elements* on page 110).

Figure 73. PGM/PST or M/E 3 Key Bus Delegate Subpanel



Source Button Tally

A source button only lights if the selected source is mapped to a button on the bus and the correct shifted/unshifted bank is selected by the source select modifiers and shift preference. That entire source select button row will be dark otherwise. Pressing a button on a dark row will continue to select its mapped source, however.

PVW/AUX Bus Source Selection

A single, local PVW/AUX bus is provided at the top of the Zodiak control panel for delegating Aux bus, Still Store and switched preview control and selecting sources on the nine (2.5-M/E system) or thirteen (3-M/E system) Aux buses.

The available Aux buses (or video/key aux signal pairs) can be delegated for control by this panel. The PVW/AUX system has three subpanels for Aux bus delegation, Bus Delegate selection, primary source selection, and secondary source selection.

Bus Delegation

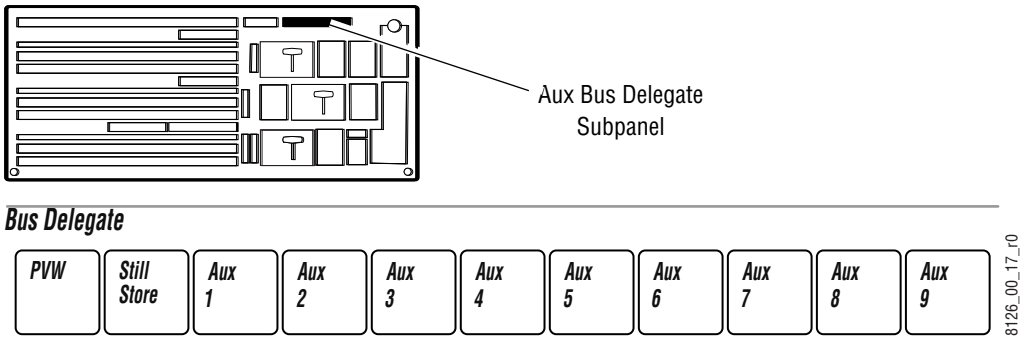
The Bus Delegate subpanel (Figure 74) delegates the source selection buttons on that bus to the primary preview (**PVW**), Still Store (**Still Store**), or an Aux bus (**Aux 1-9**).

A 2.5-M/E system has 9 Aux Buses, that can be configured for control by the **Aux 1-9** delegation buttons. In a 3-M/E system, there are 13 Aux Buses, nine of which can be configured for control with the Aux Bus delegation panel.

The **PVW** button in the delegation group permits switched preview source selection on the primary PVW/AUX bus. When the **PVW Primary** button on the Main panel's Preview subpanel is selected, the output of this bus is routed to switched preview (see *Preview Subpanel* on page 108), and you will be able to see the sources change as they are selected on the PVW/Aux panel. Changing selections on this bus when the **PVW Primary** button is not selected on the Preview subpanel will still change the output of the bus, but it will not be visible on switched preview since it will be displaying another source specified on the Preview subpanel.

The **Still Store** button permits selection of sources to feed to the Zodiak Still Store inputs.

Figure 74. PVW/AUX Bus Delegation Subpanel

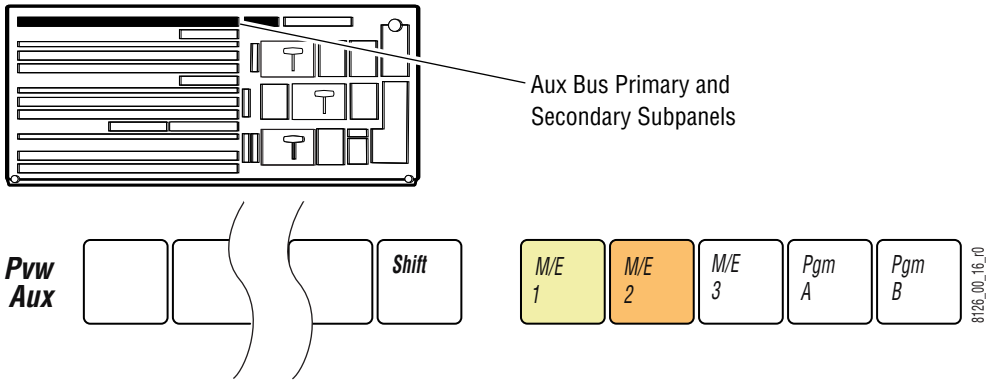


Source Selection Buses

Source selection on the PVW/AUX primary subpanel is identical to the Main panel. Twenty-three unshifted and twenty-three shifted source buttons are available on the primary bus. Five additional secondary source buttons (**M/E 1**, **M/E 2**, **M/E 3**, **PGM A** and **PGM B**) are located to right of the source buttons to select the output of M/E 1, M/E 2, M/E 3 (3-M/E systems only) or PGM A or PGM B (Figure 75).

When an Aux bus is part of an Aux pair, selecting a source on the bus changes the A Channel source for the pair. To change the B Channel source, hold down the selected Aux bus delegation button and select the desired source (also called a key split). Aux pairs are described in Section 3 – Configuration of the separate *Zodiak Installation and Service Manual*. A and B Channel source selections can also be made using the Aux Bus menu.

Figure 75. PVW/Aux Primary and Secondary Subpanels



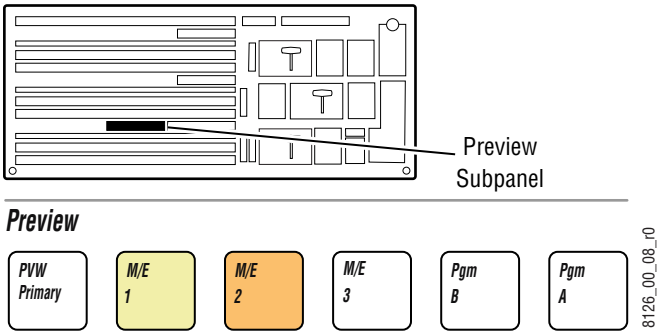
Preview Subpanel

The Zodiak preview system consists of one preview output from each M/E, two preview outputs from PGM and PST (Preview A and Preview B), and a switched preview. Preview A and B show a DSK preview for PGM A and B respectively.

The Preview subpanel (Figure 76) gives the operator a way to view the preview outputs on the Zodiak system's dedicated switched preview output BNCs. The switched preview output from the switcher can be used by the operator to preview sources, keys, and effects during production, and for setting up the switcher before a session.

Selecting the **PVW Primary** or one of the **M/E 1-3** buttons or the **PGM A** or **PGM B** button will send the preview (not program) output signal of that bus to the Zodiak system's switched preview output. Only one button can be selected at a time on this subpanel. The currently selected button will be high tally.

Figure 76. Preview Subpanel



Primary Signal Selection

To view a preview primary source, select the **PVW** button on the PVW/AUX Bus Delegate subpanel (see *Bus Delegation* on page 105). Select the **PVW Primary** button in the Preview subpanel. This routes the preview source selection on the PVW/AUX bus to the switched preview output.

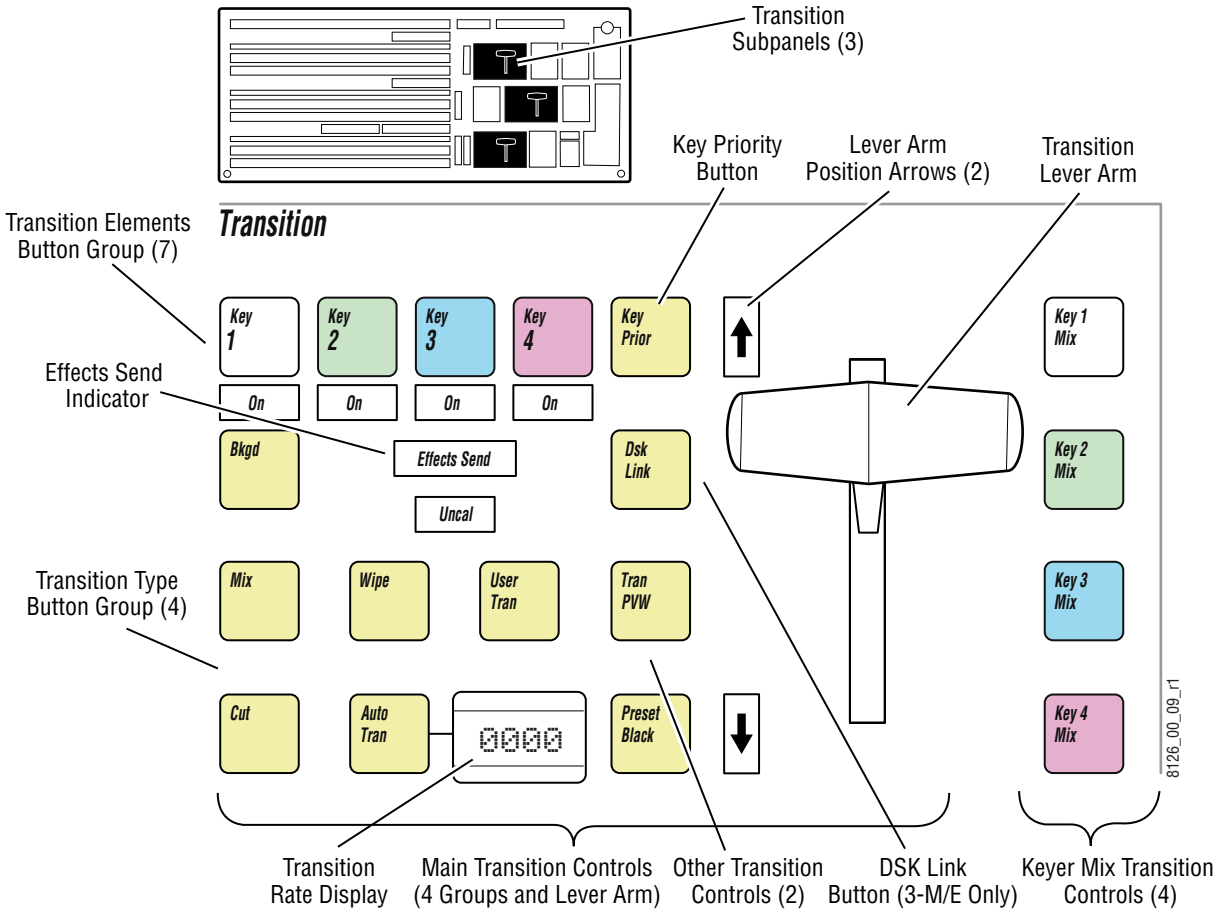
When the **PVW** button is selected on the PVW/Aux Bus Delegate subpanel and the **PVW Primary** button is selected on the Preview subpanel, the selected primary crosspoint will high tally indicating the source is the output to the switched preview bus. Selecting another preview button in the Preview subpanel will cause the PVW/AUX primary source to low tally indicating it is no longer the active output to switched preview.

Transition Subpanels

Each M/E on the Zodiak system, is functionally identical and provides complete mix, wipe, and keying capabilities. The Transition subpanel controls these compositing operations for each M/E and PGM/PST (or M/E 3 in a 3-M/E system).

Each transition subpanel actually incorporates five transition systems. Each subpanel has one set of main transition controls, and also has individual mix transition controls for each of the four keyers (Figure 77).

Figure 77. Transition Subpanel



Main Transition Controls

The transition controls are used to select the signal elements that will be involved in the transition (background or keys), define the type of transition, and perform the transition.

Transition Elements

The **Key 1 – 4** and **Bkgd** buttons select the elements that will change during the next transition. Pressing these buttons does not change the current output of the M/E, but prepares the M/E for a change (the next transition).

Pressing one transition element button automatically turns off the others in this group. More than one transition element can be selected by holding down one button while pressing another in the group. Elements not selected remain in their current state when the transition is performed. For example, if **Key 1** is on and is not selected as part of the next transition, it will remain on during and after the transition.

The **Bkgd** button selects a change in the background buses. The result will be a transition from the current source on the A (or PGM) bus to the source selected on the B (or PST) bus. After the transition, the buses will flip flop, so the A bus always remains the on-air bus. The A bus selection remains the background source if this button is not selected as part of the next transition.

The **Key 1-4** buttons selects the keyers that will be involved in the next transition. The keys currently visible on the output that M/E are identified by the **On** indicator lights below each button. Note that a key may be on but not visible (for example, half way through a preset black transition).

The **Key Prior** button selects a change in the key priority. The layering order (stack) of the keys will transition from the current stack to a new stack specified by the operator. The new key priority stack is defined using the **Key Prior** button in the Keyers subpanel or via a menu (see *Key Prior Button* on page 118).

The **Dsk Link** button is present on 3-M/E systems only. It allows one or more selected downstream keyers to be linked to M/E 1, M/E 2 or M/E 3. When linked, that downstream keyer will dissolve in or out along with that M/E's transition. Starting with Release 4.0 the downstream key link feature is not saved as part of an E-MEM effect. To use it with effects, activate the **Dsk Link** Main panel button before recalling the effect.

Transition Types

The **Mix**, **Wipe**, and **User Tran** transition type buttons select what type of transition will be used on the elements selected above for the next transition. Pressing these buttons does not change the appearance of the current output of the M/E. Only one transition type can be selected at a time.

The **Mix** button selects a mix as the next transition.

The **Wipe** button selects a wipe as the next transition. Each wipe is predefined using either the complex wipe generators or the Utility buses as the wipe shape. Wipe pattern selections are made in the Wipe menu (see *Wipe Menus* on page 322), which these buttons DPOP to.

The **User Tran** button selects customized user defined transition settings. Specialized enhancements and combinations of transition effects, including Mix through Video, FAM (Full Additive Mix) or DPM (Transform Engine) transitions, can be programmed into a user transition. These buttons DPOP to the User Transitions menu, where the user transitions are defined. Refer to *M/E Menus* on page 294 and *Mix Through Video Transition* on page 386 for more information on using a user transition.

Performing Transitions

The **Cut** and **Auto Trans** buttons and the **Transition Lever Arm** are used to perform main transitions on an M/E. After a transition completes, the background source selections flip-flop, readying the B (or PST) bus for the next source selection. The progress of a transition is indicated by the up and down arrows to the left of the lever arms.

The **Cut** button instantaneously replaces the selected elements with their new sources or states, regardless of the transition type selected. The button will light briefly to confirm the operator's action.

The **Auto Trans** button starts an automatic transition of a predetermined rate (see *Transition Rates* on page 113). The button will light during the transition. Pressing **Auto Trans** a second time during a transition stops the transition at that point. The transition can then be completed by pressing the button a third time or by moving the **Transition Lever Arm** to its opposite limit.

The **Transition Lever Arm** is used to manually perform a transition. You can move the lever in either direction to run a transition due to the flip-flop architecture of the buses. Moving the lever from one limit to the other performs a complete transition. It is possible to start a transition with the lever, then stop moving the lever at any point, reverse its direction, and even return it to the original limit without completing the transition.

Recalling an effect or performing an Auto Trans can leave the lever arm out of sync with the actual transition. In this state the lever arm is inactive. It will be necessary to move the lever arm or, if the lever arm is at a limit, run the effect to regain sync. The up and down arrows to the left of each lever arm indicate which way to move the lever arm (Figure 77 on page 109) to complete the transition.

Preset Black

The **Preset Black** button modifies a main transition so that it will go through black, instead of going directly to the new state. This is an alternate action button (pressed to turn it either on or off). The **Preset Black** button lights when it has been selected.

Two successive transition commands (**Auto Trans** button, **Cut** button, or **Transition Lever Arm** action) are used for a complete preset black transition. The first command transitions the M/E to black (first stage). When in black, both the A and B bus selections will go low tally. The second command transitions from black to the final stage, completing the preset black transition. The preset black function is canceled automatically at the end of the second transition.

The transition type can be changed when the M/E has reached its first preset black stage, allowing for example a wipe to and a mix from preset black. While in preset black, the key ON indicators report the states the keys will have when the second transition command completes. The keys involved can be changed at this time, if desired. The source on the B (or PST) bus can also be changed while in the preset black stage.

A preset black transition can be canceled by pressing the **Preset Black** button a second time. If cancelled while at the preset black stage, the system will switch back the original signal. Pressing a source button on the A (or PGM) bus will also cancel a preset black transition. The source pressed on the A bus will immediately be placed on air without any keys, even if the next transition had specified key changes.

Transition Preview

The transition preview feature allows a main transition to be previewed without affecting the program output of that M/E. A transition preview cannot be performed if the **Transition Lever Arm** or main transition is off limit, if an auto transition is in progress, or when **Preset Black** has been selected.

Pressing **Tran PVW** routes the main transition video to preview output and disables program transitions on that M/E, leaving the existing program output unchanged.

Pressing **Auto Trans** or moving the **Transition Lever Arm** with **Trans PVW** active will show the transition only on preview, allowing the setting of wipe parameters or adjusting auto transition times before actually performing that transition. Transition preview overrides whatever preview mode is currently selected. The dedicated preview monitor of that M/E (if any) and the system's switched preview output will display the transition preview. At the end of this transition, transition preview can be automatically deactivated (depending on a user preference configuration setting).

Transition preview may be canceled at any time by pressing the lit **Trans PVW** button. If an auto transition preview is in progress, it will be aborted. If the transition lever arm was used for the transition preview, cancelling the preview part way through will leave the arm off limit (see *Other Transition Control Interactions* on page 113).

Keyer Transition Controls

Each keyer has its own mix transition system, separate from the main M/E transition mechanism. Individually numbered **Key 1-4 Mix** buttons located to the right of the **Transition Lever Arm** control these transitions. These buttons can directly change the output of the M/E.

The **Key Mix** buttons can be used to mix a key on or off. The transition will mix to the opposite state (mix on if the key is off, mix off if the key is on). **Key Mix** button tallies do not indicate whether a key is on or off, but light to indicate a key mix transition is in progress.

The same keyer cannot be used for both a main transition and a keyer mix simultaneously. For this reason, the **Key Mix** buttons are inactive when a main transition is actually in progress. The **Key Mix** buttons remain active, however, when that keyer has been selected for the next main transition (as long as the main transition hasn't been initiated). While an individual **Key Mix** transition is in progress, the **Key 1-4** transition element buttons involved will go low tally to show a conflict exists. If a main transition is initiated in this state, the main transition will proceed but that keyer will be excluded from that transition. Each independent keyer has its own mix transition rate. See *Transition Rates* on page 113 for more information.

Note that **Preset Black** has higher priority than the keyers. If **Key Mix** is pressed while in preset black, the program output will remain black but the state of the key will change (shown by the Key On indicator lights) and the change will become evident when the preset black transition completes.

Transition Rates

Auto transition rates for M/E 1, 2, and 3 are set using the respective **Trans Rate** button and keypad located on that M/E's E-MEM subpanel. Rates for PGM PST are set using the **Trans Rate** button and keypad located on the Master E-MEM subpanel.

When a **Trans Rate** button is pressed, the **Auto Trans** and the four **Key 1-4 Mix** buttons will flash and the E-MEM readout prompts for the rate to be set. Pressing one of the flashing buttons delegates the E MEM keypad to that transition rate and its current rate appears on the readout. A time entry is then expected on the keypad in seconds, frames, field format. See *Time Value Entry* on page 99 for more details.

Other Transition Control Interactions

The **Transition Lever Arm** can be used in combination with the **Auto Trans** or **Cut** button to perform a main transition. For example, you can start the transition by moving the lever off its limit, and finish the transition by pressing **Auto Trans**. The transition is completed at a rate proportional to the rate set for the transition.

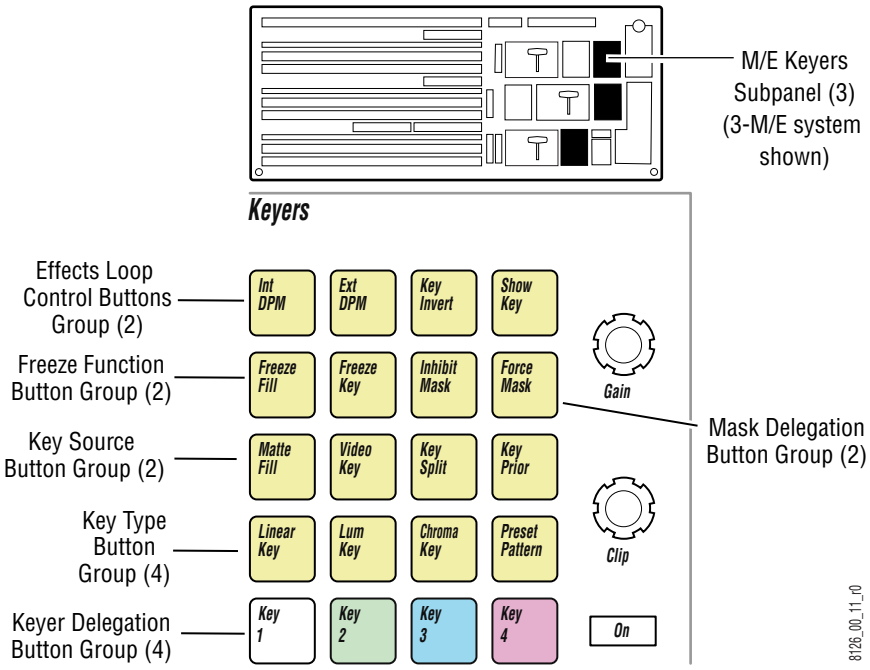
For example, if the lever was moved halfway and the transition is completed by pressing **Auto Trans** at a rate of 200 frames, the remaining half of the transition will take 100 frames. Moving the lever part way, then pressing **Cut** will complete the transition with a cut. Note that these actions will leave the lever out of sync with the state of the transition. The lever will not affect the transition until is moved to one of its limits. The lever movement in the direction of the lit arrow indicator to regain sync will not change the M/E output.

M/E Keyer Subpanels

Each full-function M/E has a dedicated Keyer subpanel to control key functions. The DSK Keyer subpanel (2.5-M/E systems only) has a reduced set of key functions and is explained separately (see *DSK Keyer Subpanel* on page 119).

The M/E Keyer subpanel is illustrated in Figure 78. Many buttons in this subpanel are organized into interconnected groups, allowing selection of only one button at a time in each group. Knobs are available to control specific keying parameter values.

Figure 78. M/E Keyers Subpanels



Keyer Delegation Button Group

The **Key 1-4** buttons manually delegate the subpanel to control one keyer in the M/E. These buttons can also be used for Hold to Preview (see below), momentary delegation (see *Momentary Delegation* on page 97), and to set Key Priorities (see *Key Prior Button* on page 118).

Hold to Preview

When setting up a key, it is often desirable to see a key that is not on air or part of the next transition. Holding down a **Key 1-4** delegation button will replace that M/E's preview output with a representation of that key over the current background. User preference settings determine whether this feature is enabled for these buttons, whether other on-air keys are shown, and how long the preview lasts. The **Show Key** button is also available to view the actual key control signal. See *Show Key Button* on page 118.

Clip and Gain Knobs

The **Clip** and **Gain** knobs in each Keyer subpanel are used to adjust all key types. A user preference provides a mode selection for the knobs depending on the key type. The knobs can be defined to either adjust Clip/Gain or Clip Hi/Clip Lo.

Linear keys usually respond best to Clip Hi/Lo settings because there is less interaction between the transparency and opacity of the key. In contrast, harder keys, or those where there is a more defined transition between transparency and opacity, respond better to Clip/Gain settings where the threshold level (Clip) can be adjusted more precisely at the point where the transition occurs.

The **Gain** knob increases the gain value with clockwise rotation. The higher the gain, the harder the key.

The **Clip** knob (Clip Hi/Lo) decreases the threshold with clockwise rotation. A decrease in clip level lowers the threshold causing more of the signal to be keyed. The entire key signal can be keyed (fully clockwise) or none of the key can be present (fully counterclockwise).

The **Clip** and **Gain** knob user preference settings are made in the *Clip Hi Lo Preferences Menu* on page 182.

Key opacity (translucency) may also be adjusted in the Keyer menus with a soft knob. Refer to *Keyer Menus* on page 313.

Key Type Button Group

The four buttons in the key type button group selects from five different key types for the delegated keyer. Single button selection is available for Linear Key, Luminance Key, Chroma Key, and Preset Pattern. An Adjustable Linear Key is also available. (See *Fixed and Adjustable Linear Keys* on page 53).

Linear Key

The **Linear Key** button selects a fixed linear key, which uses clip and gain values defined in Engineering Setups – Sources. These values cannot be changed from the panel.

Note Linear Key mode produces a proper key if the source has been set up and defined properly. If not setup properly, you can compensate by selecting Adjustable Linear mode.

Adjustable Linear Key

An adjustable Linear Key can be selected by pressing the **Lin Key** and **Lum Key** buttons simultaneously. The **Gain/Clip Hi** and **Clip/Clip Lo** knobs provide a limited range of control of Clip Hi and Clip Lo.

Luminance Key

The **Lum** button selects a Luminance key. The **Gain/Clip Hi** and **Clip/Clip Lo** knobs provide a full range control of clip and gain.

Chroma Key

The **Chroma Key** button selects a Chroma Key. The **Gain/Clip Hi** and **Clip/Clip Lo** knobs provide control of Clip Hi and Clip Lo. Additional menu controls are available via DPOP.

Preset Pattern

The **Pst Ptn** button selects Preset Pattern, which cuts the hole in the background using an internal wipe pattern generator (or Utility Bus video), rather than a source's key cut signal.

Wipe pattern selection and other preset pattern adjustment such as softness of the preset pattern edge and size of the preset pattern shape can be adjusted in the Wipe menu (see *Preset Pattern* on page 316). The **Joystick** in the Joystick subpanel, when properly delegated, controls the location of the preset pattern on the screen.

Note The Preset Pattern and Masking features share common keyer hardware. When a Preset Pattern is being used by a keyer, masking will be disabled for that keyer.

Separate key memory settings are retained for each key type (Linear, Luminance, Chroma key, and Preset Pattern). Note that the state of the **Video Key** button that determines what signal is used for key cut (see below) is included as part of each of these source memory settings. With source memory on, selecting a key type automatically selects the correct key cut signal.

Key Source Button Group

The two buttons in the Keyers subpanel determine the source of the key cut and key fill for each key as explained below.

Matte Fill Button

The **Matte Fill** button determines what signal will be used as the key fill by the keyer. When off, the key fill signal currently selected on the fill bus will be used. When on, a matte signal will be used. Selecting the **Matte Fill** button automatically delegates the Matte menu in the Menu panel. Matte adjustments can only be made through this menu. Refer to *Matte Menus* on page 269.

Video Key Button

The **Video Key** button determines what signal the keyer will use to cut the hole in the background. When off, the key signal (if defined) of the source selected on the cut bus will be used (the normal setting for a Linear key). When on, the video signal of the selected source will be used (the normal setting for a luminance key). If a source does not have a defined key signal, when **Video Key** is off the keyer will produce a full raster key signal, which is useful when the image is manipulated with a Transform Engine or external DVE.

Note **Video Key** is generally used only when the source's key signal is not appropriate. This would be the case for a character generator producing a wide key (for a border or shadow) which the operator decides to matte fill. In this case, the video signal defines the character area and usually produces a better result.

Key Split Button

Each key source button normally controls crosspoints on two buses (key cut, key fill) at the same time. The **Key Split** modifier button is used to select a different key cut signal to use with the currently selected key fill signal.

When **Key Split** is held down, the key bus lights the currently selected key cut source button. Selecting a different source changes only the key cut bus source, and leaves the key fill bus source unchanged. The **Key Split** button lights whenever the key is split. Also, while the **Key Split** button is held down, the shift mode is temporarily forced to Latched to aid in selecting a different key cut from shifted sources with one hand.

When **Key Split** is released, the Key source selector row immediately returns to showing the key fill source and the Shift mode reverts to that defined in User Prefs.

To cancel a key split, note the key fill source when **Key Split** is not held down, then hold down **Key Split** and select that same source for use as the key cut.

Key Invert Button

The **Key Invert** button reverses the polarity of the key control signal. When **Key Invert** is active (button lit) black areas of the key cut signal cause replacement of the background, and the white key cut areas cause the background to be retained.

Key Prior Button

The **Key Prior** button allows the user to set a different priority of the four keyers in the M/E. To set key priority, hold down the **Key Prior** button and press the **Key 1 – 4** buttons in the keying order desired, from top to bottom priority. This will set the priority stack. Double pressing this button will bring up the Keyer Priority menu (see *Keyer Priority Menu* on page 317) where key priority can also be set. After key priority has been set in either manner, select the **Key Priority** button in the Transition subpanel to use this priority selection as part of the next key transition.

Show Key Button

The **Show Key** button is used for viewing the key control signal. This button does not affect the output of the M/E. Holding down this button displays the black and white key control signal of the currently delegated keyer on that M/E's preview output. The results of any clipping and masking will be shown.

Mask Delegation Buttons

Masks help clean up keys by defining picture areas that are prevented from keying (inhibit mask) or are forced to key (force mask). Separate inhibit and force masks may be set up for each keyer. Masks can be created by pattern generators, or can be based on a video source that has been clip and gain adjusted to create the mask control signal. Masks cannot be applied to preset patterns.

The **Inhibit Mask** and **Force Mask** buttons delegate the keyer to control one of these two mask types. Changes to the masking controls affect only the selected mask type of the keyer delegated in the Keyers subpanel. A high button tally indicates which mask is being controlled. If the other mask is also active, its delegation button will low tally. Masking parameters are controlled in the Keyer Mask Menu. Refer to *Keyer Mask Menu* on page 318.

Effects Loop Control Button Group

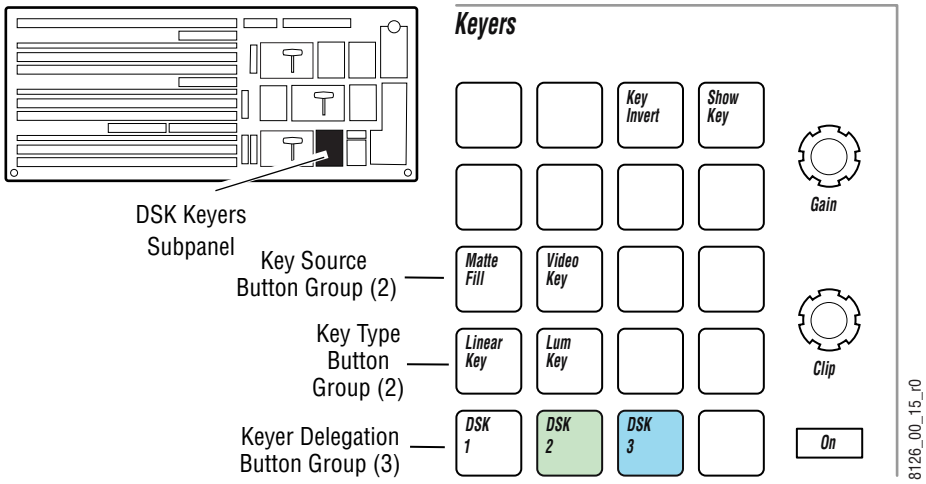
The **Int DPM** (internal DPM) buttons controls how key and video signals are routed to the keyer's Transform Engine internal effects send and return loop.

The **Ext DPM** (external DPM) button is inactive.

DSK Keyer Subpanel

The DSK Keyers subpanel in a 2.5-M/E system (Figure 79) has a reduced set of functions as described below. The Keyers subpanel operates in parallel with the DSK subpanel including the On status indicators (see *DSK Subpanel* on page 121).

Figure 79. DSK Keyers Subpanel – 2.5-M/E System



Keyer Delegation Button Group

The **DSK 1-3** buttons manually delegate the subpanel to control one keyer in the DSK. These buttons can also be used for Hold to Preview (see below), and momentary delegation (see *Momentary Delegation* on page 97).

Hold to Preview

When setting up a key, it is often desirable to see a key that is not on air or part of the next transition. Holding down a **DSK 1-3** delegation button will replace that preview output with a representation of that key over the current background. User preference settings determine whether this feature is enabled for these buttons, whether other on-air keys are shown, and how long the preview lasts. The **Show Key** button is also available to view the actual key control signal. See *Show Key Button* on page 120.

Key Type Button Group

The DSK key functionality is simpler than the M/E keyers and offers Linear and Luminance Keys.

Linear Key

The **Linear Key** button selects a fixed linear key, which uses clip and gain values defined in Engineering Setups – Sources. These values cannot be changed from the panel.

Luminance Key

The **Lum** button selects a Luminance key. The **Gain/Clip Hi** and **Clip/Clip Lo** knobs provide a full range control of clip and gain.

Key Source Button Group

The **Matte Fill** and **Video Key** buttons in the DSK Keyers subpanel determine the source of the key cut and key fill for each key as explained below.

Matte Fill Button

The **Matte Fill** button determines what signal will be used as the key fill by the keyer. When off, the key fill signal currently selected on the fill bus will be used. When on, a matte signal will be used. Selecting the **Matte Fill** button automatically delegates the Matte menu in the Menu panel. Matte adjustments can only be made through this menu. Refer to *Matte Menus* on page 269.

Video Key Button

The **Video Key** button determines what signal the keyer will use to cut the hole in the background. When off, the key signal (if defined) of the source selected on the cut bus will be used (the normal setting for a Linear key). When on, the video signal of the selected source will be used (the normal setting for a luminance key).

Note **Video Key** is generally used only when the source's key signal is not appropriate. This would be the case for a character generator producing a wide key (for a border or shadow) which the operator decides to matte fill. In this case, the video signal defines the character area and usually produces a better result.

Key Invert Button

The **Key Invert** button reverses the polarity of the key control signal. When **Key Invert** is active (button lit), black areas of the key cut signal cause replacement of the background, and the white key cut areas cause the background to be retained.

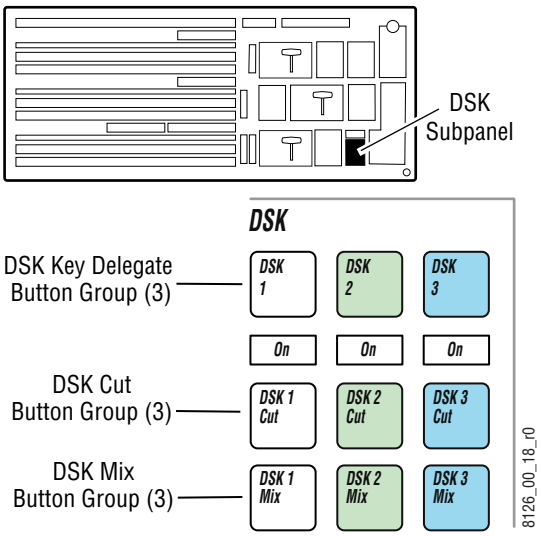
Show Key Button

The **Show Key** button is used for viewing the key control signal. This button does not affect the Program output. Holding down this button displays the black and white key control signal of the currently delegated keyer on that M/E's preview output. The results of any clipping and masking will be shown.

DSK Subpanel

In both 2.5 and 3-M/E systems the DSK subpanel (Figure 80) allows control of the three DSK keyers. This subpanel works in parallel with the DSK Keyers subpanel in a 2.5-M/E system.

Figure 80. DSK Subpanel



Keyer Delegation Button Group

The **DSK 1-3** buttons determine the next transition in the DSK or act as an additional next transition button if a DSK Link is active is any of the M/Es (3-M/E system only). They can also be used for Hold to Preview (see below), and momentary delegation (see *Momentary Delegation* on page 97).

Hold to Preview

When setting up a key, it is often desirable to see a key that is not on air or part of the next transition. Holding down a **DSK 1-3** delegation button will replace that preview output with a representation of that key over the current background. User preference settings determine whether this feature is enabled for these buttons, whether other on-air keys are shown, and how long the preview lasts. The **Show Key** button is also available to view the actual key control signal. See *Show Key Button* on page 120.

DSK Cut and Mix Button Groups

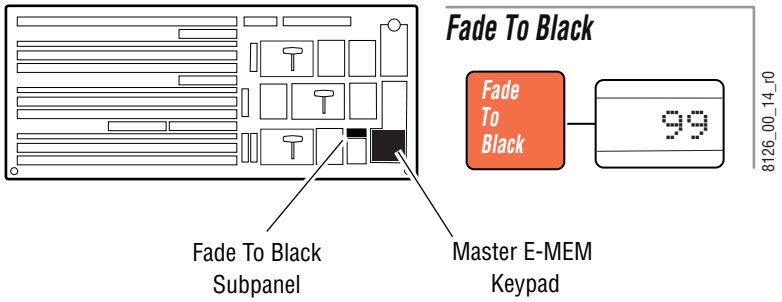
Two groups of DSK transition buttons, DSK Cut and DSK Mix, are provided to allow independent cut and mix of the DSK keyers.

Fade to Black Subpanel

Pressing the **Fade To Black** button fades the switcher's Program output to black at the transition rate shown in the display to the right of the button (Figure 81). The button will light to indicate that a fade to black transition is in progress.

When the switcher is fully faded to black, the button remains lit and the crosspoint buttons on the PGM row low tally.

Figure 81. Fade To Black Subpanel



A fade to black transition can be reversed by pressing the **Fade To Black** button while it is lit. Pressing the button during a fade to black transition will immediately reverse the transition towards black and proceed to the next transition on the PGM bus at the same transition rate.

The fade to black transition rate is set using the Master E-MEM keypad (Figure 81). To set the fade to black transition rate do the following:

1. Press the **Tran Rate** button in the Master E-MEM keypad. The **Auto Tran** button in the DSK Transition subpanel, the three **DSK Mix** buttons in the DSK subpanel, and **Fade To Black** button will flash to indicate they are in the rate setting mode.

2. Press the flashing **Fade To Black** button to delegate the Master E-MEM keypad to setting the fade to black transition rate. The current rate will appear in the display.

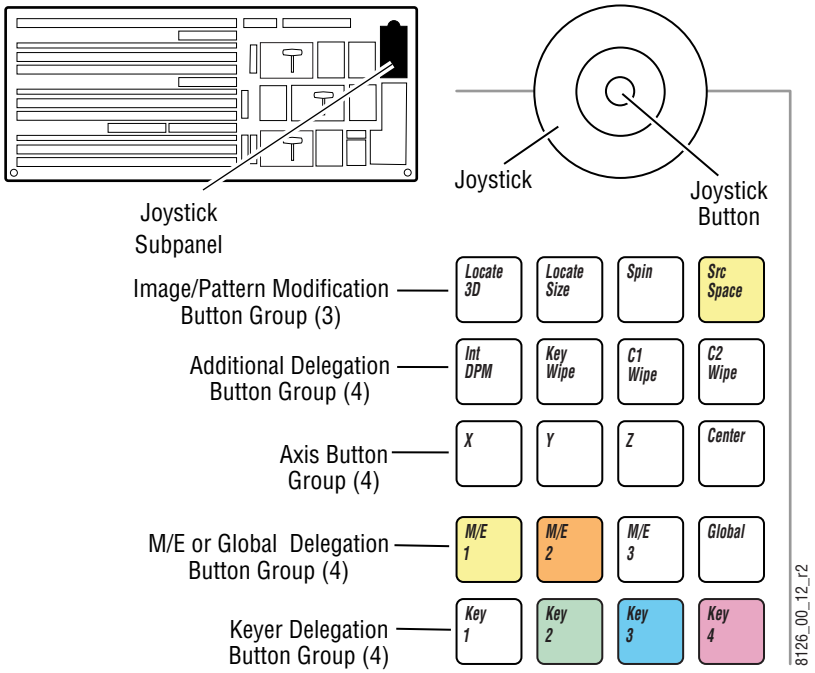
3. Make a time entry using the keypad and press **Enter** to finalize the value.

   Refer to *Time Value Entry* on page 99 for complete instructions on how to make a time value entry.

Joystick Subpanel

The Joystick subpanel (Figure 82) is used to control Joystick functions and delegation and Transform Engine image and wipe pattern placement, size, angle, and other attributes in conjunction with the Transform menus in the Zodiak Menu panel application (see (*Transform Menus* on page 273). The Joystick is particularly suitable for adjusting position and rotation parameters and can also be used to select a color from an image (for example, chroma key backing color) using an on-screen cursor.

Figure 82. Joystick Subpanel

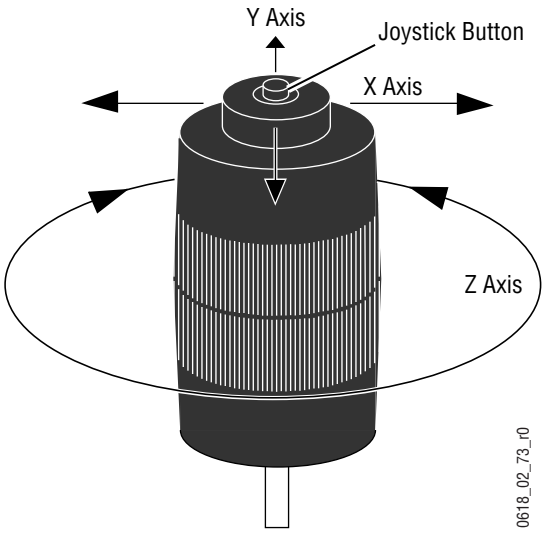


Operating the Joystick subpanel involves delegating a resource and a set of associated parameters to the Joystick. The Joystick then provides control of the delegated parameter values. Parameters can also be delegated to the Master E-MEM subpanel for exact value entry.

Joystick

The Zodiak system Joystick is a precision three-axis device. Moving the Joystick towards or away from you controls the Y-axis, moving the Joystick left and right controls the X-axis, and rotating the Joystick controls the Z-axis (Figure 83).

Figure 83. Joystick



Joystick Button

The **Joystick** button on the top of the Joystick can be used to accelerate the change of the delegated parameter, to allow quicker placement on the screen.

The **Joystick** button is also used to pick a backing color when auto setting up a chroma key.

Joystick Delegation

Because the Joystick acts as a positioner for many different functions, multiple stages of delegation can be required to access and control a specific set of parameters. Different types of delegation are available, depending on the parameters being controlled. Delegations are made by selecting individual buttons in separate delegation button groups. The individual Joystick delegation buttons are discussed in detail later in this section.

The Joystick subpanel delegation buttons have three tally levels, corresponding to the condition of that delegation. A lit button indicates the current delegation. If the delegation is valid, the button will high tally. If the delegation is invalid, the button will low tally (delegated but not active). Low tally can occur if you attempt to delegate the Joystick to a resource like a Transform Engine that is not present. Low tally can also occur when the Joystick is delegated to multiple points of use.

For example, it is possible to delegate the Joystick to M/E 2 Key 1 and Key 2 where Key 1 has a Transform Engine and Key 2 does not. In this case, the Key 1 button will be high tally but the Key 2 button will low tally.

Keyer Delegation Buttons

The four delegation buttons select a specific component of the delegated M/E to be controlled by the **Joystick** from **Key 1–4**. Pressing a single button selects that button and deselects all others in that group. Pressing down more than one delegation button at the same time delegates the Joystick to control multiple objects simultaneously.

M/E Delegation Buttons

The **M/E 1-3** and **Global** buttons are used to delegate the **Joystick** to a particular M/E bank or to the Global channel. This level of delegation is required for all **Joystick** operations. Only one bank can be selected at a time (the buttons are an interlocked group). The button of the current delegation goes high tally.

Note The Joystick is not used in the PGM/PST in a 2.5-M/E system.

Additional Delegation Buttons

Further Joystick delegation for a keyer or DPM channel is done with the **Int DPM**, **Key Wipe**, **C1 Wipe and** and **C2 Wipe** buttons. The buttons in this group are only active when M/E and Keyer delegation has been selected.

The **Int DPM** button delegates the key source (Transform Engine) for the selected keyer.

The **Key Wipe** button delegates the simple wipe generator for the keyer.

The **C1 Wipe** button delegates the C1 complex wipe generator for the keyer.

The **C2 Wipe** button delegates the C2 complex wipe generator for the keyer.

Image and Pattern Modification Button Group

The top group of delegation buttons specify how the image or pattern is to be modified. Not all selections in the group are valid for all delegations in the above groups.

The **Locate 3D** button moves the image in 3D space.

The **Locate Size** button retains X and Y location but replaces Z location with image size.

The **Spin** button permits X, Y, and Z spin of the image.

The **Src Space** button selects between Source and Target space delegation.

Axis Buttons

Holding down the **X**, **Y**, and **Z** axis buttons individually or in any combination constrains the Joystick parameter changes to the selected axes. For example, if the **X** button is held down while the Joystick is moved, then only X axis deflection is performed. Axis constraints also apply to centering functions.

The **Center** button is used to apply the default (center) value to the delegated parameter.

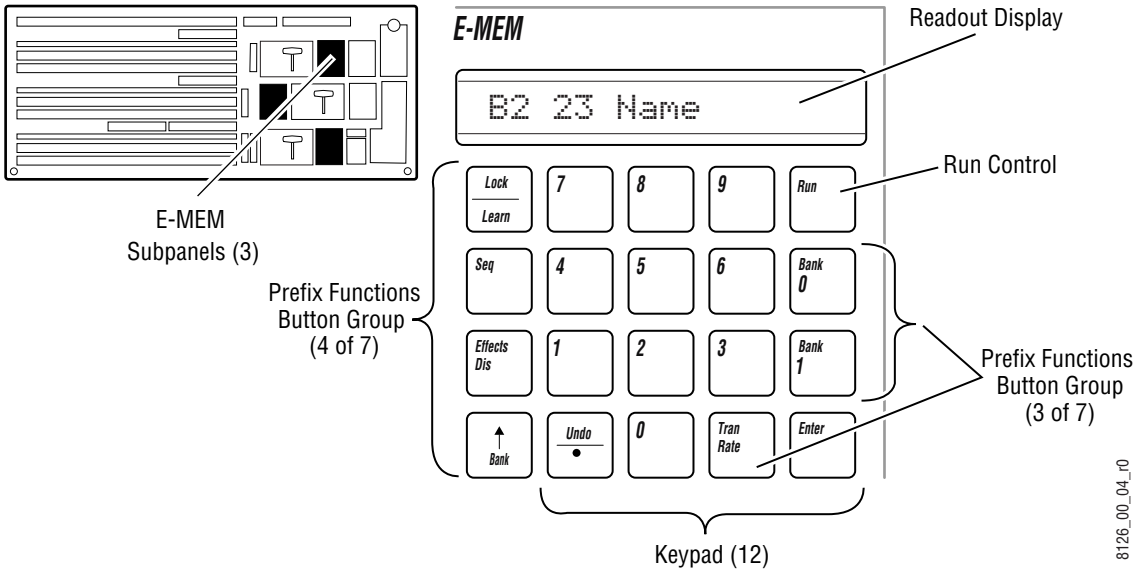
Pressing and releasing the **X**, **Y**, and **Z** buttons transfers the current transform parameter to the Master E-MEM subpanel keypad. The Master E-MEM subpanel keypad may then be used to enter an exact value for that parameter.

E-MEM Subpanels

An E-MEM subpanel is used to Learn and Recall E-MEM effects for the M/E or PGM/PST in which the subpanel resides. The E-MEM subpanel also provides Lock, Sequence, Effect Dissolve and Run capabilities. On the Zodiak system, M/Es 1, 2, and 3 (or PGM/PST in a 2.5-M/E system) are equipped with this subpanel (Figure 84).

All the functions of an individual E-MEM subpanel are also available on the Master E-MEM subpanel, via enables (see *Master E-MEM Subpanel* on page 133).

Figure 84. E-MEM Subpanels



Keypad Numeric Entry Buttons

The E-MEM keypad has 12 numeric entry buttons (**0-9**, **Undo/•**, **Enter**). These buttons are used to recall registers directly or to enter numeric values in conjunction with the prefix buttons for other functions (see below).

Same Bank Effect Recall

The default use of the keypad when a prefix button is not active is to recall an effect to that M/E. Rapid effects recall is accomplished by organizing the registers as ten banks of ten registers each (see *Banks and Registers* on page 64).

Registers in the same bank are recalled by simply pressing one of the **0-9** buttons on the E-MEM keypad. This provides immediate, single button access to ten effects. For example, if bank four is currently active, pressing the **6** button immediately recalls register 46. Effects from other banks are recalled using prefix buttons, described below.

Keypad Prefix Buttons

The prefix buttons (**Lock/Learn**, **Seq**, **Effect Dis**, **Trans Rate**, **↑/Bank**, **Bank 0**, **Bank 1**) determine which function will be affected by the values entered on the numeric keypad. Some functions are nested. For example, within a Learn operation it is possible to specify a Sequence with the **Seq** prefix button, and within a Sequence it is possible to specify delays using the **Trans Rate** prefix button. Some of the prefix buttons also have different modes, selected with the **↑ Bank** button.

When pressed, a prefix button goes high tally to indicate that function has been selected. Pressing a lit prefix button cancels that operation. The E-MEM readout prompts the operator when a prefix button is used (except for **↑/Bank**).

Direct Bank Buttons

The two direct bank buttons (**Bank 0** and **Bank 1**) located to the right of the keypad allow faster access to 2 of the 10 banks. Banks 0 and 1 can be selected instantly with a single press of the appropriate bank button. Banks 2 through 9 are accessed by pressing the **↑ Bank** button and then the bank number on the keypad as explained below.

For example, the following button presses will recall a register from bank 0:

Bank 0, register number

Subsequent single button register selections will be from that new bank unless another bank is selected before the operation. Direct bank selection is available on the E-MEM subpanels for Recall, Learn, Sequence, and Effect Dissolve operations.

Up Arrow Bank Button

The ↑ **Bank** prefix button operates as a shift button to provide two modes of operation for other buttons. The actual operating mode is determined by what other button is pressed next.

The first operating mode is used to specify a bank number. Pressing the ↑ **Bank** button so it lights causes the next **0-9** number button pressed to be interpreted as a bank number. Any bank can be selected for next use by pressing:

↑ Bank, bank number

The **0-9** buttons are used to select the bank. Pressing the number button completes the bank selection operation (the **Enter** key is not used). For example, for the Recall operation, pressing the following buttons will recall a register from another bank.

↑ Bank, bank number, register number

The selected bank is shown on the E-MEM Readout display (see *E-MEM Readout Display* on page 132). This bank selection process is available on the E -MEM subpanel for Recall, Learn, Sequence, and Effect Dissolve operations. The direct bank selection buttons are also available for quicker bank selection (see below).

The second operating mode for the ↑ **Bank** button is to shift the **Lock/Learn** and **Undo/•** button functions. The shifted function for these buttons are selected when they are pressed while the ↑ **Bank** button is lit.

Lock/Learn Button

The **Lock/Learn** button has two modes of operation, unshifted and shifted, determined by the state of the ↑ **Bank** button.

When unshifted (↑ **Bank** is off) the **Lock/Learn** button is used to initiate a Learn operation that stores the current settings for that M/E level to the specified register (or learns a sequence or an effect dissolve). A register in the current bank is learned by simply pressing one of the **0-9** buttons on the E-MEM keypad after the **Lock/Learn** button has been lit. The **Enter** button is not used. The procedure is:

Lock/Learn, register number

The current effect can also be learned to the next empty register using the **Undo/•** button in place of the register number:

Lock/Learn, Undo/•

The next empty register will receive the effect data and become the current effect. This action will not occur and an error will be displayed if there are no empty registers.

To learn M/E settings to a register in a different bank, the new bank must be specified. One of the bank selection procedures described above is used.

Lock/Learn, (**bank selection**), **register number**

The learned register becomes the current effect. Subsequent register selections will be from that new bank unless a different bank is selected before the operation.

When shifted (↑**/Bank** button is lit) the **Lock/Learn** button is used to control locking a register so it cannot be altered. The lock on the current register is toggled on and off with these buttons. The lock status of the current effect is shown on the E-MEM Readout display (see *E-MEM Readout Display* on page 132).

Sequence Button

The **Seq** button is used to program and recall sequences of registers (see *Effect Sequence* on page 67). This prefix button modifies Learn and Recall operations.

A sequence must first be learned to the participating registers, using the following procedure. Parentheses indicate optional values:

Lock/Learn, **Seq**
(bank selection), **register**, **(delay time)**
(bank selection), **register**, **(delay time)**
Lock/Learn

The **Seq** button may be pressed before **Lock/Learn** if desired. The bank selection process described earlier may be used. A delay time can be specified using the **Trans Rate** button to initiate entry of a time value (see *Trans Rate Button* on page 130). A sequence loop can be created by selecting the first register again as the last register in the sequence. Effect Dissolves can be performed during a sequence by learning the Effect Dissolve to the desired registers used in the sequence. This combined capability can be used to build complex effects.

A sequence is performed by recalling a register that has been programmed as part of a sequence with the following procedure:

Seq, **(bank selection)**, **register**

A sequence begins by recalling the specified register, then performs an Effect Dissolves if programmed, runs its effect if it has multiple key frames and **Auto Run** is active, waits the specified amount of delay time, then recalls the next register in the sequence, and proceeds to either the end of the sequence or continues to loop. The **Seq** button remains high tally during the execution of the sequence. Pressing the **Seq** button while a sequence is being executed terminates the sequence operation. Any any effect dissolve (or effect run) will complete, and the last recalled register will remain the current effect.

Effect Dissolve Button

The **Effect Dis** button is used to specify an effect dissolve from the current state of the work buffer to the first key frame of a new register (see *Effect Dissolve* on page 66). This prefix button modifies Learn and Recall operations.

Any register can be recalled as an effect dissolve with the following procedure. This is useful for testing an effect before it is learned as an effect dissolve. Parentheses indicate optional use of one of the bank selection processes described earlier:

Effect Dis, (bank selection), register

The **Effect Dis** button goes high tally while the Effect Dissolve is being performed. The effect dissolve rate is one second, unless the register has previously been learned with a different dissolve rate (see below). Recalling another register while an effects dissolve is in progress aborts the current effects dissolve and then performs the recall. Pressing the **Effect Dis** button while an Effect Dissolve is in progress stops it at that point.

A register may be learned so an Effect Dissolve is always performed whenever that register is recalled using the following procedure. This learns a new state into the register, so you should recall the register involved before performing this procedure:

Lock/Learn, Effect Dis, (dissolve rate), (bank selection), register

The **Effect Dis** button may be pressed before **Lock/Learn** if desired. A dissolve rate can be specified using the **Trans Rate** button for time entry.

An Effect Dissolve learned to a register can be cleared by recalling the register, waiting until the effect dissolve completes (the **Effect Dis** button will go off), and then pressing **Lock/Learn** and the register number to relearn the register.

Trans Rate Button

The **Trans Rate** button on the E-MEM subpanel is used to set transition rates for M/E main and keyer transitions. See *Transition Rates* on page 113 for more information.

When either the **Seq** or **Effect Dis** prefix buttons are lit, the **Trans Rate** button can be used to enter time values in the same format. See *Time Value Entry* on page 99 for details.

Enter Button

The **Enter** button on the E-MEM subpanel is only used to complete a time value entry on that keypad for an Auto Transition, Effect Dissolve, and Sequence Delay.

Undo / • Button

The E-MEM **Undo/•** button is used to enter default values and decimal points during data entry, and to undo the last action.

The two modes of the E-MEM **Undo/•** button, unshifted and shifted, is determined by the state of the ↑ **Bank** button. The exact **Undo/•** button behavior in unshifted mode is determined by the operation that is performed next, and in shifted mode is determined by what operation was performed last.

When unshifted (↑ **Bank** is off) the **Undo/•** button is used with Learn, Get, and Put operations to represent the next available register (the default). The unshifted **Undo/•** button is also used for Sequence and Effect Dissolve operations to represent the colon separator in time value entry.

When shifted (↑ **Bank** is on) and the last operation was an E-MEM register operation (Learn, Recall, keyframe edit), pressing the **Undo/•** button will undo the operation. If an operation has just been undone, pressing the shifted **Undo/•** button will redo the operation. Thus, pressing ↑ **Bank**, **Undo/•** repeatedly allows toggling back and forth between the last two states of the current effect. The **Undo/•** button must be used immediately after an undesired operation, or it may be unable to undo it.

Run Control Button

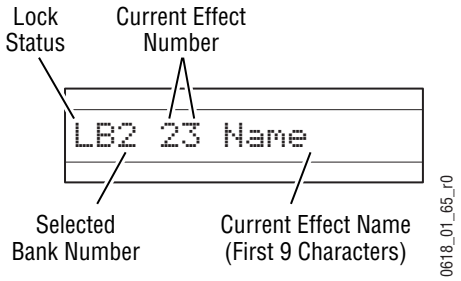
The **Run** button in the upper left corner of the keypad will cause the current effect to run. The button will light to indicate the run state. A effect run can be stopped at any time by pressing the lit button (turning it off).

E-MEM Readout Display

The E-MEM readout display has 16 alphanumeric characters, and is used to show the status of the current register status, display messages, and prompt the user.

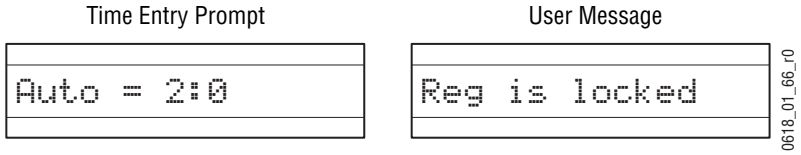
When displaying the status of the current effect, the first readout character position is either blank or indicates with an “L” that the register is locked. The second and third positions indicate the bank number selected for the next action. The current effect number and name follows. A typical display is shown in Figure 85. The full 16 character name is displayed for five seconds when a register is recalled with a name longer than 9 characters.

Figure 85. E-MEM Readout Display of Current Effect



The E-MEM readout display prompts the operator for time entry during Transition Rate operations. The readout can also display messages to the operator. For example, if an attempt is made to alter a locked register the readout will display `Reg is locked` for five seconds. Typical readout displays are shown in (Figure 86).

Figure 86. E-MEM Readout Display of User Prompts



Master E-MEM Subpanel

The Master E-MEM subpanel (Figure 87 on page 134) is organized in a similar manner to the individual E-MEM subpanels, but has additional capabilities. The Master E-MEM subpanel can also Learn and Recall effects for all the other M/Es, individually or in combination. In addition, the Master E-MEM subpanel can affect other Zodiak levels, making this an effective control center for the entire Zodiak system.

The Master E-MEM subpanel is divided into the following main sections:

- Master E-MEM keypad,
- Recall Enable buttons,
- Readout Display,
- Run Control and Modifier buttons, and
- Keyframe Edit buttons.

In this section, only the additional capabilities of the Master E-MEM subpanel will be discussed. Features identical to an individual E-MEM will be cross referenced.

Master E-MEM Keypad

The Master E-MEM keypad has numeric and prefix keypad buttons similar to the E-MEM keypad in addition to the Run Control and Keyframe Edit buttons outlined below.

Note E-MEM Operations performed on the Master E-MEM subpanel only affect the levels that have been enabled, and all levels in each active enable group will be affected. Make sure the appropriate levels have been enabled before issuing E-MEM commands.

Lock/Learn (See *Up Arrow Bank Button* on page 128.)

Seq (See *Sequence Button* on page 129.)

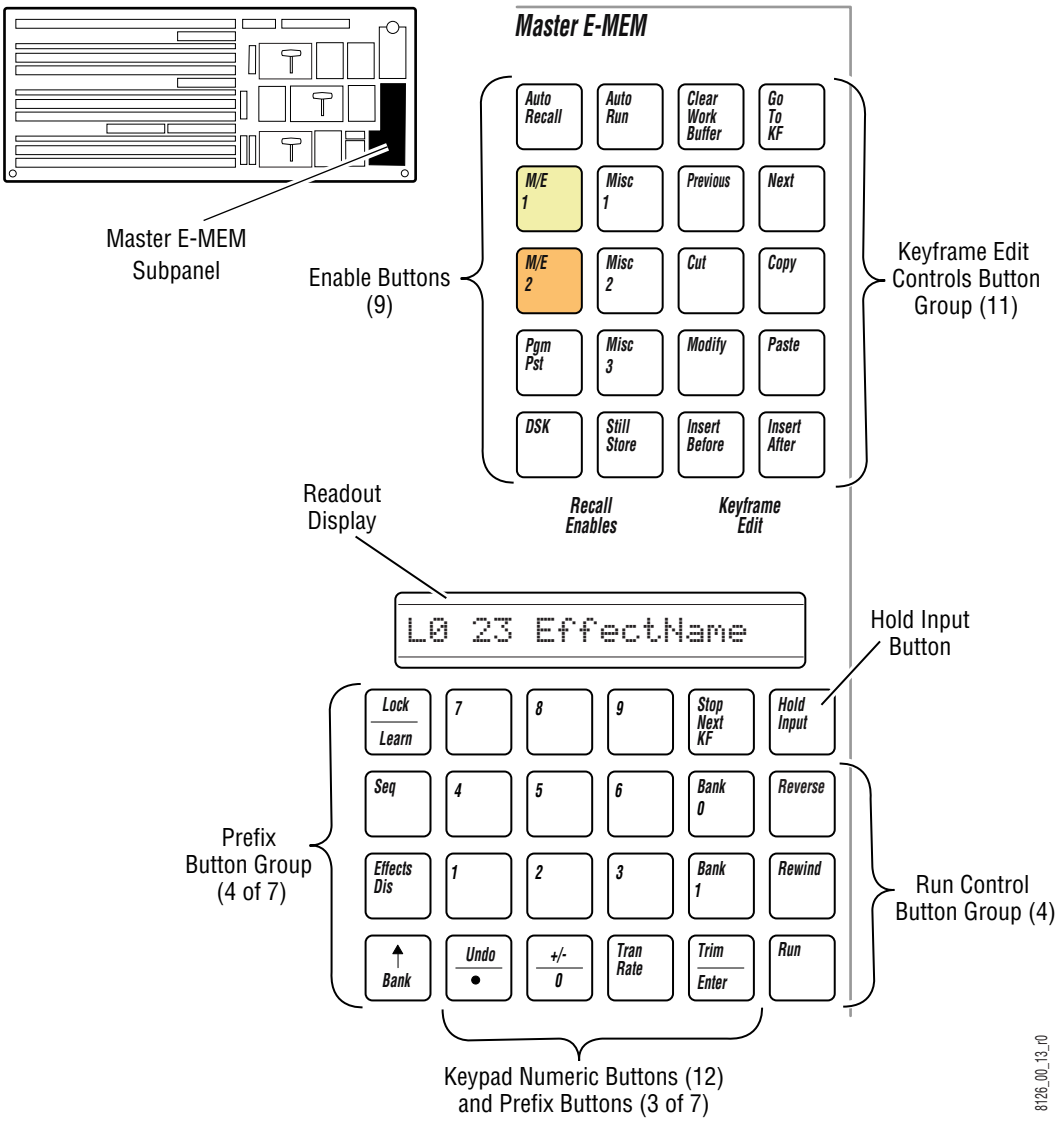
Effect Dis (See *Effect Dissolve Button* on page 130.)

Bank 0/Bank 1 (See *Direct Bank Buttons* on page 127.)

↑ **Bank** (See *Up Arrow Bank Button* on page 128.)

Undo/• (See *Undo / • Button* on page 131.) This button undoes the last action, regardless of enabled levels. Changing enable states is not considered an E-MEM command, and so cannot be undone.

Figure 87. Master E-MEM Subpanel



Additional Master E-MEM Keypad Functions

Two of the Master E-MEM keypad buttons have added shifted functionality not available on the M/E E-MEM keypads.

The **Trim | Enter** keypad button, when shifted with the ↑ **Bank** button, is used in place of the **Enter** button to change the parameter by a specific value. The value of the trim is generally typed on the keypad first, and then enacted by pressing the **Trim** button. The sign of the trim value can be changed with the **+/-** button (see below). The last trim value is retained in memory, however, so pressing **Trim** repeatedly will make successive changes to the parameter by the last specified trim value.

The **+/- | 0** keypad button, when shifted with the ↑ **Bank** button, changes the sign of the value currently being input on the Master E-MEM keypad. This button can be pressed either before or after the value has been typed into the keypad, but before it is completed with **Enter** or **Trim**. Pressing **+/-** by itself followed by **Enter** negates the current value.

Master E-MEM Enable Buttons

The Master E-MEM subpanel can control the entire Zodiak effects system, but changing the entire system all at once is rarely needed except when preparing for a new session. The E-MEM system is divided into levels to allow directing changes to desired system areas (see *Number and Types of E-MEM Levels* on page 70).

The 8 Enable buttons (**M/E 1-2**, **Pgm Pst**, **DSK**, **Still Store**, **Misc 1-3)** and the **Auto Recall** button are used to select which levels are subject to control (or enabled) from the Master E-MEM subpanel. As there are more E-MEM levels than buttons available, some of the Enable buttons can be defined in E-MEM menus for other functions.

E-MEM Level Assignments

Each Enable button can actually be configured to control several E-MEM levels or an *enable group* (see *Number and Types of E-MEM Levels* on page 70). Pressing an Enable button will activate, or enable, all the levels that have been assigned to that enable group. Once enabled, effects for those levels in that group can be learned and recalled. E-MEM levels are assigned to Enable buttons using the E-MEM Prefs menu (see *E-MEM Prefs Menu* on page 160).

Auto Recall Button

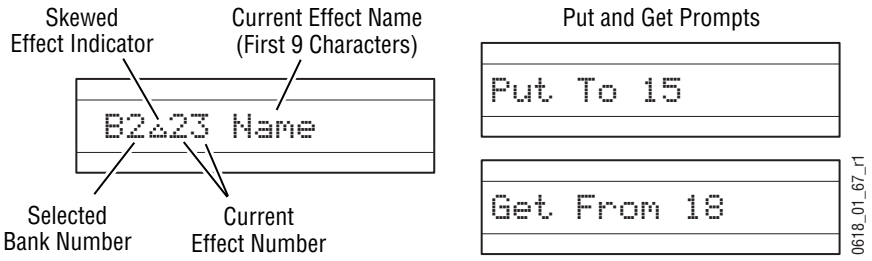
The **Auto Recall** button can be used to automatically enable the correct levels during the recall of an effect, if the effect was learned with **Auto Recall** on. It can be difficult to remember which levels are involved in a complex effect. The **Auto Recall** button can be used to make Zodiak system automatically enable the levels that were used to create an effect. Complex effects can then be easily recalled without fear of having the wrong levels enabled. The **Auto Recall** button toggles on and off, and on is its default state.

To have an effect automatically enable its levels when recalled, the effect must be learned with **Auto Recall** active. Make sure the button is lit before you learn the register. Note that learning the register stores the current settings in the register, so all the levels must be in the proper state before the learn.

Master E-MEM Readout Display

The Master E-MEM readout is organized the same as the individual E-MEM readouts. See *E-MEM Readout Display* on page 132. The Master E-MEM readout can also display additional level related information, and shows different prompts for the other Master E-MEM keypad prefix functions (Figure 88).

Figure 88. Master E-MEM Readout Display



If there is more than one current effect register (different E-MEM levels were independently recalled from different registers, also called a *skewed effect*) a triangle symbol is displayed between the current bank number and the current register number. The locations of the contributing registers can be determined by turning on one enable at a time.

Run Control Buttons

Effects stored in E-MEM can be run using the **Run** button or doing an Auto Run Recall. The four Run control buttons provided in the Master E-MEM keypad for running effects as described below.

Run Button

The **Run** button initiates the running of an effect from the current cursor location. **Run** also acts as a toggle to stop a running effect and then start it again from its stopped location. If the cursor is at the end of an effect when **Run** is pressed, the effect will automatically rewind and then run.

Stop Next KF Button

When the **Stop Next KF** button is on, subsequent effects runs will stop at the next keyframe encountered. With this feature on, you can step keyframe by keyframe through an effect by pressing the **Run** button repeatedly.

Rev Button

When the **Rev** button is on, subsequent effect runs will proceed backward, from the end of the effect to the front. This button does not affect editing operations. For example a **Go To Next** action does not reverse direction when the **Rev** button is on.

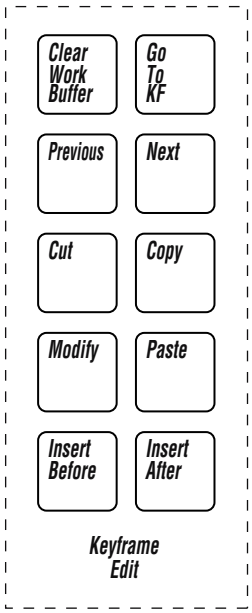
Rew Button

Pressing **Rew** will abort any run in progress and rewinds the effect to its beginning (if **Rev** is off) or to its end (if **Rev** is on).

Hold Inputs Button

The **Hold Inputs** button can be used to control whether E-MEM recalls will change any of the current source selections on any Zodiak system bus (including the Aux buses). When on, no source on any bus will change when an E-MEM is recalled. When off, sources may change during an E-MEM recall (if no other types of hold are in force).

Keyframe Edit Buttons



The Keyframe Edit button group in the upper left corner of the Master E-MEM subpanel contains ten buttons for editing and navigation of keyframes on a timeline and an **Auto Run** button for executing effects.

For an explanation of basic keyframe concepts, refer to *Keyframe* on page 62. For an overview for using the keyframe edit and navigation controls described here in conjunction with the Timeline menu, refer to *Basic Effect Editing* on page 355.

Clear Work Buffer Button

As an operator recalls E-MEM effects and makes changes to the panel and menu controls, the contents of the work buffer change accordingly. If source memory is on, the source memory settings for each source are also updated as the settings for sources modified. The **Clear Wk Bfr** can be used to return work buffer and source memory settings to known states. This can be helpful when creating effects.

Work buffer and source memory values are not set to zero when they are cleared. Instead, previously defined settings replace the current settings. The Default Keyframe is a single group of settings defining a particular switcher state. These settings are copied to the work buffer when the work buffer is cleared (see *Default Keyframe* on page 72). The Default Source Memory defines settings for each source. These settings are used when the source memory is cleared (see *Work Buffer, E-MEM, and Source Memory* on page 73).

When source memory is on, the following actions can be performed with the **Clear Wk Bfr** button:

- Pressing **Clear Wk Bfr** once clears all the work buffers parameters except those associated with source memory in all levels enabled in the Master E-MEM subpanel.
- Pressing **Clear Wk Bfr** twice rapidly clears all the work buffer parameters for all the enabled levels, and also clears the source memories of the sources currently selected in the enabled levels.
- Pressing **Clear Wk Bfr** once while holding down at least one source select button, clears only the source memory related parameters for each held down source. The Master E-MEM enables have no bearing on this operation.
- Pressing **Clear Wk Bfr** twice rapidly while holding down at least one source select button, clears the source memory related parameters and all the work buffer parameters for the level of the source button held down. This includes source selections on the key buses and the associated keyers. The Master E-MEM enables have no bearing on this operation.

Starting with Zodiak Software Version 3.1 the following rules for Source Memory Operations apply:

- While Source Memory is active, if it is loaded or copied or swapped, the new Source Memory will be immediately applied to the Current Work Buffer.
- While Source Memory is active, Source Memory will immediately be updated to reflect changes to the Current Work Buffer.
- When Source Memory is activated after having been inactive, the Current Work Buffer values will not be immediately updated to reflect the Source Memory. However, reselecting the same source on a bus will pull Source Memory into the Current Work Buffer.

When source memory is off, the separate source memory area and the Source Memory Default values are not used. In this situation, source memory related parameters cleared with the **Clear WkBfr** button will be replaced with Default Keyframe parameters.

Timeline Editing and Navigation Buttons

The following buttons in the Keyframe Edit group are used for keyframe editing and navigation in conjunction with the Timeline menus accessible from the Menu panel. An effect editing clipboard provides the ability to rearrange keyframes using these controls.

Go to KF – The **Go To KF** button is a numeric entry prefix that allows the operator to enter the number of a specific keyframe using the keypad. The cursor is positioned at the selected keyframe when the entry is complete.

Previous – Pressing the **Previous** button moves the cursor to the previous master timeline keyframe.

Next – Pressing the **Next** button moves the cursor to the next master timeline keyframe.

Cut – Pressing the **Cut** button removes the currently marked keyframe(s) from the timeline and stores it on the clipboard, completely replacing any current clipboard contents. The contents of the clipboard can be pasted anywhere on the timeline or deleted. Use this button to delete a keyframe.

Copy – Pressing the **Copy** button places the currently marked keyframe(s) onto the clipboard but leaves it in the timeline.

Modify – An existing keyframe can be changed by positioning the cursor at the desired keyframe, making the changes, and then pressing the **Modify** button.

Paste – Pressing the **Paste** button will paste the contents of the clipboard (from a cut or copy) into the current cursor location in the timeline.

The paste function can also act as a replace function. If no keyframe(s) are marked, the paste will occur at the current cursor location, moving any keyframes down the timeline later in the effect by the duration amount of the pasted keyframe(s). If a marked keyframe or group of keyframes is active, the paste will replace the marked areas with the clipboard contents. The effect duration will update if the lengths are different.

Insert Before – When the cursor is on a keyframe, pressing the **Insert Before** button inserts a keyframe at the cursor location, and shifts the keyframe the cursor was on and all the following keyframes later in the effect. The currently specified keyframe duration value determines the duration of the new keyframe, and the total effect duration increases by that amount.

When the cursor is on the path (not on a keyframe), **Insert Before** places a new keyframe at the current position without adding time or moving any existing keyframes. In either case, after the operation the cursor is positioned on the new keyframe.

Insert After – When the cursor is on a keyframe, pressing **Insert After** inserts a new keyframe (with the currently specified keyframe duration) after the keyframe the cursor was on, and shifts all the following keyframes later in the effect, which increases the total duration of the effect. When the cursor is on the path, **Insert After** places a new keyframe at the current position without adding time or moving any existing keyframes. In either case, after the operation the cursor is positioned on the new keyframe.

Auto Run Button

The **Auto Run** button on the Master E-MEM subpanel controls whether a multiple keyframe effect will run when it is recalled. When on, the effect will immediately run when recalled. When off, the effect will remain on its first keyframe when recalled.

Remote Aux Panels

There are five different Remote Aux panel options available with the Zodiak system. The panels come with either 24 or 32 primary source buttons and can be single or multi-destination. Operation of Remote Aux panels is similar to the local PVW/AUX subpanel on the Main panel. Differences and features of the Remote Aux panels are covered in the sections below.

24-Crosspoint Remote Aux Panel

There are three types of 24-Crosspoint Remote Aux panels as shown in Figure 89, Figure 90, and Figure 91.

Figure 89. KAL-24AUX1 (1 RU) Remote Aux Panel

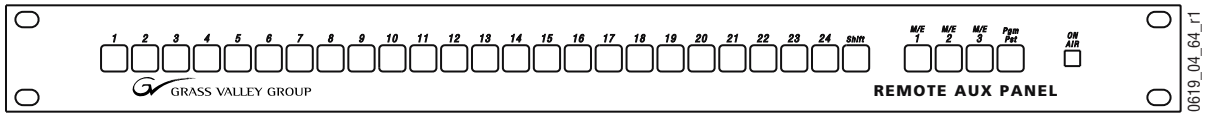


Figure 90. KAL-24AUX2 (2 RU)

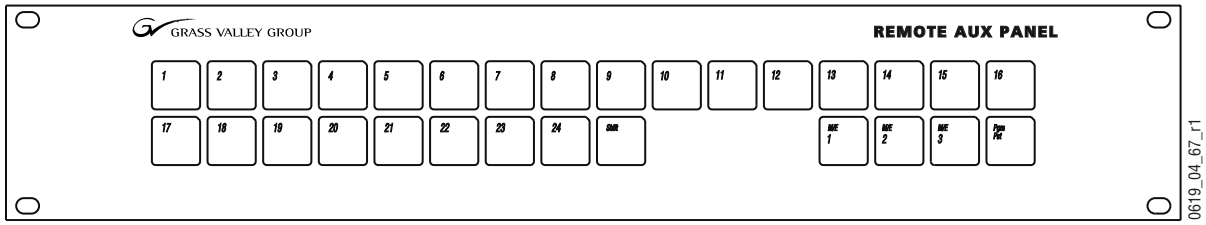
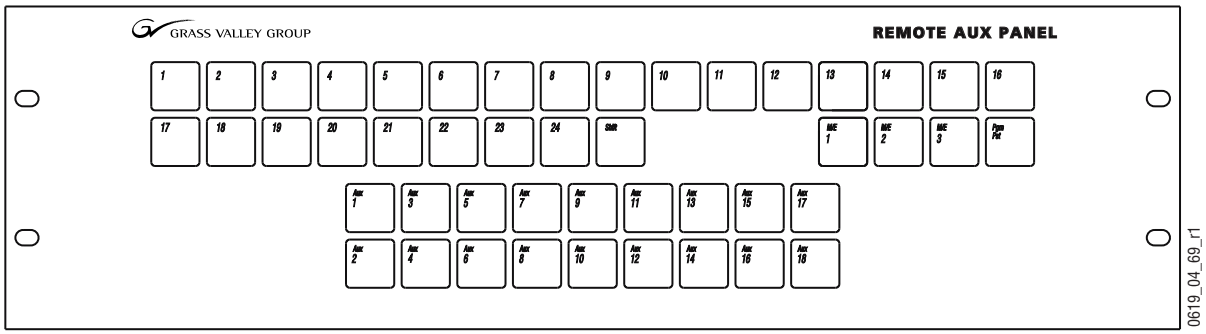


Figure 91. KAL-24AUX3 (3 RU)



Each panel has 24 primary source selection buttons and a **Shift** button for accessing another 24 sources. Four secondary source selection buttons on each panel can select the outputs from the switcher M/E and PGM/PST A buses.

The single bus Remote Aux panels control only one Aux bus. The multi-destination panel has 18 Aux bus delegation buttons that may be configured to control any of the available Zodiak Aux buses. Aux bus delegation mapping and source to button mapping is described in detail in *Button Mapping* on page 331.

When an Aux bus controlled by a multi-destination Remote Aux panel is part of an Aux pair, the A and B Channels of the Aux pair can be assigned to different Aux bus delegation buttons to allow changing sources on either channel as described in *Mapping Aux Bus Pairs* on page 336.

32-Crosspoint Remote Aux Panels

Two types of 32-crosspoint Remote Aux panels are available as shown in Figure 92 and Figure 93.

Figure 92. KAL-32AUX1 (1 RU)

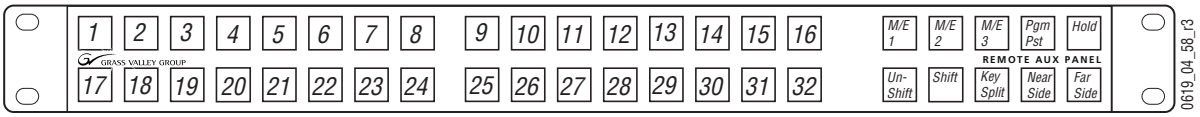
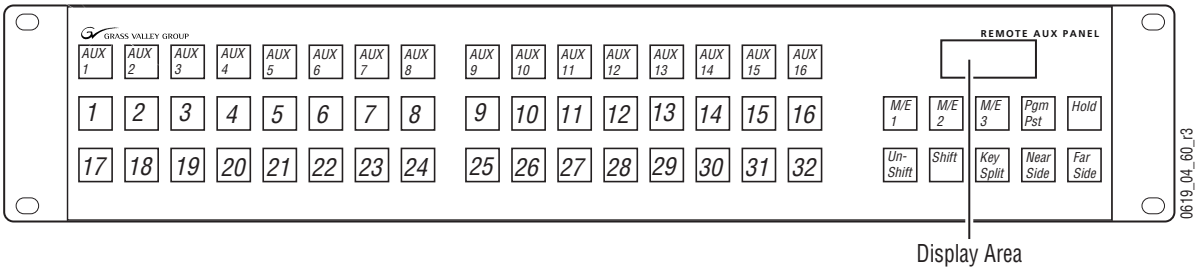


Figure 93. KAL-32AUX2 (2 RU)



Each panel has 32 primary source selection buttons and 32 shifted buttons. Four secondary source selection buttons on each panel can select the outputs from the switcher M/E and PGM/PST A buses.

The single bus Remote Aux panel controls only one Aux bus. The multi-destination panel has 16 Aux bus delegation buttons that may be configured to control any of the available Zodiak Aux buses. Aux bus delegation mapping and Source to button mapping is described in detail in *Button Mapping* on page 331.

The readout display on the 2 RU panel will indicate the name of the Remote Aux bus after it is selected on the delegation bus or a source name after it is selected on the source selection bus.

The other source select modifier buttons are described below.

Source Select Modifier Buttons

Hold Button

The **Hold** button on each panel is alternate action, either on or off. When on (high tally), the **Hold** button prevents an E-MEM recall from the Main panel from changing the source selection on the bus (a bus hold).

Shift/Unshift Buttons

The **Unshift** and **Shift** source select modifier buttons are used to select the shifted or unshifted buttons on the panel.

Holding down a Remote Aux panel **Unshift** button while making a source selection always selects the unshifted sources for the Aux bus. Likewise, holding down the **Shift** button always causes selection of the shifted source.

Key Split Button

When an Aux bus controlled by a Remote Aux panel is part of an Aux pair, the **Key Split** source select modifier button can be used to select a different B Channel source (video or key as defined in the Aux Bus menu). When **Key Split** is held down, the Aux bus lights the currently selected B Channel source button. Selecting a different source changes only the B Channel source (a key split), and leaves the A Channel source unchanged.

To cancel a key split, note the B Channel source when **Key Split** is not held down, then hold down **Key Split** and select that same source for use as the B Channel source.

Aux pairs are described in Section 3 – Configuration of the separate *Zodiak Installation and Service Manual.*

Near/Far Side Buttons

The **Near Side** and **Far Side** buttons are used to select only the near (visible) side, or the far (not visible side) of a digitally manipulated source. These buttons are active if a Transform Engine or external DPM is associated with the bus (aux buses or buses with Effects Send active). When a **Near Side** or **Far Side** button is not held down, a change in source selection is applied to both the near and far sides. This functionality is currently not active in the Zodiak.

Disk Drives

The Zodiak file system includes a CD-ROM drive installed in the side of the Menu panel used to load software files and an external 250 Mb Zip disk connected to the menu panel used for saving and loading configuration and effect files. The system also includes two 1.44 MB floppy drives, one located inside the Main panel tub and the other in the Video Processor frame. The floppy drives are used for maintenance and troubleshooting purposes only.

For instructions on installing software, refer to the Zodiak Installation and Service Manual or the latest release notes included with software releases.

The basic Zodiak system also houses two hard drives, one in the Main panel to support the Menu panel display, and another in the Video Processor frame for all non-volatile and on-line storage of effects and configuration information.

Section 4

Menus Overview

Introduction

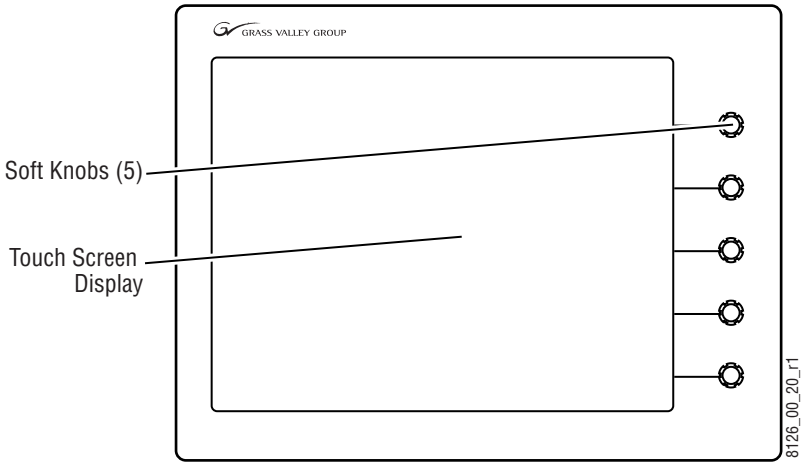
The Zodiak system's Menu panel provides capabilities that complement the operation of the Main panel and the Remote Aux panels. The Menu panel controls most system functions, and has additional controls not available on the Main panel (for example, wipe pattern selection, chroma key manual controls, and configuration menus). During live production the operator spends most of his time working directly on the Main and Remote Aux panels. The Menu panel is used extensively for setup and effects creation.

CAUTION Do not install unauthorized applications on the Zodiak system. Activity from other applications may adversely affect Zodiak system operation.

Menu Panel Description

The Menu panel has a touch screen display and five soft knobs on the right (Figure 94).

Figure 94. Menu Panel



Touch Screen

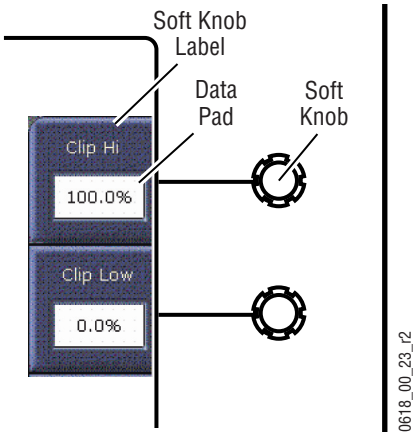
CAUTION Do not apply any sharp or rigid object (no pens or pencils) to the touch screen display surface.

The Menu panel touch screen allows direct interaction with menu controls displayed on the screen. The screen is designed to work with a finger or other soft object. The touch screen is sensitive to a single pressure location only, so only one touch surface control can be adjusted at a time.

Soft Knobs

Knobs along the right side of the Menu panel can be used to dial in parameter values for functions displayed on the touch screen. When a knob is active, the touch screen displays the parameter name and its current value on a data pad (Figure 95). The parameter can be adjusted by turning the knob, or the data pad can be touched to bring up a numeric keypad. On some menus, a soft knob may be able to control parameters or scroll a list located elsewhere on the screen. In these cases a line connects the soft knob to the controlled screen area.

Figure 95. Soft Knob and Pad

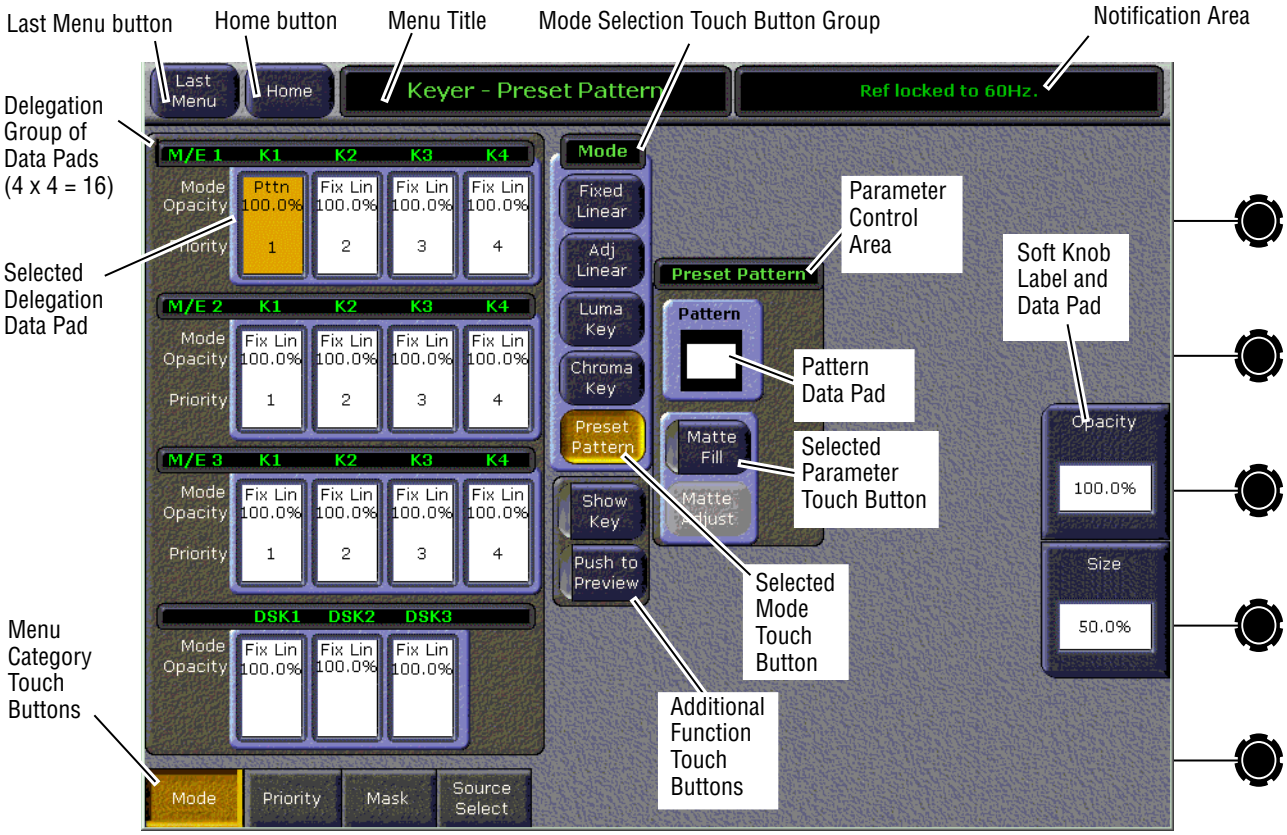


Menu Screen Organization and Components

Zodiak system menus are context sensitive. They display different information and provide various types of controls depending on what area of the system is involved. Menus are organized into categories of related controls, which can be directly selected with touch buttons located at the bottom of the screen. Some configuration menus have additional subcategory selections available at the left edge of the menu.

Within a menu, delegations may also be available to access specific parameters. In general, once a menu category/subcategory has been selected, levels of delegation are available in a left to right and top to bottom order. This generally results in placing some parameters next to the soft knobs for easy adjustment. In no case is the user more than four buttons away from the desired menu (mode selection, menu category, highest priority delegation, and final delegation). In most cases, fewer selections are required. A representative menu screen (Keyer-Preset Pattern) is shown in Figure 96.

Figure 96. Keyer – Preset Pattern Menu Example



Data Pads and Touch Buttons

The Zodiak system menus make extensive use of data pads. Data pads are active areas on the screen that display a summary of the status of an object, and when touched bring up additional controls and information for that object. In Figure 96, the data pad for M/E 1 Keyer 1 has been selected, causing the rest of the screen to display settings and controls for that keyer.

Some data pads display a single value (for example, the soft knob data pads). Touching a soft knob data pad brings up a keypad on the screen for data entry (which can be closed without making any changes if desired). A special pattern data pad also exists, which displays the shape of the current pattern (the circle shape in Figure 96). Touching this data pad brings up a wipes palette, from which wipe pattern generator shapes are selected.

Note that a single touch of a data pad will not change any Zodiak system settings, but just brings up controls that permit changes. You can safely touch any data pad to explore that object's parameters and settings. Actual changes are enacted on the screen with the touch buttons, by turning a soft knob, or by entering a value on a keypad.

Some menu items that look like data pads only display information, and will have a colored rather than white background. Touching these buttons does not generate a popup menu. The information displayed might be able to be changed using different controls, or it may simply report a status.

Touch buttons do not display data, and are labeled by their function. There are two types of touch buttons. One type changes parameters directly, and the other changes the menu's display of parameters, from which changes can be made. Direct change touch button functions include selecting an operating mode (**Preset Pattern** in Figure 96), or turning on an attribute (**Matte Fill** in Figure 96). Touching these buttons will immediately activate their function. Note that the Menu Category touch buttons at the bottom of the screen are used to display a different category of controls, and this is actually a form of delegation. Touching these buttons will not change any actual Zodiak system settings, so they can also be safely touched at anytime to explore the menus.

Touch buttons can control on/off functions, and have a colored indicator on the left side (**Matte Fill** in Figure 96), or they can select from a group of parameters, and turn gold to indicate the state of that parameter (**Preset Pattern** in Figure 96). For on/off buttons, the color of the indicator shows the relative importance of the function. Green indicates this is a normal parameter and that either an on or off state is typical. Yellow indicates an active function that may change expected behavior. Red indicates an active function which significantly changes normal behavior.

Touch buttons and other elements on the screen colored gray are inactive, perhaps due to their function not being available in a particular mode or delegation. Features not yet implemented also have gray touch buttons.

Menu Top Line

The top line is identical in all the Zodiak system menus. The left portion of the top line identifies the name of the current menu. The selected subcategory or specific mode is also displayed when appropriate. The right portion of the top line is an operator notification area, where messages generated by the Zodiak system are displayed. Touching the menu title at the top of any menu returns you to the Home menu.

Menu Category Selection

Menu category selection touch buttons are arranged along the bottom of the screen (**Mode**, **Priority**, **Mask** etc. in the example). Touching one of these buttons takes you directly to that category. The currently selected category is shown by the touch button turning gold.

Some configuration menus have additional subcategory selections available at the left edge of the menu. The selected subcategory button is colored gold.

Delegation Group

Additional levels of delegation are needed in the Keyer menu, since it must control all 8 (or 12 in a 3-M/E system) keyers. This highest level of delegation is located on the left side of the menu, as a 2 x 4 grid of data pads (two M/Es, each with four keyers). Data pads display limited status for a particular object. Touching a data pad delegates that object, and the rest of the menu will then display information and controls for only that object. The data pad of the selected object is colored gold.

Mode Selection

Each keyer has several types of operation, one of which can be chosen with the Mode Selection touch buttons. Selecting one of these touch buttons deselects the others (they are interlocked and act as “radio” buttons). In the Keyer menu, when a particular mode is selected, the Parameter Control area will display information for only that mode of the delegated object. Different types and numbers of controls can appear, depending on the capabilities of the selected mode.

Generally, touch buttons that are closely related to one another have a blue background, though this is not necessarily an indicator that the buttons are interlocked.

Parameter Control Area

In the Keyer menu example, a Parameter Control area contains function selection touch buttons and soft knob pads for the selected operating mode. Function selection touch buttons either toggle on and off or are part of an interlocked group.The soft knob pads on the right allow individual parameter adjustments, as described earlier.

Additional Function Buttons

In the Keyer menu, some functions are available for all delegated objects and their modes. Touch buttons for these functions can be located outside the Parameter Control area.

Menu Access Touch Button

In some cases it is handy to jump to a different menu and delegation to adjust related controls. For example, an operator setting up a mask may need to adjust a pattern in the wipe menu. To make menu navigation easier, a menu access button can be included on one menu that links to a different, related menu. For example, the Copy Swap or Matte Adjust functions.

Numeric Keypad

Touching a soft knob pad or other single numeric parameter pad brings up a numeric keypad that can be used to enter exact values (Figure 97). You can also connect a standard computer keyboard to enter information while this display is active.

Figure 97. Numeric Keypad

Alphanumeric Keypad

Touching the pad for a text parameter brings up an alphanumeric keypad (Figure 98). You can also use a standard computer keyboard to enter information while this display is active.

Figure 98. Alphanumeric keypad

Scrolling Selections

Sometimes it is not possible to display all the available selections on a menu screen. For example, the Daily Setups-Local Aux Delegation menu has two vertically scrolling areas, one that lists the available buttons and one that lists the available buses (Figure 99 on page 152).

Figure 99. Daily Setups - Local Aux Delegation Menu Example

Touching an arrow on the top or bottom of these displays scrolls that area to the next group of available items. The white area of the scroll bar is used to scroll the entire page. When the top or bottom of the list is reached, that arrow goes gray.

Menu and Panel Interactions

The Main panel and the Menu panel graphical user interface operate as a single control surface, and so these components interact with one another. Many controls on the Main panel are duplicated on the Menu panel screens. For example, a keyer can be set to use a Chroma key with a Main panel button or a Menu touch button. Other controls, like manual Chroma key settings, are only available on the Menu panel.

Double Press Open (DPOP) and Single Press Open (SPOP) are convenient ways to access related menus when working on the Main panel. Double pressing or single pressing certain buttons bring up particular menus (see *DPOP and SPOP Menu Delegation* on page 98).

Once that menu is displayed, delegation changes affecting that menu that are made on the Main panel will be tracked on the Menu panel. For example, if M/E 2 Key 1 is selected on a menu, and then M/E 2 Key 2 is

selected on the Main panel, the menu display will change its delegation to M/E 2 Key 2. However, the reverse is not true. Changing delegations on the Menu panel does not change Main panel delegations.

When both the Main panel and the Menu panel are delegated to the same object (say, M/E 1, Key 1), changes can be made to that object from either panel. Once the change occurs, both panels will be updated to reflect the status of the object.

Both panels do not need to be delegated to the same object to enact a change, however. Suppose the Main panel is delegated to control M/E 1, Key 1 while the Menu panel is delegated to M/E 2, Key 2. Changes made on the Menu panel will affect only M/E 2, Key 2, and changes made on the Main panel will affect only M/E 1 Key 1. When the delegation of either panel is changed to a new object, that object's current status (which may have been changed since last shown) will be reflected on that panel.

Menu Summaries

In the remainder of this chapter, figures of several Zodiak system menus are presented to familiarize you with various screen layouts. Cross references are provided for more detailed information. Because each menu controls different aspects of the Zodiak system, the screen parameters and organization will vary, but the basic principles previously described are followed.

In general, to learn menu capabilities you can touch the screen where you think more information may be available (data pads and subcategory touch buttons). The actual video output of the system will not change unless a specific parameter button is touched, a value is changed with a soft knob, or a new value is entered with a popup keypad or standard PC keyboard.

Starting the Zodiak application will bring up the splash screen (Figure 100). To enter the menu system, touch or click on the **Home** button (upper left) or the top left menu title bar to bring up the Home menu.

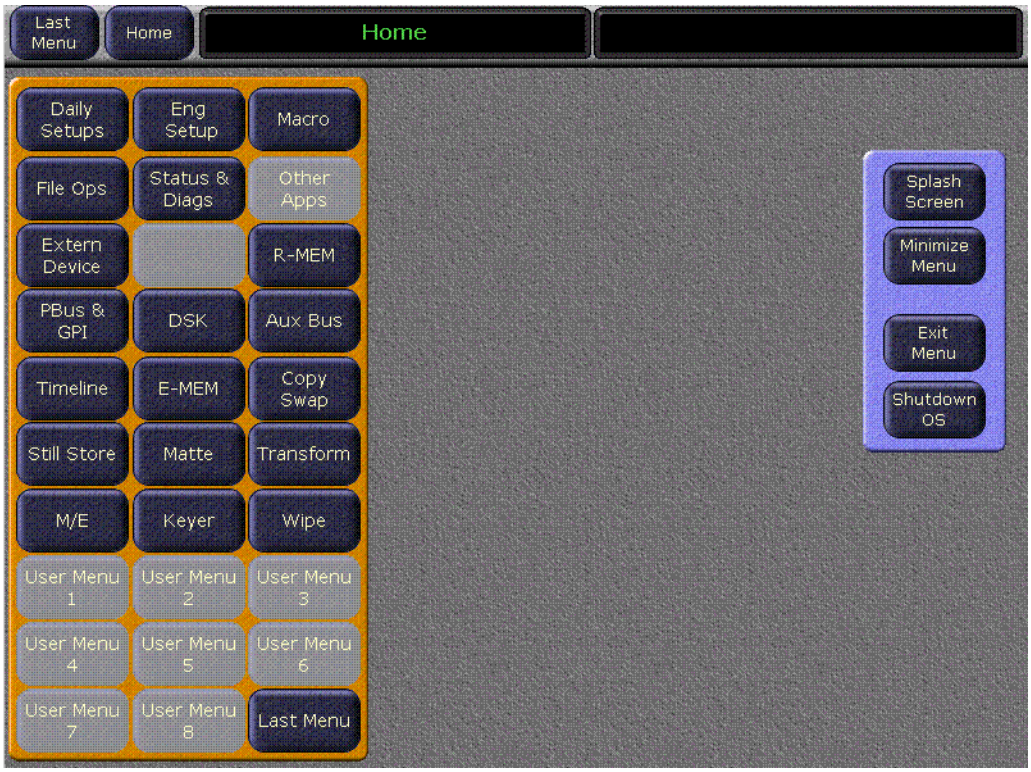
Figure 100. Zodiak Menu Application Splash Screen

Home Menu

The Home menu (Figure 101) is used to access the Zodiak system menus. Touch the button of the desired menu type to go directly to that menu. If multiple menus are available for that type, the last selected menu will be displayed. Touching the **Home** button (upper left) in any menu returns you to the Home menu.

Touching the **Last Menu** button in the upper left corner will return you to the last menu viewed.

Figure 101. Home Menu



Home Menu Buttons

The Home menu soft buttons on the left side of the screen act as the main directory for accessing the menu structure. The remaining grayed-out Home menu buttons are currently inactive.

Some buttons on the Main control panel will open a specific menu automatically when pressed (SPOP). For example, selecting a **Wipe** button in any Keyers subpanel will open the Wipe menu. For a list of these SPOP buttons and the menus they will open, refer to *DPOP and SPOP Menu Delegation* on page 98.

Table 4 lists the purposes of each menu selection soft button. A link to the page number for each menu summary is also given in the table.

Table 4. Home Menu Soft Button Functions

Home Menu Buttons	Purpose	Page Number
Daily Setups	User and Suite Preferences configuration, including user Profiles	page 157
Eng Setups	Engineering Setup including inputs, Aux bus outputs and Remote Aux panels	page 183
Macro	Macro recording, attachment and playback.	page 193
File Ops	File Operations controls	page 201
Status & Diag	Software Versions, memory usage gauge	page 202
Extern Device	Provides control of configured external devices such as DDRs and VTRs	page 203
R-MEM	Router Interface control	page 221
PBus & GPI	Provides peripheral b us and GPI output trigger and enable controls	page 223
DSK	Set the Clean Feed configuration for Program A and B outputs	page 227
Aux Bus	Aux Bus B channel video/key selection and Near/Far side control	page 228
Timeline	E-MEM effect timeline display	page 230
E-MEM	E-MEM registers load and save, source holds, interpolation paths, register ops	page 242
Copy Swap	Copy or swap settings	page 247
Still Store	Grabbing, saving and displaying stills	page 253
Matte	Matte adjustment controls for all mattes in the system	page 269
Transform	Control of M/E Key Transform Engine effects	page 273
M/E	User transition definition menu	page 294
Keyer	Keyer type and adjustment controls	page 313
Wipe	Wipe pattern generator selection and pattern modifier adjustment controls	page 322
Last Menu	Returns to the last menu viewed	

Home Menu Window Management Buttons

The four window management buttons in the pane on the right of the screen perform the following functions when touched:

Splash Screen – Brings up the Zodiak splash screen and top menu line shown in Figure 100 on page 154. Touch anywhere in the Zodiak title to return to the Home menu. To return to the splash with top menu line, touch the Grass Valley Group logo on the bottom of the screen.

Minimize Menu – Minimizes the Zodiak Menu down to the Windows Task Bar. A mouse or keyboard will be needed to restore the menu from the Task Bar. Use the keyboard **Alt Tab** keys to cycle through open applications.

Exit Menu – Shuts down the Zodiak Menu application completely. Touch the Zodiak Menu icon on the desktop to restart.

Shutdown OS – Takes you to a pull down menu where you can Log Off, Shut Down or Restart the Windows 2000 application.

Daily Setups Menus

The Daily Setups menus contain controls operators may need to change routinely to meet various project requirements.

Daily Setups Save-Load Menu

The Daily Setups Save-Load menu employs the Zodiak file browser and is used to save and load User Profiles, Suite Profile, and Source Memory information to disk. Only these file formats are supported in this menu. The menu is accessed by touching **Daily Setups**, **Save Load** (Figure 102).

Figure 102. Daily Setups Save-Load Menu

In the lower right hand area of the Save Load menu, User Profile directs the Save Load action to user preference settings that can change the behavior of a control surface to match the personal preferences of an operator. Controls for these settings reside in the User Prefs menus.

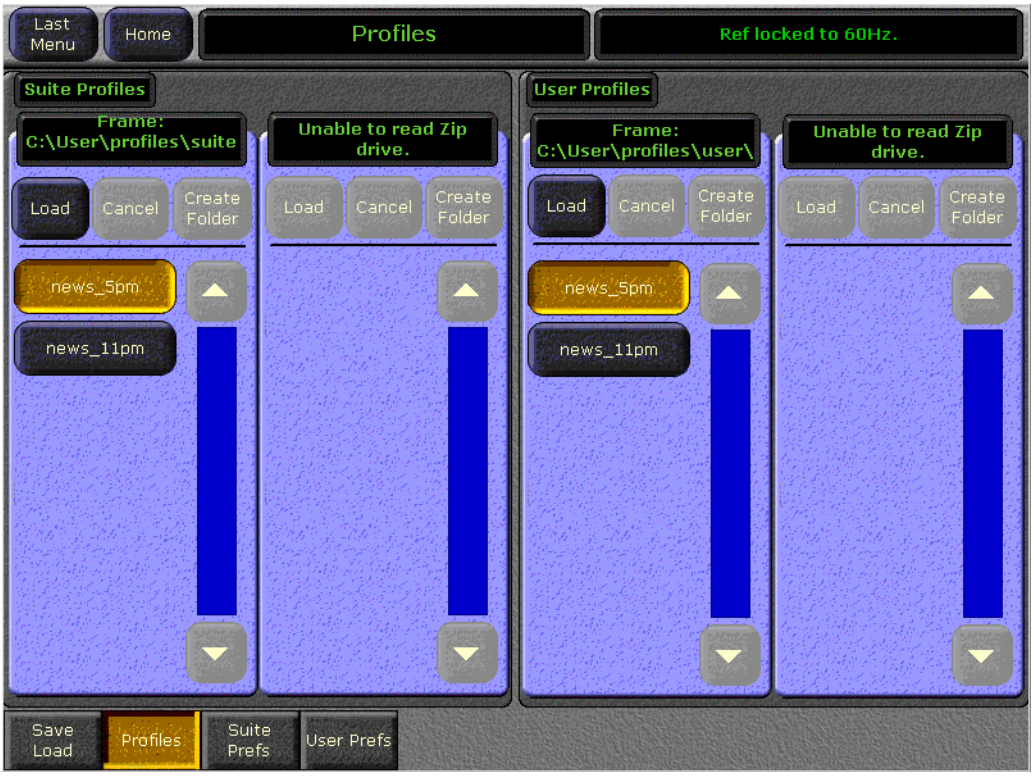
Suite Profile contains settings that define how all the control surface in a suite behave, which may affect system behavior for multiple operators. Controls for these settings reside in the Suite Prefs menus.

Source Memory contains keyer and other settings that can dynamically change during video production (see *Source Memory* on page 72 for more information). See *File Operations* on page 338 for operating instructions.

Profiles Menu

The Profiles menu is used to load User Profile and Suite Profile files from specific folders on the Video Processor frame hard disk or Zip disk. Only these file formats are supported in this menu. The menu is accessed by touching Daily Setups, Profiles (Figure 103).

Figure 103. Profiles Menu



A collection of preference settings is called a profile. Zodiak profiles can be used to instantly change all the Suite or User preferences of a Zodiak system. This allows operators to quickly customize the behavior of the panels and/or to prepare for different shows without having to alter individual preference settings. Profiles saved to specific folders (Frame:C:\User\profiles, and Zip:D:\profiles) appear as buttons on the Profiles menu.

See *File Operations* on page 338 for specific operating instructions.

Suite Prefs Menus

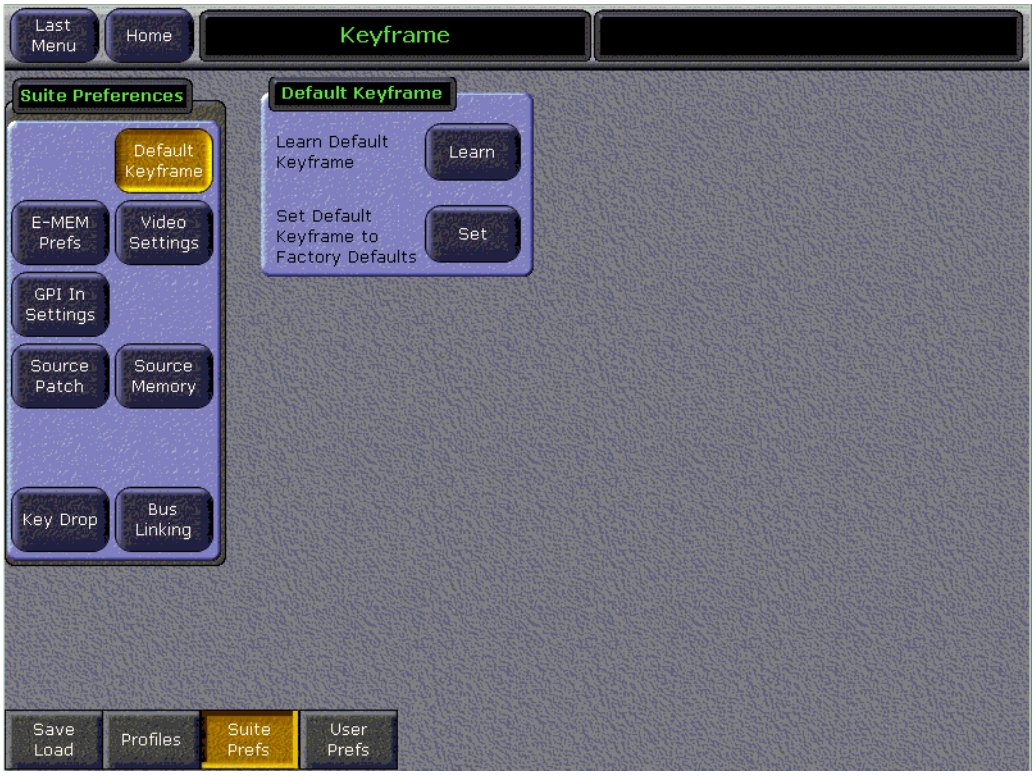
A Zodiak suite is a grouping of one or more control surfaces. Systems with more than one control surface may be used by more than one operator at the same time. Suite Preference controls define how all the control surfaces associated with a Zodiak suite behave. The Suite Preference parameters are identical for all the current users of the Zodiak system. To access Suite Pref-

erences, touch **Daily Setups**, **Suite Prefs**. Various Suite Preference controls are available by selecting a subcategory touch button on the left side of each menu.

Default Keyframe Menu

The Default Keyframe menu is used to learn the current Zodiak panel state to the system's Default Keyframe, and to set the Default Keyframe back to factory settings. The Default Keyframe is used when an empty register is recalled and when the **Clear Work Buffer** button is pressed. The menu is accessed by touching **Daily Setups**, **Suite Prefs**, **Default Keyframe** (Figure 104).

Figure 104. Default Keyframe Menu



To Learn a Default Keyframe:

1. Set up the entire switcher Main panel to the desired state.
2. Press the **Learn** button in the Default Keyframe pane.

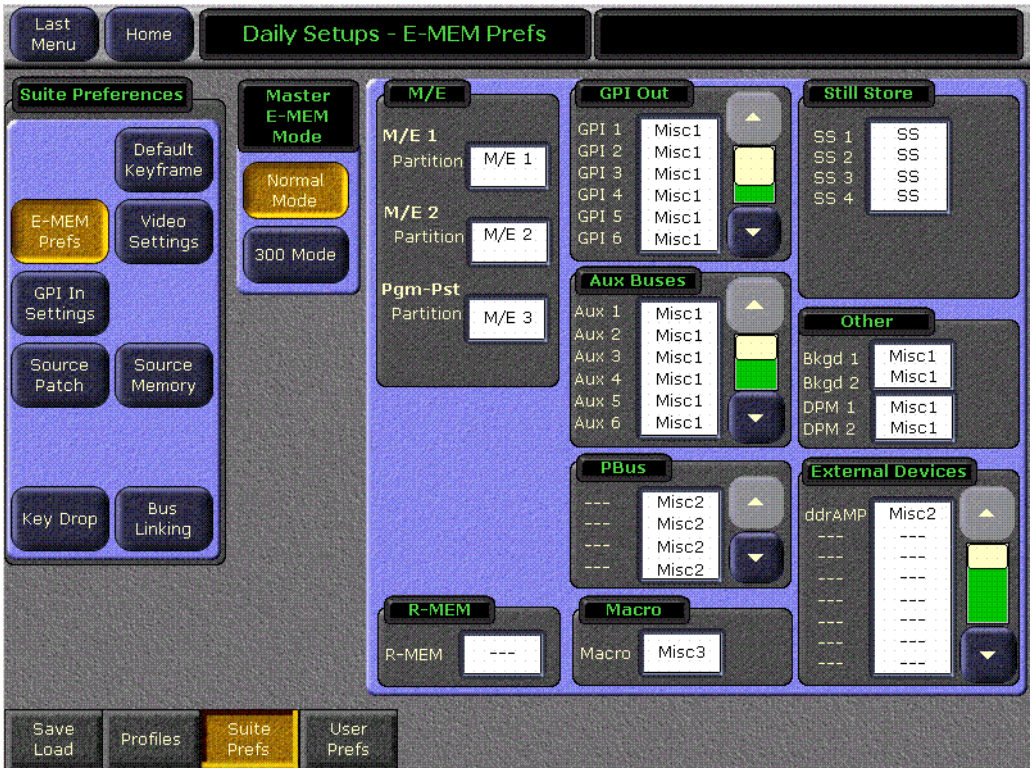
To set the Default Keyframe to the selected defaults, press the **Set** button.

Note You should save your current Suite Profile, which includes the Default Keyframe settings, before resetting to factory defaults.

E-MEM Prefs Menu

E-MEM Prefs menu is used to set the E-MEM level assignments. The menu is accessed by touching **Daily Setups**, **Suite Prefs**, **E-MEM Prefs** (Figure 105).

Figure 105. E-MEM Prefs Menu



E-MEM Sublevel to Enable Button Assignment

The Zodiak E-MEM system has many levels (M/E 1 -3, PGM PST, etc.) and sublevels (Still Store outputs, Aux buses, etc.), the actual number depending on installed options and external devices. Each level offers independent E-MEM control of specific Zodiak system areas and capabilities. The total number of possible levels is more than the 8 E-MEM Enable buttons on the Master E-MEM subpanel (see *Master E-MEM Enable Buttons on page 135*). Levels are assigned to Enable buttons to provide control of all the levels. E-MEM levels can be reassigned to different Enable buttons in the E-MEM Prefs menu.

Some of the Enable buttons (**M/E 1**, **M/E 2**, **M/E 3** or **PGM/PST** and **DSK**) have dedicated levels and may not be changed. Some functions, such as GPI outputs, PBus II and external devices, may be assigned to dedicated buttons as stated below.

The default assignments for each level are shown in Table 5.

Table 5. E-MEM Level Default Assignments

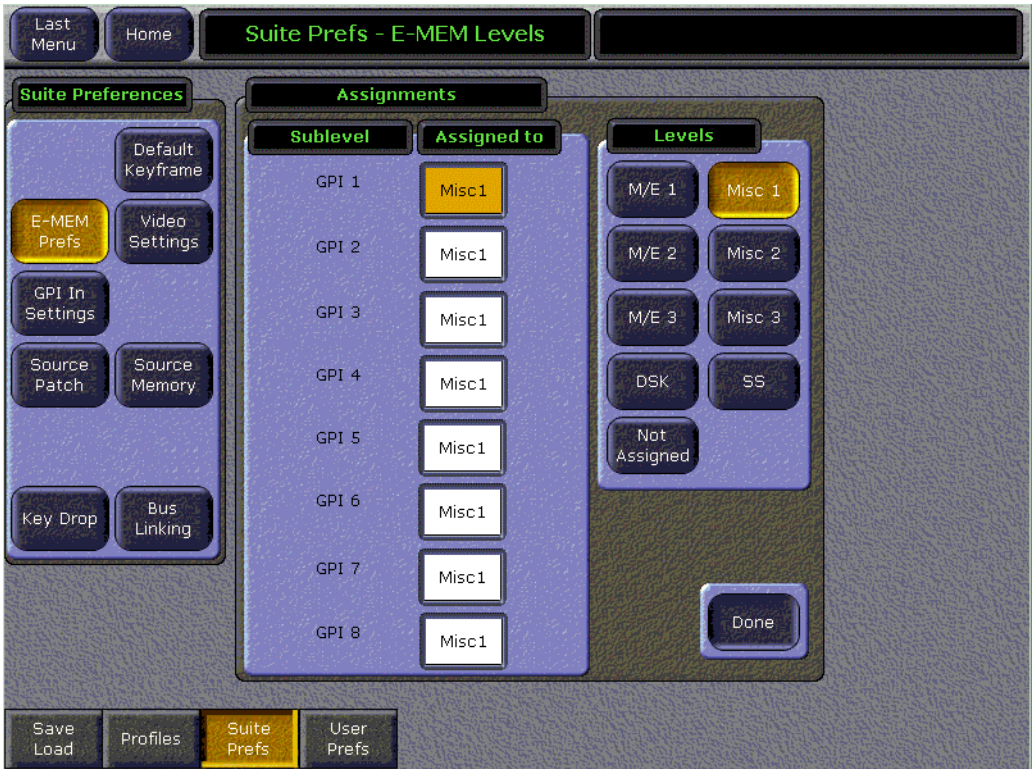
E-MEM Sublevel	Default
GPI out	Misc 1
Still Store outputs	Still Store
Aux buses	Misc 1
Bkgd 1 and 2	Misc 1
DPM 1 and 2	Misc 1
Peripheral Bus II	Misc 2
External devices	None
R-MEM	None
Macro	Misc 3

Grouped level assignments can be used to isolate control of Zodiak components and external devices, and to logically associate things together. For example, you can assign GPIs 1-5 that are used for Play, Stop, Rewind, etc. with a particular external device to one of the **Misc** Enable buttons, making only those GPIs for that device active when that level is enabled.

Level Group to Enable Button assignments are a Suite Preference, and are saved and loaded with Suite Profiles.

The E-MEM Prefs menu displays all the Zodiak system levels in several labeled panes on the right. The current Enable button assignment is displayed in each pane's data pad. Some of these panes scroll to display additional available levels, which can vary in number in different Zodiak systems. Touching a data pad on a pane opens another pane where the actual assignment is performed, such as the GPI assignments shown in Figure 106.

Figure 106. E-MEM Prefs – E-MEM Level Assignments



On the left individual levels can be selected for assignment (the selected level is yellow). Touching one of the buttons in the E-MEM Enable pane will assign that level to that button. Click on **Done** to return to the previous menu, from which you can access other levels to change.

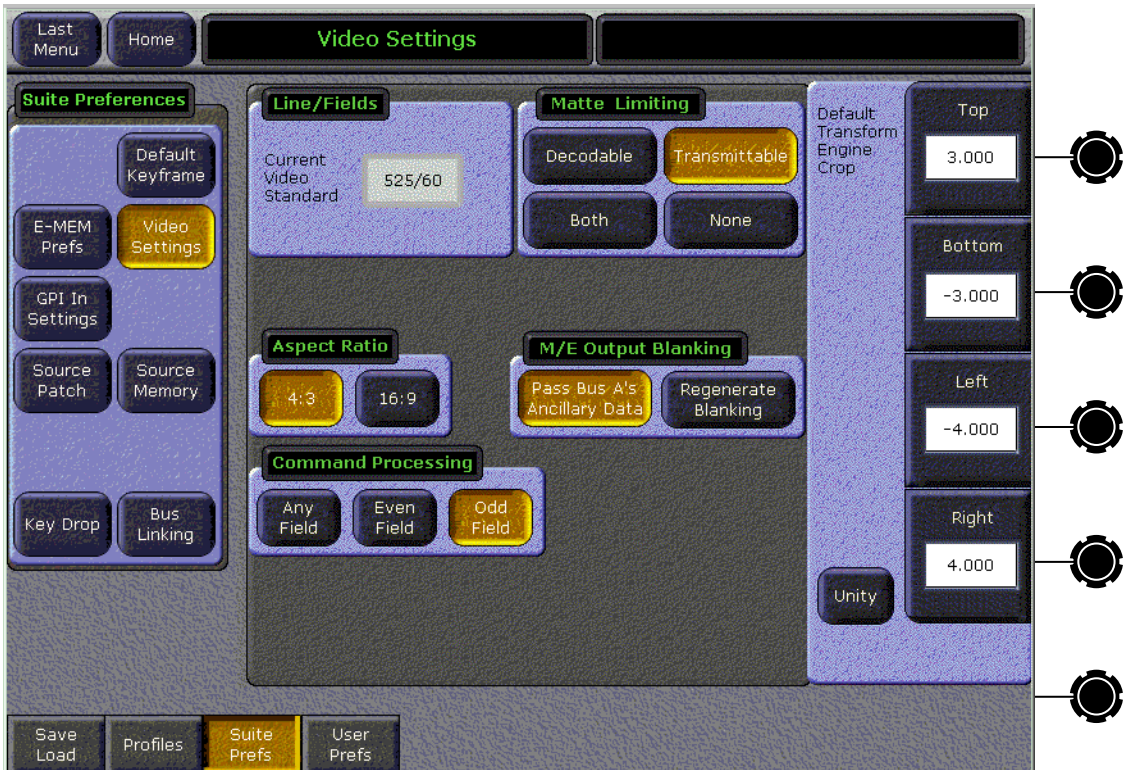
Master E-MEM Mode

300 Mode is an alternative Master E-MEM method of operation that mimics the behavior of the Grass Valley Group Model 300 switcher. In this mode, Master E-MEM Learn operations store the register numbers of the individual M/Es, allowing the recall of different combinations of M/E registers with a single button press. See *E-MEM 300 Mode* on page 365 for more information.

Video Settings Menu

The Video Settings menu is used to set video standards to be used by the Zodiak system. This menu is accessed by touching **Daily Setups**, **Suite Prefs**, **Video Settings** (Figure 107).

Figure 107. Video Settings Menu



Line/Fields

The Line/Fields mode of operation displayed is a read-only field determined by the reference in signal provided to the system.

Matte Limiting

Matte Limiting determines how the matte generators produce colors. Limits can be imposed to prevent downstream signal problems.

Decodable – This limiter mode produces colors that decode to valid RGB components. Not all valid RGB colors can be transmitted in NTSC, however. Saturated colors near yellow and cyan over modulate an NTSC transmitter.

Transmittable – This limiter mode prevents over modulating an NTSC transmitter, but can produce colors which can not be decoded into RGB. For example, a 0% luminance blue produces negative green and red components.

Both – This limiter mode is similar to Decodable, except that maximum levels are reduced slightly around yellow and cyan to prevent over modulating an NTSC transmitter.

None – In this mode, no limiting is imposed. Analog signal paths and monitors may behave poorly to some colors produced in this mode.

Aspect Ratio

Select the aspect ratio from **4:3** or **16:9** as desired.

M/E Output Blanking

Set the M/E Program output blanking to either **Pass Bus A's Ancillary Data** or **Regenerate Blanking**. This sets the output blanking for all the M/Es.

Pass Bus A's Ancillary Data – Passes the ancillary data from the A bus to the M/E Program output during the vertical interval.

Regenerate Blanking– Regenerates blanking during the vertical interval.

Command Processing

These controls determine when commands (like source selections or the initiation of mixes or wipes) will be enacted by the Zodiak system (also known as field dominance). These controls can be useful for consistent match frame editing.

Any Field – The action will occur at the start of the next field, either even or odd. Use this setting if you are not going to edit the video output and want the fastest response.

Even Field – The action will always occur at the start of the next even field. This is probably only appropriate if your edit controller is set to edit in the middle of a frame.

Odd Field – The action will always occur at the start of the next odd field. This is the normal setting when the video output will be edited. It is compatible with most video editing systems that use the frame boundary for edits.

Default Transform Engine Crop

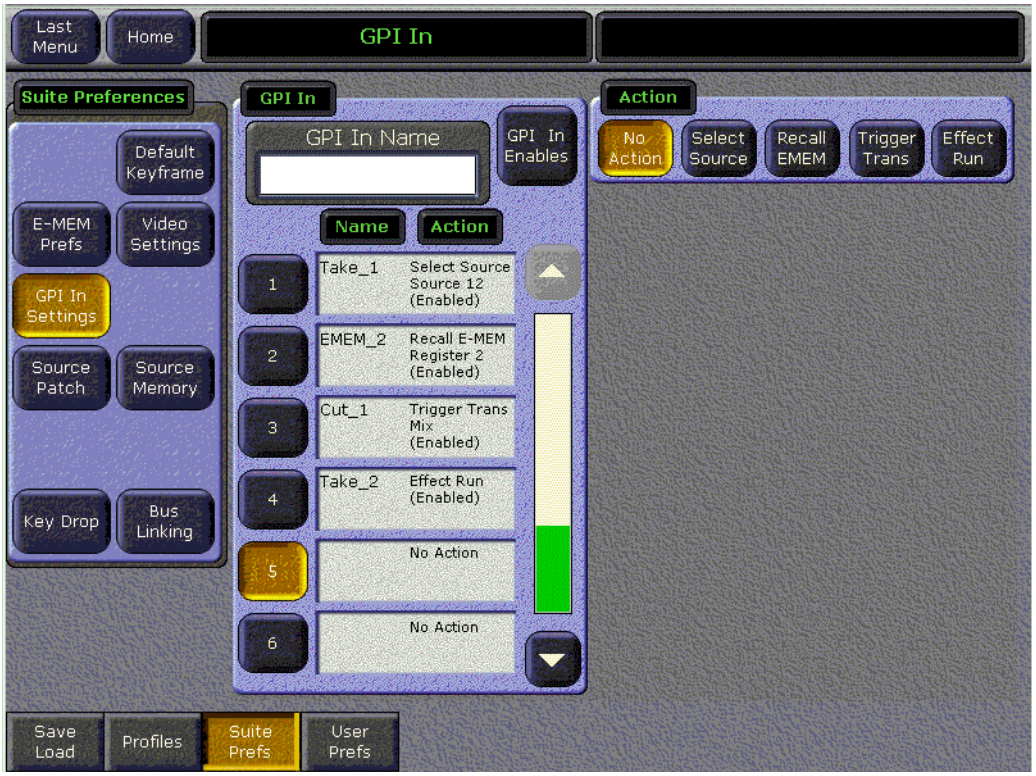
The Default Transform Engine Crop controls adjust cropping when individual Transform Engine channel crop is turned off (see *Transform Menus* on page 273). This is important because television images are surrounded by blanking (black). Not all images have the transition to blanking in exactly the same place. Normally, these blanking variations are hidden at the extreme edges of the picture and are not visible.

If an image smaller than expected is transformed, black lines can occur at its edges, which are now visible because they have moved inside the visible picture area. SMPTE has published recommended practices for standard image sizes (production aperture, clean aperture). If a facility conforms to these practices, the system default values will be correct and no adjustment should be necessary. To compensate for variations in your facility's nominal blanking, you should adjust the default crops so they just remove black edges on the facility's normal image.

GPI IN Settings Menu

The GPI In Settings menu (Figure 108) allows you to define the actions triggered by the eight GPI inputs to the GPI Port (J1) on the rear of the Video Processor frame. GPI inputs can be named and assigned to trigger a specific switcher action when the input is fired from an external device. The menu is accessed by touching **Daily Setups**, **Suite Prefs**, **GPI In Settings.**

Figure 108. GPI In Settings Menu



The four switcher actions are:

- Select Source,
- Recall E-MEM,
- Trigger Transition, and

- Effect Run.

Refer to the following sections of the *Zodiak Installation and Service Manual* for GPI input connection and configuration information:

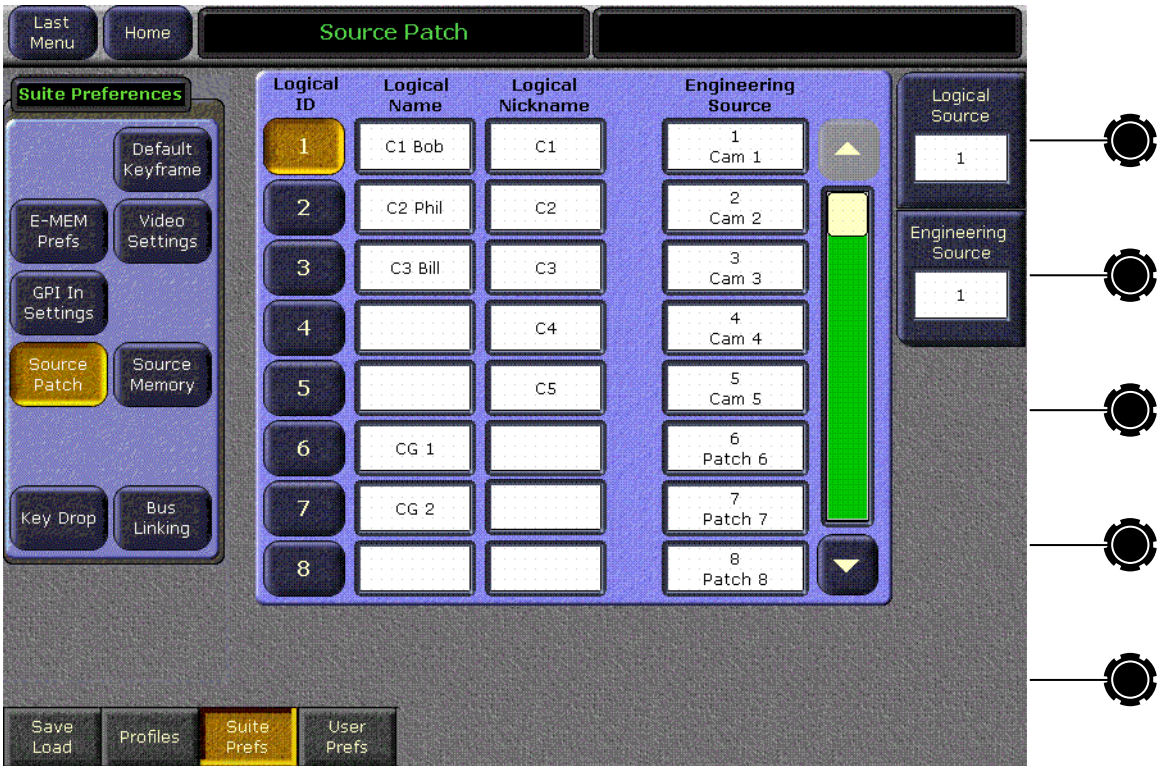
- *Section 2 – Installation* – describes how to connect the physical GPI inputs to the GPI port on the rear of the Video Processor frame.
- *Appendix C – External Interfaces* – contains a complete explanation of how to configure the GPI inputs to the switcher using the GPI In menu.

Source Patch Menu

Logical source name definitions and source patching are accomplished in the Source Patch menu, accessed by touching **Daily Setup**, **Suite Prefs**, **Source Patch** (Figure 109).

Note Source Patching is the bridge between engineering sources and logical sources. Both TD and EIC should make reference to this menu when resolving source issues. The mechanism is similar in concept to a physical patch panel. Effects and all source selections are based on logical sources. Tally and associations with external devices are based on engineering sources.

Figure 109. Source Patch Menu



Logical Source Selection Pane

The Source Patch menu has a scrolling list of Logical sources displayed in ascending Logical ID order. The Logical Source soft knob can be used to scroll up and down the list and select a different Logical source. Touching the soft knob label data pad brings up a numeric keypad that can be used to scroll the list to the entered Logical ID number and select that source. One Logical source is always selected, though it may be scrolled out of view.

Logical Source Name Definition

Each logical source has a Logical Name and a Logical Nickname data pad associated with it. Touching one of these data pads brings up an alphanumeric keypad used to enter that name.

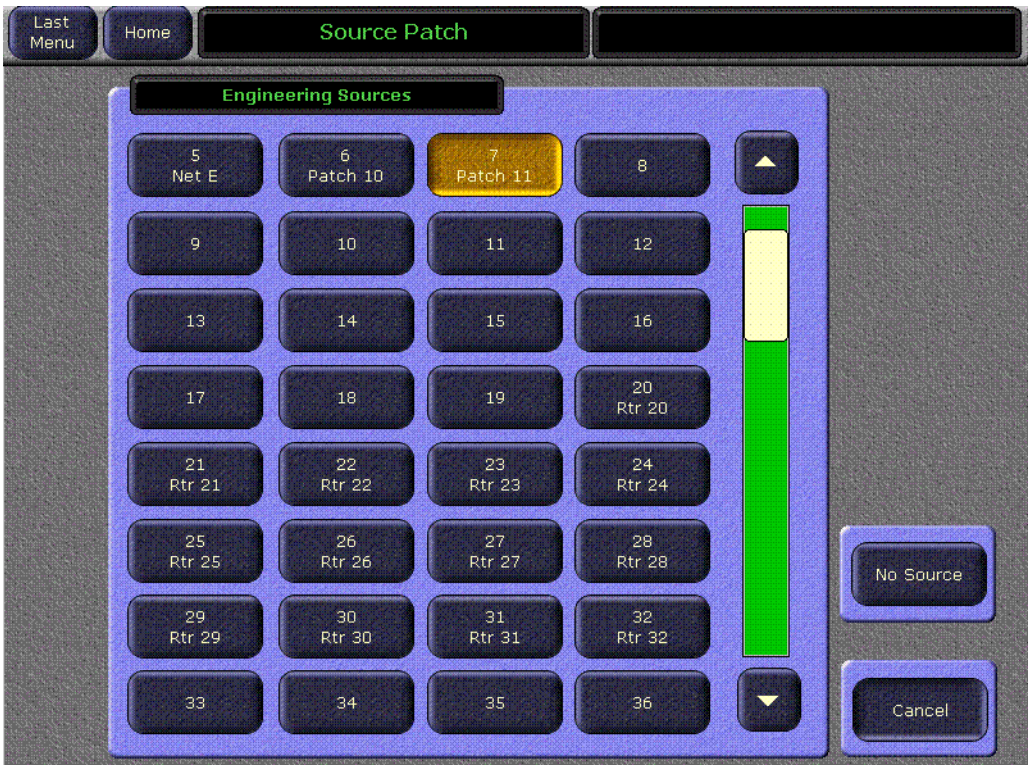
See *Section 3 - Configuration* in the separate *Zodiak Installation and Service Manual* for specific instructions on defining sources.

Source Patching

The Engineering Source column on the right displays the current association of Engineering Source to Logical source. With a Logical source selected on the left, the Engineering source for that Logical source can be changed in real-time with the Engineering source soft knob (Figure 109). If that Logical source is visible on a monitor you can dial in the desired Engineering source by eye. Touching the soft knob label data pad brings up a numeric keypad that can be used to select an Engineering source by its Engineering ID number.

Engineering source selection is also possible using a source picker. Touching an Engineering Source data pad in the Logical source selection pane brings up a scrolling Engineering source picker (Figure 110).

Figure 110. Source Patch Engineering Source Picker



Touching an Engineering source button associates that source to the currently selected Logical source. You can also select **No Source**, in which case the system substitutes black whenever that Logical source is selected.

It is possible to associate the same Engineering source to many different Logical sources. In this case selecting either Logical source on a panel selects the same Engineering source.

Internal sources (M/E outputs, Still Store outputs, etc.) can be named in the Source Patch menu but can not be remapped. This permits defining custom names to avoid confusion between internal Zodiak source names and pre-existing external source names already used in a facility.

Using Source Patching for Effects Portability

Source patching makes it possible to built effects on a Zodiak system in one facility or truck, and then use those effects on a different Zodiak system at another facility that has different Engineering source configurations. Building a Source Patch table prior to effects creation simplifies the migration of effects between facilities.

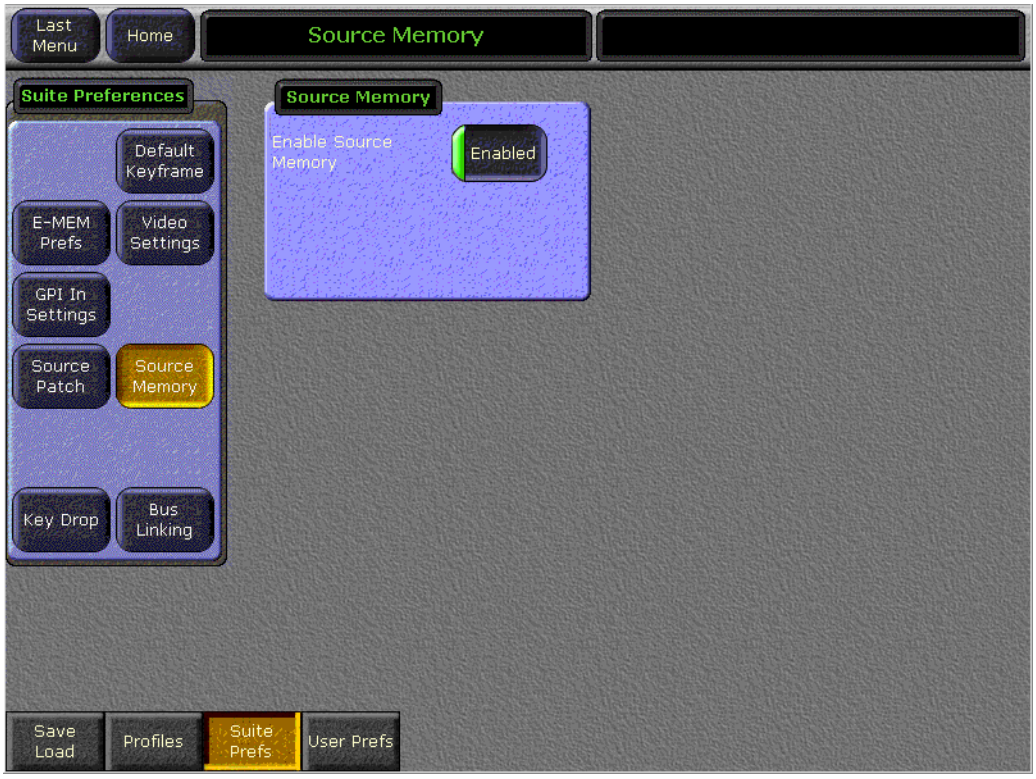
Plan out the sources you will use for a show, even ones that may not exist on the system where you are creating the effects. Build a list of Logical sources in the Source Patch menu without regard to the currently associated Engineering sources. After the list is built, map one of the facility's existing Engineering sources to each Logical source. If physical devices don't exist for some planned sources, substitute a dummy Engineering source. You can then build your effects and verify that they run properly. When you are satisfied with the effects, save the Suite Prefs and E-MEM effects you created to Zip disk. At the new facility, load these files into that Zodiak system. Do not load the Eng Setups of one facility into the other, as this will overwrite that facility's existing Engineering configuration.

Once the Suite Prefs and effects are loaded at the new facility, go to the Source Patch menu and map the appropriate Engineering sources of the new facility to the original list of Logical sources. Your effects should now run as previously designed without having to edit or rebuild them. When satisfied the effects run correctly at the new facility, save that Suite Prefs under a different name for use the next time you use this facility. Do not overwrite the original Suite Prefs, as you will need it when you return to the original facility.

Source Memory Menu

The Source Memory menu is used to enable and disable Source Memory. See page 72 for background information on Source Memory. The menu is accessed by touching **Daily Setups**, **Suite Prefs**, **Source Memory** (Figure 111).

Figure 111. Source Memory Menu



When **Enabled** (green indicator on the button is illuminated), key type and source memory settings will change as different sources are selected on that bus. When disabled (green indicator off), the current key type and source memory settings will not change when different sources are selected on that bus.

Each source's memory actually contains four separate groups of settings, one for each type of key (**Fixed Lin**, **Lum**, **Chr**, and **Pst Ptn**). Changing the key type of a currently selected source will select the source memory settings for that new key type, regardless of whether source memory is enabled or disabled.

Key Drop Menu

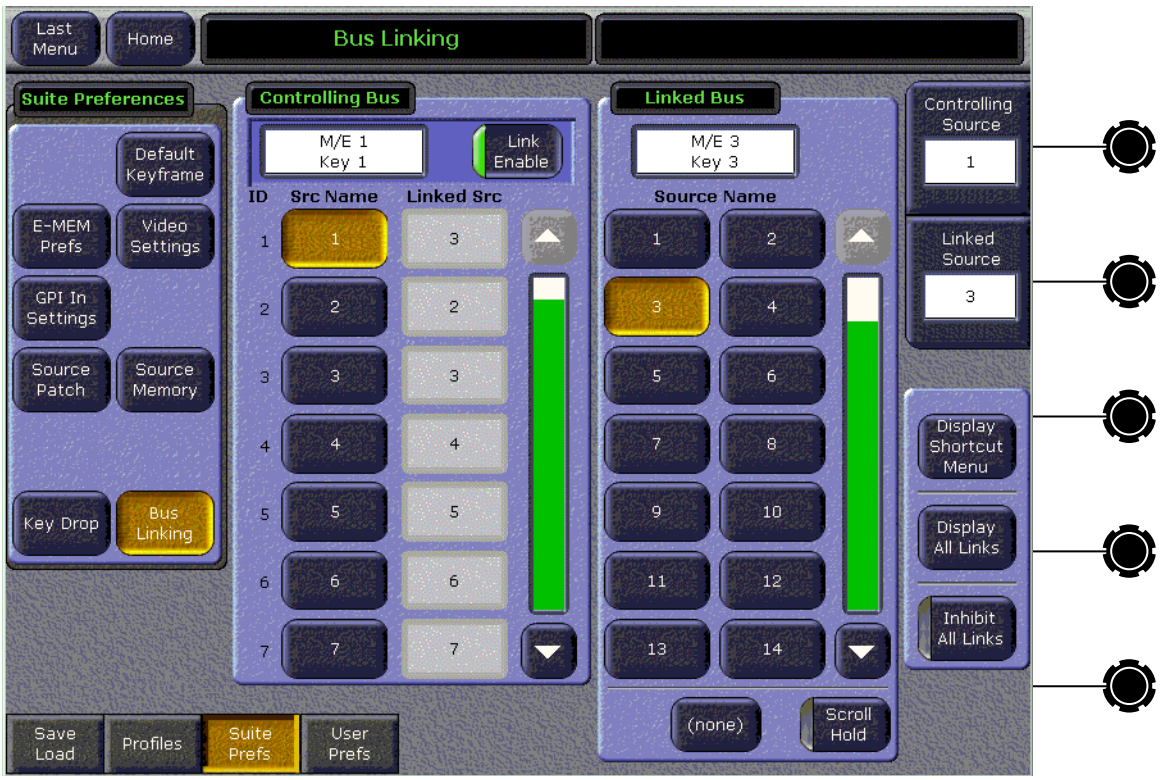
A Key Drop menu is accessible from the Daily Setups-Suite Prefs menu. An On Air, hot cut will turn off all linked keys as selected for each M/E.

Figure 112. Key Drop Menu

Bus Linking Menu

The Bus Link menu allows the operator to set up bus links and source associations and enable the linking. This menu is accessed via Daily Setups, Suite Prefs, Bus Linking (Figure 113).

Figure 113. Bus Linking Menu



The Bus Linking menu has two main panes, a Controlling bus pane on the left and a Linked bus pane on the right. Controls in these panes are used to select the buses to be linked and associate the sources between those buses. The Controlling bus pane shows the current source associations. Controls outside these panes on the right side of the menu are also available for making source associations and managing bus links.

As a general rule, the Bus Linking menu operates from a Controlling bus viewpoint. The basic steps to follow are to select the Controlling bus, select the Linked bus, enable the link, select the Controlling bus source, then select the Linked bus source. See *Source Associations* on page 174 for more information.

Bus Picker

Touching the data pad at the top of either the Controlling Bus or Linked Bus pane facilitates selecting a bus via a popup bus picker (Figure 114).

Figure 114. Bus Picker Popup

The type of bus to display (**M/E Buses** or **Aux Buses**) is chosen with the Bus Type buttons at the bottom of the menu. When a Linked bus has been selected you can also choose **(none)** to define no bus link. Only valid buses will be displayed. Unavailable buses (those already linked to other buses) appear grayed out. Touching a bus button selects that bus for that pane. When a bus is selected, you return to the previous Bus Linking menu (Figure 113 on page 172), with the information in the scrolling lists updated to indicate the current status for the newly selected buses.

Buses are linked by selecting one in each pane and then turning on the **Link Enable** button in the Controlling bus pane. Note that the **Inhibit All Links** button in the lower right corner must also be off for the links to be active.

Bus Linking Restrictions

- The Switched Preview, Primary Preview, and Still Store input buses cannot be configured as Linked buses.
- An Aux bus associated with a DPM cannot be configured as a Controlling bus. However, these buses may be configured as Linked buses.

Source Associations

Selecting a button in the Controlling Bus pane delegates the Linked Bus pane to that Controlling source (Figure 113 on page 172). Selecting a button in the Linked Bus pane associates that new Linked bus source to the currently selected Controlling bus source. The **(none)** selection chooses no source link. A complete Link Mapping table is built by selecting each source in the Controlling Bus list, then selecting the appropriate source in the Linked Bus list.

Two soft knob controls on the upper right can be used to select sources to be associated. The top knob selects the source in the Controlling Bus pane, and the second knob selects the source in the Linked Bus pane.

The **Scroll Hold** button changes the behavior of the Linked Bus scrolling list. When **Scroll Hold** is Off, selecting a source in the Controlling Bus pane will scroll that list so the Linked source is visible in the pane. When **Scroll Hold** is On, selecting a source in the Controlling Bus panel the list will not scroll. The selected Linked source may not appear in the pane. This permits the rapid selection of adjacent Linked Bus sources without having to continually re-scroll that list.

Link Management

Individual bus links are enabled and disabled with the **Link Enable** button in the Controlling bus pane. When enabled, commands will be sent from the Controlling bus to the Linked bus, provided all links are not inhibited (see below).

Other controls on this menu can be used to manage bus links.

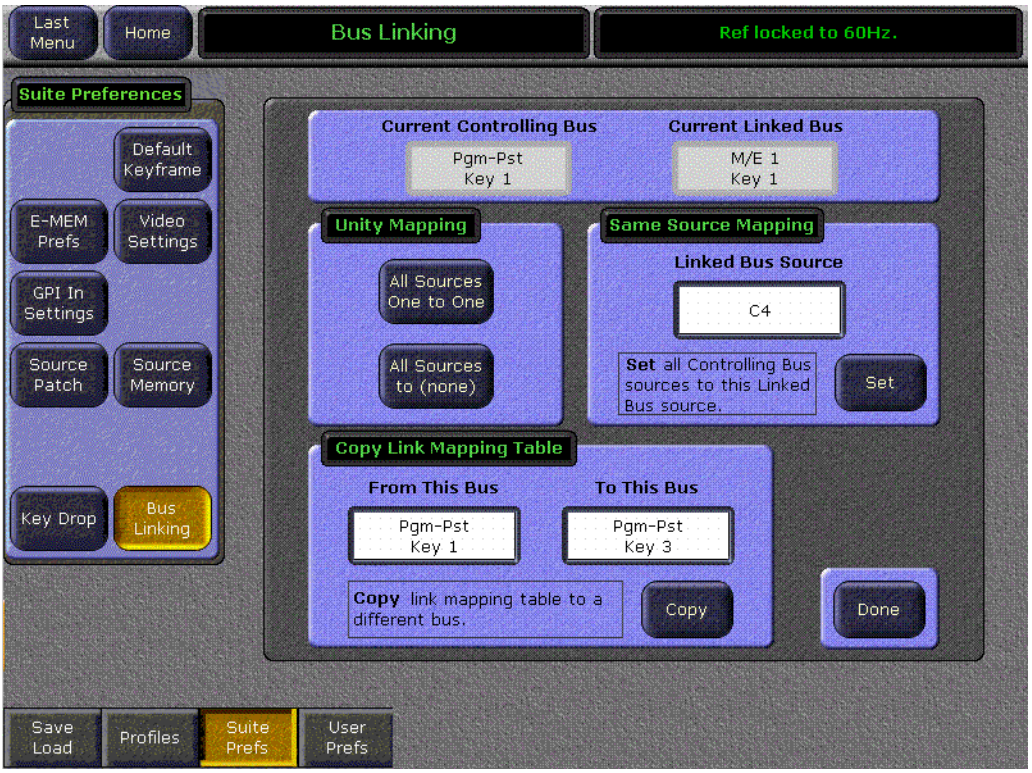
Bus Hold Inhibits Links – This control affects the behavior of the Main panel **Hold** button for all Linked buses. When **Bus Hold Inhibits Links** is On and the **Hold** button on a Linked bus is also On, that Linked bus will ignore bus link commands and will not change sources when Controlling bus sources change. Note that the **Hold** button retains its existing functionality, keeping that bus from changing sources when an E-MEM register is recalled.

Inhibit All Links – Overrides all **Link Enable** settings to disable all active bus links. This does not change the individual **Link Enable** settings, however. Turning **Disable All Links** off will re-enable any bus links with **Link Enable** on.

Shortcut Menu

Touching the **Display Shortcut Menu** button brings up a menu that can help reduce the time required to build Link Mapping tables (Figure 115).

Figure 115. Bus Linking Shortcut Menu



The current Controlling Bus and Linked Bus are identified in the data pads at the top of the pane.

Unity Mapping

All Sources One to One – Sets up a one-to-one mapping of Controlling bus sources to Linked bus sources. Useful when the linked sources mostly match the controlling bus sources.

All Sources to None – Sets all the Controlling bus link source mappings to (none). Useful when the controlling bus should only make a few changes to the linked bus (most controlling bus source selections do nothing to the linked bus).

Same Source Mapping

All the Controlling bus sources can be linked to the same Linked bus source, using the Same Source Mapping pane. Touching the **Set** button maps all the Controlling bus sources to the Linked bus source displayed in the data pad.

To choose a different Linked bus source for same source mapping, touch the Linked Bus Source data pad to go to the Bus Linking menu selection menu. Select the desired Linked Bus source from the scrolling list, then touch **Display Shortcut Menu** to return to the Shortcut menu. The Linked Bus source you selected is now displayed in the data pad and can be mapped to all the Controlling bus sources with the **Set** button.

Copy Link Mapping Table

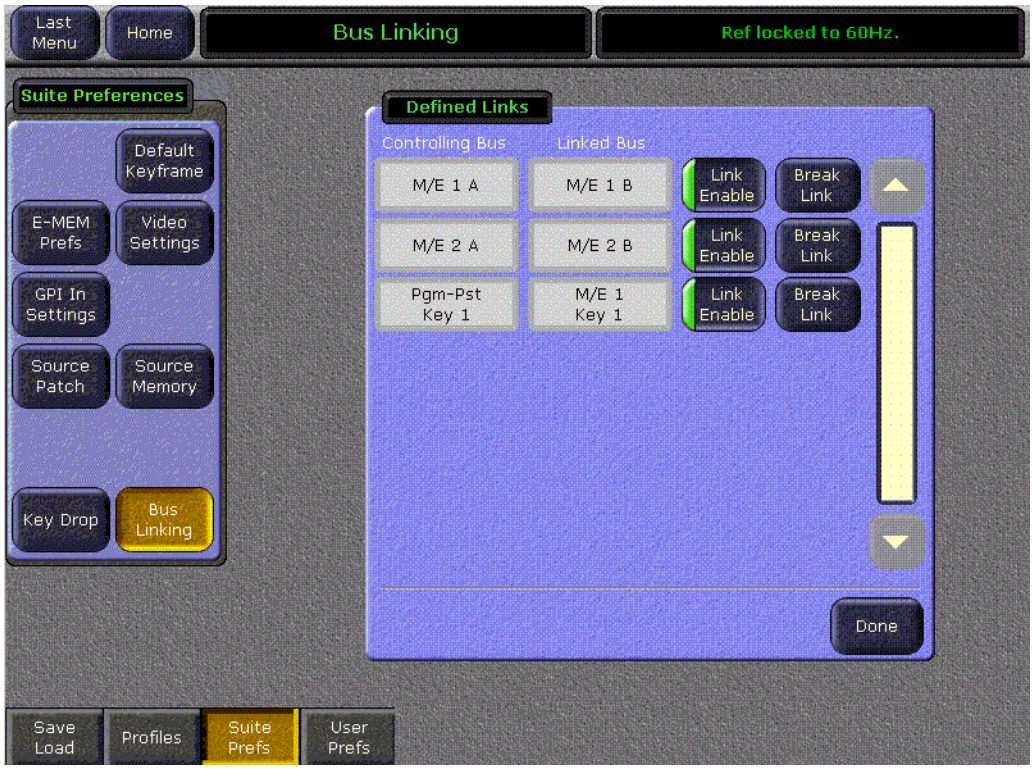
The Link Mapping table of one bus can be copied to another bus. Touching the From This Bus and To This Bus data pads brings up the bus picker. Once the desired buses have been selected, touch the **Copy** button.

Note Link Mapping tables are active on Controlling buses only. If a list is copied to a Linked bus, the data is transferred but the table is ignored as long as that bus is not a Controlling bus. The Link Mapping table will become active on that bus should it later become a Controlling bus.

Display All Links Menu

Touching the **Display All Links** button on the Bus Linking menu brings up a scrolling list of all the defined bus links (Figure 116). This can be used to help manage the links. Buses that are not linked are not shown.

Figure 116. Bus Link Status



Link Enable – Enables the bus link, same as the Controlling bus **Link Enable** on the Bus Linking menu.

Break Link – Breaks the link between the buses. After the link is broken that pair of buses is deleted from the menu. It is therefore not possible to undo the Break Link operation.

User Prefs Menus

User Preferences are defined by individual operators to customize system parameters to match their work flow methods. Each control surface has its own set of User Preferences. To access User Preferences, touch **Daily Setups**, **User Prefs**. In the upper left User Preferences pane of each menu, you can choose the subcategory of settings to view or adjust.

Button Mapping Menu

The Button Mapping menu is used for source to button mapping on local and remote panels, which permits arranging sources in any order on the source selection button rows. On the Zodiak system, each bank on the Main Panel has the same source to button mapping. The menu is accessed by touching **Daily Setups**, **User Prefs**, **Button Mapping** (Figure 117).

Figure 117. Button Mapping Menu

See *Source to Button Mapping* on page 35 for background information.and *Button Mapping* on page 331 for detailed instructions.

Shift Preferences Menu

The Shift Preferences menu (Figure 118) is used to configure the Shift mode of the source selection buttons. The menu is accessed by touching **Daily Setups**, **User Prefs**, **Shift Prefs**.

Figure 118. Shift Preferences Menu

Normal Mode

The **Shift** button at the far right of each bus allows access to 23 additional input sources (refer to *Shifted Sources* on page 37). When in Normal mode, holding down the **Shift** button and selecting a crosspoint source selects a source from the input sources assigned to sources 24 – 47. The **Shift** button will light indicating the selection made on the bus to its left is a shifted source.

Latched Mode

When in Latched mode, the **Shift** button acts like the Caps Lock key on a standard keyboard. Pressing the **Shift** button latches the bus to the shifted state and lights the button. Selecting any crosspoint button to its left now selects only a latched source until the button is pressed again and turns off.

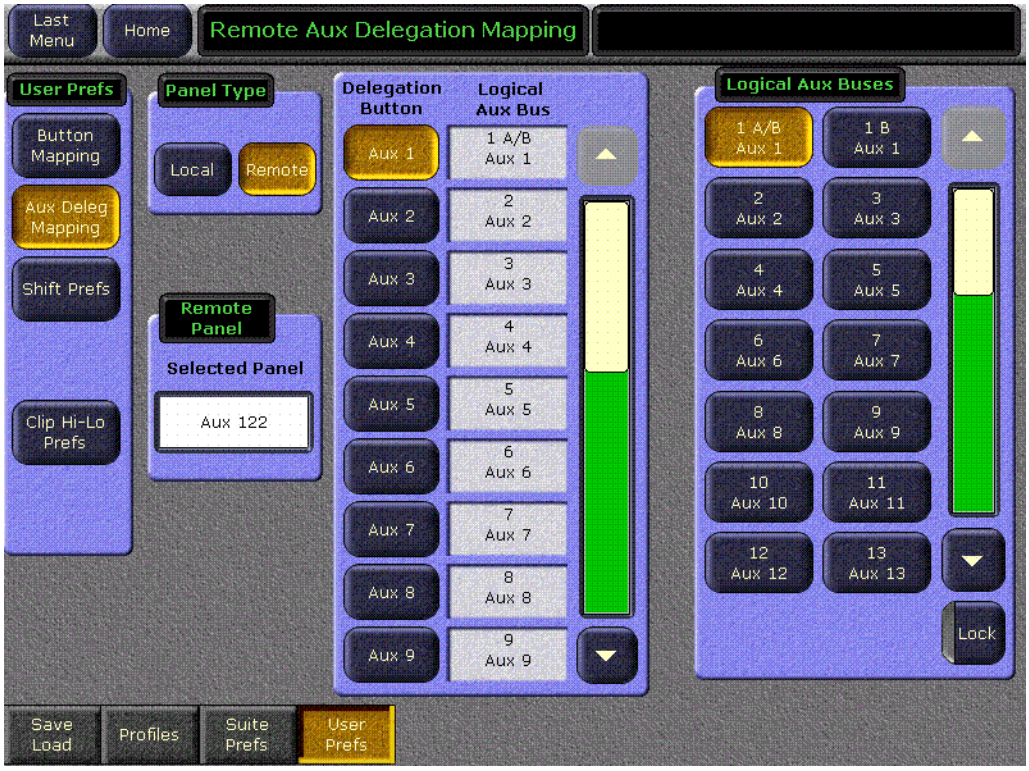
No Shift Mode

You can configure the Zodiak system to have 24 source selection buttons on the Main panel. In this mode, the farthest right **Shift** button becomes a normal source selector like the other buttons. No shifted sources are available directly on the M/E bus in this mode. However, any E-MEMs learned with shifted sources selected can still be used to recall those sources even if the No Shift mode is active.

Aux Deleg Mapping Menu

The Aux Deleg Mapping menu (Figure 119) is used to map the delegation buttons on the local PVW/AUX panel and any optional Remote Aux panels to control the desired (logical) Aux bus. The menu is accessed by touching **Daily Setups**, **User Prefs**, **Aux Deleg Mapping**.

Figure 119. Aux Delegation Menu



The Zodiak local PVW/AUX panel has 9 Aux bus delegation buttons that can be used to control 9 Aux buses at a time. A 2.5-M/E system has a total of 9 Aux buses available allowing all buses to be configured. The 3-M/E system has 13 available aux buses, 9 of which may be delegated to the Aux delegation buttons. Aux Pairs are often paired for effects send operation and any defined pair may be assigned to a single Aux bus delegation button.

Refer to *Section 3 – Configuration* in the *Zodiak Installation and Service Manual* for detailed instructions on configuring Aux buses.

Clip Hi Lo Preferences Menu

The Clip Hi-Lo Preferences menu controls how Clip and Gain knobs behave. The menu is accessed by touching **Daily Setup**, **User Prefs**, **Clip Hi-Lo Prefs** (Figure 120).

Figure 120. Clip Hi-Lo Prefs Menu

The Clip and Gain knobs on the Zodiak system Main panel and Menu panel can control either Clip and Gain, or Clip Hi and Clip Low, depending on the preference set (see page 50 for background information on these key controls). Different knob preferences can be applied to Adjustable Linear Keys, Luminance Keys, and Chroma Keys. The chosen settings for each key type are applied universally across the Main and Menu panels, wherever that type of key is used.

Touch the button of the preference you wish to use for the listed key type.

Eng Setups Menus

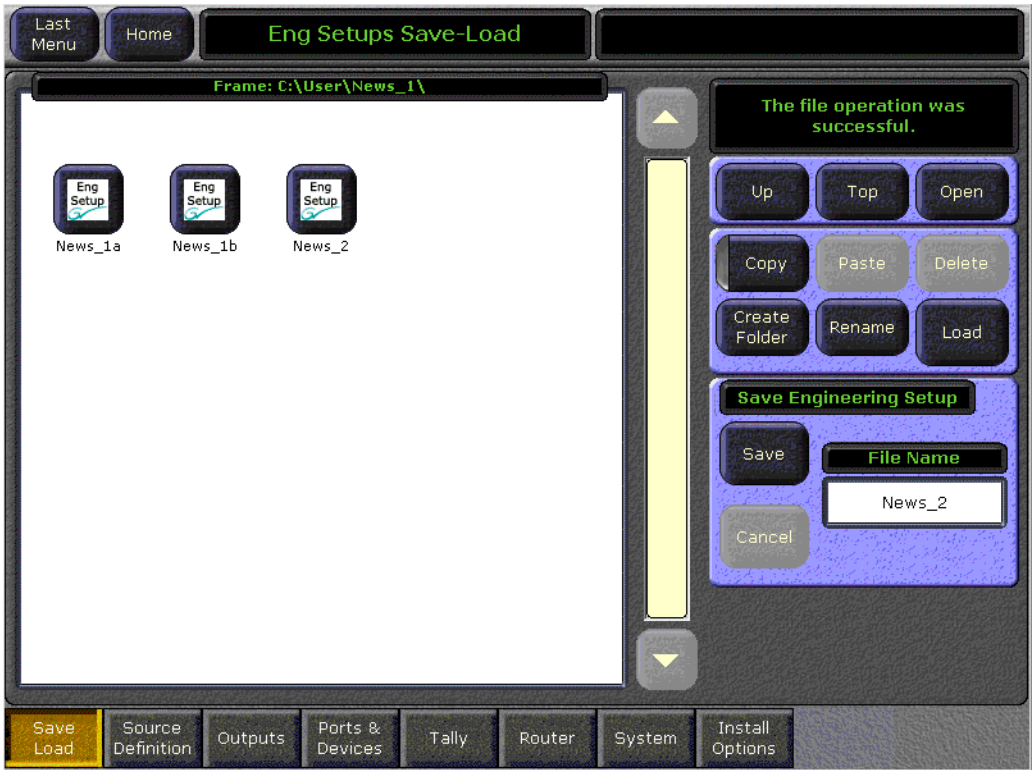
The Eng Setups menus contain controls generally used by engineering personnel to set up and configure the Zodiak system.

Note Engineering Setups configuration procedures are covered in more detail in the separate *Zodiak Installation and Service Manual.*

Eng Setups Save-Load Menu

The Eng Setups Save-Load menu employs the Zodiak file browser and is used to save and load Engineering Setup information. The menu is accessed by touching **Eng Setups**, **Save Load** (Figure 121).

Figure 121. Eng Setup Save-Load Menu



An Engineering Setup file contains settings that are critical to system operation, including source definitions, output assignments, and external device configurations. Responsibility for this data rightfully belongs to the engineer in charge, and must be saved and loaded carefully.

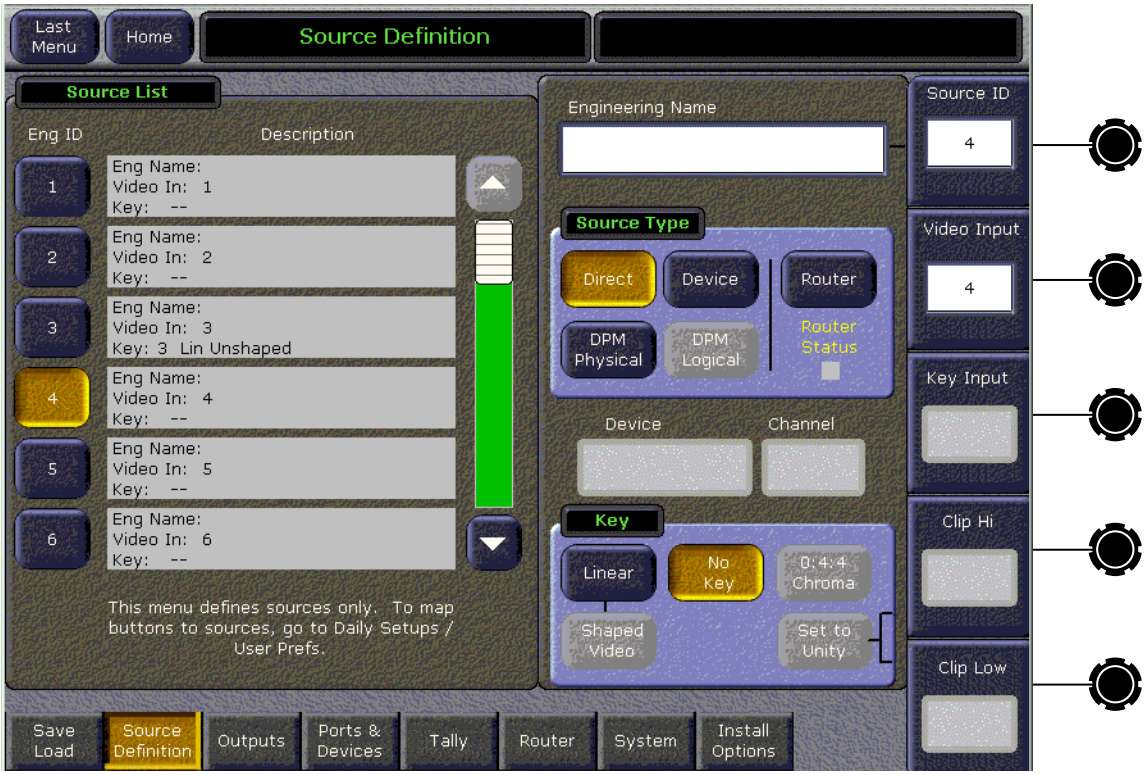
CAUTION The Load button immediately replaces information the Zodiak system is currently using with the selected file information. When Eng Setup files are loaded, significant changes to Zodiak system operation are possible.

See *File Operations* on page 338 for specific file operations information.

Source Definition Menu

Engineering sources are defined in the Source Definition menu, accessed by touching **Eng Setup**, **Source Definition** (Figure 122).

Figure 122. Source Definition Menu



Touch the Engineering Name data pad to bring up a keypad to enter the desired name. Name changes take effect immediately. This name appears in the Engineering Setup menus. If no Logical names are defined, this name also appears on the Zodiak Main panel, Local and Remote Aux panels, and Menu panels.

See *Section 3 - Configuration* in the separate *Zodiak Installation and Service Manual* for specific instructions on defining sources.

Outputs Menu

The Eng Setups – Outputs menu is used to assign the Zodiak system Aux Buses to the physical output destinations on the rear of the Video Processor frame. The menu is accessed by touching **Eng Setup**, **Outputs** (Figure 123).

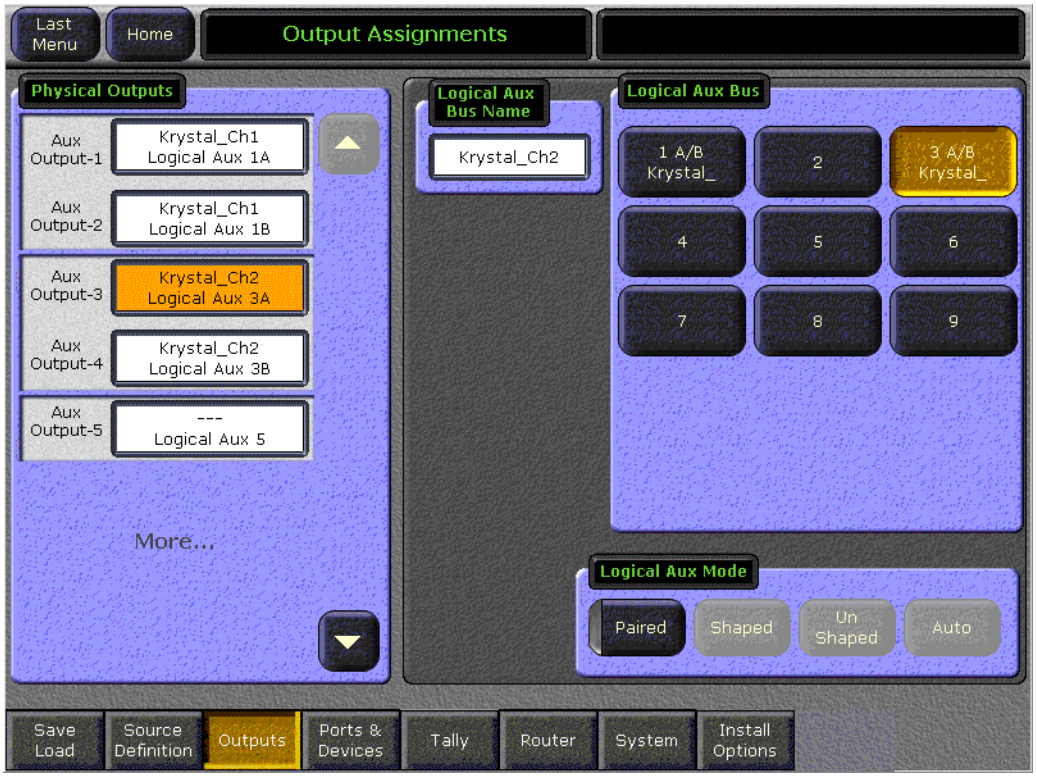
The Program and Preview outputs of the switcher are dedicated to specific output BNC connectors on the rear of the Video Processor frame. These output destinations cannot be changed. The Aux Buses can be assigned in any configuration to any of the physical Aux Bus output BNCs as desired.

There are 9 Aux Buses available on the 2.5-M/E system and 13 on the 3-M/E system, so the layout of the Outputs menu differs between the two systems in the number of physical outputs shown. Depending on the type of equipment the Aux Bus is feeding, some Aux Bus attributes are configurable.

An Aux Pair (video/key, video/video) may also be defined for an effects send configuration to an external DVE device. Pairing is defined for an Aux Bus video signal and the associated key signal assigned to it in the Sources menu. The paired signals are then assigned to individual physical Aux Bus output pairs on the rear of the frame. The Aux Pair can also be named and configured for shaping or unshaping in this menu.

Aux Bus configuration is explained in more detail in *Section 3 – Configuration* in the *Zodiak Installation and Service Manual*.

Figure 123. Outputs Menu

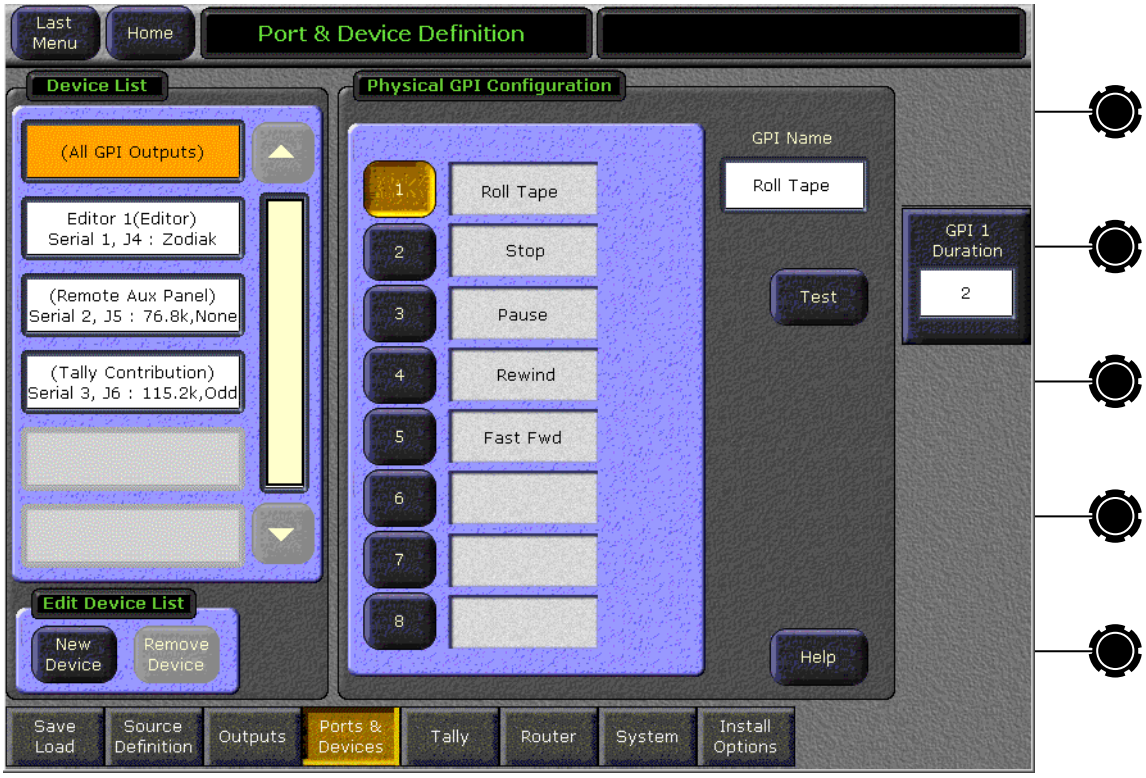


Ports & Devices Menu

The Eng Setups – Ports & Devices menu is used to define external devices to interface to Zodiak. The menu is accessed by touching **Eng Setup**, **Ports & Devices** (Figure 124).

The setup for each type of device is described in detail in *Appendix C – External Interfaces* of the *Zodiak Installation and Service Manual*.

Figure 124. Ports & Devices Menu



Tally Menus

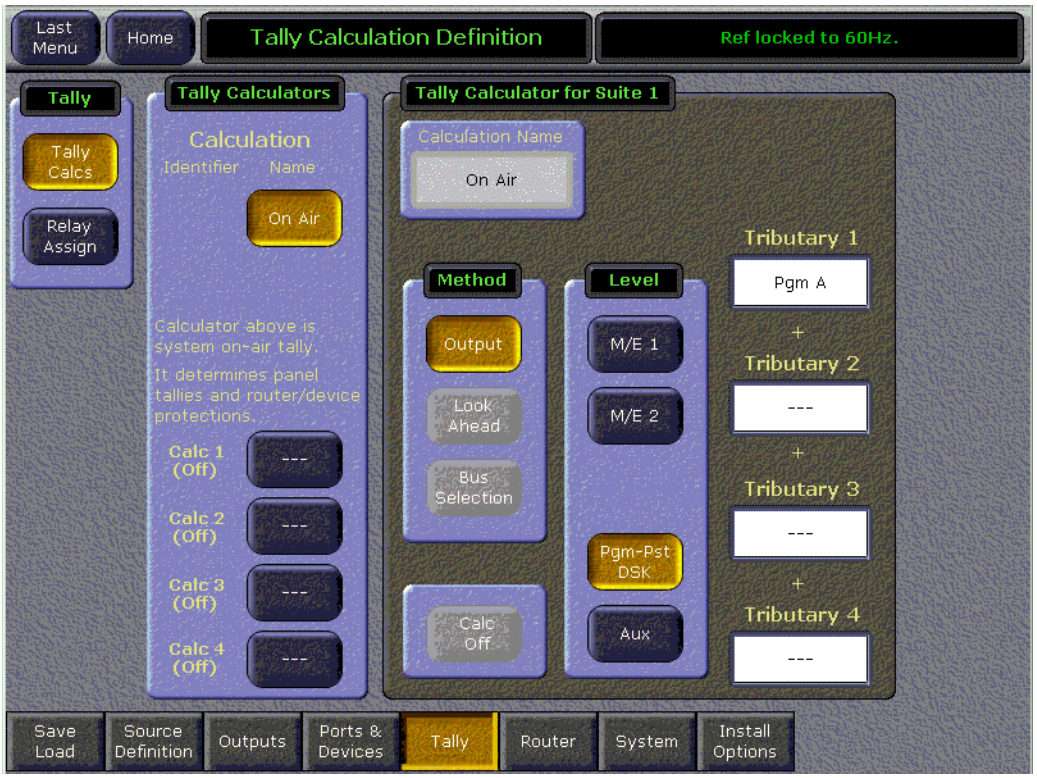
The Tally menus are used to configure the tally system. There are multiple tally calculators, three different tally calculation methods, and user assignment of tally relays. The results of the tally calculators are applied to the tally relays on the Tally modules in the Video Processor frame, and those relays control external tally lights. The menu set also allows the user to map Engineering sources to the tally relays.

See the separate *Zodiak Installation and Service Manual* for detailed information about tally configuration.

Tally Calculation Definition Menu

The Tally Calculation Definition menu is used to select calculators, methods, and levels, name User calculators, assign outputs to Tributaries, and turn the User calculators on and off. Touch **Eng Setup**, **Tally**, **Tally Calcs**, (the Tally Calcs button is in the Tally pane) to access the menu (Figure 125).

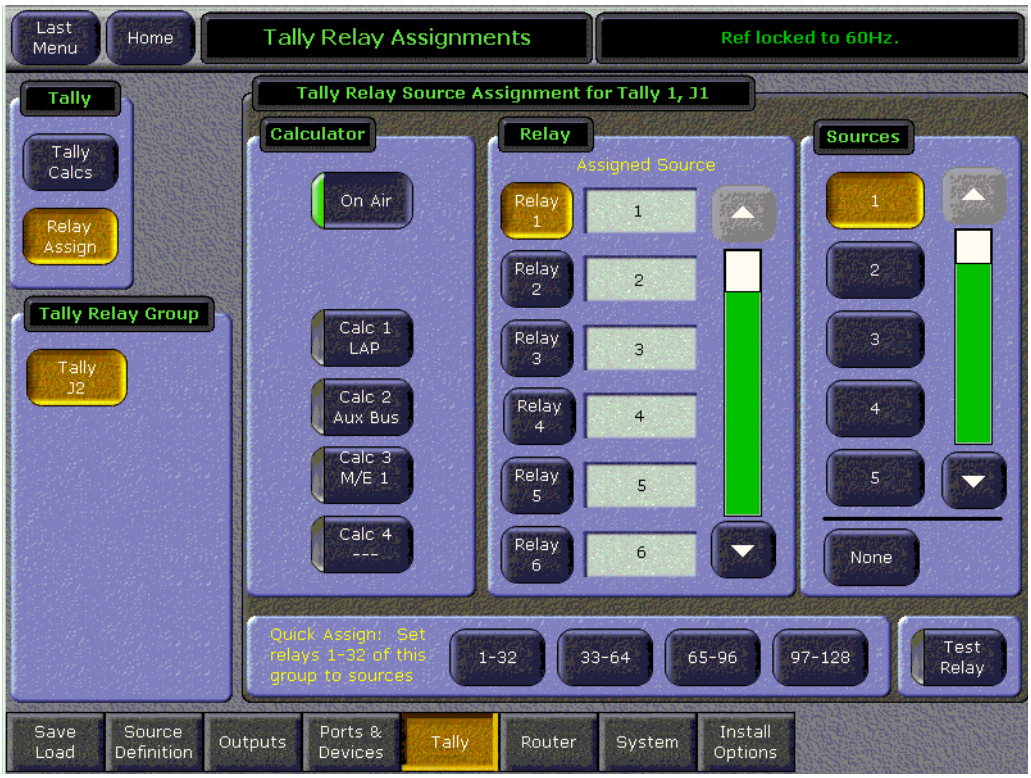
Figure 125. Tally Calculation Definition Menu



Tally Relay Assignments Menu

Touch **Eng Setup**, **Tally**, **Relay Assign** (the Relay Assign button is in the Tally pane) to access the Tally Relay Assignments menu (Figure 126).

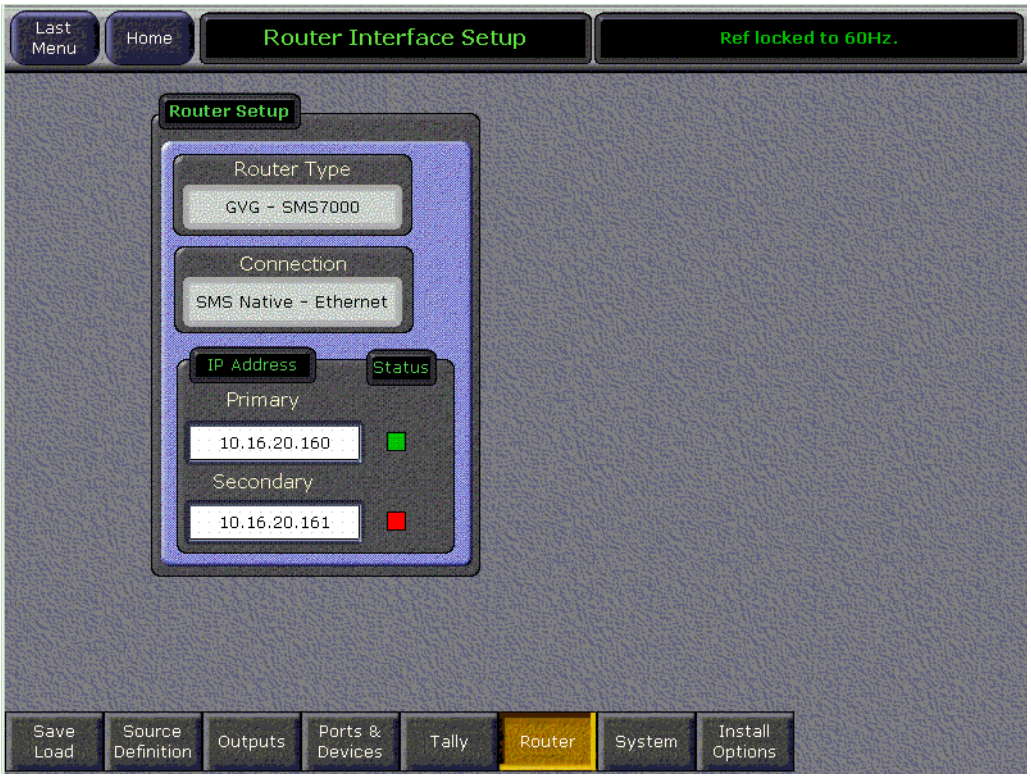
Figure 126. Tally Relay Assignments Menu



Router Interface Setup Menu

The Router Interface Setup menu (Figure 127) is used to set the IP Address(es) the Zodiak system will use to communicate to the external router. The Connection Status indicator is red when communication is not detected, and is green when communication is established.

Figure 127. Router Interface Setup Menu



See the separate *Zodiak Installation and Service Manual* for specific configuration information.

System Menus

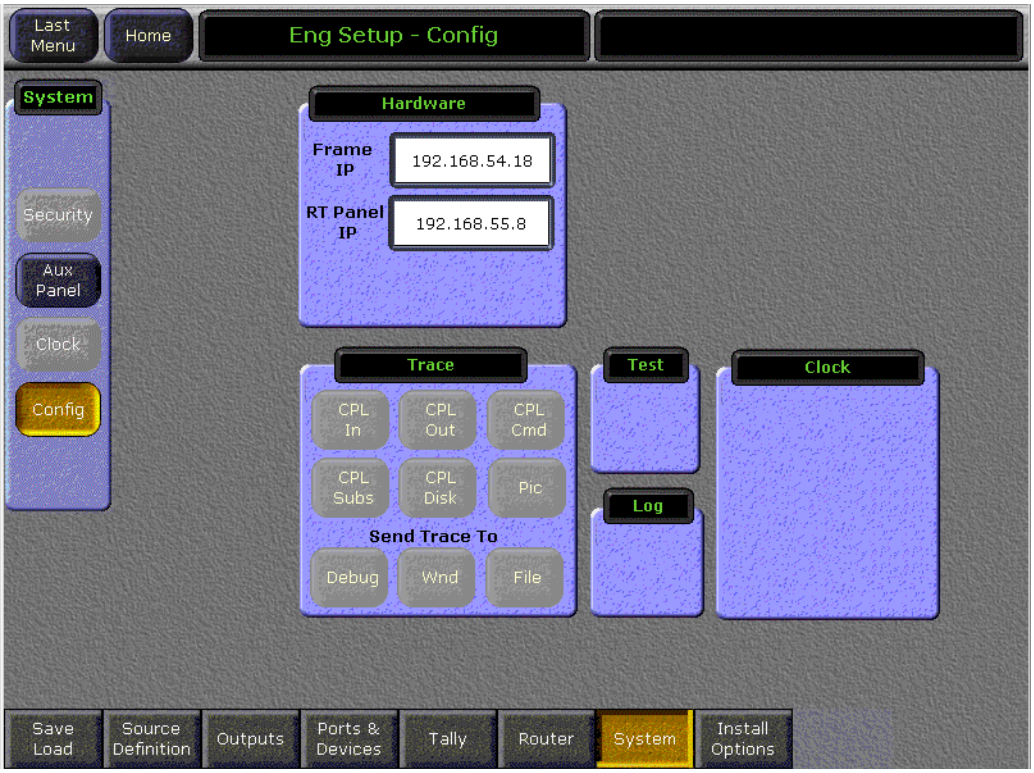
The System menus are used to identify the Zodiak Frame and Main panel IP address (**Config**), and configure Remote Aux panels (**Aux Panel**). Subcategory selection buttons for these controls are located on the left. Other controls on this menu are currently inactive in released software.

Config Menu

The Config menu is used to identify and change the IP addresses of the Video Processor frame and the Main panel (also called the Real Time or RT Panel in this menu) for communication with the Menu panel. The menu is accessed by touching **Eng Setup**, **System**, **Config** (Figure 128).

Complete IP addressing instructions are given in *Section 3 – Configuration* in the *Zodiak Installation and Service Manual*.

Figure 128. Config Menu



CAUTION The Frame and Main (RT) panel IP address must be set correctly or the Menu panel will not communicate with the frame or Main panel.

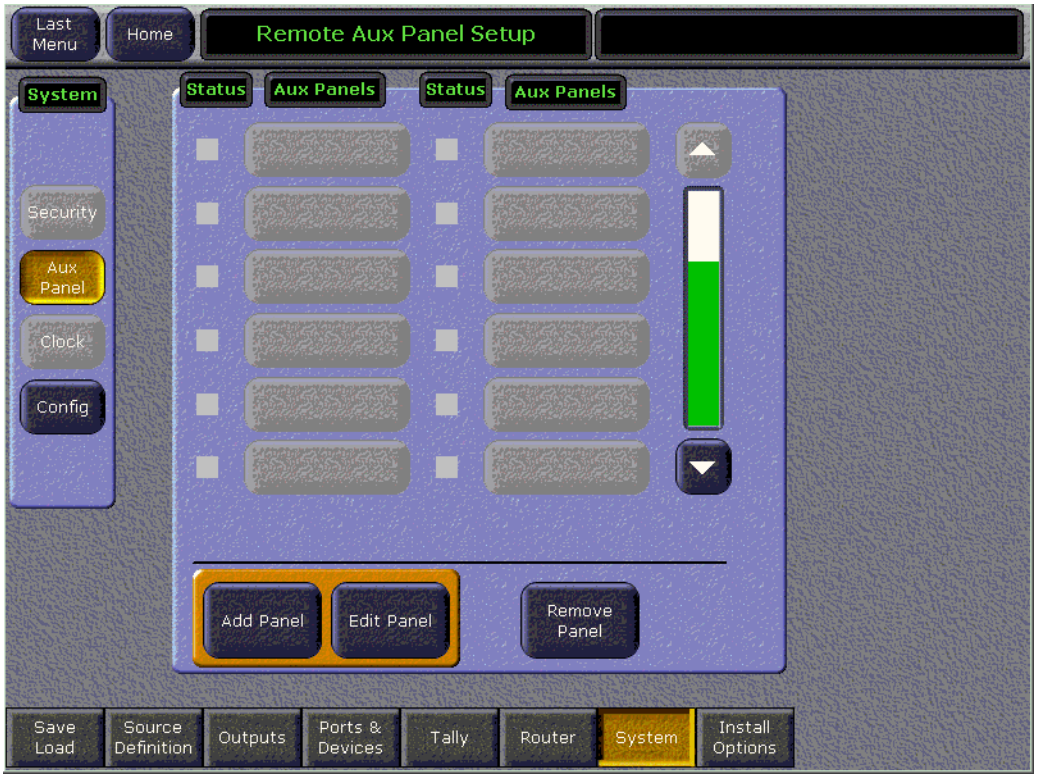
After changing the IP addresses, you must exit the Zodiak Menu application (by touching the upper right message area). It is also recommended to restart Windows 2000 to reset the internally generated IP routing tables for proper communication.

Aux Panel Menu

The Aux Panel menu is used to configure optional Remote Aux panels in the Zodiak system. The menu is accessed by touching **Eng Setup**, **System**, **Aux Panel** (Figure 129).

Complete instructions for configuring Remote Aux panels is given in *Section 3 – Configuration* in the *Zodiak Installation and Service Manual*.

Figure 129. Eng Setups – System – Aux Panel Menu

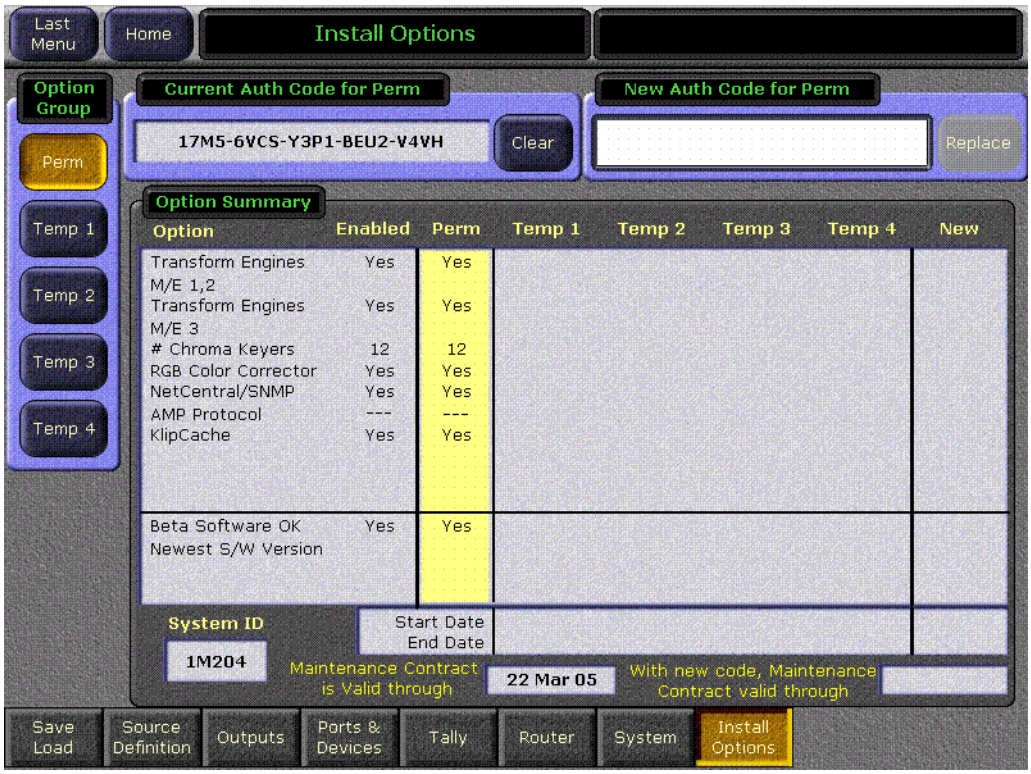


Install Options

The Eng Setup – Install Options menu (Figure 130) is used enter an authorization code to enable software options that have been purchased after switcher delivery or are being tried on a temporary basis. This menu is reached by touching the **Install Options** category selection button on any Eng Setup menu.

For a complete explanation on how to use this menu to install new or temporary options, refer to *Section 3 – Configuration* in the *Zodiak Installation and Service Manual*.

Figure 130. Install Options Menu



Macro Menus

The Macro menus provide access to many Zodiak system macro functions. The Macro menus can be used to:

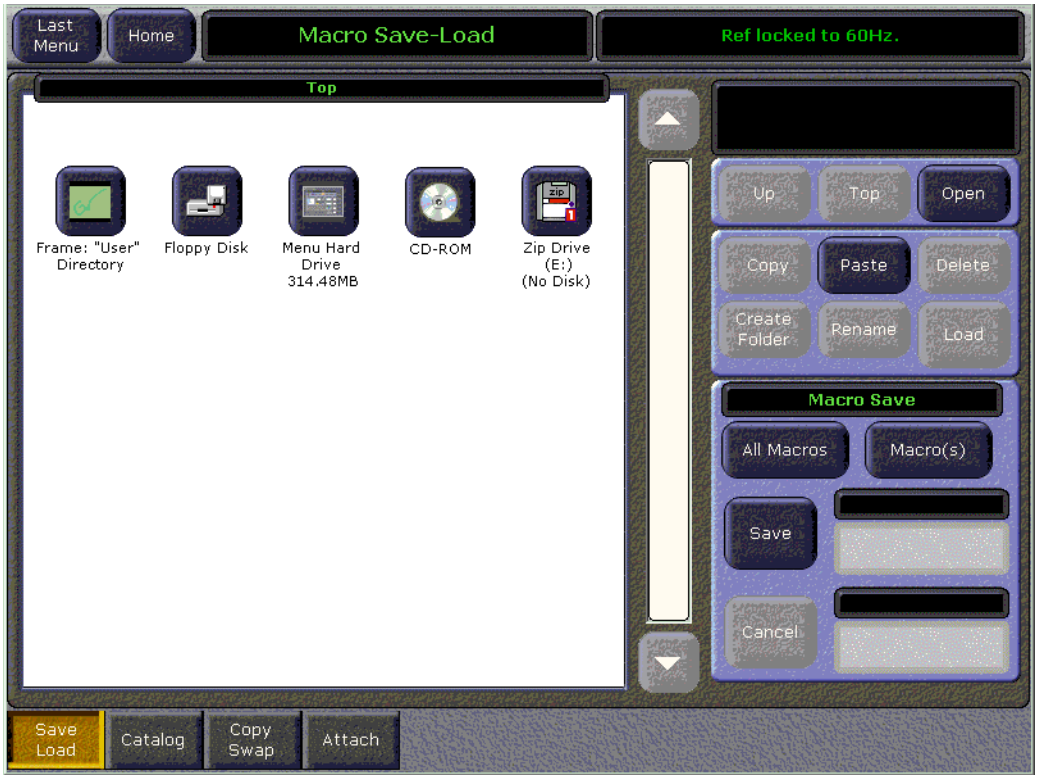
- Record a new macro and append record onto an existing macro,
- Insert time delays between macro steps,
- Name a macro,
- Play a macro and stop a playing macro.
- Delete an existing macro,
- Save and load macro registers (all, or by range),
- Copy and swap macro registers, and
- Attach a Macro to a button.

The Macro menus are accessed via the **Macro** button on the home menu. Four different Macro menus are available.

Macro Save-Load Menu

The Macro Save-Load menu (Figure 131) is accessed by touching the Save Load category selection button at the bottom of the Macro menu.

Figure 131. Macro Save-Load Menu



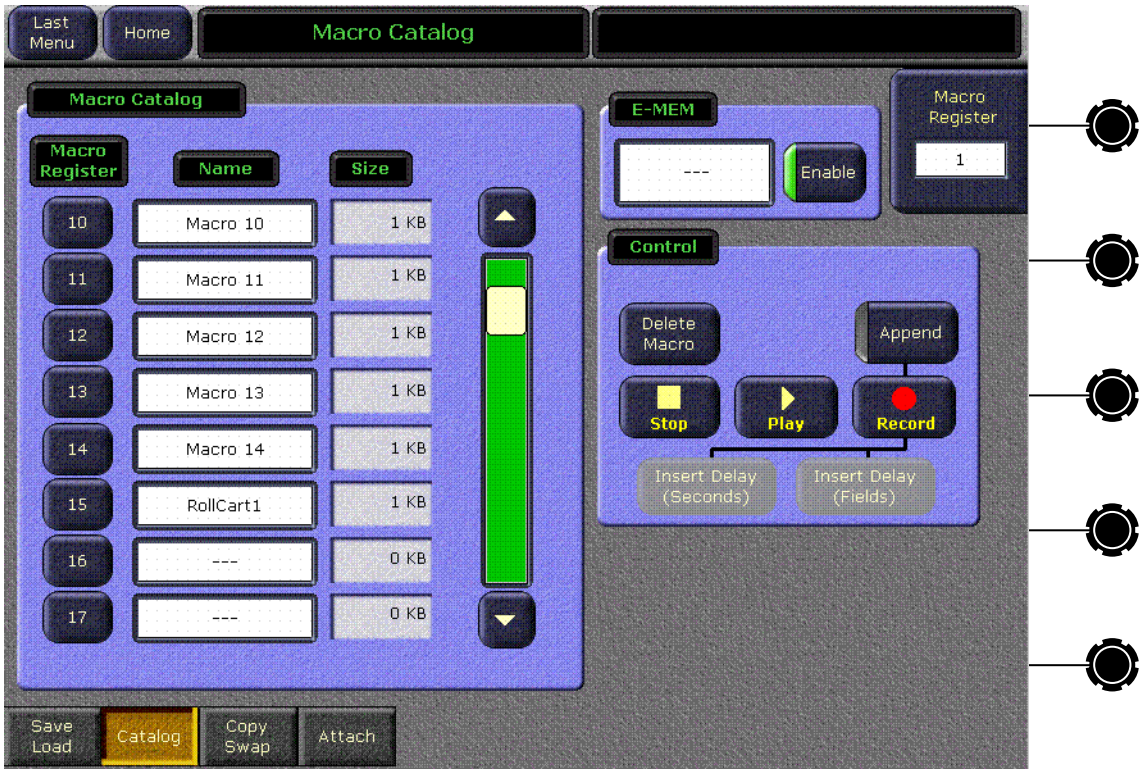
This menu operates the same as the other save load menus (for example, E-MEM, Eng Setup, and Daily Setups Save-Load). You can select all macro registers, or a range of macro registers, to save to disk. You can also load a single macro, or load a folder containing several macros.

This menu does not affect any macro button attachments that may have been established.

Macro Catalog Menu

The Macro Catalog menu (Figure 132) is used to record, play, and name macros.

Figure 132. Macro Catalog Menu



Macro Catalog Pane

The Macro Catalog pane has a scrolling list of all 100 macro registers. Touching a macro register button selects that register for Macro menu control operations.

The name of the macro appears in the central column. By default, macros are named **Macro 01** though **Macro 50** and **Macro S01** though **Macro S50**. Touching the Name data pad for a macro register opens a keypad for naming that macro. You do not need to select the macro register button to

change its name. If a macro register is named but no macro steps are recorded, the name of the empty macro will be deleted the next time the system is rebooted.

The memory size of each macro, to the nearest kilobyte, is displayed for each recorded macro. 0 KB is reported for empty macro registers.

Control Pane

The buttons in the Control pane affect the selected macro register, performing the labeled functions.

CAUTION You must first select the desired register and then press the desired macro function button (**Record**, **Append**, **Delete Macro**). Initiating the recording of a macro immediately deletes any existing information for the macro register currently selected on the Macro menu.

The **Record** button initiates recording a macro into the selected macro register. Once initiated, the recording of a macro is terminated from the menu with the **Stop** button. Macros may also be stopped using the Main panel source selection button for that macro register.

When a macro recording is underway, the two **Insert Delay** buttons become active, permitting the insertion of time delays in seconds or fields before the next macro step will be performed during playback.

The **Append** button, when pressed, permits appending more macro steps to the end of an existing macro. Macro record mode is automatically initiated when this button is pressed, but the existing macro information will not be overwritten.

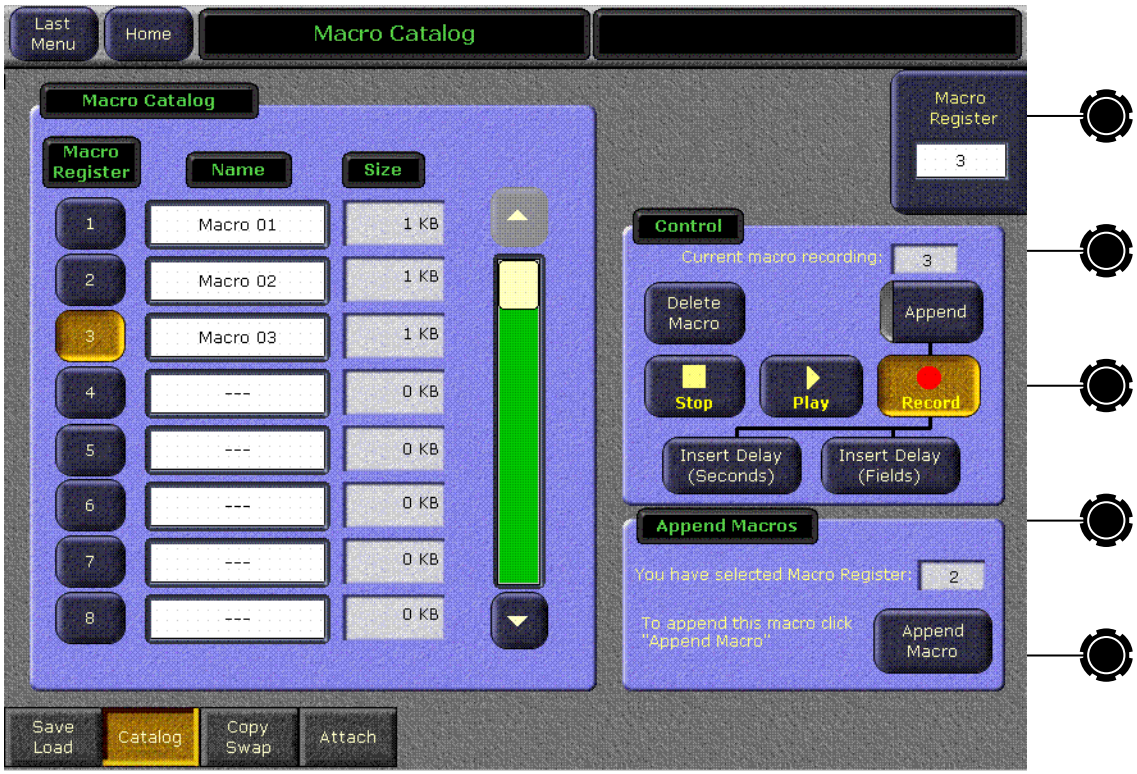
The **Stop** button stops the playback of a playing macro, and also stops the recording of a macro.

The **Delete Macro** button deletes the currently selected macro register.

Append Macros Pane

You can append the contents of one macro into another macro using the Macro Catalog menu. After touching either the **Record** or **Append** button on the menu, touching another Macro Register button on the menu opens an Append Macros pane (Figure 133).

Figure 133. Macro Catalog Menu with Append Macros Pane



The Append Macros pane shows the register number of the macro you just selected to append. You can select a different macro register if you wish by touching a different button on the Macro Catalog menu. The Append Macros pane will update to show the currently selected macro. Only one macro register can be selected for append at a time. When the correct macro register has been chosen, touching the **Append Macro** button appends the contents of that macro to the one currently being recorded. You can then continue to record the macro, and if you wish you can append the contents of another macro register following the same procedure. You cannot, however append a macro to itself (this action is ignored).

Just like appending macros using the buttons on the Main panel, only the current contents of a macro is appended to another macro. Once the contents of one macro has been appended to another macro, deleting or changing that source macro will not change the behavior of the macro that had received its contents through an append.

Soft Knob Register Selection

Macro registers can be selected using the labeled soft knob on the right, and a specific register number can be entered on the data pad to go directly to that register.

E-MEM Pane

The E-MEM pane is used to add a macro to an E-MEM. Touching the E-MEM data pad opens the Macro selection menu, from which you select the desired macro. The name of the selected macro is then displayed in the data pad.

Note Do not attempt to use the Macro Catalog pane on the left or the Macro Register knob control on the right to associate a Macro to an E-MEM. The E-MEM data pad is used for this purpose.

The **Enable** button enables or disables that specific macro. It defaults to On whenever a macro is selected.

Both the selected macro register number and its Enable state are added to the current effect location when a keyframe is inserted or modified.

Macro Copy Swap Menu

The Macro Copy/Swap menu (Figure 134) is accessed by touching the **Copy Swap** category selection button at the bottom of the Macro menu.

Figure 134. Macro Copy Swap Menu

Macro register information can be moved from one register to another with this menu by selecting the registers in the From and To scrolling panes, then touching the **Copy** or **Swap** action buttons on the lower right. The soft knobs and data pads on the upper right can be used to quickly select specific register numbers in each pane.

Macro Attach Menu

The Macro Attach menu (Figure 135) is accessed by touching the **Attach** category selection button at the bottom of the Macro menu.

Figure 135. Macro Attach Menu

Panel Attach Mode Pane

Macros can be attached to other panel buttons so the macro runs when that button is pressed. Macros can run before the normal function of that button, after the normal function (when the button is released), or completely replace that button function. When macro mode is on, touching a **Pre Attach**, **Post Attach**, or **Replace Attach** buttons activates attach mode. You then select the macro register of the desired macro and press the button to which you wish to attach that macro.

Any buttons on the Main panel (except delegation buttons and buttons disabled due to a lack of resources) can have macros attached. Attach mode remains on until turned off, to permit quick attachments of the same macro to several buttons.

Macros are attached to physical buttons, not to the delegated function of that button. For example, if you attach a macro to the **Chroma Key** button, the macro will run whenever that button is pressed, regardless of what keyer that subpanel has been delegated to control.

Macro attachments are broken by entering one of the attach modes (it doesn't matter which one) and, without a macro register selected, pressing the panel buttons with attachments you wish to remove. This attaches no macro to that button. If a macro register has already been selected, touching that macro register button de-selects it, and then button attachments can be broken.

It is possible to attach up to three macros to a single button (pre, replace, and post). It is not guaranteed that the last command in the pre-macro will be executed before the original function is executed. However, it is guaranteed that all three attachment macros will be executed in the right order (pre, replace, post) with no overlapping.

The **Show Attach** button activates a mode that low tally blinks panel buttons that have macros attached. The **Show Attach** button jewel lights when the mode is active. Touching and releasing the button activates Attach mode which remains on until the button is touched a second time.

The **Attach Enable** button enables and disables all macro button attachments globally. When on, the **Attach Enable** button jewel lights, and then pressing panel buttons with macros attached will run those macros. When off, macros are only played back by activating macro mode and pressing the macro register buttons, or with the Macro menu. The **Attach Enable** button is active whether or not macro mode is active, so it can be instantly turned on and off at any time.

Macro Attachments Pane

The Macro Attachments pane displays all possible buttons on the selected section either **M/E 1**, **M/E 2**, **M/E 3**, or **Misc**. If any of the buttons have macros attached the information on the macro will display in the appropriate column either Pre, Replace, or Post.

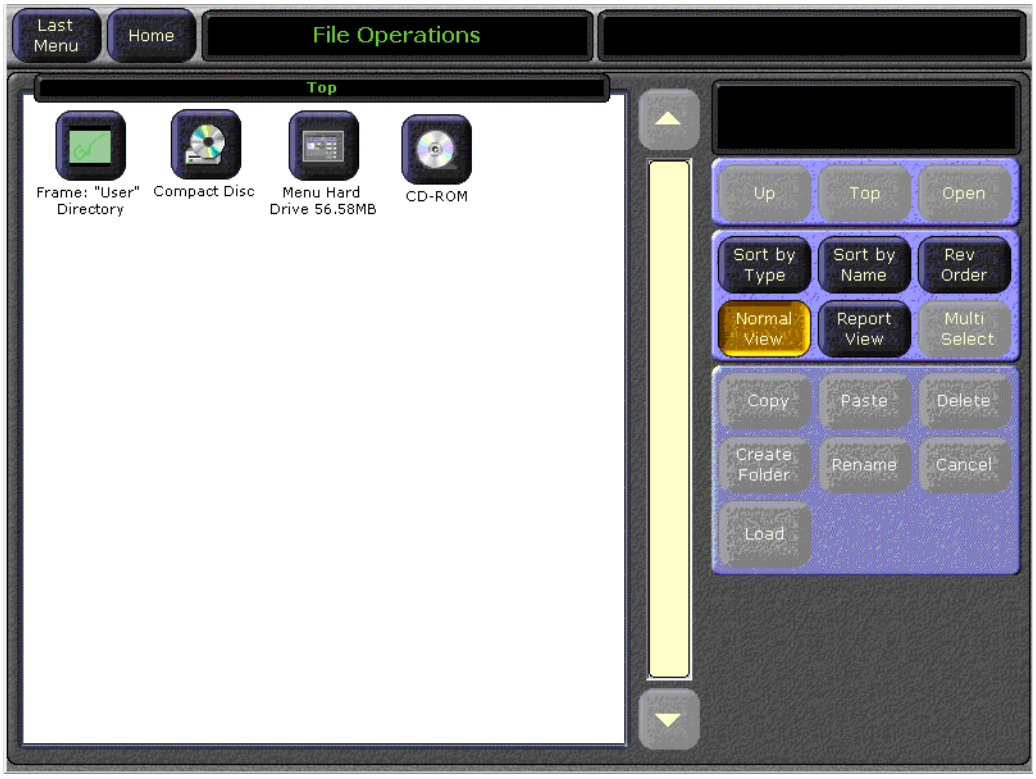
Note The display will show buttons for the maximum used by a Zodiak system. This means that if you have a 2.5 ME system, the button set will still display all the buttons for a 3 ME system.

When the **Show Attach** button is lit all buttons on the panel that have macros will blink. Pressing a blinking panel button will cause the Macro Attachments pane to scroll to and display that button's macro information.

File Operations Menu

The File Operations menu employs the Zodiak file browser. This menu is used to navigate through the available file hierarchies, create folders, rename folders and files, and copy/paste files. Only mapped network drives and selected areas of the Zodiak system are accessible. The menu is reached by touching **File Ops** (Figure 136).

Figure 136. File Operations Menu



See *File Operations* on page 338 for specific operating instructions.

Status/Diags – Versions Menu

The Versions menu displays currently loaded software versions for all the Zodiak system components (Figure 137). Touch **Status & Diags** to access this menu.

Figure 137. Versions Menu

A Memory Usage bar graph displays the amount of E-MEM keyframe memory currently in use. If usage reaches 100%, no new keyframes will be able to be added to any effect. Deleting keyframes from any effect will regain space and allow the addition of new keyframes.

In most cases placing keyframes on all levels at every point on a timeline is not necessary. Place a keyframe on a level only if it is needed for the effect. This conserves keyframe memory space.

External Device Menus

The External Device menus are used to control external devices, such as tape machines (VTRs) or digital disk recorders (DDRs), with the Zodiak Menu application and switcher E-MEMs. The external devices must be defined and configured in the Eng Setup, Ports & Devices menu and assigned to an E-MEM group level before they will be available for control. Status from external devices such as device availability, and current playback and record position is also reported in the menus.

Five menus are available:

- Enables – Enables and disables control of external devices.
- Timeline Events – Used to add machine control event triggers to E-MEM timelines.
- Control – Used for direct control of external devices (similar to the Machine Control subpanel).
- Event List – Permits the creation and saving of lists of DDR clips that can be loaded and then played in order.
- Link – Permits the linking of devices so they roll in sync.

Note All menu buttons are grayed out if external devices have not been configured.

Control of configured external devices from the Menu application includes basic play, stop, fast forward, and rewind actions. They may also be controlled through switcher E-MEM using *events* learned to effect keyframes. Events act as triggers for specific behaviors, similar to GPI or Peripheral Bus II commands. As each keyframe with an event is encountered during an effect run, that event information is sent to the external device, commanding it to action.

Actions include:

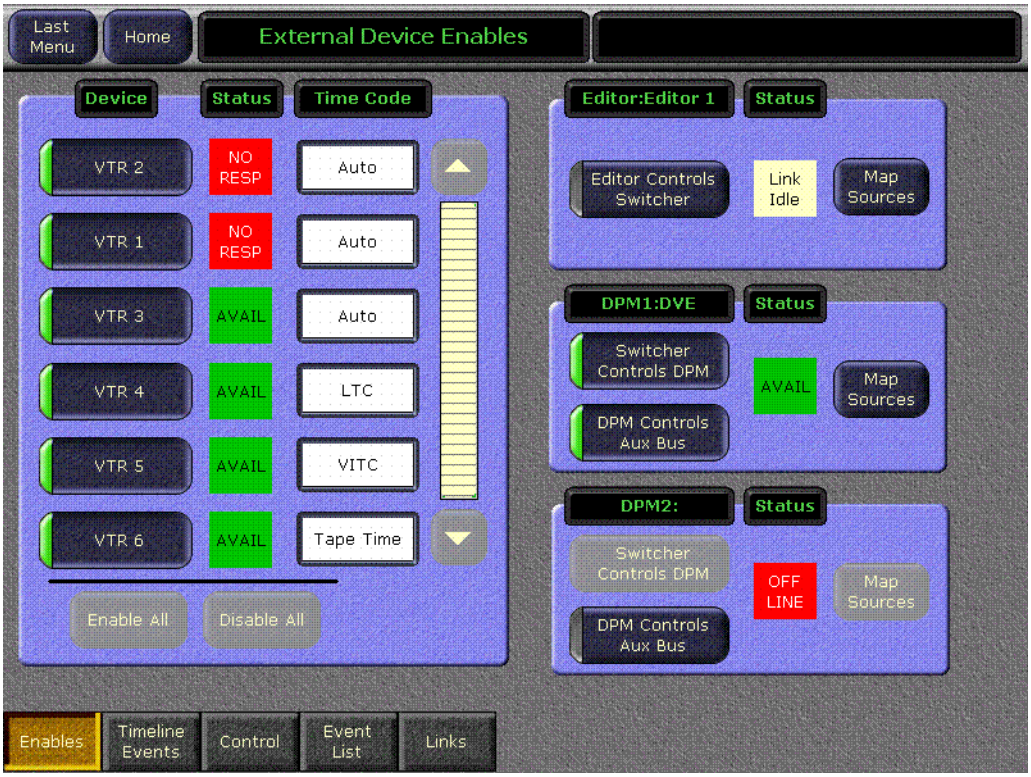
- Cue, play, and stop DDR clips, and
- Cue, play, and stop tapes in VTRs.

Note These menus will have all buttons grayed out if external devices have not been configured in the Eng Setups, Ports & Devices menu.

External Device Enables Menu

The External Device Enables menu is used to selectively enable and disable control of external devices that have been defined in the Eng Setups, Ports & Devices menu. The External Device Enables menu (Figure 138) is accessed on the Menu panel by touching **Extern Device**, **Enables**.

Figure 138. External Device – Enables Menu



Disabling device control temporarily can be useful. For example, during a rehearsal you may not want to cue or roll VTRs. With the External Device Enables menu you can control which devices will respond without having to rebuild effects or change engineering configuration.

Enables Device Pane

The Device pane on the Enables menu is a list of all the DDRs and VTRs available on the Zodiak system (Figure 138). Only currently configured devices are displayed. Refer to *External Interfaces – Appendix C* in the separate *Zodiak Installation and Service Manual* for how to configure an external device. Currently, only four serial devices can be controlled at once corresponding to the four available serial ports (Serial 1 – Serial 4) on the rear of the Video Processor frame.

Touching the button for a device toggles the device between an enabled or disabled state. When enabled, E-MEM and Control menu commands will be sent to the device during effect runs. When disabled, the commands are not issued to that device.

The **Enable All** and **Disable All** touch buttons can also be used to enable or disable all the devices on the list.

Enables Device Status

Next to each device button is a status indicator, reporting the state of the interface to that device.

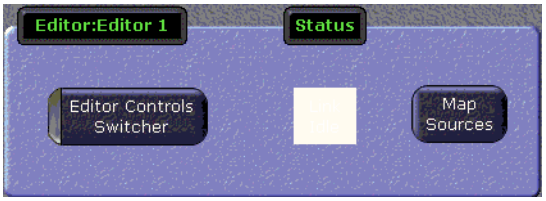
- A green **Avail** box indicates the device is controllable from the Zodiak system.
- A yellow **Other User** box indicates the device is responding, but is in use by another control point and has been locked from Zodiak system control.
- A red box indicates the device is not responding (**No Resp**), or is responding but has been placed off-line (**Off Line**).

External Device Source Mapping

DPM and Editor Source mapping will map external device IDs to switcher logical source IDs and back again for status reporting. The maps have to be unique in both directions so the translation is deterministic and unambiguous. DPM and Editor mapping configuration data is saved with Suite Prefs.

Editor Pane

Figure 139. Editor Pane



The **Editor Controls Switcher** button toggles on and off to indicate whether the Editor can control source selection on the switcher.

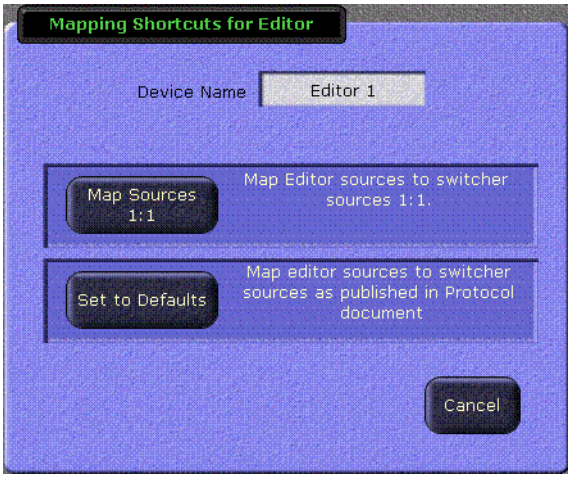
The **Map Sources** button accesses the External Mapping menu (Figure 143). This menu will allow the user to map any or all of the Zodiak sources to editor buttons. The menu does not know how many sources the editor has

so it is the responsibility of the user to map the correct number of sources based on the protocol used by the editor device. For example, if the editor uses the 200/250 protocol, then only the first 20 sources can be used.

Figure 140. Editor Map Sources Menu

The **Mapping Shortcuts** button accesses a Mapping Shortcuts for Editor window, see Figure 144.

Figure 141. Editor Map Sources Menu

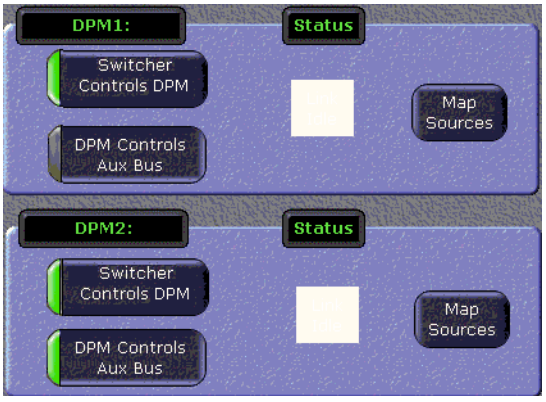


- Touching the **Map Sources 1:1** button does a quick mapping of the sources 1 to 1, (Switcher Source 1 to Editor Source 1).
- Touching the **Set to Defaults** button uses the default mapping of the protocol that the device uses for communicating to Zodiak.

Note The protocol button will display the protocol selected for the device in the **Eng Setup**, Port & Device Definition menu.

DPM Panes

Figure 142. DPM Panes



The **Switcher Controls DPM** and the **DPM Controls Aux Bus** buttons toggle on and off. The three possible combinations are:

Switcher Controls DPM is On and **DPM Controls Aux bus** is On.

The switcher changes to the aux bus are sent as a request to the DPM. The DPM replies to the switcher with the report of the new source. Switcher receives the request and changes the source on the Aux Bus.

Switcher Controls DPM is On and **DPM Controls Aux Bus** is Off.

Switcher changes to the Aux Bus are immediately applied on the Aux Bus and sent as a request to the DPM. The DPM replies to the switcher with the report of the new source but the switcher drops the request without changing the source on the Aux Bus.

Switcher Controls DPM is Off and **DPM Controls Aux Bus** is On or Off.

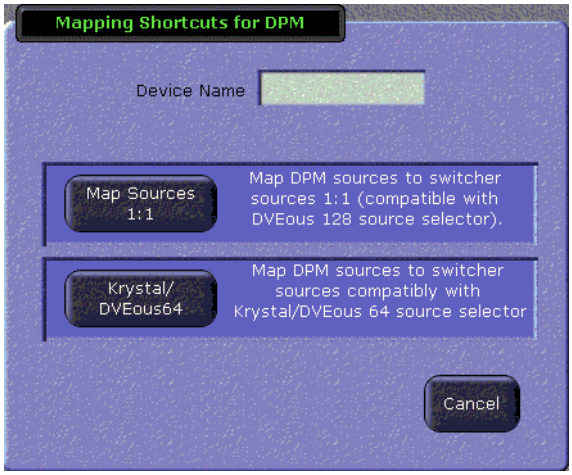
The state of the **DPM Controls Aux Bus** button is ignored whenever the **Switcher Controls DPM** button is Off. Switcher changes to the Aux Bus are immediately applied to the Aux Bus and the request is not sent to the DPM. DPM replies to the switcher with report of the new source are ignored and dropped without changing the source on the aux bus.

The **Map Sources** button accesses the External Mapping menu (Figure 143). This menu will allow the user to map any or all of the Zodiak sources to DPM buttons. The menu does not know how many sources the DPM has so it is the responsibility of the user to map the correct number of sources based on the protocol used by the DPM device.

Figure 143. DPM Map Sources Menu

The **Mapping Shortcuts** button accesses a Mapping Shortcuts for Editor window, see Figure 144.

Figure 144. DPM Map Sources Menu



- Touching the **Map Sources 1:1** button does a quick mapping of the sources 1 to 1, (Switcher Source 1 to Editor Source 1).
- Touching the **Krystal/DVEous64** button uses the default mapping of the protocol that the device uses for communicating to Zodiak.

Note The protocol button will display the protocol selected for the device in the **Eng Setup**, Port & Device Definition menu.

External Device Time Code Selection

On the External Device Enables menu you can specify what type of time-code the Zodiak system will use with each device. The current time code mode is displayed in the Time Code column (Figure 138 on page 204). It is assumed the controlled external device is operating with the same time code type as selected.

Touching the **Time Code** data pad for a device opens a Timecode Mode window (Figure 145).

Figure 145. Time Code Mode Selection Window

Auto — The controlled device returns the best source of timecode available. At speeds less than 0.25 play Longitudinal Time Code (LTC) will be used if it can be read. At these slow speeds if LTC is not found but Vertical Interval Time Code (VITC) is available, VITC will be used. At speeds greater than 0.25 play, VITC will be used if it can be read. At these higher speeds if VITC is not found but LTC is available, LTC will be used. At any speed, if neither LTC or VITC is readable, Corrected LTC will be used, which is the last good LTC time corrected by the tape timer.

LTC — Longitudinal Time Code will be used.

VITC — Vertical Interval Time Code will be used.

Tape Time — The current zero based tape time setting of the controlled device will be used.

Touching a time code button selects that type of time code for that device and closes the Time Code Selection window.

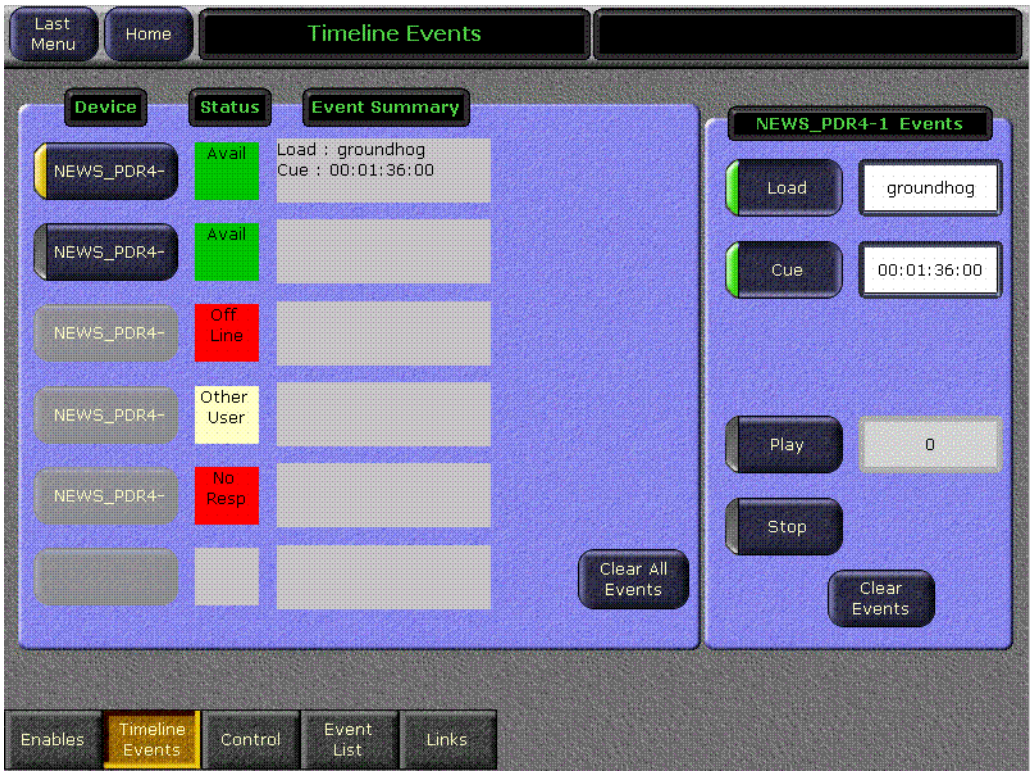
External Device Timeline Events Menu

The Timeline Events menu is used to specify what external control events will be placed on a keyframe on an E-MEM timeline. This menu also displays the external control events currently in the work buffer, and reports the status of each device. Touch **Extern Devices**, **Timeline Events** to access this menu (Figure 146).

You must define what E-MEM level group the external device will be a part of in the E-MEM Prefs menu (see *E-MEM Prefs Menu* on page 160).

Note This menu directly affects the Zodiak system work buffer, not the effect keyframes themselves. Changes made to this menu must be added to keyframes with the Main panel **Insert**, **Modify**, or **Learn** controls to make the changed settings active during an effect run.

Figure 146. External Devices – Timeline Events Menu



Device Pane

The Device pane on the left is a scrolling list of all configured external devices, as described in the External Device Enables menu on page 204. The name of each device is shown on the left, and its status is indicated in the adjacent box (see *Enables Device Status* on page 205).

Timeline Device Status

These status indicators are identical to those described in *Enables Device Status* on page 205.

Events Summary

The Event Summary data pads to the right of each status box display the currently enabled external device events (if any) in the work buffer for that device. Touching this data pad delegates the pane on the right to that device, where the external device triggers can be selected (see *Events Pane* below).

The **Clear All Events** button turns off all events at the current keyframe of all devices in the scrolling list. This button makes it easy to insure that no external device events will be added to the timeline when you are editing an effect. If a keyframe is accidentally inserted or modified with incorrect external device events, this button can also be used to quickly recover from the situation.

Events Pane

The Events pane on the right shows buttons for events available for the selected external device. Each event is turned on and off in the work buffer by touching its button. The controls in this pane do not actually activate a device, but rather specifies when the event takes place. The events must be turned on and added to a keyframe before their actions will be enacted during an effect run.

Load is not functional in this release.

Cue instructs the device to cue to a specified time code when that keyframe is encountered. Turning **Cue** on displays the current time code location for the device (the default cue point) in the adjacent data pad. Touching this data pad brings up a numeric keypad allowing entry of a different time code.

Note Turning on Cue while a device is playing will grab a timecode on the fly, which is not very useful. It is better to either park the device at the desired cue point using the Control menu or to manually enter a timecode before turning on Cue.

Play instructs the device to play when that keyframe is encountered. A **100** in the display indicates a play speed of 100%. Turning **Play** on automatically turns **Stop** off if it was selected. Play events encountered before the device has cued may be executed late or not at all. Cue times must be factored into the effect when it is created.

Stop instructs the device to stop playback when that keyframe is encountered. Turning **Stop** on automatically turns **Play** off if it was selected.

The **Clear Events** button turns off events at the current keyframe for only the delegated device.

External Device Control Menu

The External Device Control menu is available to directly control a DDR or VTR. Touch **Extern Device**, **Control** to access this menu (Figure 147).

Figure 147. External Device Control Menu

The pane on the left provides full control of one device. The three panes on the right provide limited control of each of those devices. Any limited control device can be swapped with the full control device by touching the **Swap** button. This gives any device access to the additional control functions available in the larger pane.

Playback Controls

Standard **Rewind**, **Stop**, **Play**, **Fast Fwd**, and **Jog** controls are available at the bottom of the left control pane.

The smaller control panes on the right have **Cue to Begin**, **Stop**, and **Play** control buttons.

The **Var Play Speed** button turns the variable speed function On and Off. When On, the device will play at the speed displayed when the Play button is pressed. When Off, normal forward play speed occurs regardless of the rate displayed in the Play Speed data pad. The Play Speed data pad is used to set the variable speed playback rate, as a percentage. The range is ± 5000%, corresponding to 50x forward and backward play speeds. Touching

the data pad brings up a keypad for entering the play speed. A variable play speed set in the larger left pane is retained for use on that device if control is swapped to a smaller pane on the right. Pressing the smaller pane's **Play** button plays that device at the speed that was set for that device in the left pane.

Device Name

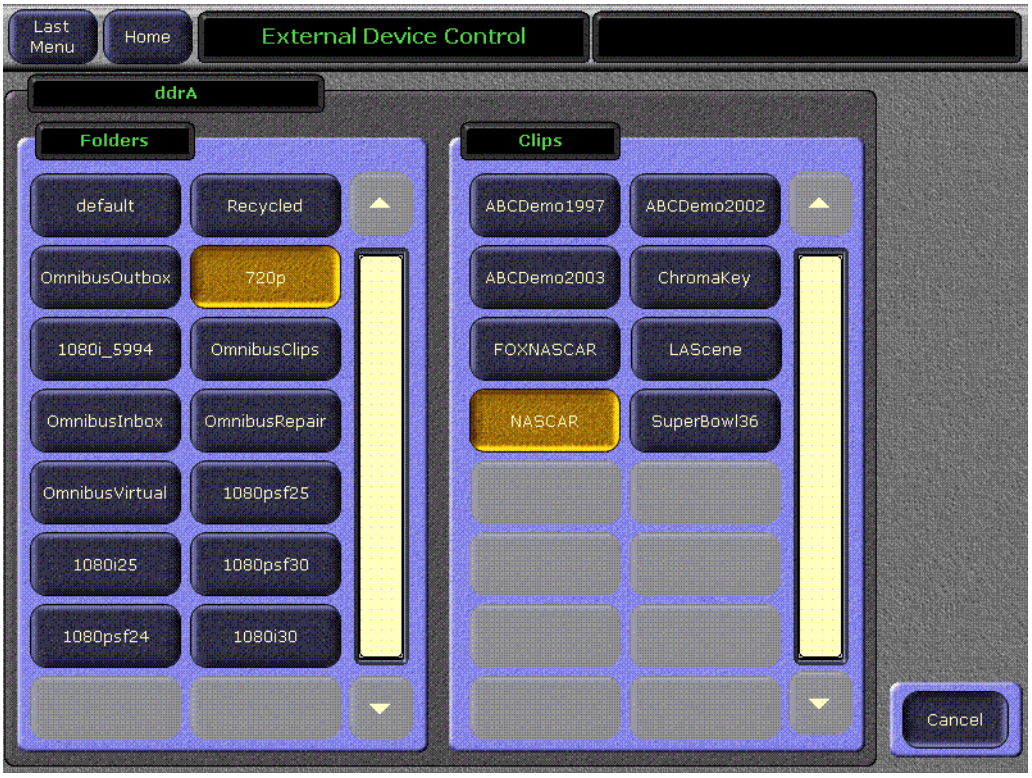
The device the menu is delegated to directly control is displayed in the Device data pad. Touching this data pad brings up a device picker, permitting selection of a different device for control (Figure 148).

Figure 148. Device Picker

Preset and Program Clip

Devices that allow clip selection (DDRs for example) are loaded with a specific clip with the **Preset Clip** and **Program Clip** data pads. Touching these pads bring up a clip picker menu. If the device is using the optional AMP Serial Machine Control feature, both folder and clip selections are available (Figure 149).

Figure 149. Folder and Clip Selection Menu



Manual Control

Control settings in this menu are not saved to E-MEM. Use the Timeline Events menu and/or the Links menus for E-MEM control of external devices.

External Device Event List Menu

An Event List of DDR clips can be created and edited to arrange selected clips in a particular order. These clips can then be played back in that order during program production, automatically if desired using the **Auto Start** and **Off Air Adv** buttons. Event Lists can be saved and reloaded at a later time.

The External Device Event List menu is accessed by touching **Extern Device**, **Event List** (Figure 150). The Event List itself appears in the right pane, list editing controls appear in the central pane, and a clip browser from which clips are selected appears in the left pane.

Figure 150. External Device Event List Menu

CAUTION If an Event List is loaded that has the names of clips that have been deleted from the DDR, there is no advance notification that clips are missing, commands for the missing clips will be ignored, and those clips will not play.

Clip Browser

The name of the external device the menu is delegated to control is displayed on the Device data pad at the upper left. Touching this data pad brings up the Device Picker, permitting selection of a different device (Figure 149 on page 215).

The scrolling pane below has buttons for all the clips residing on the selected device. Touching a clip button selects that clip. The action (if any) performed when a clip is selected is determined by the status of the List Edit and Event List panes on the right.

The buttons in the Clip Browser are arranged in alphabetical order, including the path. Clip “Apple” will be listed above clip “Zebra” if they are stored in the same DDR folder. The paths for clips are not displayed on the buttons, but will affect the order of the clips in the Clip Browser. If some

clips are stored in a News8 folder, and others are stored in a News10 folder, the clips in the News10 folder will appear above those in the News8 folder (1 precedes 8).

List Edit

The buttons in this pane select what action will be performed when a clip is selected in the Clip Browser, and are also used to edit the order of clips in the Event List on the right, and to save, load, and unload Event Lists. The event list editor is designed for speed, using modal operation. Buttons are pressed to set a mode, allowing the subsequent rapid entry of multiple commands.

When the indicator for the **Replace** button is illuminated, the next clips selected in the browser will replace the currently selected clip in the Event List on the right.

When the indicator for the **Insert Before** button is illuminated, the next clips selected in the browser will be inserted before the currently selected clip in the Event List on the right.

When the indicator for the **Insert After** button is illuminated, the next clips selected in the browser will be inserted after the currently selected clip in the Event List on the right.

The **Undo** button reverses the last Event List action performed. After it has been used it is no longer available and is grayed out.

The **Delete** button deletes the currently selected clip from the Event List. This only removes the clip from the list, and does not delete the clip itself from the DDR.

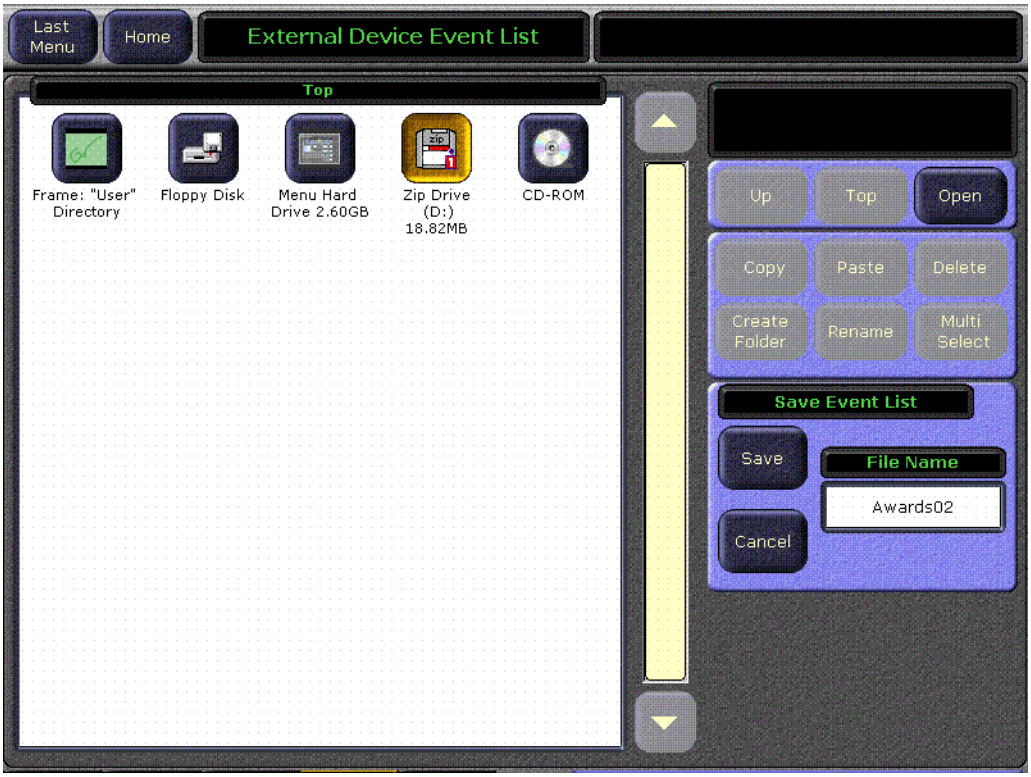
The **Cut** button removes the currently selected clip from the Event List and places it in a clipboard.

The **Paste** button pastes the contents of the clipboard into the location currently selected in the Event List.

The **Move Up** and **Move Down** buttons moves the clip selected in the Event List up or down one location. When at the beginning or end of the, only one of these buttons will be active.

The **Load List** or **Unload List** button (the text of this button changes in context) brings up a file browser (Figure 151), allowing you to navigate to a folder location, create a new folder, and name the Event List. The Event List can be saved with the **Save** button, after which the list is unloaded from the Event List pane, you can select **Cancel** to unload the list without saving it.

Figure 151. External Device Event List File Browser



The **Save List** button brings up a file browser (Figure 151), allowing you to navigate to a folder location, create a new folder, name the Event List, and **Save** it to that location. When a list is saved using this button, the list remains loaded in the Event List pane. Pressing **Cancel** cancels the save operation and leaves the list loaded in the Event List pane.

Event List

The name of the currently selected list, if it has been saved, appears at the top of this scrolling pane. The green Loaded indicator illuminates for the clip that is currently loaded for playback (Figure 150 on page 216).

When the indicator for the **Auto Load** button is illuminated, the next clip selected in the Event List or added to the Event List from the browser will automatically be loaded for playback.

The **Prev Event** and **Next Event** buttons selects the Event List clip above or below the selected clip.

Event List Automation

When combined with **Auto Start** and **Off Air Adv**, an event list provides a nearly automatic way to play out clips during a scripted show like a news cast. Once the event list is created and loaded into a DDR channel, taking the channel to air will play the current clip and taking the channel off air will cue up the next one.

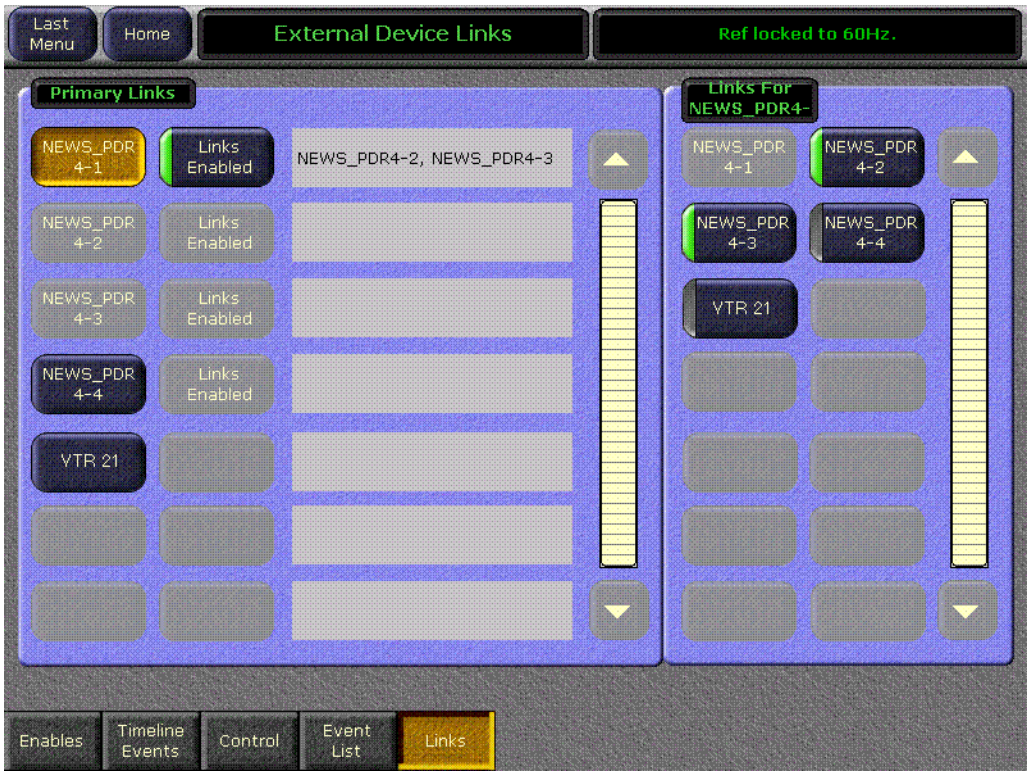
External Device Links Menu

The External Device Links menu is used to link devices so they can be controlled together. One device is the primary device, and other devices can be linked to that device. The linked devices follow the behavior of the primary device. Commands sent directly to a linked device, however, do not affect the primary device.

Any number of devices can be linked to a primary device, but a device can link to only one primary device, and a primary device cannot be linked to another primary device. Current Zodiak system performance does not guarantee sync roll of more than two devices, however.

The External Device Links menu is accessed by touching **Extern Device**, **Links** (Figure 152).

Figure 152. External Device Links Menu



The External Device Links menu has two panes with scrolling lists, each listing the devices setup for Zodiak system control. A primary device is selected in the Primary Links pane on the left, and the devices that are to be linked to that primary device are selected in the pane on the right.

Each device in the left pane has a button labeled with the name of the device, and a text field that lists the links currently associated with that primary device. Selecting a device button in the left plane illuminates that button, and delegates the right scrolling list to allow selecting and de-selecting links for that primary device. The **Links Enabled** button in this pane activates or deactivates the links that have been established between the devices.

With a primary device selected in the left pane, the remaining devices available for linking are displayed as active buttons in the right pane. Devices not available for linking are grayed out and inactive. Touching one of the active buttons in the right pane illuminates its indicator, and that device's name is added to the text field of links for the primary device. Touching an illuminated button disassociates the link and removes that device's name from the text field.

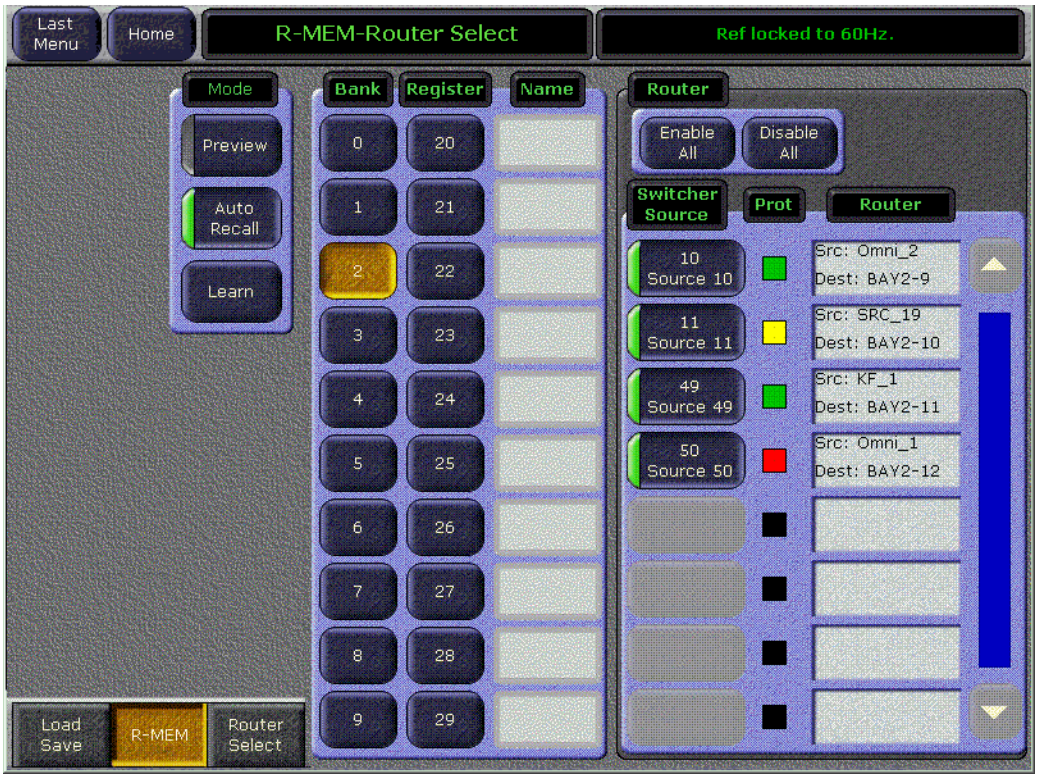
E-MEM Control

The settings in this menu can be saved as E-MEM keyframes. When used in conjunction with the Timeline Events menu, it becomes possible to have an E-MEM register load, cue, and sync roll devices.

R-MEM Menu

R-MEM registers are learned, recalled, and previewed from the R-MEM menu. The R-MEM menu is reached by pressing the **R-MEM** Menu panel button, then touching the **R-MEM** category selection button (Figure 153).

Figure 153. R-MEM Menu



The R-MEM menu has a mode pane on the upper left, a pane in the center listing the R-MEM registers available (the full register number is displayed on each register button), and a Router pane on the right showing the switcher sources, router sources and destinations, and protection status. Switcher sources configured as routed Zodiak sources appear in the right pane.

R-MEM Auto Recall Mode

The R-MEM Auto Recall mode acts similar to the E-MEM Auto Recall. An R-MEM Auto Recall automatically changes only the switcher sources that were enabled when the register was learned.

To Learn an R-MEM Register:

1. Enable the switcher sources to be affected by R-MEM in the right pane. Selected switcher source buttons are green on the left. Only the selected sources will be saved to the R-MEM. You can use the **Enable All** and **Disable All** buttons above to select all or none of the switcher sources.
2. If you want the register to use Auto Recall, touch the **Auto Recall** button so its indicator illuminates.
3. Touch the **Learn** button in the Mode pane.
4. Touch the numbered Bank and Register buttons in the center pane to save the information to the selected register. Touch the bank button first if you are saving to a different bank. If the desired bank is already selected, you can touch just the Register button.

To Recall an R-MEM Register

1. Make sure the Preview mode button is not selected.
2. Turn the **Auto Recall** button on or off to control how the register is recalled.
3. Touch the Bank and Register buttons for the desired register. Touch the bank button first if you are recalling from a different bank, or just touch the Register button if in the same bank.
   a. If the **Auto Recal**l button is on, the sources selected at the time the register was saved (with **Auto Recall** on) will be changed to the R-MEM values of that register. If **Auto Recall** was not on when the register was saved, the currently selected switcher sources will be changed.
   b. If the **Auto Recall** button is off, the sources currently selected in the Switcher source pane will be updated with the R-MEM values of that register.

Note A switcher source that is currently on-air with an **On Air** protection status cannot be changed by an R-MEM recall. Either place the source off-air or select a different protection status to change the switcher source selection.

Preview

When **Preview** mode is turned on, recalling a register will only display the R-MEM settings stored in that register. No switcher sources will change. This allows you to see what switcher sources will be affected by a register recall, and what the router sources and destinations will be after the recall.

When **Preview** is turned off, the right pane returns to displaying the current status, including any previously set enables.

R-MEM Save-Load Menu

The R-MEM Save-Load menu is accessed by touching **R-MEM**, **Save Load** (Figure 154). This menu is used to save and load Router Memory files. The R-MEM Save Load menu operates the same as other save load menus. Refer to File Operations in the *Zodiak User Manual* for details.

Figure 154. R-MEM Save-Load Menu

PBus2 & GPI Menus

The PBus (Peripheral Bus II) & GPI menus are used to specify the sending of trigger commands to external devices. GPI and PBus triggers are placed on keyframes when an effect is created. When working on an effect, this menu is used to change the working buffer to include trigger commands. An Insert or Mod must be performed to make these changes part of the effect. These outputs can be disabled in the Enables category of this menu. If the device isn't enabled, triggers will not be sent. Devices must be configured in the Eng Setups, Ports & Devices menu in order to be displayed on these menus.

Note PBus and GPI configuration is covered in detail in *Appendix C - External Interfaces* in the separate *Zodiak Installation and Service Manual.*

PBus Triggers Menu

The PBus menu is reached by pressing the **PBus & GPI** Home menu button, then touching the **PBus** category button (Figure 155).

Figure 155. PBus Triggers Menu

Up to 16 PBus triggers (0 – 15) can be associated with each external device on the PBus. When a device is defined (Eng Setups/Ports & Devices), names can be given to the device and each of its triggers. The actual action performed when a particular trigger is sent is determined by the external device. For user convenience, in Eng Setups each trigger can be given a descriptive name.

Once the peripheral device has been defined in the Ports & Devices menu, the device can be selected in the PBus & GPI menu to be controlled by an E-MEM recall or test fired.

Any defined peripheral devices and their triggers are identified in the display. Touching a button in the PBus Trigger pane activates that trigger and lights the green indicator. Pressing the **Test Trig's** button on the right will manually test fire any active triggers for that device.

Triggers are fired during an E-MEM recall. Select the desired trigger(s) in the menu by touching their buttons, then learn an E-MEM register with **Misc 2** enabled (the default E-MEM level for PBus II devices). The selected PBus triggers will be sent when that E-MEM register is recalled.

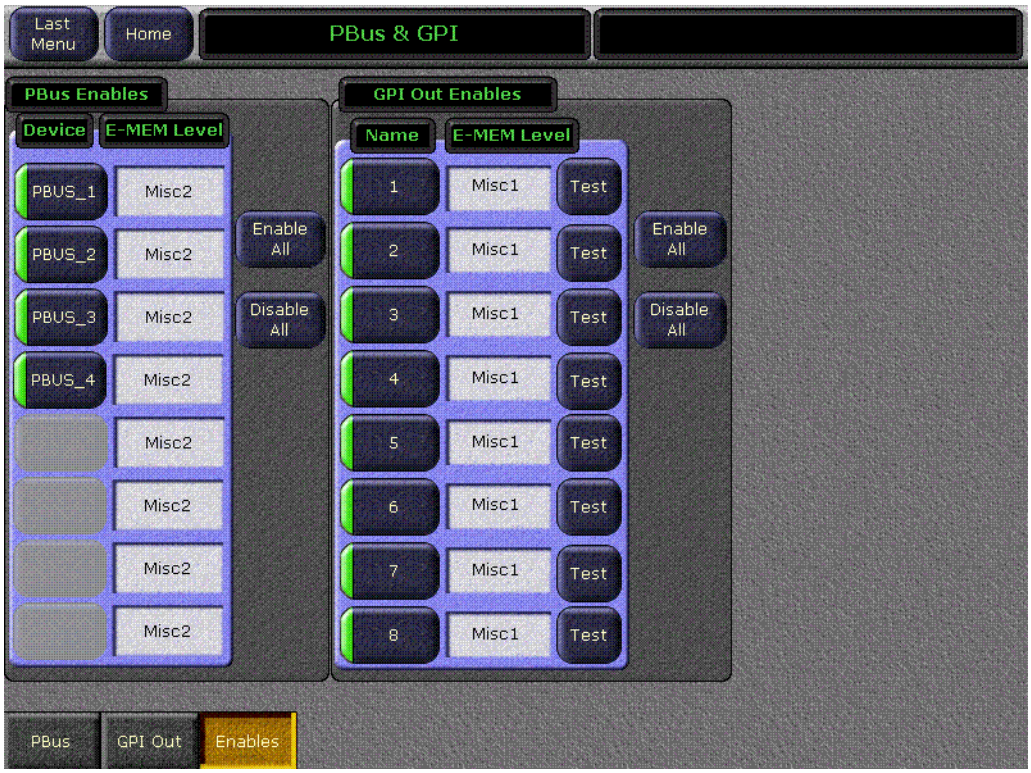
PBus trigger commands are by default associated with E-MEM level group **Misc 2**. You can associate PBus triggers with any E-MEM level group, not just **Misc 2**. This is done in the Daily Setups, Suite Prefs, E-MEM Prefs menu (see *E-MEM Prefs Menu* on page 160). To determine what E-MEM level is currently assigned, select the **Enables** menu category button in the PBus & GPI menu to view the Enables menu (Figure 156 on page 225).

When the **Learn Recall** button in the PBus menu (Figure 155 on page 224) is active (green light on) under a device name on the left, the E-MEM Learn and Recall register information from Zodiak is sent out for use by the peripheral device. When the button is off, just the trigger information is sent over the PBus to the peripheral device.

Enables Menu

Peripheral Bus II devices and triggers can be enabled and disabled in the Enables menu, accessed by touching the **Enables** category button at the bottom of the screen (Figure 156). The left side of the menu is used for Peripheral Bus II control. GPI Out control resides on the right side of the menu.

Figure 156. PBus & GPI Enables Menu



Enable All and **Disable All** buttons allow enabling or disabling all enables for PBus and GPI outputs. Items that are disabled will not fire, even when programmed to do so by an effect.

GPI Out Triggers Menu

The GPI Out Triggers menu is used to specify the sending of GPI type commands from the Video Processor frame to external devices. The Zodiak system supports a total of 8 GPI outputs (1-8). The menu is reached by touching **PBus & GPI**, **GPI Out** (Figure 157).

Figure 157. GPI Out Trigger Menu

In the Eng Setups, Ports & Devices menu, each GPI trigger can be given a descriptive name that appears on this menu. The actual action performed when a GPI trigger is fired is determined by how it is wired to the external device.

GPI triggers by default are associated with E-MEM level group **Misc 1**. Select the desired trigger(s) in the menu by touching their buttons, then Learn an E-MEM register with **Misc 1** enabled. The selected GPI triggers will fire when that E-MEM register is recalled. You can associate GPI triggers with any E-MEM level group desired, not just **Misc 1** (see *E-MEM Prefs Menu* on page 160).

DSK Menu

The DSK menu (Figure 158) is used to set the Clean Feed configuration for the PGM A and PGM B switcher outputs. Touch **DSK** in the Home menu to access this menu.

The Clean Feed Configuration data pad will appear. This allows selection of any of the three downstream keys (DSK 1, 2 and 3) to appear (or not appear) on the PGM A and PGM B outputs of the switcher.

In the example shown here, the three downstream keyers, DSK 1, 2 and 3, are enabled on the PGM A output and disabled on the PGM B output (a clean feed). Any combination of keyers can be chosen.

Figure 158. DSK Menu

Aux Bus Menu

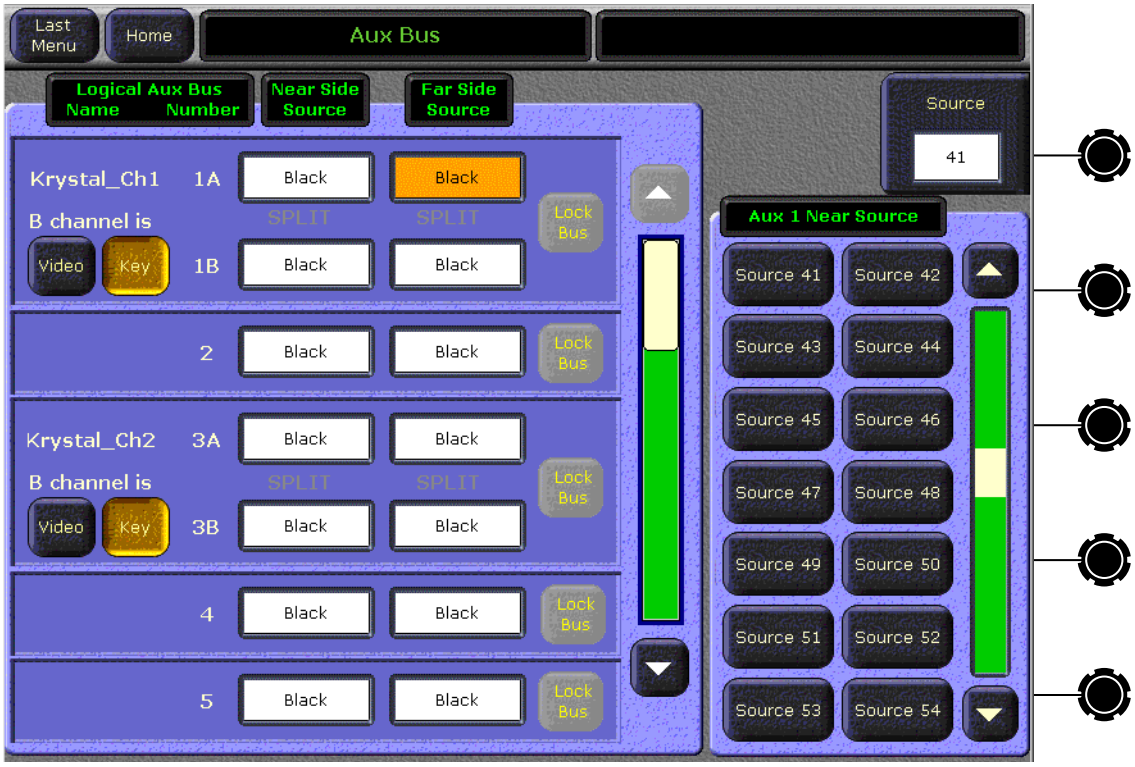
The Aux Bus menu (Figure 159) is a source selector for the A and B channels for Aux pairs and defines the B channel of an Aux Pair as either **Video** or **Key**. It also allows the operator to set up the **Near Side Source** and **Far Side Source** to be selected in conjunction with a digital effects system.

Aux bus outputs are first configured in the Eng Setups - Outputs menu (see *Outputs Menu* on page 185). Aux Bus delegation for selecting sources on the PVW/AUX bus are set in the User Preferences – Aux Delegate Mapping menu (see *Aux Deleg Mapping Menu* on page 181). Refer to *Section 3 – Configuration* in the *Zodiak Installation and Service Manual* for complete Aux Bus configuration instructions.

When an Aux bus is configured as an Aux Pair, the settings on the Aux Bus menu affect the B channel output of that Aux Pair as shown in the example below. The A channel of the Aux Pair is always a video signal. The B channel can be either a **Video** or **Key**.

Paired outputs are typically used with external DPMs. The DPM can choose to operate in video/key or video/video mode. The settings in this menu should match the settings currently being used by that DPM's effect. The Aux Bus settings in this menu are keyframeable, allowing the changing of settings even during an effect run. You may want to assign the aux buses associated to a DPM to the same E-MEM enable group as that DPM, so the settings are always recalled in sync with the DPM effect recall.

Figure 159. Aux Bus Menu



The **Near Side Source** and **Far Side Source** selections allow the operator to select the near (visible) side, or the far (not visible side) of a digitally manipulated source. This is done by selecting the desired source from the keypad on the right which lists all switcher sources. A scroll bar is provided to allow the operator to see all available sources. In addition, a Scroll Sources data box is provided to select a source number from a numeric keypad. The Near Side/Far Side functionality is used in conjunction with a Transform Engine or external DPM is associated with the bus (aux buses or buses with Effects Send active).

When a different source is chosen for the B channel (not associated with the video signal in the Sources menu) the SPLIT indicator will light as shown above to indicate a split key has been performed.

Timeline Menus

Timeline menus are used in conjunction with the Keyframe Edit controls in the Master E-MEM subpanel on the Main panel (refer to *Keyframe Edit Buttons* on page 137). In some cases, duplicate buttons will be present in both locations. The buttons that reside in the Timeline menus will be referred to as soft buttons.

Timeline – View Menu

The Timeline-View menu provides a graphical representation of the current effect. It shows the location in time of all the keyframes for the currently enabled groups, and displays the current location of the time and edit cursors. The Timeline – View menu is accessed by touching **Timeline**, **View**.

Besides displaying current effect information, the Timeline menu also provides editing controls that are not available on the Main panel.

If a register is not currently loaded, the menu will be blank with a No Valid Register message (Figure 160). In this situation, load a register containing keyframes to bring information to the screen.

Figure 160. Timeline-View Menu

Timeline – Edit Menu

The Timeline-Edit menu provides the editing controls for modifying keyframe effects on the timeline. As mentioned earlier, some duplicate controls are also present in the Keyframe Edit subpanel on the Main panel (refer to *Keyframe Edit Buttons* on page 137). The Timeline – Edit menu is accessed by touching **Timeline**, **Edit** (Figure 161).

Figure 161. Timeline-Edit Menu

The number of the currently loaded register appears at the upper left corner of the menu. Below are the names of E-MEM level groups, and to the right of each name is an area for displaying its timeline. Only Enabled level groups are displayed. The names of level groups that are delegated for editing are highlighted in yellow. Only these highlighted timelines are affected by edit operations.

Timelines consist of keyframes at specific time locations. Keyframes are indicated on the timelines with short vertical lines. The Master Timeline at the top is created from keyframes in the timelines below. Each level's keyframe is reflected up to the Master Timeline. Only one Master Timeline keyframe is created above if multiple keyframes reside at the same time on different timelines below. The master keyframes are numbered, and show their time in the effect. If adjacent keyframes are located so close there is not room to display separate keyframe lines or numbers, they will be removed. Non-consecutive numbers will indicate hidden keyframes exist.

Two types of master timeline keyframes exist. Those from timelines that are delegated for editing are solid (edit keyframes). Those created from timelines that are not delegated for editing are colored cyan (time keyframes). Conceptually, there are actually two timelines superimposed on one another, the edit timeline and the time (or run) timeline. Effect editing operations are based on the edit timeline, with editing rules affected only by edit keyframes. Time keyframes and the run timeline are ignored during effect editing. All keyframes are numbered on the master timeline, however, not just the edit keyframes.

Cursors are used to indicate specific locations in the effect. Two cursors exist, associated to the **Edit Crsr** button in the Timeline menus. The edit cursor is colored orange, and spans all the timelines in the effect. Individual time cursors exist for each timeline, and are colored yellow. The time cursors can be located at different locations on different levels. When **Edit Crsr** is selected, the two cursors are joined and move together through the effect.

When **Edit Crsr** is not selected different controls will move the cursors independently (time cursor mode). Effect navigation controls move the edit cursor, while the effect run controls move the time cursor(s). The edit cursor determines where edit operations will occur. The work buffer is interpolated from each time cursor location.

Additional information is displayed on the Timeline-Edit menu in special cases:

- If a timeline's effect is different from the master timeline, its number is displayed to the right of the timeline name.
- If the timeline's start time is not zero, a negative start time is displayed numerically to the left of the timeline.
- If the timeline's last keyframe is not at the end of the effect, the end time is displayed numerically to the right of the timeline.

When you edit an effect the Timeline menu shows your exact location in the effect and what levels will be affected. As changes are made the effect information on the menu is rapidly updated. For example, inserted keyframes will appear, moving the later keyframes to the right by the duration of the inserted keyframes. Changing the duration of a keyframe will move all the affected keyframes on the timeline to reflect their new locations in the effect.

Clear Work Buffer Buttons

As an operator recalls E-MEM effects and makes changes to the panel and menu controls, the contents of the work buffer change accordingly. If source memory is on, the source memory settings for each source are also updated as the settings for sources modified. The **Clear Wk Bfr** button on the

Keyframe Edit subpanel or the soft button in the Timeline – Edit menu can be used to return work buffer and source memory settings to known states. This can be helpful when creating effects.

Work buffer and source memory values are not set to zero when they are cleared. Instead, previously defined settings replace the current settings. The Default Keyframe is a single group of settings defining a particular switcher state. These settings are copied to the work buffer when the work buffer is cleared (see *Default Keyframe* on page 72). The Default Source Memory defines settings for each source. These settings are used when the source memory is cleared (see *Effect Register, Work Buffer, and Current Effect* on page 62).

When source memory is on, the following actions can be performed with the **Clear Wk Bfr** button.

- Pressing **Clear Wk Bfr** once clears all the work buffers parameters except those associated with source memory in all levels enabled in the Master E-MEM subpanel.
- Pressing **Clear Wk Bfr** twice rapidly clears all the work buffer parameters for all the enabled levels, and also clears the source memories of the sources currently selected in the enabled levels.
- Pressing **Clear Wk Bfr** once while holding down at least one source select button, clears only the source memory related parameters for each held down source. The Master E-MEM enables have no bearing on this operation.
- Pressing **Clear Wk Bfr** twice rapidly while holding down at least one source select button, clears the source memory related parameters and all the work buffer parameters for the level of the source button held down. This includes source selections on the key buses and the associated keyers. The Master E-MEM enables have no bearing on this operation.

When source memory is off, the separate source memory area and the Source Memory Default values are not used. In this situation, source memory related parameters cleared with the **Clear WkBfr** button will be replaced with Default Keyframe parameters.

Restore Work Buffer Button

Rest WrkBfr – This is a soft button in the Timeline Edit menu. Touching this button restores the work buffer to its original keyframe values or interpolated state. For example, if you recall an effect and make changes to its settings in the work buffer, pressing **Rest WrkBfr** removes the changes that were made and restores the original values. **Rest WrkBfr** is useful if during effect editing you accidentally change the wrong parameter.

Timeline Navigation Button Group

Prev – This button on the Main panel moves the cursor to the previous master timeline keyframe.

Next – This button on the Main panel moves the cursor to the next master timeline keyframe.

Begin – This soft button in the Timeline – Edit menu moves the cursor to the first keyframe of the effect.

End – This soft button in the Timeline – Edit menu moves the cursor to the last keyframe of the effect.

These buttons are inactive during effect runs.

Constant Duration Button

Const Dur – This soft button in the Timeline menus, enables Constant Duration operating mode, in which the overall duration of the effect can be retained through editing. Inserting new keyframes between existing keyframes (on the path) occurs normally in this mode, since this does not change the effect duration. Inserting a keyframe on an existing keyframe is also permitted in Constant Duration mode, however, even though this does increase the duration of the overall effect. (This is different behavior from the Grass Valley Group Model 4000 switcher, which did not permit inserting on a keyframe in Constant Duration mode).

Constant Duration mode influences Delete, Cut, Copy, and Paste operations. For example, if a keyframe is deleted from an effect with **Cons Dur** off, the time between that keyframe and the next is removed, shortening the duration of the effect. If a key frame is deleted with **Const Dur** on, the key frame data is removed from the effect, but the subsequent key frames do not move on the timeline. The duration of the previous keyframe is increased to fill the time.

Timeline Edit Button Group

Delete – The **Delete** button is only present in the Timeline menus. When the cursor is on at least one keyframe, pressing the **Delete** soft button deletes the keyframe(s) at the current cursor location and removes the duration to the next master timeline keyframe. Note that this also deletes the same duration from other delegated timelines, including those that have the cursor on the path. This maintains the relative alignment of all the delegated timelines. The deleted keyframe information is not saved. When the cursor is on the path on all delegated timelines (not on any keyframe), **Delete** is inactive.

Clipboard Operations

The **Cut**, **Copy**, and **Paste** buttons in the Timeline menus and on the Main panel use a clipboard register to temporarily store effect data. The clipboard information can then be pasted back into the same or a different effect. When new information is saved to the clipboard, any existing information in the clipboard is overwritten.

Cut – When the cursor is on any delegated timeline keyframe, pressing the **Cut** button cuts the keyframe(s) at the current cursor location and removes the duration to the next master timeline keyframe of that effect. It also cuts the same duration from any other delegated timelines, including those that have the cursor on the path. This maintains the relative alignment of all the delegated timelines. The cut keyframe information is saved to the clipboard, overwriting any existing information. **Cut** is inactive when the cursor in on the path on all delegated timelines (not on any keyframe).

Copy – Places a copy of the effect keyframe data located at the cursor location into the clipboard, along with the duration to the next master timeline keyframe. Like **Cut**, all delegated timelines are involved, but the information is only copied, not removed. The original effect is not changed by a **Copy** operation.

Paste – Inserts the data currently in the clipboard into the effect at the cursor location. The data remains in the clipboard for reuse. Keyframes on all delegated timelines in the effect move later in time to accommodate the duration in the clipboard. However, the contents of the clipboard must be consistent with the delegated timelines of the effect for paste to operate.

For example, if the clipboard contains a portion of the **Misc 3** timeline and only **M/E 2** is currently delegated, a paste cannot occur because the parameter sets are completely different. If the clipboard contains a portion of the **M/E 1** timeline, however, it can be pasted into the **M/E 2** timeline because the parameters are compatible. If the clipboard contains data from multiple timelines, the paste operation will only be permitted if the same timelines are currently delegated in the effect.

Modify, Insert Buttons

Note See *Basic Effect Editing* on page 355 for effect editing procedures.

Modify Buttons

Modify All Abs (absolute) applies the actual values of changed Work Buffer values to all the keyframes in all delegated levels of the effect. Only those parameters that have changed from the original values at the current cursor location are involved (by pressing a button, turning a knob, or entering a value with the keypad). **Modify All Abs** applies absolute values, not relative values as is done with the **Modify All Rel**. For example, if a hue was changed

30 degrees to make it red, different hues on other keyframes will be changed with **Modify All Abs** to red, not shifted 30 degrees. If the cursor is on the path, a keyframe will also be added to the effect at that location.

Modify All Rel – Applies relative values of changed Work Buffer values to all the keyframes in all delegated levels of the effect. In the example above, if a hue value is changed by 30 degrees, each value will shift 30 degrees relative to its original position.

Mod KF – Updates the keyframe at the current cursor location to the current state of the work buffer. When the cursor is on the path, **Modify** acts the same as the Insert function, inserting a keyframe without adding time.

Insert Before – When the cursor is on a keyframe, pressing **Insert Before** inserts a keyframe at the cursor location, and shifts the keyframe the cursor was on and all the following keyframes later in the effect. The currently specified keyframe duration value determines the duration of the new keyframe, and the total effect duration increases by that amount. When the cursor is on the path, **Insert Before** places a new keyframe at the current position without adding time or moving any existing keyframes. In either case, after the operation the cursor is positioned on the new keyframe.

Insert After – When the cursor is on a keyframe, pressing **Insert After** inserts a new keyframe (with the currently specified keyframe duration) after the keyframe the cursor was on, and shifts all the following keyframes later in the effect, which increases the total duration of the effect. When the cursor is on the path, **Insert After** places a new keyframe at the current position without adding time or moving any existing keyframes. In either case, after the operation the cursor is positioned on the new keyframe.

Note Each E-MEM effect can hold a maximum of 64 keyframes.

Pause At Keyframe

The **Pause At KF** button is used to set and clear keyframe pauses at the current edit cursor position. A running effect pauses when it encounters a keyframe pause on the timeline, and will resume running when the **Run** button is pressed. On the Timeline-Edit menu, a keyframe with a pause set displays a red dot above the keyframe line. Pauses reside on individual level timelines, not the master timeline.

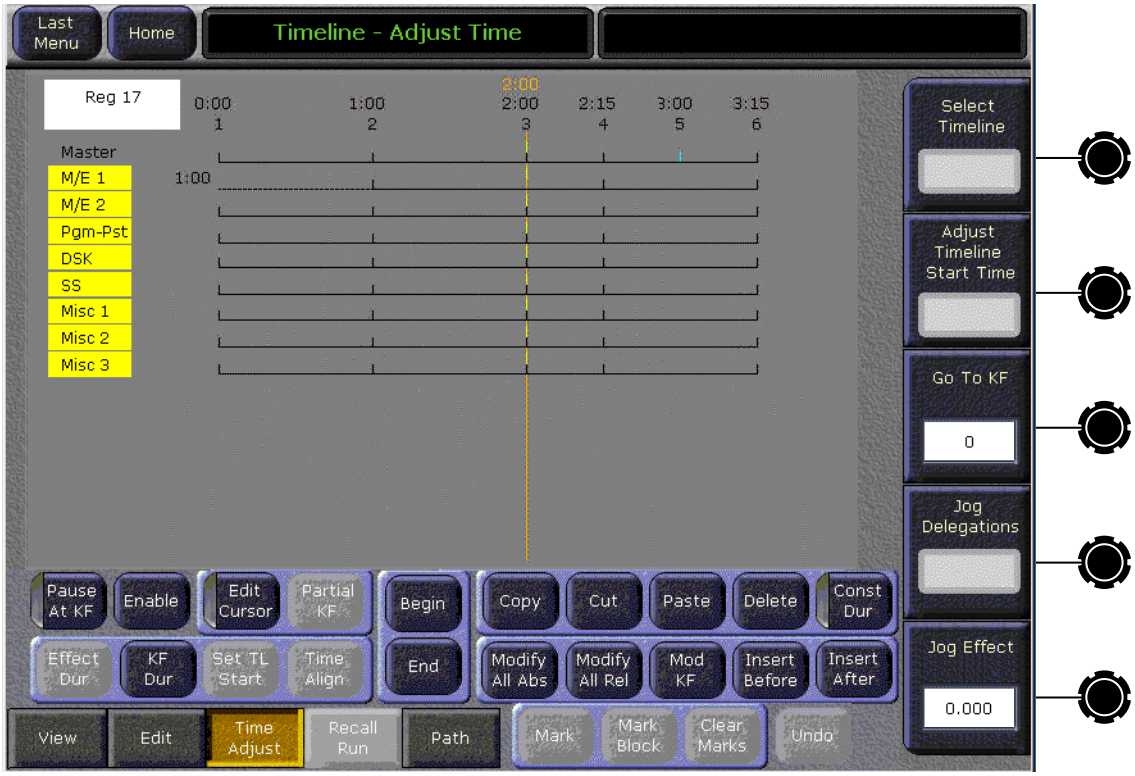
The edit cursor must be on a keyframe to set or clear a keyframe pause. The **Pause At KF** button illuminates when the cursor is located on an existing keyframe pause. Pressing the button when it is not illuminated sets a pause on that keyframe. Pressing the button when lit clears the pause on that keyframe. Only timelines delegated for editing are affected. If multiple enable groups are delegated for editing, pauses will be added to or cleared from all the timelines.

Timeline – Time Adjust Menu

The Timeline – Time Adjust menu is used to modify keyframe duration. The Timeline-Time Adjust menu is accessed by touching **Timeline, Time Adjust** (Figure 162).

Select the **KF Dur** button in the menu to change the duration with a numeric keypad. Press the **Mod KF** button to make the change.

Figure 162. Timeline-Time Adjust Menu



Timeline – Path Menu

The Path category selection button at the bottom of the menu provides access to the Interpolation Paths menu (Figure 163). This menu provides controls over interpolation between keyframes.

Figure 163. Interpolation Paths Menu

The menu is organized with Levels, Sublevels, and Path Group delegation panes on the left, and the actual path controls on the right. Some delegation panes scroll to access additional buttons. What appears in the Sublevels delegation pane depends on what has been selected in the Levels pane; what appears in the Path Group pane depends on what has been selected in the Sublevels pane. Buttons in the delegation panes toggle on and off, which makes it possible to choose multiple items and change the path control parameters of all of those items simultaneously. The **Select All** and **Deselect All** buttons are used for making and clearing delegations for all the items in that pane.

Levels selected for path control can be similar to one another, or they can be dissimilar. Similar levels share a common sublevel architecture, while dissimilar levels have different sublevel architectures. For example, an M/E has several sublevels, including one for each of that M/E's buses. When two M/E levels are chosen, they share a common sublevel architecture and so the selection is considered similar. A background generator, however, has no sublevels. Choosing a background generator and an M/E level results in the selection of dissimilar levels. When dissimilar items are

selected a **Dissimilar Levels** or **Dissimilar Sublevels** message is posted. In this case, path control adjustments will apply to all the sublevels within the selected levels, and/or all the groups within the selected sublevels.

The actual path controls are located adjacent to the soft knobs on the right. These path controls may be delegated to a single part of the Zodiak system by selecting only one item in each delegation pane. For example, in Figure 164 the Keyer Wipe of M/E 1 Keyer 1 is selected and has a Curve path. Multiple item delegation is also available.

Graphic symbols representing the Linear, S-Linear, Curve, and Hold path types appear on the Path control buttons. The selected path type symbol also appears next to each group delegation button. This symbol also appears next to each level or sublevel delegation button when all the sublevels and/or groups for that item have the same path type (Figure 164).

Figure 164. Interpolation Paths Menu, Multiple Items Selected

An informational graphic is displayed next to the scroll bars in the delegation panes indicating the on/off state of every button in that scrolling list. The location of the indicator corresponds to the relative location of that button in the list. This makes is easy to see how many sublevels or groups have been delegated even if the selected buttons are scrolled off the screen.

When an individual delegation button in a pane is selected, it gets colored gold. Only one button in each pane can have this state, though there may be multiple delegations active in that pane. The path type and parameters

associated with the gold colored delegation buttons are reported by the path controls on the right. When a valid delegation does not exist the path controls gray out and are inactive.

To Change Path Control Values in an Effect:

1. Move to the location in the effect that you wish to change.
2. Go to the Path Types menu and delegate the desired Level(s), Sublevel(s), and Group(s).
3. Choose the desired Path type (**S-Linear**, **Linear**, or **Curve**). If **Curve** is selected, you can use the soft knobs or data pads to change the values for **Tension**, **Continuity**, and **Bias**.
4. Add the new values to a keyframe in the effect with **Insert** or **Modify**, or Learn. You must change the keyframe, because current work buffer values are overwritten during the running of an effect.
5. Run the effect to see your changes.

General Curve Tips

Although adjusting the Curve path type Tension, Continuity, and Bias controls can feel like a guessing game, here are some general tips to help you build desired effects in a timely manner:

- Tension in the minus direction (up to -1.0) creates bigger, looser curves.
- Continuity at +1.0 is the same as S-Linear motion.
- Continuity in the plus direction gives a bigger bounce, with +2.0 a good value.
- Bias in the plus direction makes the curve happen after the keyframe.
- Bias in the minus direction makes the curve happen before the keyframe.

Cutting and Pasting Path Values

Being aware of how Curve values may change during editing can help you successfully fine tune the paths of edited effects.

- When keyframes are cut and pasted to and from the clipboard, the path type (Curve, Linear, S-Linear) is retained for each keyframe.
- When a block of Curve path keyframes are cut and pasted, the first and last keyframes in the block are given Tension = 1.0, Continuity = 0.0, and Bias = 0.0 values. This helps merge the path with neighboring path settings, since the Curve path requires three keyframes for proper calculation. Intermediate Curve path keyframes in the marked block retain their original values, since the neighboring keyframes required for the calculation exist.
- Cutting or copying a single keyframe with a Curve path type is handled the same as a first or last keyframe, and so this keyframe is given Tension = 1.0, Continuity = 0.0, and Bias = 0.0 values.
- If you paste a keyframe with a Curve path into the middle of an effect, reset Tension values to 0.0.

Controlling Smooth Path Windup

Effects with a curved transform path may move back slightly in the opposite direction when the move begins or ends. This "windup" is a characteristic of Curve path control, which is the factory default path type applied to new effect keyframes. Curve requires three keyframes for proper interpolation, so values for the previous (or next) keyframe affects the path through the next (or previous) keyframe.

There are several ways to change an effect so moves begin and end without any windup.

- Change the Path Type on the function keyframe to S-Linear.
- Set the Curve path Tension value on the function keyframe to 100.
- Set a Path Control menu Hold for the function on the previous keyframe.

E-MEM Menus

E-MEM – Save-Load Menu

The E-MEM Save-Load menu employs the Zodiak file browser and is used to save and load E-MEM files. Only this file format is supported in the menu. Other types of files saved in the same directory will not be visible. E-MEM files can be saved as All E-MEMs, by bank(s), or by register(s). The menu is accessed by touching **E -MEM**, **Save-Load** (Figure 165).

See *File Operations* on page 338 for specific operating instructions.

Figure 165. E-MEM Save-Load Menu

E-MEM – Source Holds Menu

The E-MEM-Source Holds menus is used to program holds into E-MEM effects. The menu is accessed by touching **E-MEM**, **Source Holds** (Figure 166).

Figure 166. Source Holds Menu

During E-MEM recalls and effect runs, sources can be programmed to change. Sometimes this is not desired, as an effect may be designed to run on the currently selected sources, not the particular sources used when the effect was built.

Only Source Hold, controlled from this menu, is keyframeable. The others are panel states not controlled by the E-MEM system. A hold is imposed whenever one or more type of hold is in force.

To Set a Source Hold in a New Effect

1. Go to the Source Holds menu.
2. Select the buses you wish to hold by touching their labeled buttons on the menu so their green indicators illuminate.
3. Choose the bank and register number on the E-MEM subpanel, then press **Learn** to create a new effect with a Source Hold in its first keyframe.

Source Hold, being a Work Buffer parameter, will be imposed on other keyframes as they are inserted, unless turned off in the Source Hold menu. You may want to start an effect with a Source Hold, so the existing sources will not change when the effect is recalled, then turn it off to enable source changes during the running of the remainder of the effect.

To Set a Source Hold in an Existing Effect:

1. Locate the cursor on a keyframe in the effect where you wish to add a Source Hold.
2. Select the buses you wish to hold by touching their labeled buttons on the Source Holds menu so their green indicators illuminate.
3. Press **Modify** or **Insert** to add the Source Hold to the effect.

The Source Hold only applies to that keyframe, meaning the previously selected sources on the chosen buses will be held at that keyframe until the next keyframe lacking a Source Hold is encountered.

E-MEM – Path Menu

The Path category selection button at the bottom of the menu provides access to the Interpolation Paths menu (see *Timeline – Path Menu* on page 238). This menu provides controls over interpolation between key-frames.

Figure 167. Interpolation Paths Menu

E-MEM – Register Ops Menu

An existing effect stored in an E-MEM register can be copied and pasted to another register. The E-MEM Register Ops menu (Figure 168) is used to enable the **Get** and **Put** functions for register copy and paste operations. When either **Get** or **Put** is selected, a numeric keypad will appear to allow selection of a register number.

Select the register to be copied by touching the **Get** button and entering a register number with the keypad.

Figure 168. E-MEM Register Ops Menu

Select **Put** to assign a register to paste the effect (Figure 169).

Figure 169. E-MEM Put Register

Copy Swap Menus

The Copy Swap menus are used for copying setups from one part of the system to another. For example, if a chroma key was set up on M/E 1, but the operator needs the key while M/E 1 is in use. He can copy the keyer's setup to M/E 2 and place the chroma key on air there. On Zodiak, all copy/swap operations are done through the menu system.

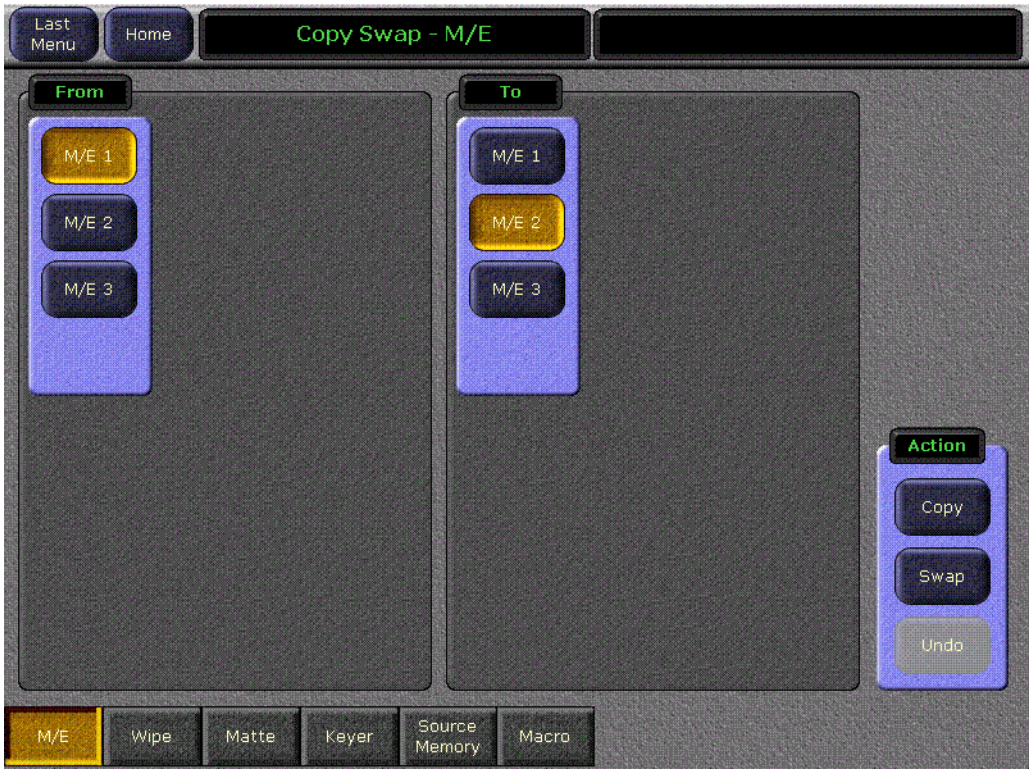
The set of menus for Copy and Swap use a common layout. The Copy/Swap M/E menu, shown in Figure 170, typifies the layout shared by the others. Choose a source in the From pane, choose a destination in the To pane, and an action in the Action pane. After performing a Copy or Swap, one level of Undo is available until another button on the menu is pressed.

Copy/Swap operations immediately affect values of selected sources, even if they are on-air.

Copy Swap ME Menu

The Copy Swap ME menu is used to copy a setup from one M/E to another. Touch **Copy Swap, M/E** to access the menu (Figure 170).

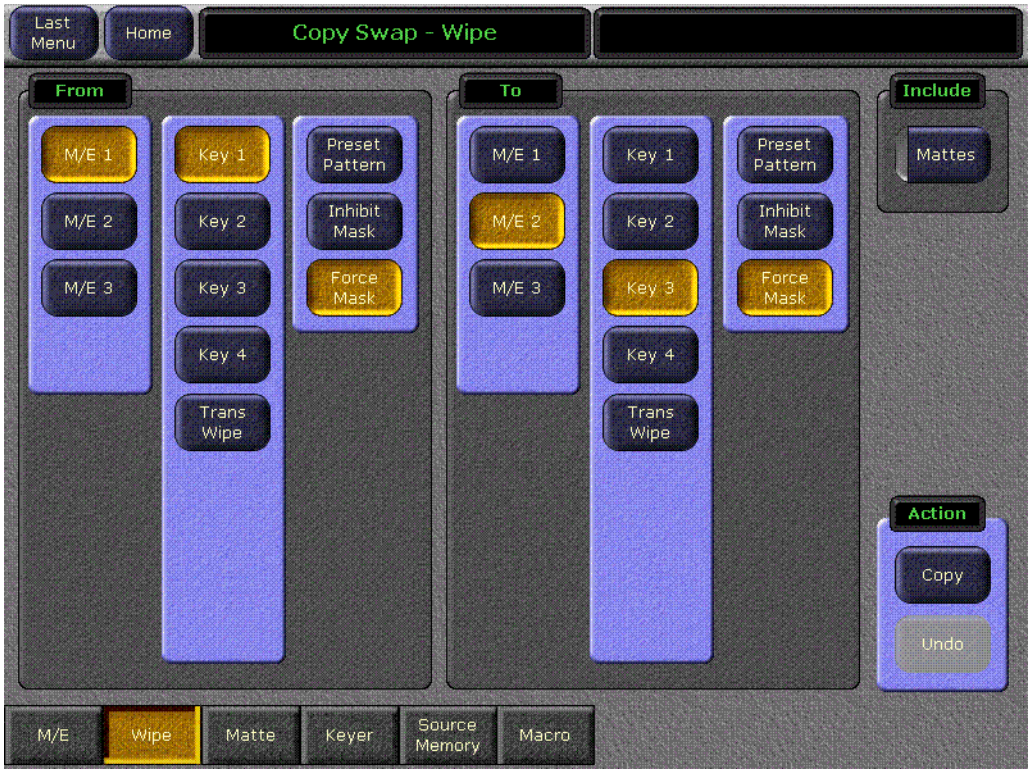
Figure 170. Copy Swap ME Menu



Copy Swap Wipe Menu

Touch **Copy Swap**, **Wipe** to access the Copy Swap Wipe menu (Figure 172).

Figure 171. Copy Swap Wipe Menu



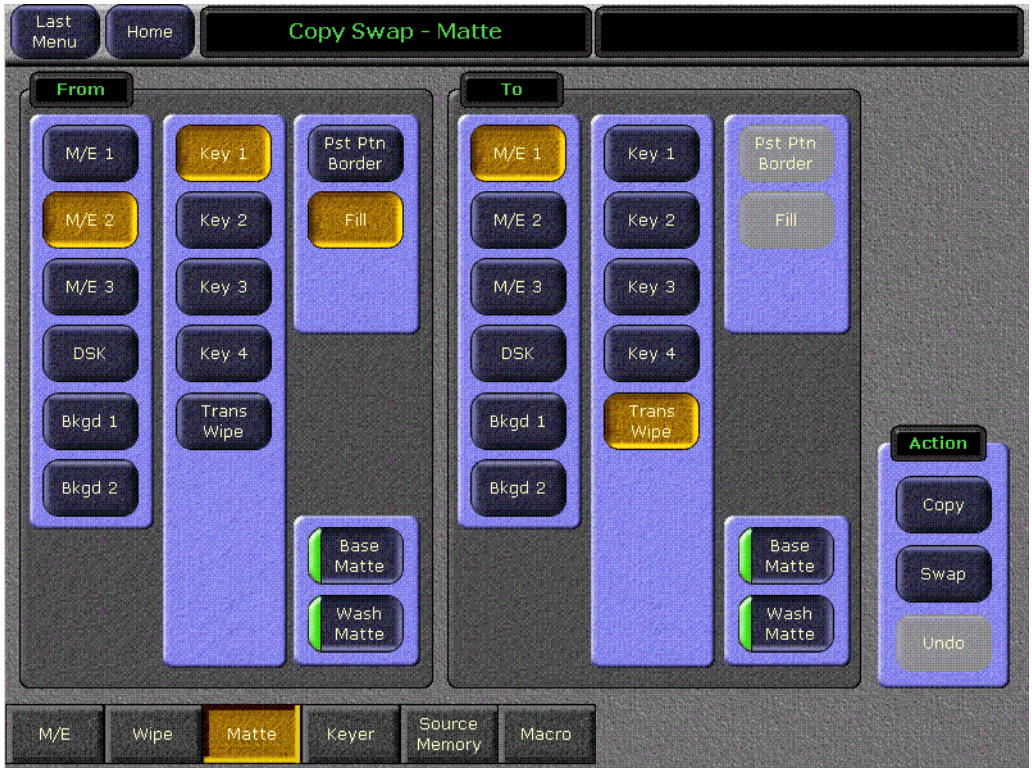
This menu supports copying only, and does not support swaps.

When copying or swapping wipes, you can choose to include mattes with the **Mattes** button.

Copy Swap Matte Menu

Touch **Copy Swap**, **Matte** to access the Copy Swap Matte menu (Figure 172).

Figure 172. Copy Swap Matte Menu



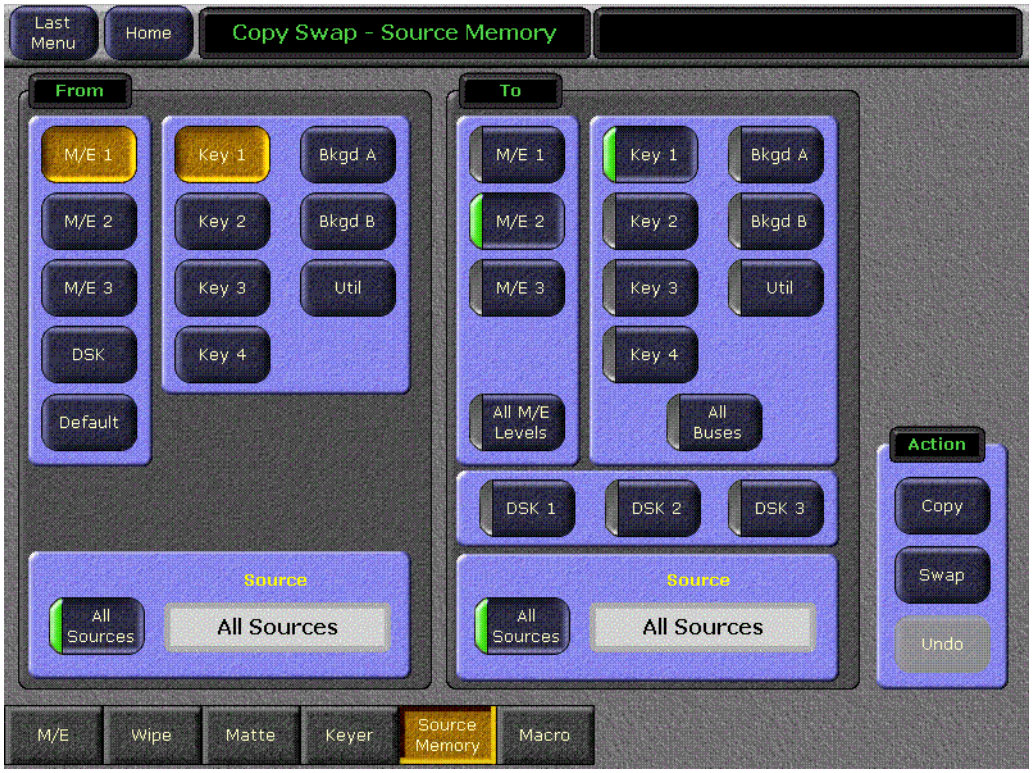
Some combinations of M/E level, Key level, and matte generator level do not exist. For example, in Figure 172, the destination matte is M/E 1's Trans Wipe. Pst Ptn Border, and Fill are grayed out because they only apply to keyer mattes. Similarly, if Bkgd 1 had been chosen, no further delegation would be needed, so all of the keyer related selections would be grayed out.

For a 2.5 M/E switcher, the M/E 3 buttons would not appear.

Copy Swap Source Memory Menu

Touch **Copy Swap**, **Source Memory** to access the Copy Swap Source Memory menu (Figure 173).

Figure 173. Copy Swap Source Memory Menu



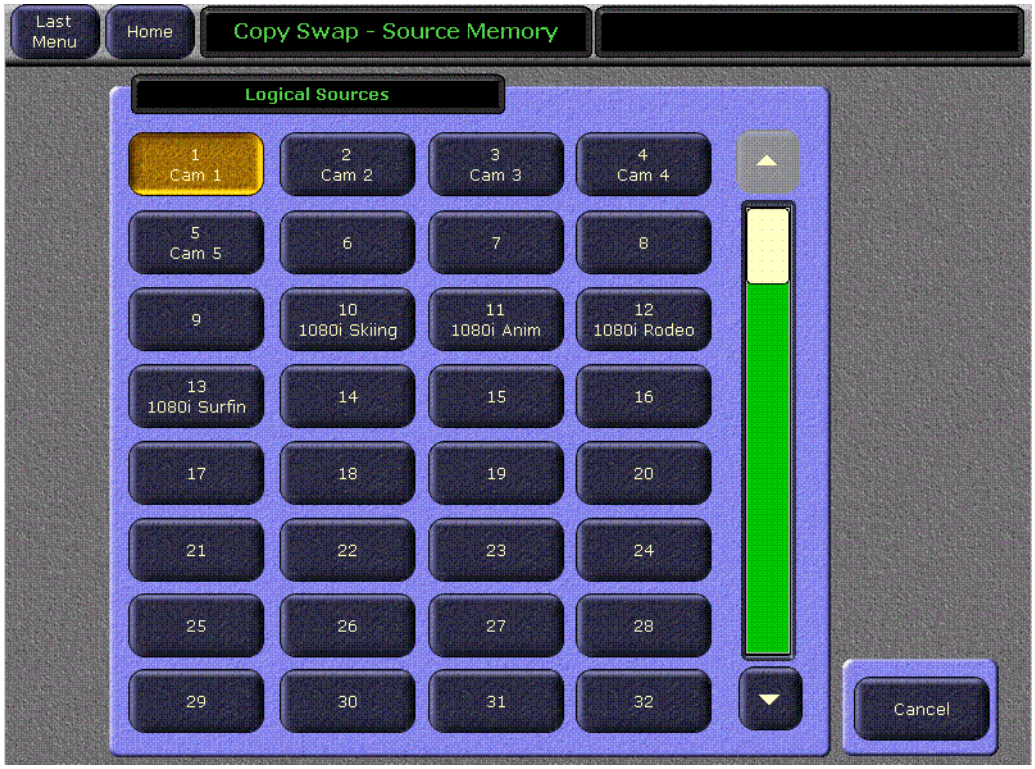
The user delegates the M/E level, the keyer within the M/E, and the numbered input source to the keyer. Each source on each keyer has its own source memory, which is a collection of keyer settings specific to that particular intersection (point of use) of the keyer and its input.

The Source is automatically updated to the working buffer's setting for the selected M/E and keyer.

The user can choose to copy all the sources by touching the **All Sources** button (Figure 173). When selected the words All Sources appear in the Source text box. When **All Sources** is chosen in the From pane, All Sources is automatically put into the To pane. However, if a single source is chosen in the From pane, it is permissible for it to copy into a single source or to All Sources in the To pane. If **All Sources** is chosen in either pane but not both, the **Swap** Action button grays out.

When the **All Sources** button is off, the user can select a single source by touching the Source text box. This pops up the Source Picker menu arranged in numerical order, see Figure 174.

Figure 174. Copy Swap Source Picker Menu



Copying or swapping of keyer parameters applies only to like types of keying.

The key type buttons are simple on/off buttons (not radio buttons), meaning the user may copy/swap any or all of the parameters for multiple key types in a single operation. When the user selects a different M/E or keyer, the key type buttons automatically default to the setting in the working buffer. Since the working buffer will only have a single keying type selected, then the default key type configuration displayed on this menu will always be a single keyer level on. However, the user may turn on additional key types and override the default.

In the To pane there is a **Default** button. If this button is selected, the From key selectors and source selector, gray out, because the source for copying is the set of defaults written in the engineering setup rather than specific bus, keyer, and input source memory. The **Swap** button grays out. The transfer of default parameters go only one direction, from default storage to source memory.

Several defaults can be transferred in a single operation. The To pane's selectors change to on/off LED buttons. The user can choose any combination of default. The following scenarios might exist allowing the user to copy:

- A specific default source and a specific bus,
- A specific source to all buses,
- All sources on a specific bus,
- All sources on an M/E, or
- All sources to all buses on all M/E's.

Copy Swap Macro Menu

The Macro Copy Swap Macro menu is described on page 198.

Still Store Menus

The Still Store menus have changed to accommodate the enhanced Still Store features. Three basic Still Store menus exist:

- Playback
- Create Edit, and
- Cache.

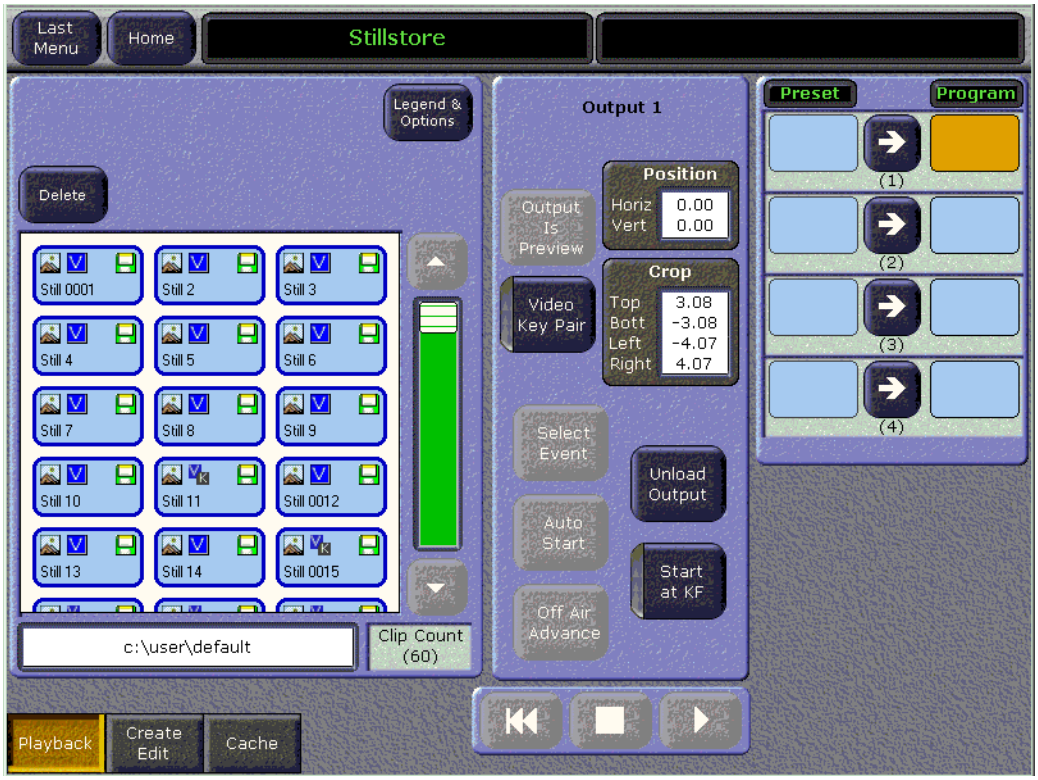
While the Playback menu is optimized for playback operations, playback control is also available from the Create Edit menu.

Each Still Store menu is divided into right, center, and left panes. The right pane provides Still Store menu delegation (selecting what output will be affected by the remaining menu controls), the left pane is used for still and clip selection, and the center pane offers playback and image capture controls. Special function control panes can also temporarily appear over the left and right menu panes. Information reporting the status of transfers are displayed in the notification area at the upper right corner of the menu.

Still Store Playback Menu

The Still Store Playback menu provides menu delegation to an output, still and clip selection, clip playback, video/key pair control, and position and crop controls. Touch **Still Store**, **Playback** to access this menu (Figure 175).

Figure 175. Still Store Playback Menu



Menu Delegation to an Output

Buttons for the Still Store outputs reside in the right pane (if video/key pairs exist less than eight sets of controls will be displayed). The Still Store **Preset** and **Program** buttons delegate the rest of the menu controls to that Still Store output.

The **Program** button delegates the menu to the actual output of the Still Store. Menu changes made when this button is selected immediately affects that Still Store output image.

The **Preset** button delegates the menu to a holding area for that output. Pre-selecting an image here makes the necessary preparation (caching) to allow instant transfer to that output without disturbing the current output of that channel.

The number of the still or clip loaded to Program or Preset appears on the button. The button is blank if nothing is loaded on that output. If a cached item from a different folder is loaded to an output, the button will be shaded.

When an item is loaded to either a **Program** or **Preset** button it is automatically locked into the cache, which protects it from being overwritten by other caching operations. When an item is unloaded from an output, either by being replaced with another item or with the **Unload Output** button, the item is automatically unlocked from the cache and becomes subject to being overwritten (if it is not loaded on another output).

Preset Transfer to Program

The arrow transfer button between the delegation buttons swaps the current Preset item with the Program output. item. Pressing the button repeatedly swaps the items back and forth.

Still and Clip Selection

The left pane is used as a browser for selecting still or clip items for the delegated Still Store output. The scrolling list displays all the items saved in the currently selected folder (see *Folder Browser* on page 256), and also displays cached items from different folders (these items are shaded). The item associated with the currently delegated output is highlighted. Changing output delegation scrolls the browser to show that output's item. Touching an item on the scrolling list loads it to the delegated Still Store output, caching the item if necessary. The current item selection on a Still Store output is keyframeable (see page 408).

Icons indicate if the item is cached, is a still or a clip, is a video/key pair or video only, and other information (see *Still Store Icons* on page 267). Some of this information for the currently selected item is also displayed at the upper left corner of the pane.

The **Delete** button initiates the delete process for the selected item in the browser. When an item is deleted it is removed from the cache and its files are also deleted from that folder on the disk. If the item was loaded to an output, that output image will be blanked, even if on-air. Deleting a shaded item that was cached from another folder removes it from the scrolling list and cache, but does not delete the original file residing in the other folder.

Note The Delete button will blank any image currently being used on that output, even if it is on-air.

Unload Output Button

Pressing **Unload Output** unloads the item from the delegated Still Store output.

Note The Unload Output button will blank any image currently being used on that output, even if it is on-air.

Start at KF Button

The **Start at KF** button is used to set a trigger for a Still Store animation clip cue and play command at the current location of an E-MEM effect. After this button is turned on, the setting needs to be added to the current effect by inserting a new keyframe or modifying an existing effect keyframe (see page 408).

Note You will need to ensure the clip is recorded and cached before the **Start at KF** trigger will work properly in an effect. Running the effect in advance of its use will cache recorded material for instantaneous playback.

Pressing this button does not make the current clip play, it only allows the addition of a cue and play trigger command to an effect. Use the play button on the Still Store menu or the Machine Control subpanel to run an effect manually.

Folder Browser

Below the scrolling list is a data pad that reports the path of the currently selected folder (whose items are displayed above), and number of items in the list is reported on the right (Figure 175 on page 254). Touching the path data pad brings up the Still Store folder browser (Figure 176).

Figure 176. Still Store Folder Browser

The Still Store folder browser only displays folders, and does not show any files that may reside in a folder. This browser is intended primarily for Still Store folder selection. This browser does not support individual file management (this capability is available from the File Operations menu). However, a folder copied with the Still Store Folder browser menu to another disk drive duplicates all the files that folder contains, and deleting a folder removes all the files in that folder from the disk.

The Still Store folder browser accesses the Still Store (C:) User directory, and the Menu HD (C:) Zodiak User directory. It also accesses all mapped drives, including the Zip drive (typically D:), CD ROM (typically E:), and, if present, Floppy drive (A:). This browser does not access the Zodiak Video Frame hard disk.

The **Up**, **Top**, and **Open** navigation controls operate the same as the other Zodiak browsers (except you cannot view or select files).

The **Use Selected** button chooses the currently selected folder for use by the Still Store. The browser will close, the Still Store Playback menu will reappear, and the items in the selected folder will be displayed in the scrolling list. If items from the previous folder have been cached, after the folder change those items will continue be displayed on the list (they will be shaded) and they remain available for use.

Note Avoid changing folders unnecessarily. Still Store material may become inaccessible or the wrong material may be loaded if items with the same names reside in different folders. Also, if you switch back and forth between folders, cached items that have been shaded remain so, even if their files actually reside in the current folder.

The **Cancel** button returns you to the Still Store Playback menu without changing the folder.

The standard **Copy**, **Paste**, **Delete**, **Create Folder**, **Rename**, and **Multi Select** functions are available for the folder currently navigated to and selected in the left pane. However, it is better to use the File Operations menu for folder and file management.

CAUTION Use care if you delete or rename folders from Still Store folder browser menu. You cannot inspect the folder's contents from this menu before making a change. Also, some folders (like Still Store/User/DEFAULT) should be present in their original location and retain their original names for proper system operation. Only delete or rename folders you are familiar with and know are safe to modify.

Playback Controls

When the Playback menu is selected, the center pane provides playback controls for the delegated output.

The **Video Key Pair** button controls pairing of the delegated output for use with key signals. Pairs are consecutive with the odd numbered output the video and the even numbered output the key (1-2, or 3-4,). When an output is paired, an image saved as a video/key pair will load its video portion to the odd output and its key portion to the even output. This control is key-frameable (see page 408).

Clip Playback Controls at the bottom of the menu are activated if an output loaded with an animation clip is selected. Cue, Stop, and Play buttons are available, each indicated with the standard symbol.

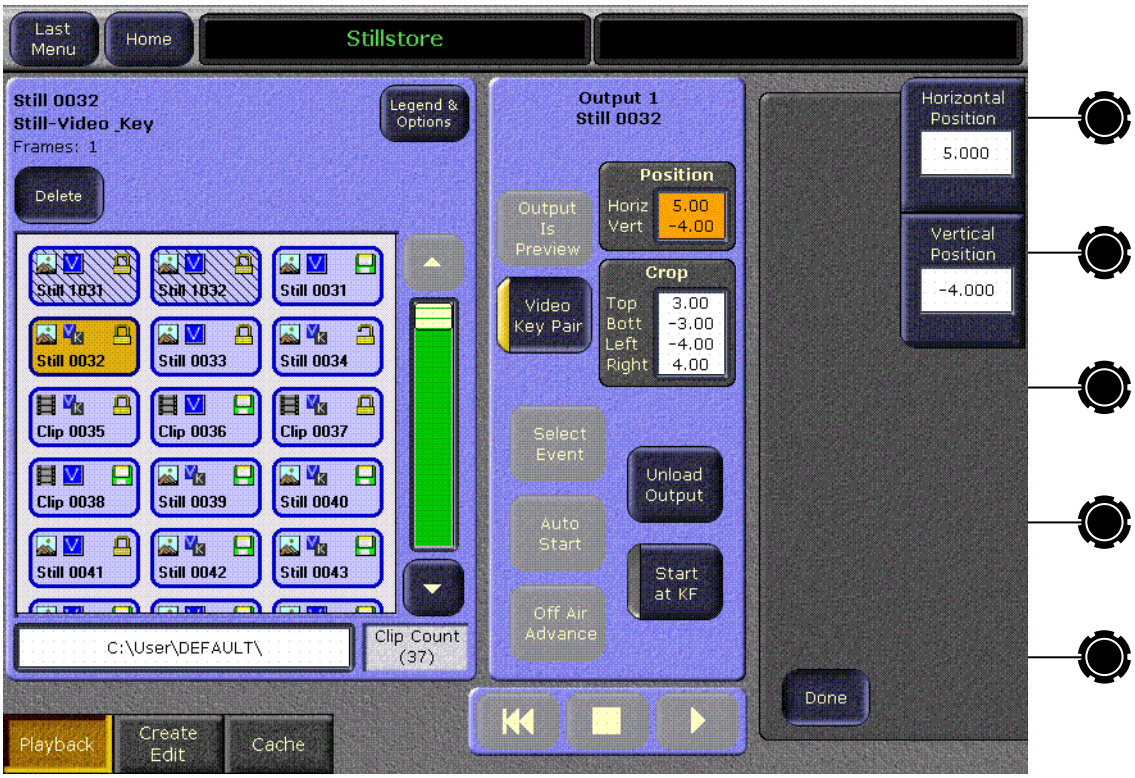
Playback Menu Position and Crop Controls

Position and **Crop** data pads are displayed that report the current values for these parameters, in screen units from the center of the image. In this Still Store Playback menu, these controls affect only how the item will be displayed during playback, and can be used to override any position or crop values applied when the item was saved.

The Playback menu position and crop controls only apply to the Program output, not Preset. If modified crop values are applied to the Program output, transferring an item to Program from Preset will clear the modified values and the position and crop values saved with the Preset image will be used.

Touching the **Position** data pad brings up a pane on the right with **Horizontal Position** and **Vertical Position** controls associated with the soft knobs (Figure 177). The image can be positioned anywhere on the screen. If crops have been applied, the crops track the position changes. These controls are keyframeable (see page 408), but resolution is limited to pixels and lines so interpolated motion may not appear smooth. For smooth motion use a Transform Engine.

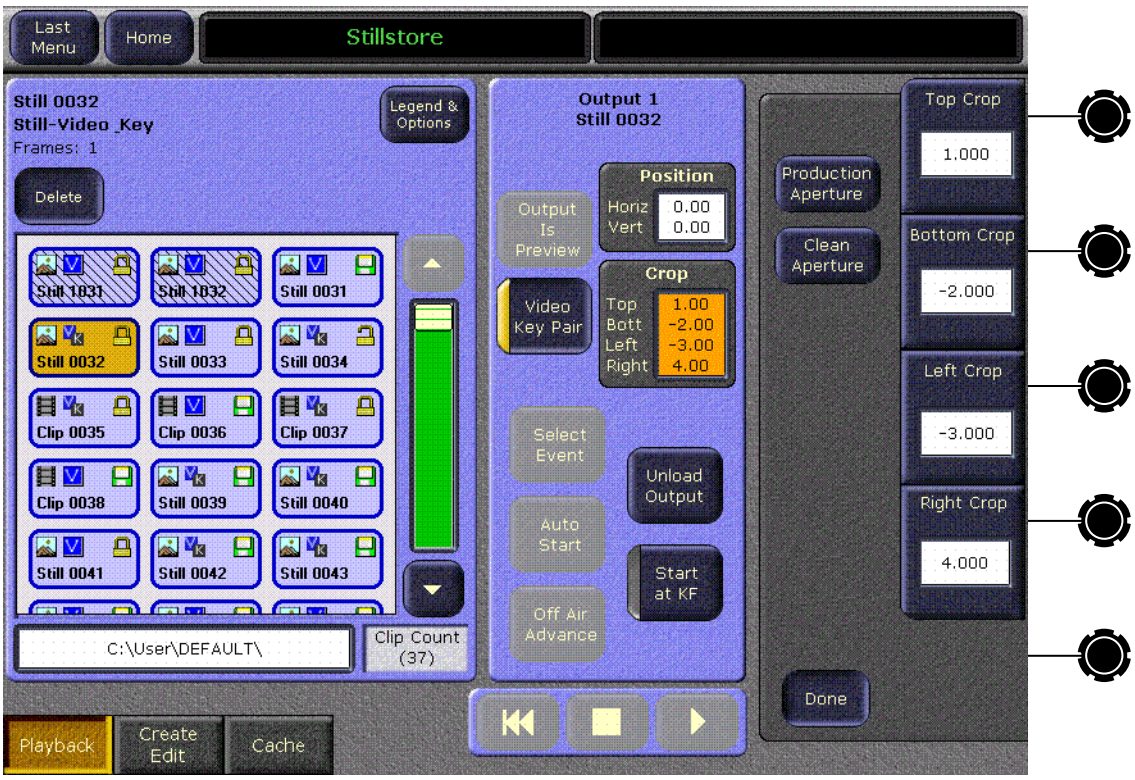
Figure 177. Still Store Playback Menu, Position Controls



Touching the **Crop** data pad brings up a similar menu with **Top Crop**, **Bottom Crop**, **Left Crop**, and **Right Crop** controls (Figure 178). The image can be cropped to any rectangular shape. These controls are keyframeable (see

page 408), but resolution is limited to pixels and lines so interpolated motion may not appear smooth. For smooth motion use a Transform Engine.

Figure 178. Still Store Playback Menu, Crop Controls



The **Production Aperture** button sets crops slightly wider than Clean Aperture, to meet the SMPTE recommended practice. This permits passing the maximum amount of image data down the signal chain, which can help hide edge artifacts during subsequent image processing.

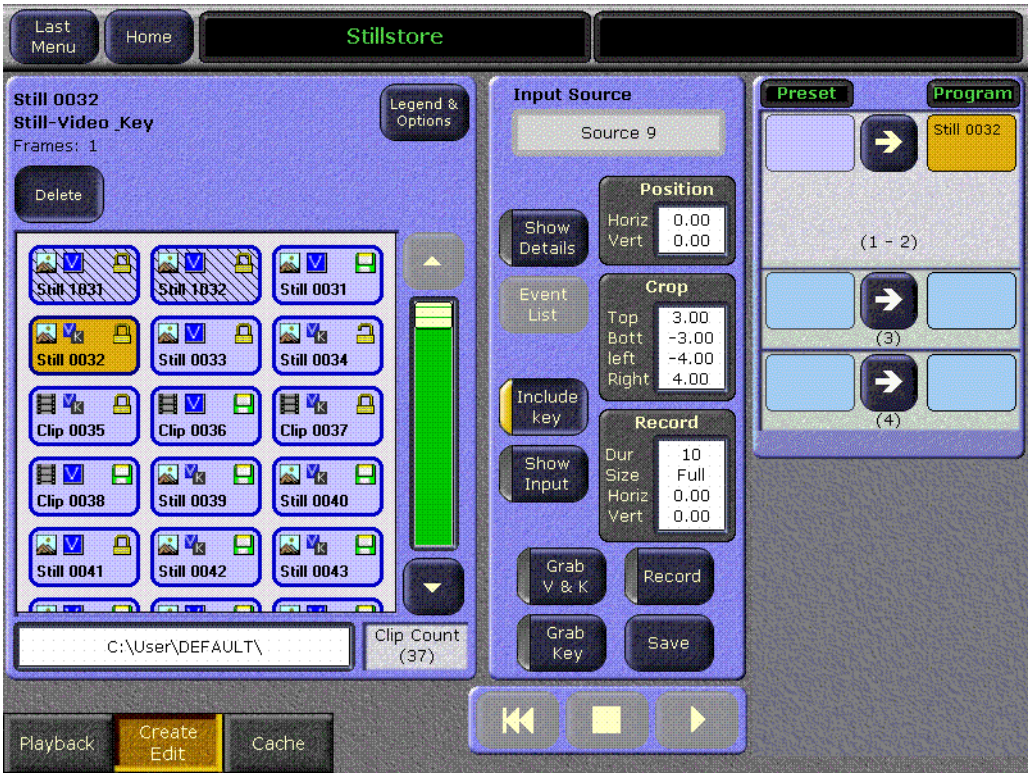
The **Clean Aperture** button crops the image to exactly match the aspect ratio, to meet the SMPTE recommended practice. Crop values are set to 3.0, -3.0, -4.0, 4.0 with this button.

These buttons adjust crop values, which are keyframeable (see page 408).

Still Store Create Edit Menu

The Still Store Create Edit menu provides many of the same controls as the Playback menu, but also provides still capture, clip recording, save controls, and also provides access to clip mark and loop editing controls. Touch **Still Store**, **Create Edit** to access this menu (Figure 179).

Figure 179. Still Store Create Edit Menu



Capture Controls

The **Show Input** button routes the input signal to the delegated output so that the incoming video can be monitored. Any previously grabbed video or key image is released to accommodate the new input. See *Still Store Configuration* on page 398 for more information.

The **Include Key** button determines if a video only or a video/key capture is performed. This button is only active when the Still Store output is configured as a video/key pair. When **Include Key** is off, only a video image is captured. When on, both video and key are captured.

The **Grab V & K** button freezes the input stream and grabs one complete frame. Whether video only or video and key signals are captured is determined by the **Include Key** button above.

Note Images that have not been saved are only held temporarily. Selecting a different item or changing Still Store output delegation discards unsaved images.

The **Grab Key** button permits grabbing only the key portion of an image. This button is active only after a Video and Key grab has been performed. **Grab Key** can be used if the video and key are supplied from separate sources or are laid down sequentially on a graphics reel. The key image to be grabbed cannot be previewed using the Still Store (do not press the **Show Input** button, as this discards the currently grabbed material). You can use a separate monitor to view the graphics reel to cue to the key image (see Step 7 on page 402).

Note The Grab buttons are intended for quick capture of full screen stills. To capture a smaller area, set up a single frame fenced record (see page 263).

The **Save** button saves the item to the currently selected folder (see *Folder Browser* on page 256).

The progress of the save is reported in the upper right notification area. See *Approximate Animation Clip Load and Save Times* Table 12 on page 396 for related information about saving clips.

Create Edit Menu Position and Crop Controls

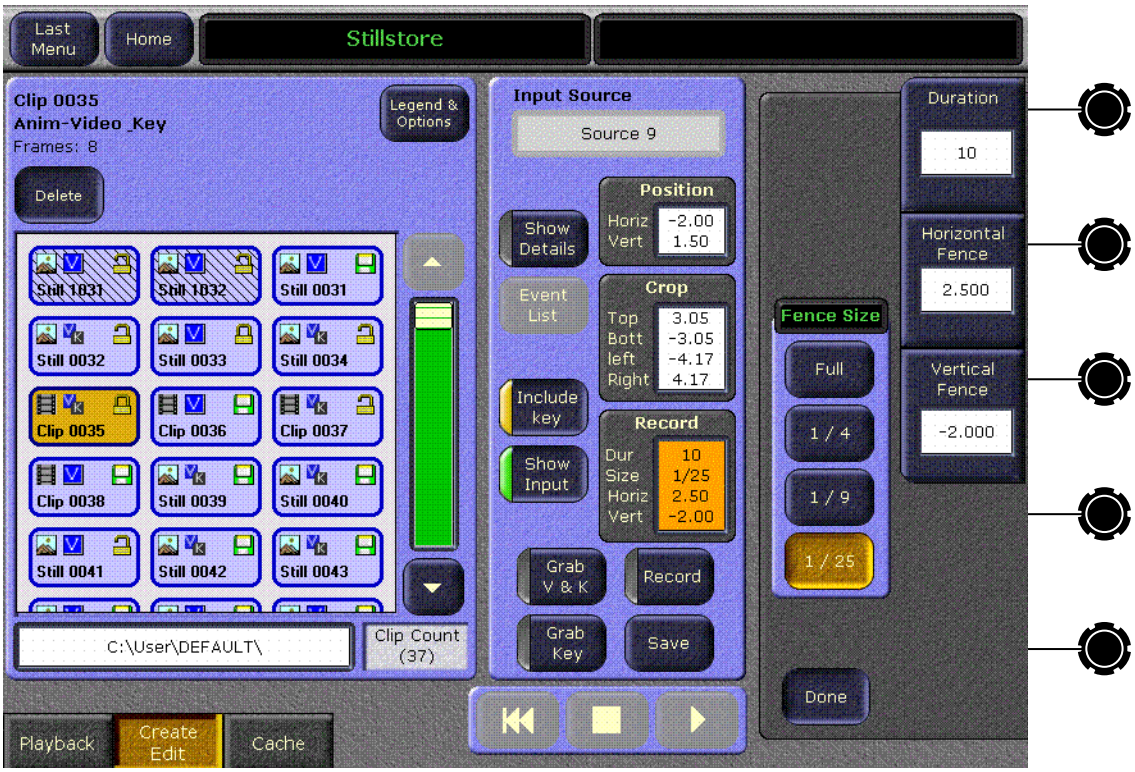
Touching the Position and Crop data pads brings up the same controls available from the Still Store Playback menu (see Figure 177 on page 259 and Figure 178 on page 260). These controls affect what is displayed on the Still Store output and what metadata will be saved with that item.

The **Record** button is used to record an animation clip (either video only or video/key). The **Record** button lights when material resides in the record buffer, not while a recording is in progress. The current status of a recording is reported in the notification area at the upper right of the menu.

Note Images that have not been saved are only held temporarily. Selecting a different item or changing Still Store output delegation discards unsaved images.

The Record data pad indicates the preset duration of the record and the record Fence parameters used to restrict the region captured. To set record parameters, touch the Record data pad. A pane appears on the right with clip recording controls (Figure 180).

Figure 180. Still Store Create Edit Menu, Recording Controls



The **Duration** data pad and soft knob determine the duration of the recording. The parameter value is in frames.

Note When the cache is full, older items will be uncached to make room for the new item. Long duration recordings involve lots of data and will clear many cached items. Saving a long recording also takes considerable time. Fenced recording can be used to reduce storage requirements and save times.

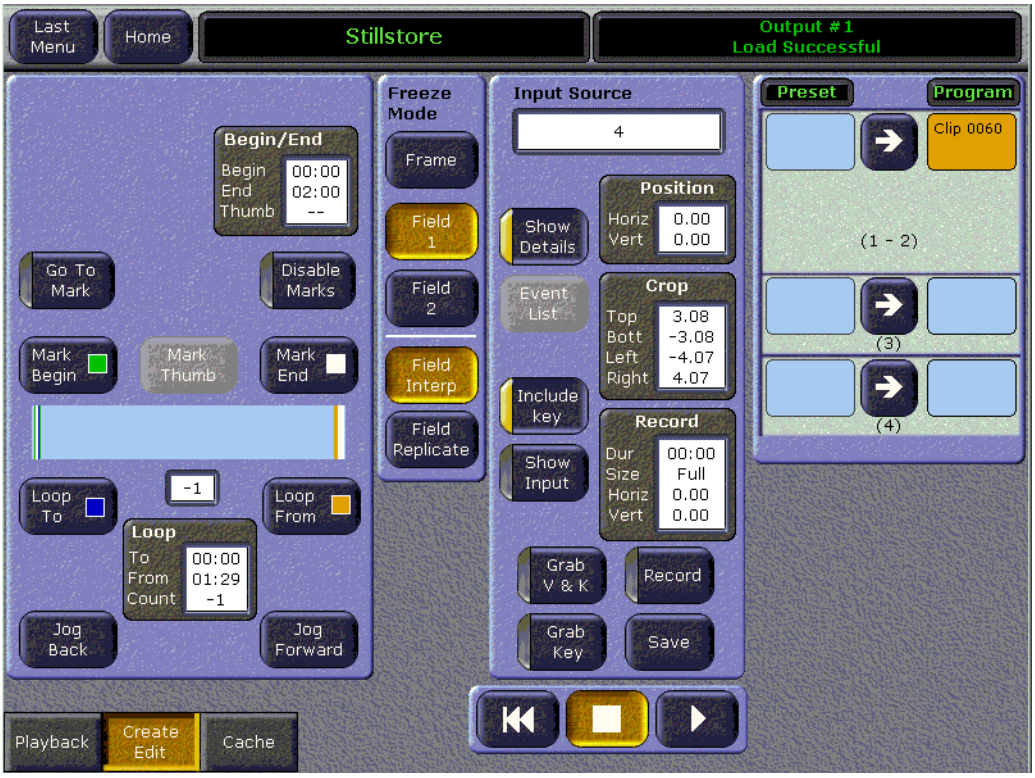
The following fence adjustments must be selected before performing the recording.

- The **Fence Size** pane has buttons that determine the size of the image to be recorded (full screen, 1/4. 1/9, 1/25),
- The **Horizontal Fence** data pad controls the horizontal position of the fenced area to be recorded,
- The **Vertical Fence** data pad controls the vertical position of the fenced area to be recorded, and
- The **Done** button hides the pane and redisplays the Still Store output delegation controls.

Freeze and Clip Playback Editing Controls

Touching the **Show Details** button brings up a pane on the left (Figure 181). Freeze mode controls are available on the right side of this pane. Clip playback editing controls fill the remainder of the pane.

Figure 181. Still Store Create Edit Menu, Show Details



Freeze Controls

The Freeze controls affect the appearance of a still image or a stopped clip. These controls are keyframeable (see page 408).

The **Frame** button selects a two field display. This display offers the highest resolution, but moving video can cause flicker between the fields.

The **Field 1** and **Field 2** buttons selects the specified single field display. The other field is synthesized in one of two ways:

When **Field Interp** is selected the missing field is created by interpolating adjacent lines from the selected field.

When **Field Replicate** is selected the missing field is created by replicating the selected field.

Clip Playback Editing Controls

When a clip is selected the clip playback editing controls in this pane are active (Figure 181 on page 264). Once a clip has been captured, its intended playback can be adjusted. Marks can be entered to control where a clip starts and ends, and looping controls are also available. These adjustments can then be saved so they are applied when that clip is loaded to a Still Store output.

A timeline graph in the center of the pane shows the physical length of the clip and the defined playback region. A white cursor shows the current playback time of the clip. Mark Begin (green), Mark End (yellow), Loop To (blue), and Loop From (gold) indicators are also included on the graph. Mark control buttons are located immediately above the timeline graph, and loop controls are available below.

The **Jog Back** and **Jog Forward** buttons at the bottom of the pane move the clip one frame backward or forward. Movement is restricted to the playable area of the clip, and will stop at Begin and End marks (unless **Disable Marks** is turned on). A soft knob jog control is also available (see page 266) which permits movement before and after the marks regardless of the **Disable Marks** setting. The Cue, Stop, and Play controls labeled with standard symbols at the bottom center of the menu can also be used to cue, play, and stop the selected clip.

The **Go To Mark** button activates a mode in which touching a mark or loop button moves the current time of the clip to that mark. For example, to go to the mark end point, turn on **Go To Mark** and then press **Mark End**.

Turning the **Disable Marks** button on temporarily deactivates begin and end marks and looping. Clips will then play only once from their absolute beginning to their absolute end, and can be jogged backward and forward to any recorded location. This button state is *not* saved to E-MEM.

Note The **Disable Marks** button is intended for use as a clip playback debugging tool. The button automatically turns off when a different item is loaded to an output, when the output delegation is changed, and when the pane is closed with the **Show Details** button.

The **Mark Begin** button sets the current time as the beginning of playback. When the clip is loaded, the clip is cued to this point. The Cue button returns to this frame when pressed.

The **Mark End** button sets the current time as the end of playback. When played, the clip will play to this point and freeze.

The Begin/End data pad at the top of the pane displays the current mark points for the clip. Touching this data pad brings up soft knob controls on the right (Figure 181 on page 264).

The **Begin** and **End** knob controls can be used to dial or type in specific Begin and End time values.

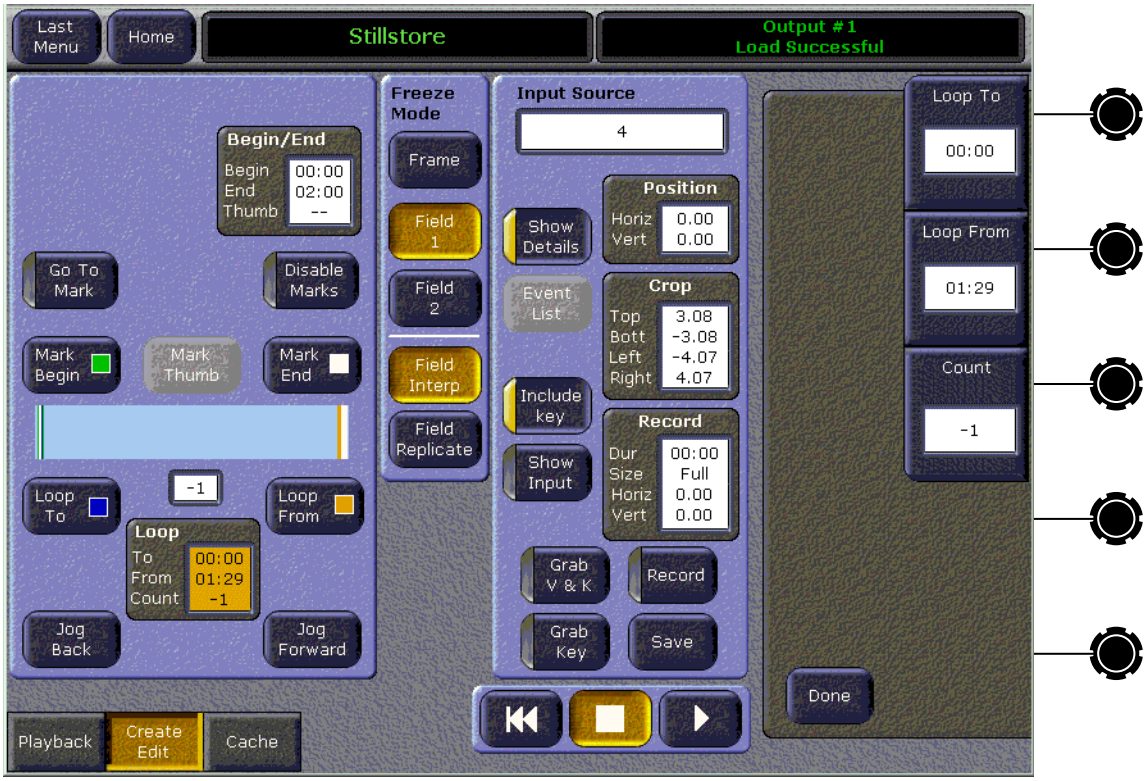
The **Jog Time** knob is also available to adjust the playback time, essentially jogging the clip. This control ignores Begin and End marks.

Clip Loop Controls

Portions of an animation may be looped. Each loop has a Loop From timecode (where the loop begins), a Loop To timecode (where the loop jumps to), and a Loop Count. Clip playback will jump from the Loop From point to the Loop To point and repeat the Loop Count number of times. For looping to occur, the Loop From point must be after Loop To point. If Loop From is before Loop To, the material between the points will be skipped and the Loop Count will be ignored. These adjustments can then be saved so they are applied when that clip is loaded to a Still Store output.

The Loop data pad at the bottom of the pane displays the loop points and loop count. Touching this data pad brings up a pane of soft knob controls on the right (Figure 182).

Figure 182. Still Store Create Edit Menu, Loop Controls



Note Loop button settings are ignored when **Disable Marks** is turned on.

The **Loop To** button sets the current time as the loop to location.

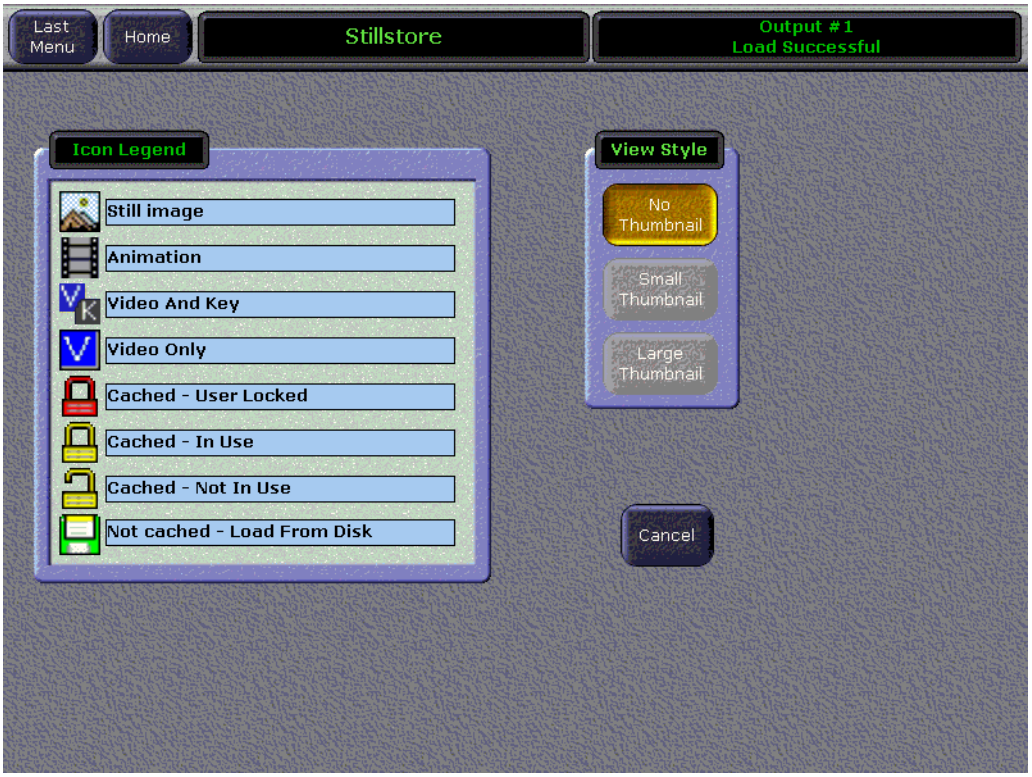
The **Loop From** button sets the current time as the loop from location.

The **Loop Count** data pad and knob sets the number of times the looped section will be played (up to 9999). Entering any negative value creates an infinite loop that will run continuously until it is stopped manually or a different clip is loaded to that Still Store output.

Still Store Icons

The Zodiak Still Store handles different types of stills and clips that can also be in different states (cached, locked, etc.). Icons are used to indicate the type and status of each clip and animation. Touching the **Legend and Options** button on the Still Store Playback or Create Edit menu brings up descriptions of what each icon represents (Figure 183). Pressing **Cancel** brings back the previous menu.

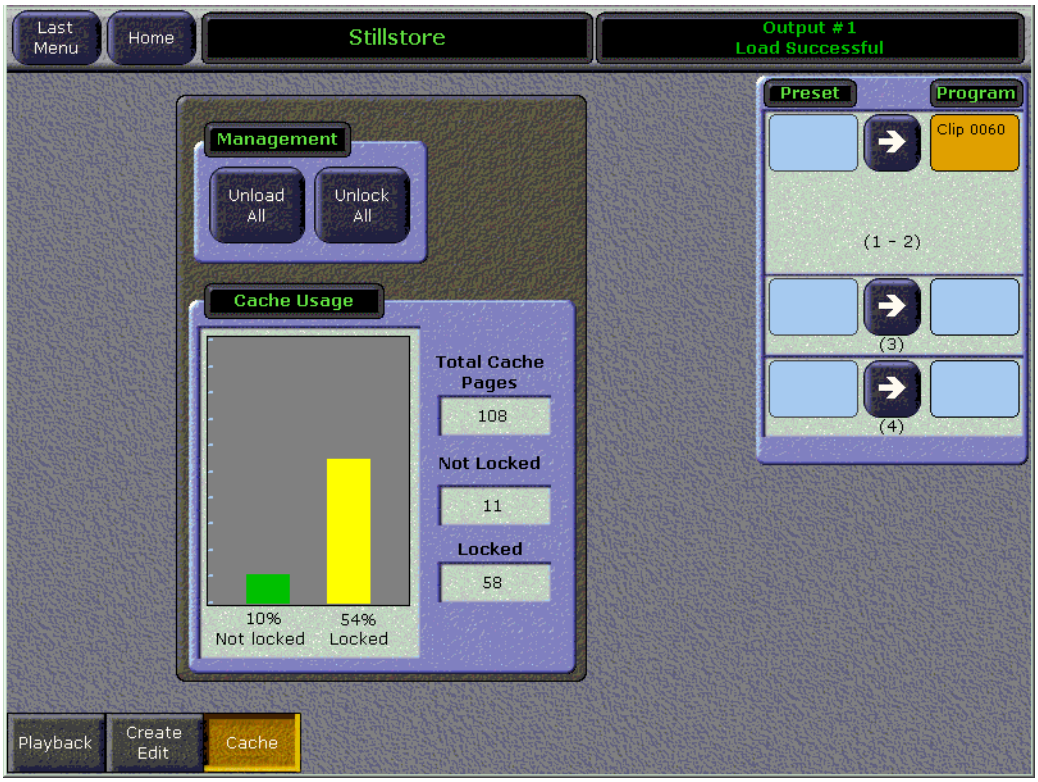
Figure 183. Still Store Icon Descriptions



Still Store Cache Menu

The Cache menu reports cache usage, and can be used to help manage the cache. Manual cache management is optional, as the still store cache operates without operator intervention. When the cache becomes completely filled, older unlocked cached are deleted to make room for the caching of new items. Touch **Still Store**, **Cache** to access this menu (Figure 184).

Figure 184. Still Store Cache Menu



The Cache Usage pane reports the status of the cache. Values displayed on the right report the total number of full raster cache pages (109 standard, 900 with the KlipCache option enabled) that can reside in the cache, and the number of unlocked and locked cache pages. The total page number is fixed (determined by the amount of memory) but the locked and unlocked page counts vary depending on the current status of the cache. Bar graphs on the left show the percentage of unlocked and locked material in the cache.

The locked and unlocked page numbers represent full pages of video, and these values can be greater than or less than the number of items actually cached. A full raster video and key still requires two pages, a 1/25 fenced recording uses 1/25th of a page, and each frame of an animation clip uses equivalent space. Thus, a 1/25 fenced video with key clip that is 10 seconds long requires 24 pages of storage{(10 x 30 x 2)/25 = 24}.

The **Uncache Unlocked** button uncaches all Still Store items that are not locked (items loaded to an output are locked).

The **Unlock All** button clears the locked statuses of all cached items (those loaded to outputs). Unlocking an item does not uncache it, but allows it to be uncached. Thus, after this button is pressed an item loaded to output could be automatically uncached, even if on-air.

Note Pressing **Unlock All** then **Uncache Unlocked** completely clears the cache, and will blank any items loaded to outputs, even if on-air.

Matte Menus

The Matte menus give you control over matte color, type, and appearance. There are no local matte controls on the Main panel; all matte adjustments are made in the menus. Category selection buttons exist at the bottom of each menu, allowing you to select M/E, DSK, or Background mattes. Soft knobs are provided on the right side of the menu for adjustment of matte parameters.

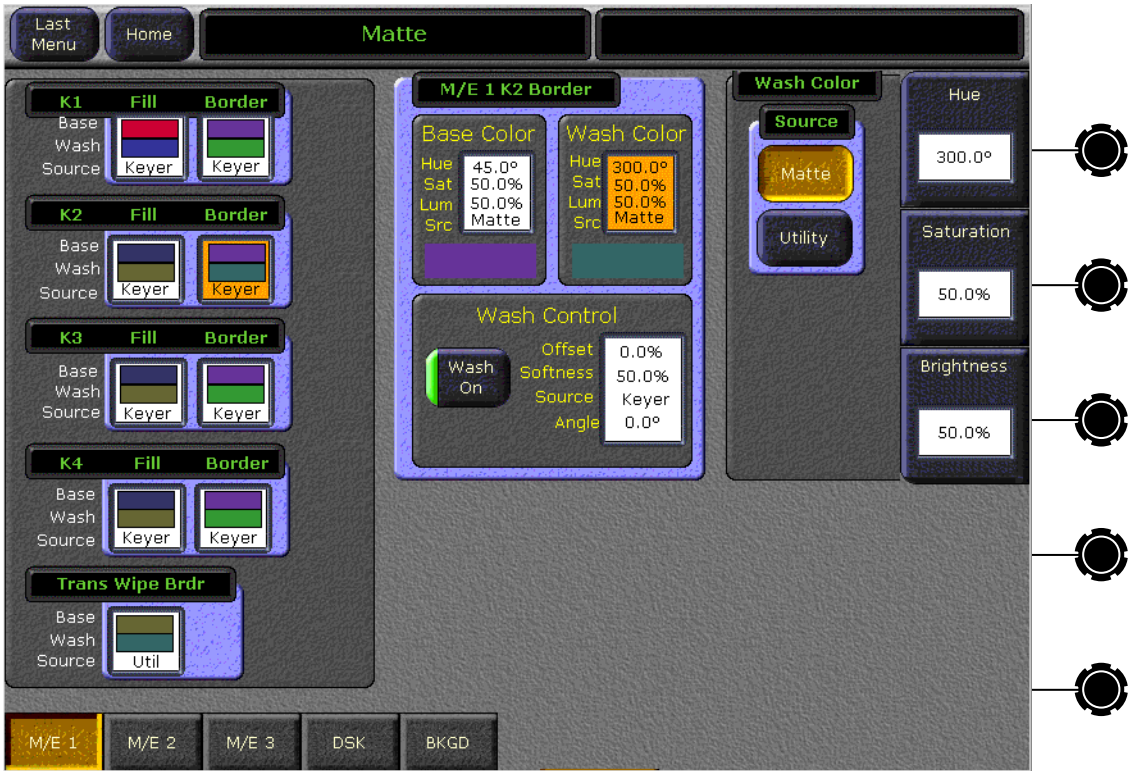
In general, each matte generator is represented by a color swatch that approximately matches the currently selected color or the matte generator. A washed matte is represented by a pair of swatches, one the base color and one for the wash color.

The matte generator delegation buttons with swatches are organized by key level and by columns for key fill, preset pattern border, and borderline fill (not yet available.

Matte – M/E Menu

When M/E 1, M/E 2, or M/E 3 (3-M/E system only) is selected (Figure 185), touch pads are displayed for each keyer, and for the wipe in that M/E. Touching any of these pads displays the current parameters in the remainder of the menu, with soft knob control.

Figure 185. M/E Matte Menu

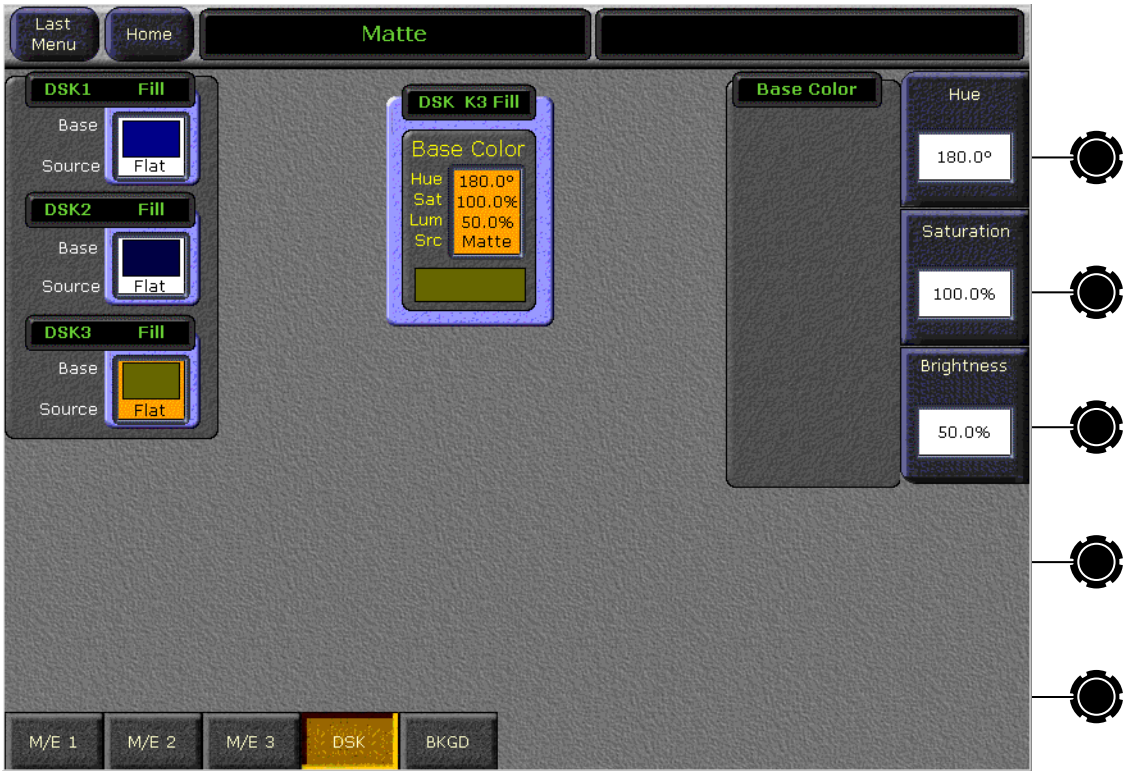


Matte – DSK

When **DSK** is selected (Figure 186), the menu displays three panes for control of the key fill matte for DSK 1, DSK 2, and DSK 3. Each touch pad activates the soft knobs to control those parameters. Values can be entered with the popup keypad, or with the standard PC keyboard.

The DSK matte menu is a subset of the M/E menu. Zodiak downstream keyers are simplified and do not employ wash, borders, utility video fill or texture. Since there is no wash, the wash source defaults to flat.

Figure 186. Matte Menu, DSK Selected



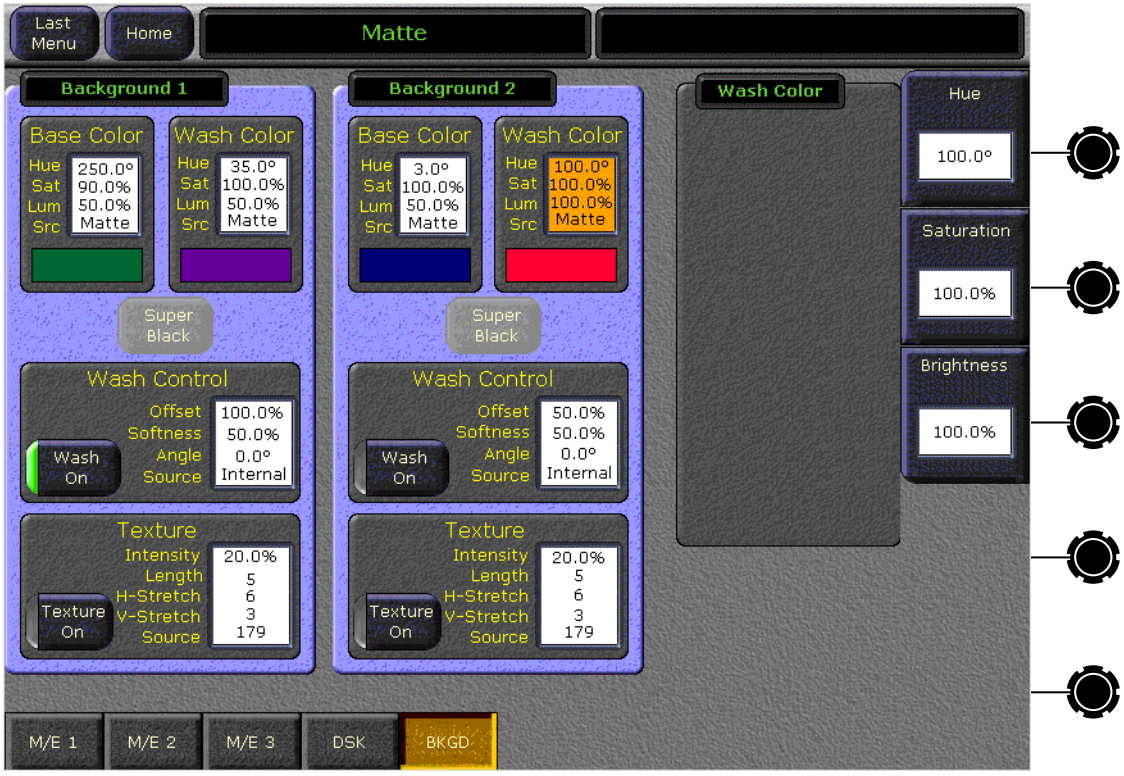
Matte – Background Menu

When **BKGD** is selected (Figure 187), the menu displays two panes for control of Background 1 and Background 2, including base and wash colors, wash direction and offset, and wash edge texture attributes. Each touch pad activates the soft knobs to control those parameters. Values can be entered with the popup keypad, or with the standard PC keyboard.

The background generators are capable of adding texture to the wash. You can experiment with the texture controls to discover unique patterns. The Source in the Texture menu is the numerical seed from which a texture is generated. There are 256 possible sources.Wash sources for background mattes come from dedicated, internal simple wipe generators that make a straight line wipe that can be softened, rotated, and offset. Length adjusts the number of elements in a texture pattern before it repeats. H-stretch and V-stretch set how many pixels repeat on each pattern element in the horizontal and vertical directions.

For a complete explanation of setting matte values, see *Matte Menu Controls on page 371*.

Figure 187. Matte Menu, Background Selected



Transform Menus

Transform Engines activated in a keyer can be controlled with the Transform Engine – Transform menu in addition to the controls provided in the Joystick subpanel on the Main panel (see *Joystick Subpanel* on page 123). Transform Engines are a software option and must be enabled in the Eng Setup, Install Options menu when purchased.

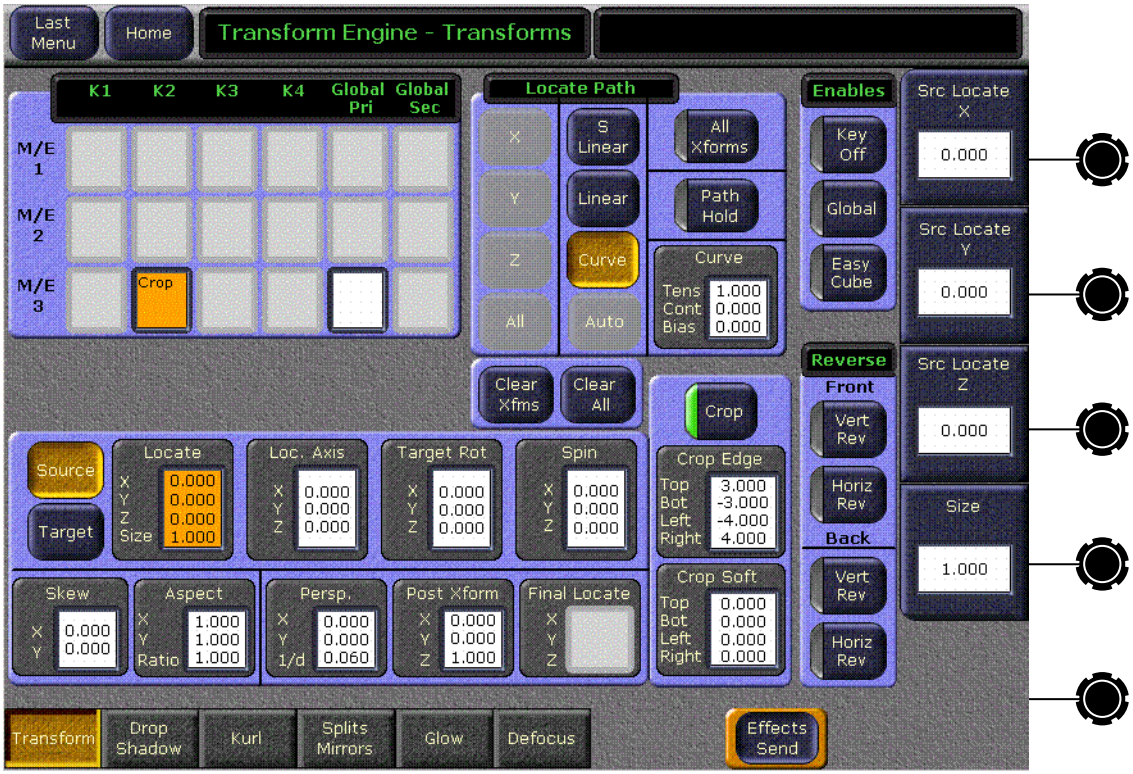
Controls for the standard Glow feature are also provided, which are available without Transform Engines installed.

A keyer's Effects Send must be turned on before it will be available for delegation on the Transform Engine menus. You can touch the Transform Menu **Effects Send** button to go to the EFX Send menu, or you can delegate the desired keyer on the Main panel and press the Maiun panel **Ext DPM** button (see *Effects Send Menu* on page 312).

Transform Menu

The Transform menu allows you to select the keyer or Global channel to control (delegation), select the desired type of transform control, and then adjust the parameters associated with the chosen control using the soft knobs or a pop-up keypad. The menu is accessed by touching the **Transform** button on the Home menu, then touching the **Transform** category selection button (Figure 188).

Figure 188. Transform Menu



The Transform Engine menu has some of the same transform controls as the Main panel's Joystick subpanel. The Joystick (**X**, **Y**, **Z**, **Size**) can be controlled from the menu with the soft knobs or keypad entry.

Transforms Menu Delegation

The Transform Engine – Transforms menu contains a data pad matrix in the upper left for delegation (Figure 188). Data pads for keyers with Transform Engines assigned will be active. Inactive keyers will be grayed out. Touch an active data pad to delegate the menu to control one of the 12 keyers, or to control a **Global** channel (see *Global Channel Assignments*). The keyer data pads themselves indicate whether Crop is enabled, Global Assignment is on, and if the Key is off.

Global Channel Assignments

When a keyer is assigned to a Global channel, it is also affected by transforms of that Global channel, permitting the easy creation of complicated moves. Multiple keyers can be assigned to Global channel, allowing coordinated moves of all the assigned keyers.

A keyer is associated with the Global channel by delegating the keyer, then touching the **Global** modifier button in the Enables pane on the upper right side of the Transform Engine menu so it is illuminated. No information appears in the **Global** data pad itself, and some functions (Skew, Crop, Reverse) are inactive for these channels and so are grayed out.

Key Off Control

The **Key Off** button located in the Enables pane on the upper right of the menu is used to turn off the key signal processing for the delegated keyer, resulting in a full raster image. For example, suppose you want to fly a graphic that is normally accompanied by a key signal. Turning the key off forces the graphic to full raster, ignoring the key. The **Key Off** button is inactive for Global channels.

Easy Cube Control

When a channel is used to create a cube or slab, turning on the **Easy Cube** button automatically translates the delegated channel to the visible face of the shape as it is rotated in space.

Transform Controls

The Source and Target transform controls below the delegation matrix delegate what 3-D transformation will be controlled with the soft knobs or pop-up keypad entry. Selecting one of the transform buttons activates the soft knobs on the right side of the Menu panel to control specific parameters of that transform and delegates the Path Control pane to that transform.

The transform controls are organized on the menu according to Source and Target space capabilities. See *3-D Digital Effects Concepts* on page 76 for background information about 3-D image controls, including Source and Target space. Note that some parameters intrinsically apply to either Source or Target space, and have no meaning in the other space. Size and aspect for example apply only to the Source space. Perspective applies to the projection of the transformed image on the TV screen and has no meaning in Source space.

The **Locate**, **Loc Axis**, **Target Rot**, and **Spin** transforms can be assigned to work in either source or target space with the touch buttons at the left of their pane. Selecting the **Source** button provides image adjustment using that channel's coordinate system for reference. Selecting the **Target** button provides image adjustment using the screen as the reference. Only one space button is selectable at a time.

Note **Target Rot** displays only Target Rotate transform parameter values, even when Source space is selected. The soft knobs still adjust either the Target or Source space rotation parameters, however.

The **Skew** and **Aspect** transforms work in Source space.

The **Persp.**, **Post Xform**, and **Final Locate** buttons work in Target space.

Crop Controls

The **Crop** button in the pane to the right of the Transform buttons is used to activate the crop feature for the delegated keyer (this button is inactive for Global channels). The Crop Edge data pad delegates the soft knobs to control each side's cropping, while the Crop Soft data pad delegates edge softness control.

Reverse Controls

The Reverse controls are located to the right of the Crop pane. The front and back sides of the Transform Engine picture can be reversed vertically and/or horizontally with these controls.

Path Controls

The path control pane is located to the right of the data pad delegation matrix. **S Linear**, **Linear**, and **Curve** interpolation touch buttons are available. When **Curve** is selected, soft knob controls for **Tension**, **Continuity**, and **Bias** soft knob become available. You can also turn off transform interpolation and hold each keyframe's values with the **Path Hold** touch button. See *Path Control* on page 84 for an explanation of path controls.

To specify a path for a transform, select the category of transform with the data pads at the lower area of the screen. Then select the path type in the upper middle pane, which will be labeled with that transform category. When **Curve** is selected, use the soft knobs or associated data pads to enter values for tension, continuity, and bias. See *Tension, Continuity, and Bias Controls* on page 85 for an explanation of these controls.

All transforms except **Spin** apply the same path control to all that transform's parameters. **Spin** allows different paths to be specified for each axis of the transform. When **Spin** is selected, the **X**, **Y**, **Z**, and **All** touch buttons are activated. The selected path will only be applied to the specified axis.

Clear Transforms

Two buttons located on the lower right side of the Transform Engine menu (page 274) are used to clear transform settings.

Clear Xfms – Sets all transform parameters of the delegated keyer (or global channel) to Default Keyframe values. The transform parameters reside in the panels below the data pad delegation matrix and do not include Crop.

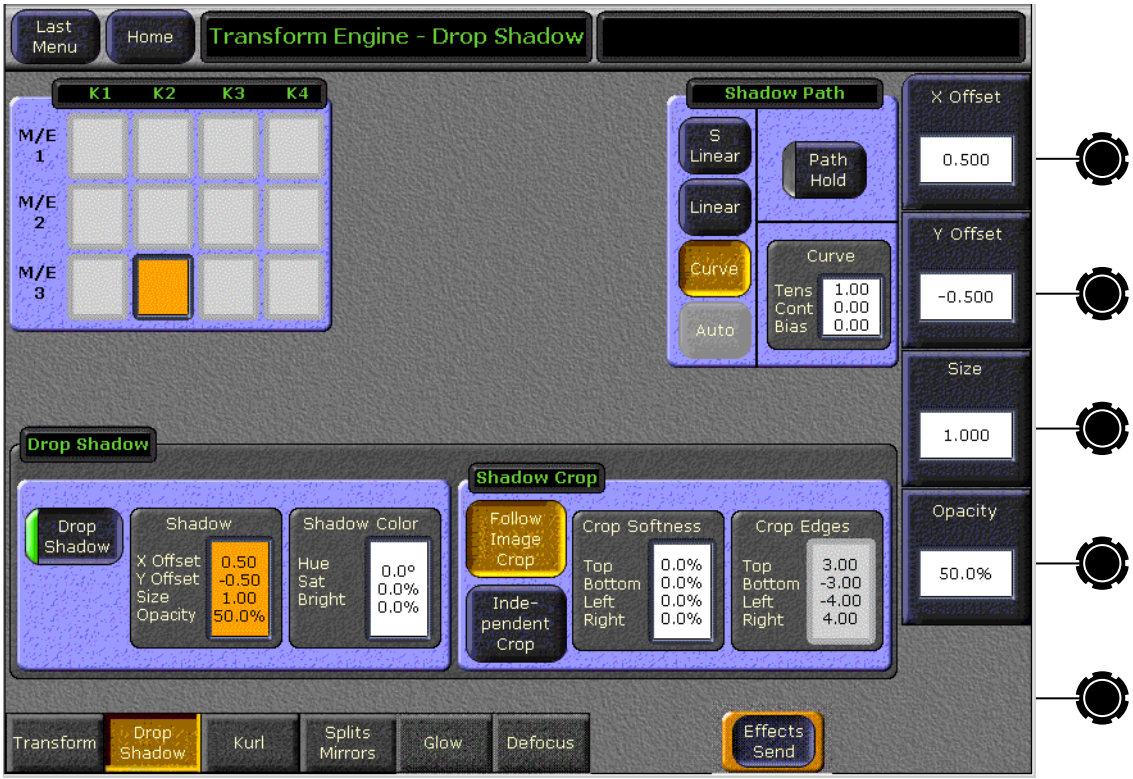
Clear All – Sets all transform parameters and all other menu settings, including Crop values, of the delegated keyer to Default Keyframe values.

Drop Shadow Menu

The Drop Shadow menu is accessed by touching the **Transform** button on the Home menu, then touching **Drop Shadow** (Figure 189).

Note The Zodiak Drop Shadow is generated in the Source plane. Operation of the Drop Shadow will appear slightly difference in some effects (Kurls and Warps) due to this design. When an image is rotated on the X or Y axis with a Drop Shadow effect, the shadow will not be parallel with the key.

Figure 189. Drop Shadow Menu



Drop Shadow Controls

The Drop Shadow feature is turned on with the **Drop Shadow** button in the Drop Shadow pane. When turned on, soft knob controls become available on the right. Different soft knob controls appear, depending on which data pad has been selected in that pane. The current parameter names and values are displayed on each data pad.

When **Shadow** is selected soft knobs for **X Offset**, **Y Offset**, **Size**, and **Opacity** are available.

When **Shadow Color** is selected soft knobs for Hue, Saturation, and Brightness are available.

Transform Subpanel Drop Shadow Controls

The **Int DPM** button on the Main panel Joystick subpanel delegates the joystick to drop shadow control. The joystick X and Y axis adjust the drop shadow offset from the primary image and the joystick Z axis controls the size of the drop shadow.

Shadow Crop Controls

The Shadow Crop controls are used to adjust shadow cropping and edge softness. The current parameter names and values are displayed on the data pads.

When **Follow Image Crop** is selected, crop values of the shadow match the crop values used for the primary image. Only shadow edge softness controls are active in this mode. When the **Crop Softness** data pad is selected soft knob controls for shadow edge softness are available (Top, Bottom, Left, and Right). The total softness of the drop shadow edges will be the softness of the shadow edge combined with any softness of the primary image.

When **Independent Crop** is selected, the edges of the drop shadow can be given crop values different from the primary image. Touching the **Crop Edges** data pad delegates the soft knobs to control drop shadow edge cropping (Top, Bottom, Left, and Right).

Kurl Menus

The Kurl effects are grouped into modes, each of which has its own set of menu panes and related soft knob controls.

The Kurl modes are:

- Position/Size Modulation,
- Slits, and
- Page Turn/Roll.

A Transform Engine can apply only one set of Kurl mode parameters at a time. If you wish to use more than one mode of Kurl effects simultaneously on the same video (for example, size modulation of an effect), use multiple Transform Engines with re-entry.

Menu Access

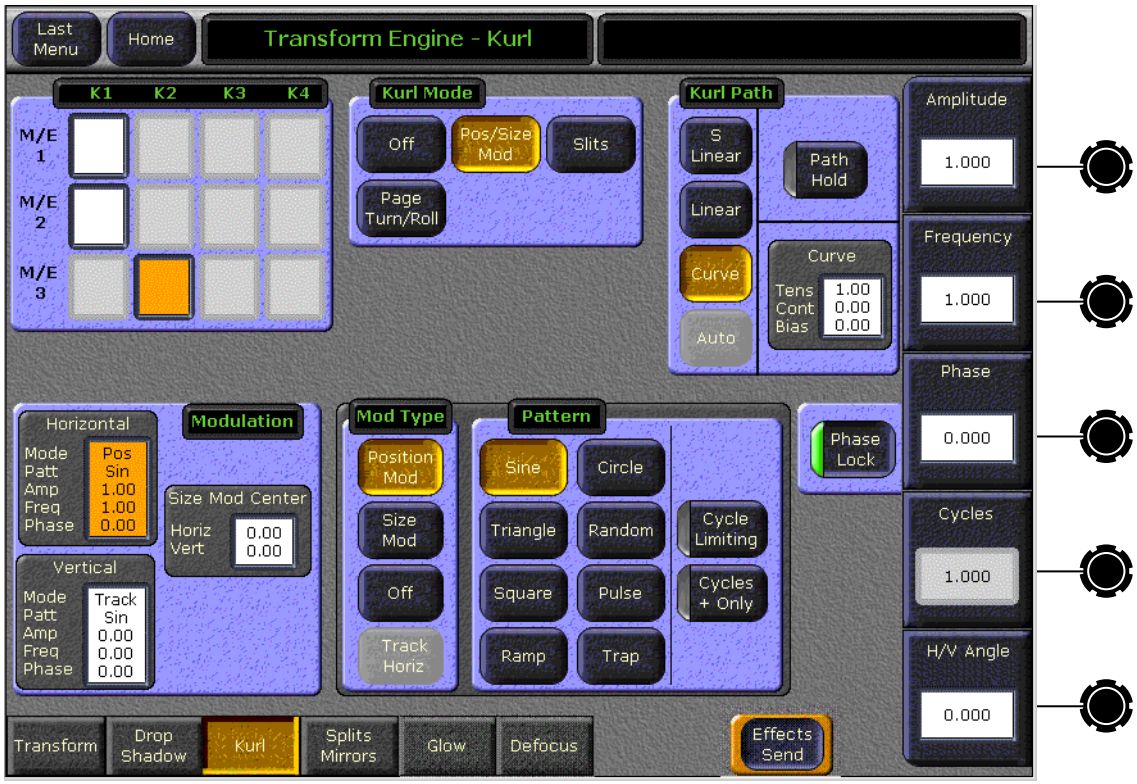
The Kurl menus are accessed by touching the **Transform** button on the Home menu, touching the **Kurl** category button, then touching the Kurl Mode button of the desired mode.

Position/Size Modulation Mode

Position and Size Modulation is an effect in which the source video is position- or size-modulated through an additive process with either a single wave train, or two wave trains with the second wave at a right angle to the first. Each of the two wave trains (horizontal, vertical) may be selected independently from a set of modulation patterns.

Touch the **Pos/Size Mod** Kurl Mode button to access the position and size modulation controls (Figure 190).

Figure 190. Kurl Menu, Position Modulation



Modulation Pane

In the Modulation pane you select the wave train axis (**Horizontal** or **Vertical**) for which the rest of the menu controls will apply. The following Soft knob controls appear on the right for the selected axis:

Amplitude — defines the modulation amplitude (the height of the pattern waves).

Frequency — defines the modulation frequency and therefore the number of pattern cycles to appear across the source.

Phase knobs — The **Phase Lock** button on the right controls whether the pattern is fixed (on) or moving (off). When **Phase Lock** is on, the **Phase** soft knob is available to control the static location of the phase of the pattern.

When off, the **Speed** soft knob is available to adjust the speed of the pattern's motion. Negative values can be entered to reverse the direction of the motion.

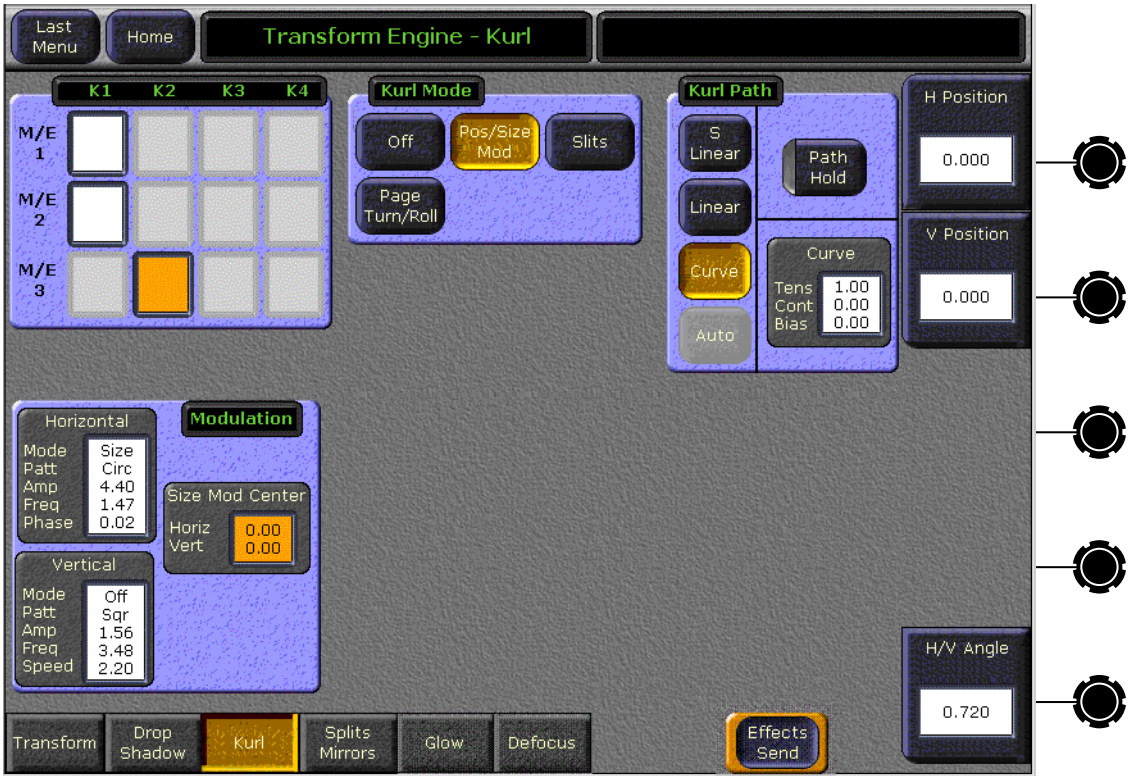
H/V Angle — defines the angle of the Position Modulation with respect to the source X and Y axes.

Mod Type Pane

With an axis selected, you select the type of modulation to be applied to that axis (**Position Mod** or **Size Mod**) in the Mod Type pane. When the **Vertical** axis is selected, you can choose to have that axis' modulation values match the horizontal values with the **Track Horiz** button.

When **Size Mod** is selected in the Mod Type pane, the Size Mod Center data pad in the Modulation pane is active. When this data pad is selected soft knob controls for **H Position**, **V Position**, and **H/V Angle** are available (Figure 191).

Figure 191. Kurl Menu, Size Mod Center



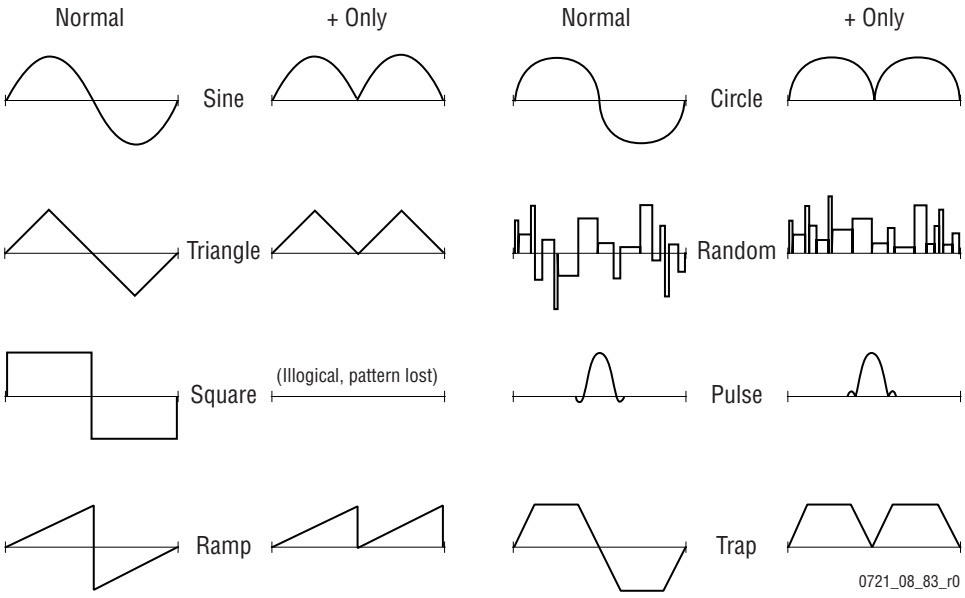
Pattern Pane

The type of wave pattern to be applied to the selected axis and modulation type is selected in the Pattern pane.

Cycle Limiting — activates the Cycles soft knob. This control can be used to limit the number of wave pattern cycles.

Cycles + Only — selects only the positive portion of the wave cycle. Representative wave shapes are shown in Figure 192.

Figure 192. Available Wave Patterns



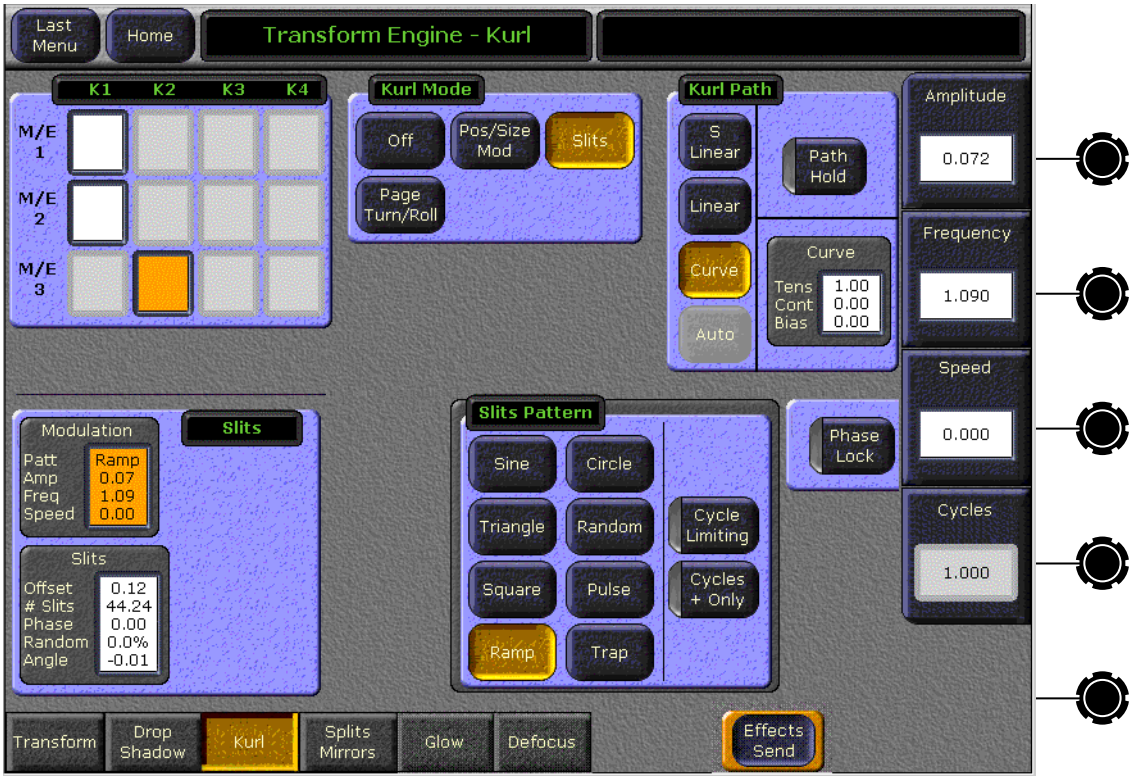
Slits Mode

Slits is an effect in which the source video is split into a number of parallel slits. The width of the slits may be uniform or random, and an angle may be specified. An offset function is provided which controls the amount of displacement of alternating slits in opposite directions (to cause a transition type effect).

Touch the **Slits** Kurl Mode button to access the slits controls.

When the Modulation data pad is selected in the Slits pane a menu similar to Figure 193 appears.

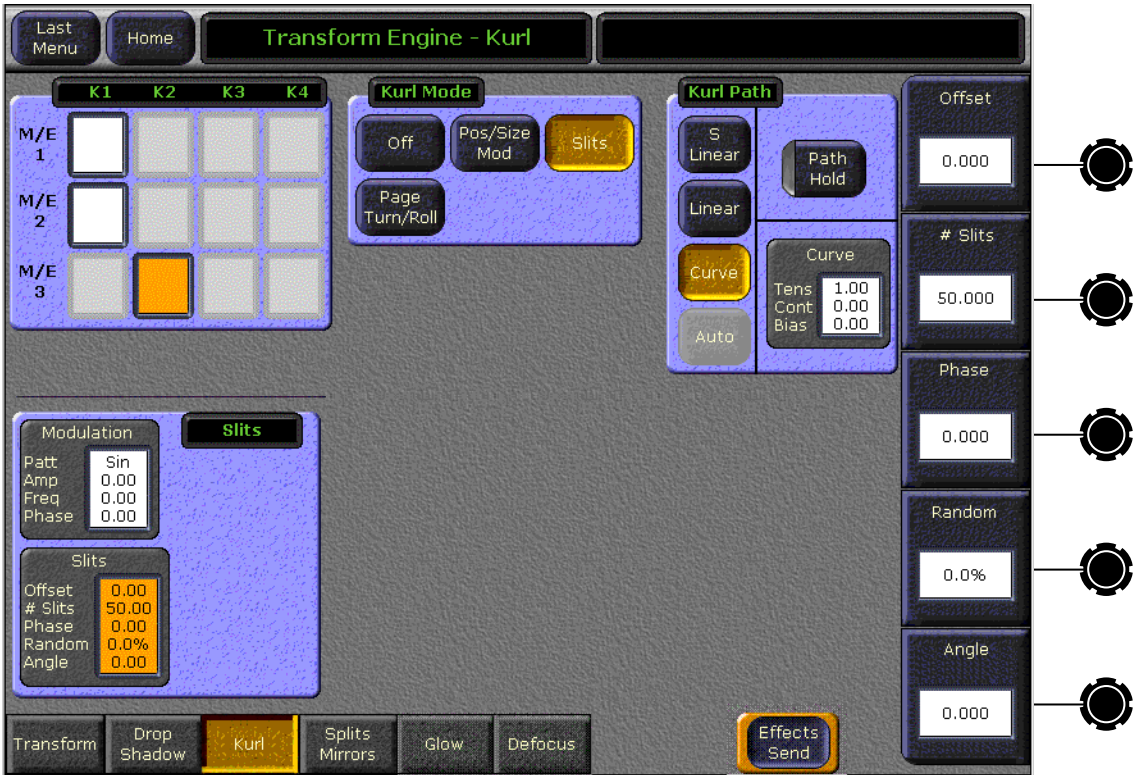
Figure 193. Kurl Menu, Slits Modulation



The Slit modulation soft knob controls and wave patterns are the same as Position/Size (see *Modulation Pane* on page 280 and Figure 192 on page 282).

When the **Slits** data pad is selected a menu similar to Figure 194 appears.

Figure 194. Kurl Menu, Slits



Soft knob controls are provided to control the following attributes of the slits:

Offset — sets the distance adjoining slits move away from each other. This can be used for transition effects, using a zero offset for the starting key-frame and an off the screen offset for the ending keyframe.

 # Slits — defines the number of slits.

Phase — determines the starting point or phase of the modulation to occur at the center point.

Random — defines the degree of randomization of slit width.

Angle — defines the angle of the slits with respect to the source X and Y axes.

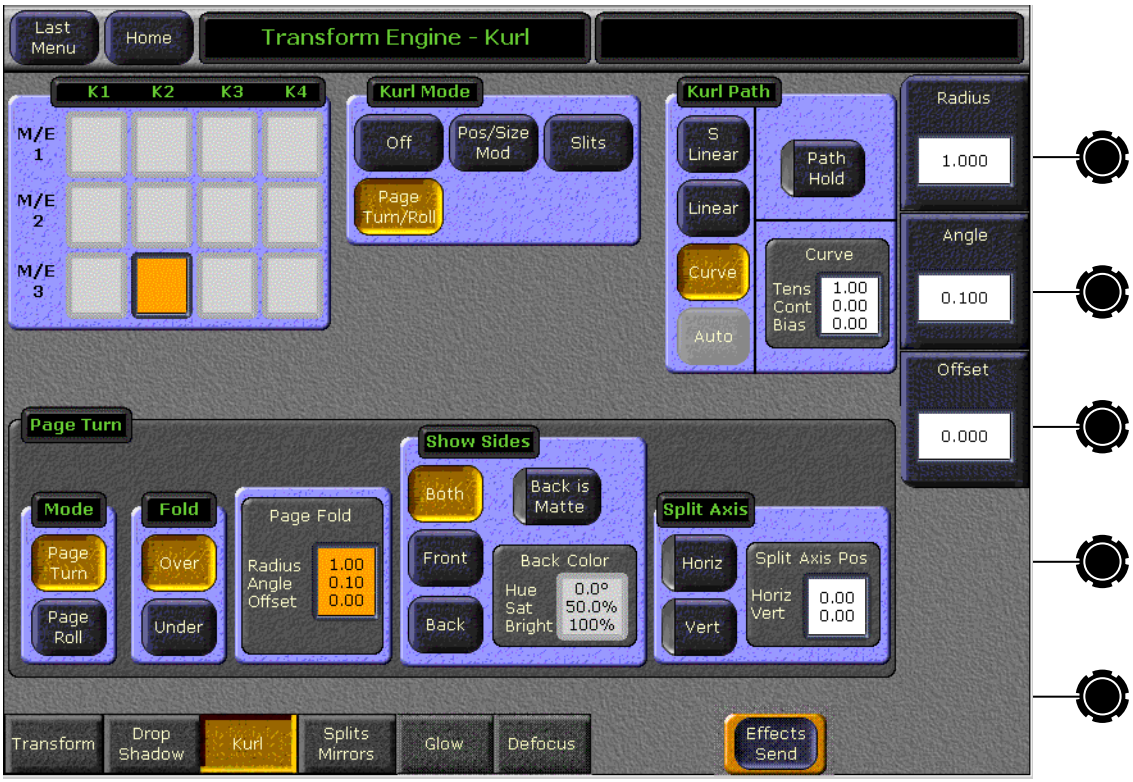
Page Turn/Roll Mode

Page Turn is a transition effect with the video being mapped to an original plane, a cylinder, and a final plane parallel to the original plane. Page Roll maps the video to an original plane and a cylinder. Page Turn and Roll are parallel projections to the target screen with no perspective.

Note For a Page Turn effect on a key or video that is not a full raster, you will need to set up two identical keys and use the Show Sides **Front** and **Back** buttons to define the position of each key.

Touch the **Page Turn/Roll** Kurl Mode button to access the Page Turn and Roll controls (Figure 195).

Figure 195. Kurl Menu, Page Turn



Page Turn Pane

The page mode (**Page Turn** or **Page Roll**), and orientation of the fold (**Over** or **Under** the original plane) are selected in the Page Turn pane.

When the Page Fold data pad is selected, the following soft knob controls are available:

Radius — adjusts the radius of the page turn cylinder affecting the sharpness of the curl.

Angle — defines the orientation of the page turn cylinder with respect to the source X and Y axes, and specifies the direction of the turn.

Offset — positions the page turn cylinder with respect to the source plane and, when interpolated between keyframes, causes the page to turn. The offset would typically change from one edge or corner of the source raster to the opposite edge or corner for the turn.

Show Sides Pane

Choices of what sides of the effect to display (**Both**, **Front**, **Back**) are available in the Show Sides pane. Selecting only a portion of the effect can be used for multi-pass effect creation.

When **Back is Matte** is selected, the back of the effect will be a matte color. The color of the matte can be changed by touching the Back Color data pad to bring up soft knob controls for Hue, Saturation, and Brightness.

Split Axis Pane

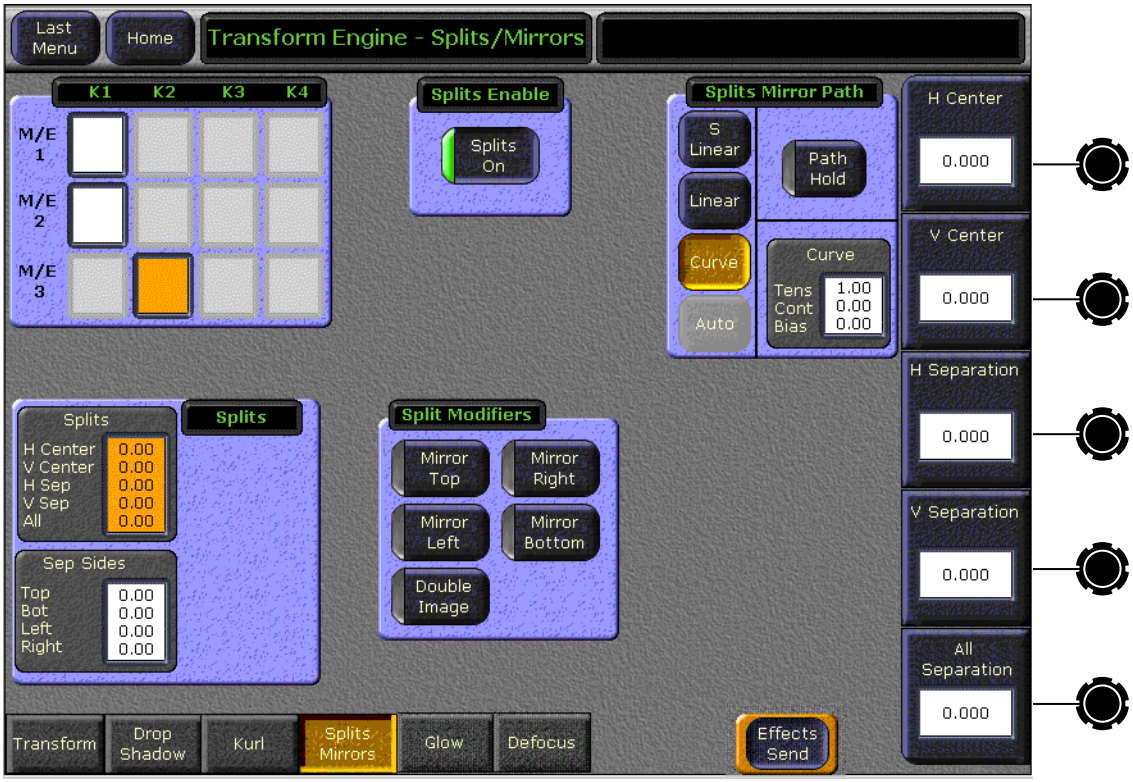
Split page turn and roll effects are controlled with the Split Axis pane. The effect can be split **Horiz**, or **Vert**, or both ways using the labeled buttons.

Selecting the Split Axis Pos data pad brings up Horiz and Vert soft knobs that control the location of the split.

Splits Mirrors Menu

The Splits and Mirrors effect allows you to divide a picture horizontally and/or vertically, and create mirror images of the image along these axes. Touch the **Splits/Mirrors** button to access the Splits and Mirrors controls (Figure 196).

Figure 196. Splits/Mirrors Menu



Touch the **Splits On** button in the Splits Enable pane to bring up the following Splits controls:

Splits Pane

When the **Splits** button in the Splits data pad is selected, the following soft knob controls are available. (Values are displayed in screen units.)

H Center — controls the horizontal position of the split.

V Center — controls the vertical position of the split.

H Separation — controls the amount of horizontal separation between the split images.

V Separation — controls the amount of vertical separation between the split images.

All Separation — controls both horizontal and vertical separation simultaneously. This control is additive with the other separation controls, such that changing its values changes the H and V separation values.

When the Sep Sides data pad is selected, individual soft knob controls for separation are available (T Separate, L Separate, R Separate, B Separate). These controls allow movement of individual Top, Left, Right and Bottom portions of the split image.

Split Modifiers Pane

The Split Modifiers pane has mirror and double image controls.

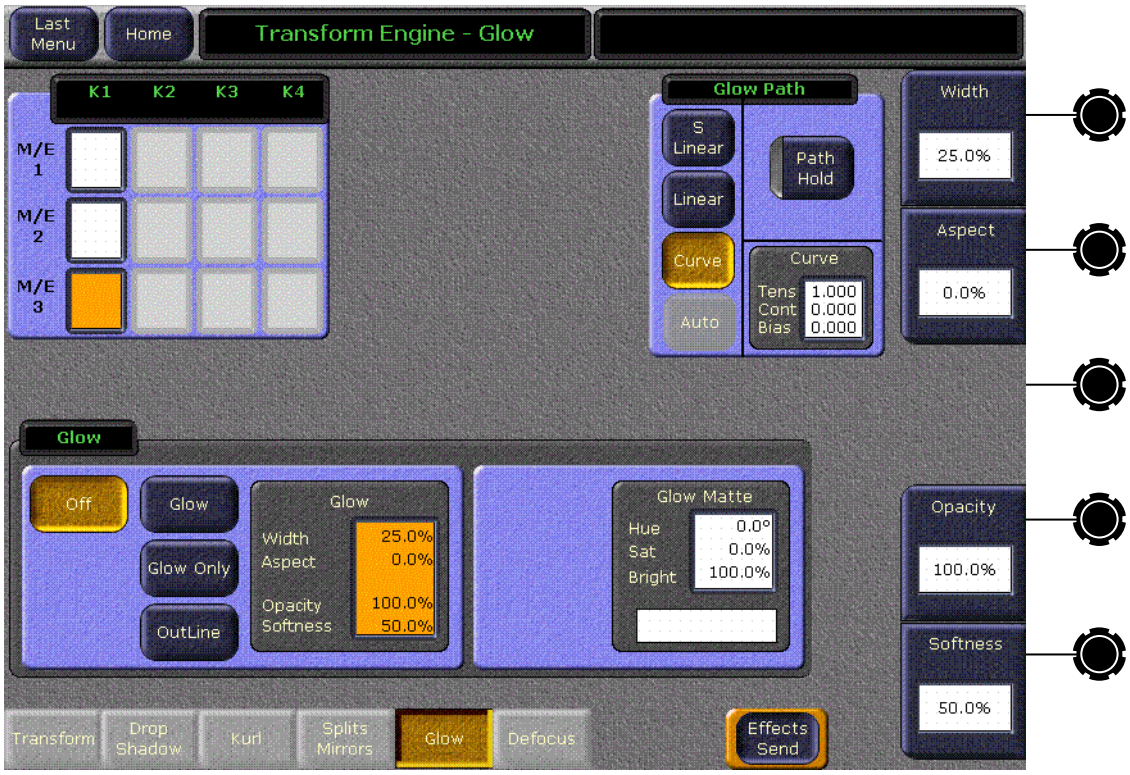
The mirror buttons replicate the side of a picture about the axis location to the opposite side. Mirror orientation is based on the picture's source space. It is possible to simultaneously reflect multiple sides by turning on the **Mirror Top**, **Mirror Right**, **Mirror Left** and **Mirror Bottom** buttons. The original picture for that side is always reflected. A side that has been mirrored to the opposite side will not be mirrored a second time.

When **Double Image** is on, the area of separation is filled by extending the interior sides of each half of the original split picture to the axis position. At large separation values the picture will be doubled about the axis. This control only has an effect when separation exists between the splits.

Glow Menu

Glow adds a soft edged variable opacity border around keys, leaving the original keyed image unmodified, and is a standard feature available on all Zodiak systems. Glow controls are available on the Transform Engine Glow menu, accessed via **Transform**, **Glow** (Figure 197). You must turn Effects Send on for each keyer on you wish to use the glow feature (touch the **Effects Send** button, then touch the desired keyers, or use the **Ext DPM** button on the Main panel). The Glow controls on the menu affect the delegated keyer. Only one keyer can be delegated at a time (Figure 197).

Figure 197. Glow Menu



Glow Pane

Off — The Glow effect is deactivated.

Glow — The Glow effect is applied around the keyed image which remains visible.

Glow Only — The glow effect is applied to the entire keyed area, replacing the original keyed image. Only the glow is shown.

Outline — The glow effect is shown around the keyed area, but the original keyed image is not shown. Only the border area of the glow is visible.

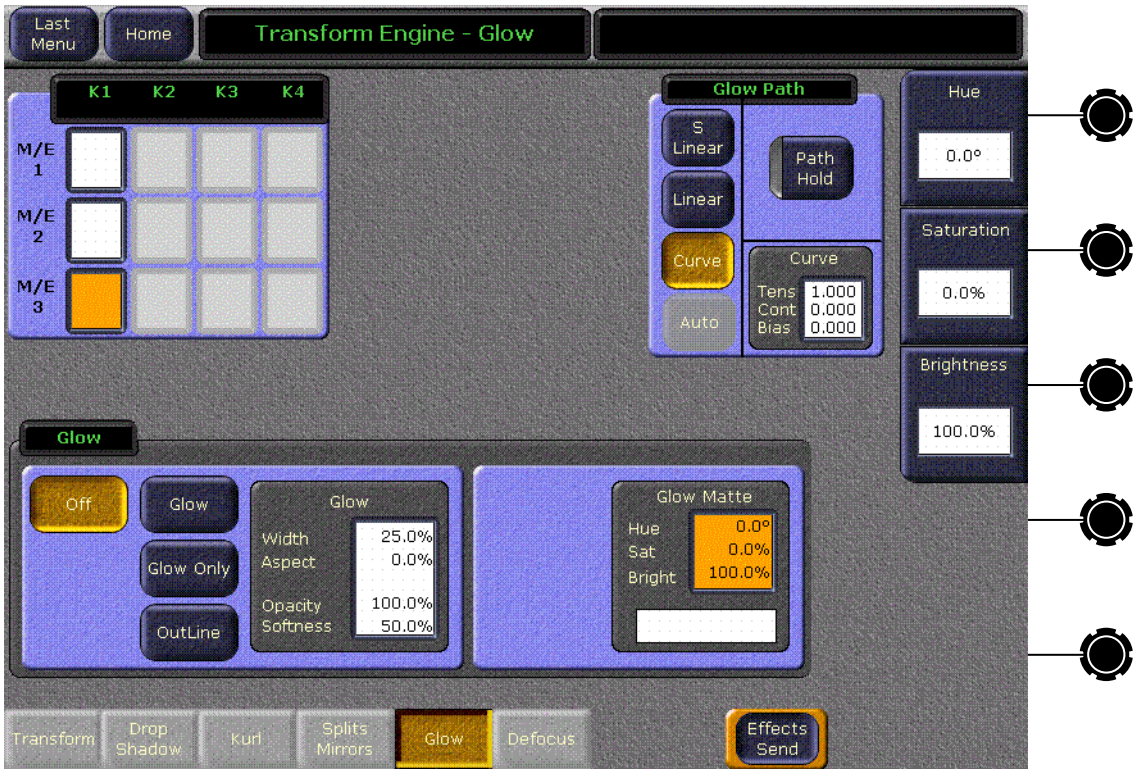
When the Glow pane is activated, knob controls for Glow **Width**, **Aspect**, **Opacity**, and **Softness** are available.

Note The Glow Softness parameter value is shared with Drop Shadow Softness. Adjusting either Glow or Drop Shadow Softness will affect both Glow and Drop Shadow Softness.

Glow Matte Pane

When the Glow matte pane is activated, knob controls for matte **Hue**, **Saturation**, and **Brightness** become available. An approximation of the color of the matte is shown at the bottom of the pane (Figure 198).

Figure 198. Glow Menu, Matte Controls Activated



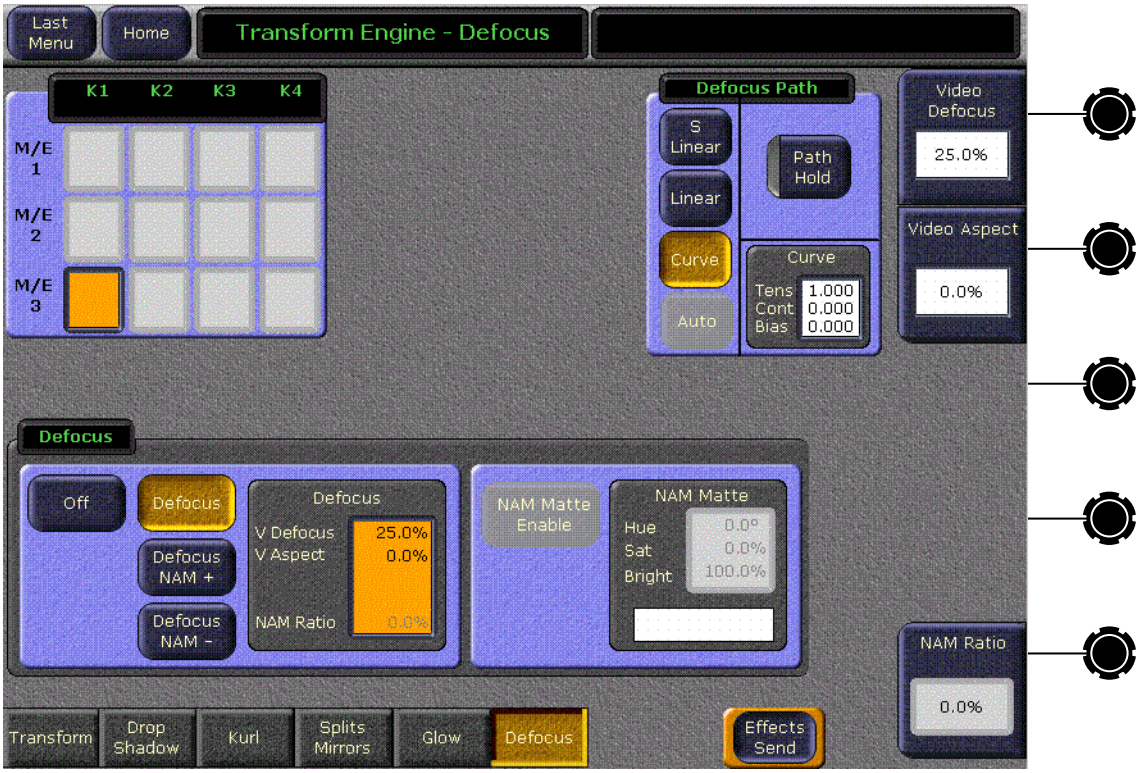
Glow Path Pane

Controls for glow path, using the standard **Hold**, **S Linear**, **Linear**, and **Curve** parameters, are applied when the Glow feature is activated.

Defocus Menu

Defocus blurs the actual keyed image, and is available with the Transform Engine option. Defocus controls are available on the Transform Engine Glow menu, accessed via **Transform**, **Defocus** (Figure 199). This menu is only available when a Transform Engine option has been installed.

Figure 199. Defocus Menu



Defocus Pane

Off — The Defocus effect is deactivated.

Defocus — The Defocus effect is applied to the original keyed image.

Defocus NAM + — The defocused image is compared to the original image on a pixel by pixel basis, and the lighter (higher luminance) pixel of the two is used in the final image.

Defocus NAM - — The defocused image is compared to the original image on a pixel by pixel basis, and the darker (lower luminance) pixel of the two is used in the final image.

When the Defocus pane is activated, knob controls for **Video Defocus**, **Video Aspect**, and **NAM Ratio** are available.

Video Defocus — Adjusts the total amount of defocus applied to the image.

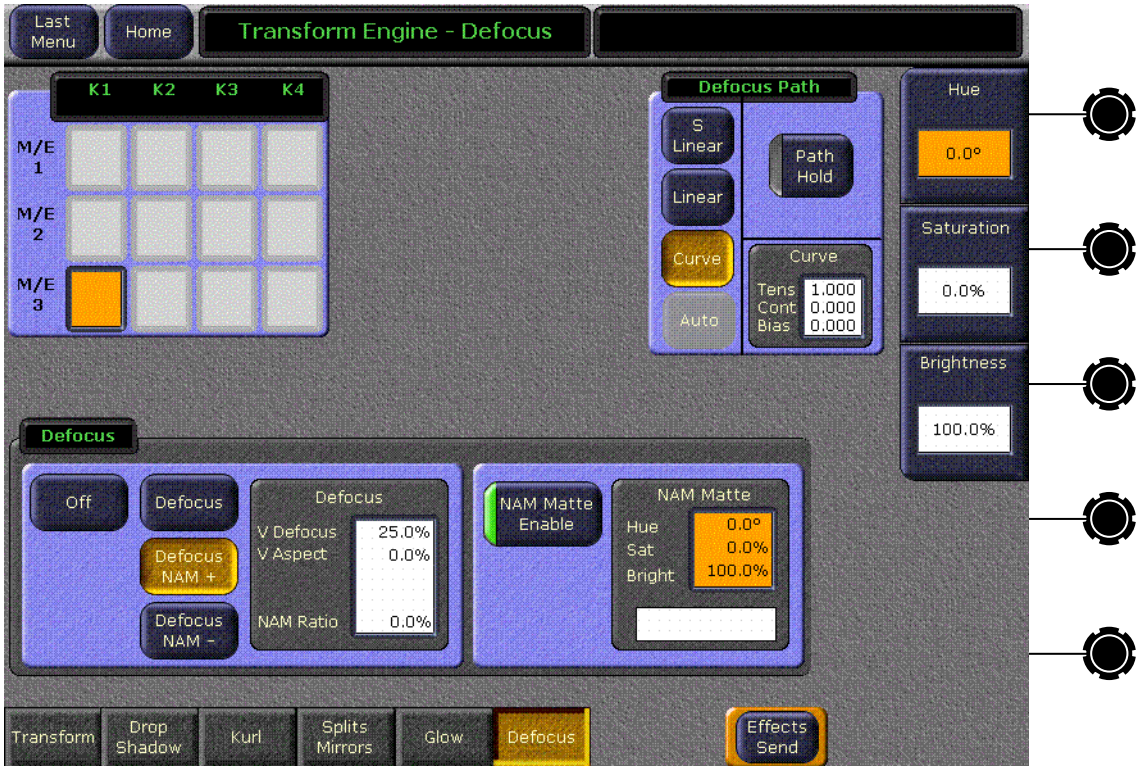
Video Aspect — Adjusts the percentage of defocus applied to the vertical and horizontal axes of the image.

NAM Ratio — Adjusts the level of luminance at which the Defocus effect will be applied to NAM pixels. This value applies to both NAM + and NAM - modes.

NAM Matte Pane

NAM Matte Enable — When selected a matte color is applied to the selected NAM (lighter or darker) portion of the keyed image (Figure 200).

Figure 200. Defocus Menu, NAM Matte Activated

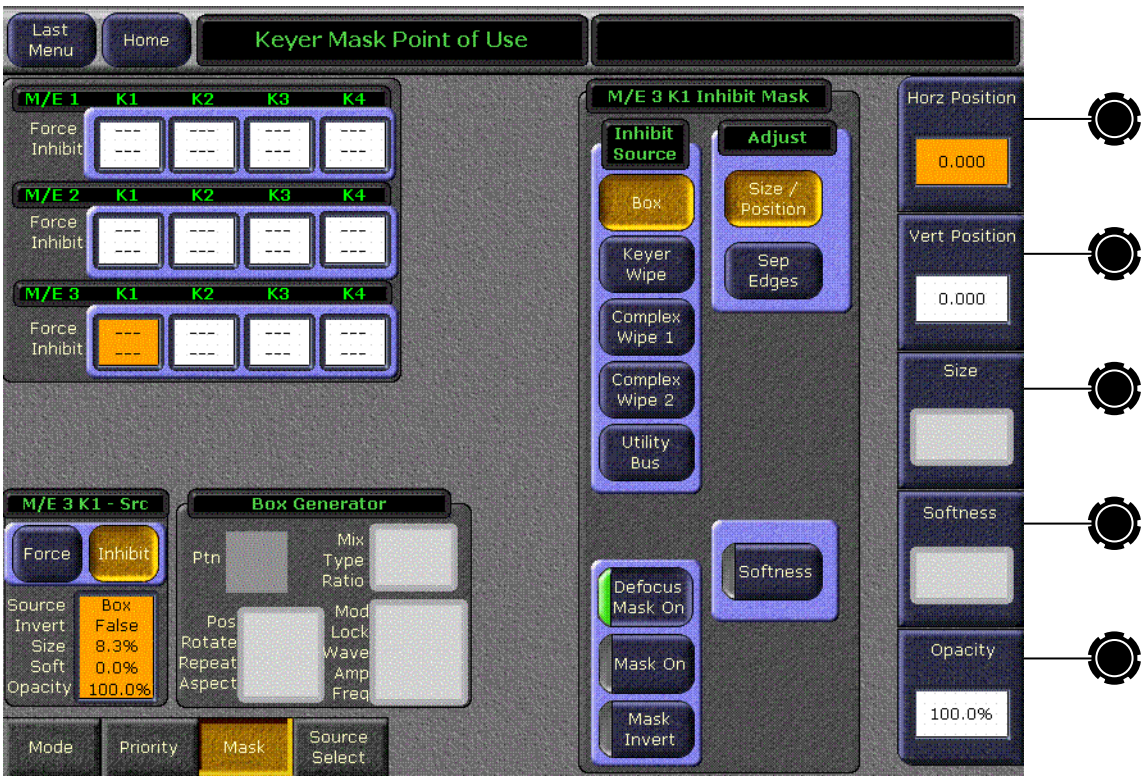


When the NAM Matte pane is activated, knob controls for matte **Hue**, **Saturation**, and **Brightness** become available. An approximation of the color of the matte is shown at the bottom of the pane.

Keyer Menu Defocus Mask

A **Defocus Mask On** button is available on the Keyer Mask menu. This feature is available when the delegated keyer has Defocus turned on and an **Inhibit** mask has been selected (Figure 201).

Figure 201. Keyer Mask Menu, Defocus Mask On



When on, the Defocus effect can be masked so it is applied to only a portion of the image.

Defocus is not available with a **Force** mask.

M/E Menus

There are five Mix Effects menus:

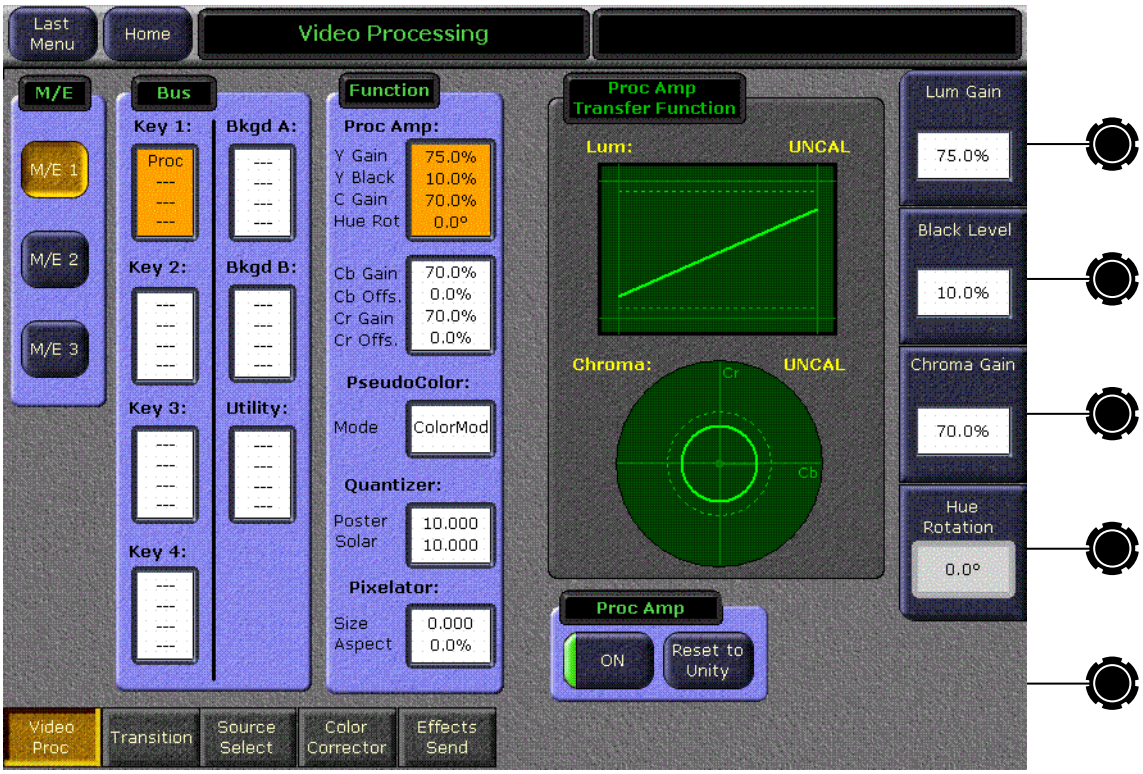
- Video Processing (Proc Amp, Pseudocolor, Quantizer, and Pixelator),
- Transition controls for selecting and customizing a user transition type,
- Source Select changes sources in real-time,
- Color Corrector adjusts RGB color on a selected bus and input, and
- Effects Send.

Video Processing Menu

Video Processing controls are available for all keyer fill, background, and utility bus sources. Each bus has its own video processor. Video processing settings are stored for each source on each bus in source memory. When source memory is on, the specific video processing settings for each source are applied when that source is selected on a bus. Video processing settings can be saved to E-MEM keyframes. Continuously variable video processing parameter values interpolate between keyframes.

Video processing is controlled with the Video Processing menu, accessed by touching **M/E**, **Video Proc** (Figure 202).

Figure 202. Video Processing Menu – Luminance Proc Amp Controls



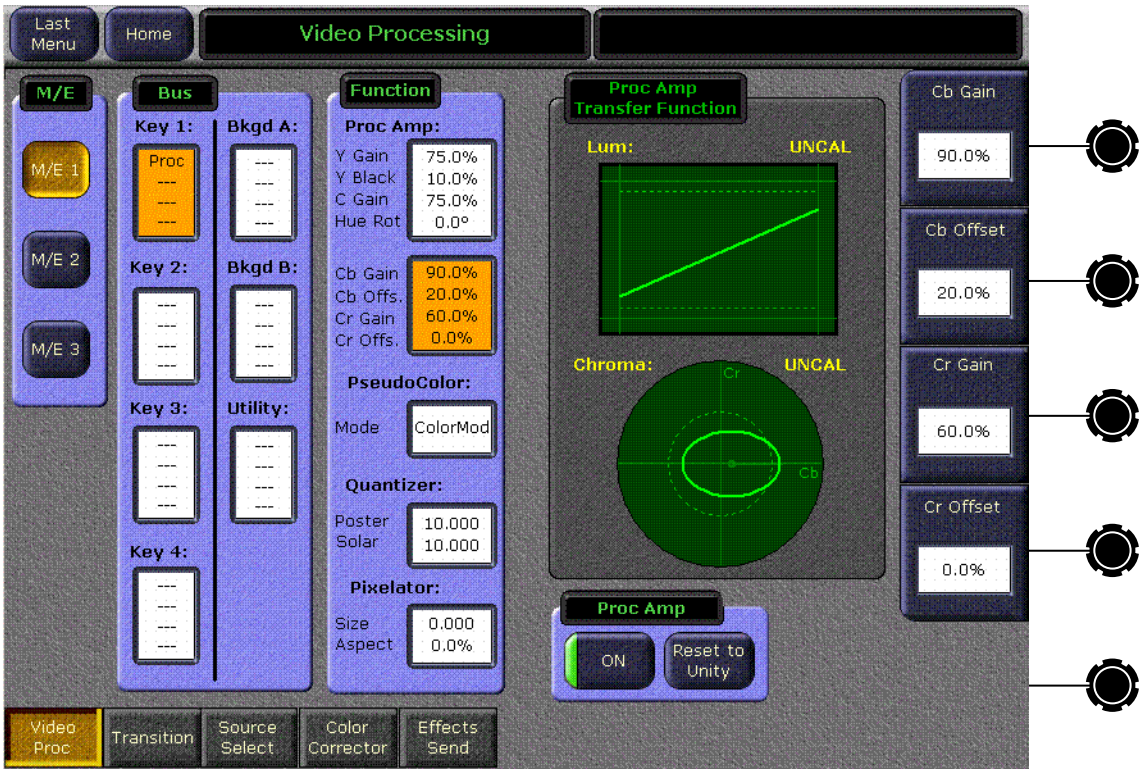
Menu delegation panes (M/E, Bus) on the left permit selecting which bank and bus the menu's video processing controls will be delegated to control. A central Function pane selects the video processing function. Controls for the selected function appear on the right. Soft knobs are available for continuously variable parameters, and touching a soft knob data pad permits entry of exact values.

The data box for each of the delegation selectors in the Bus pane indicates which video processing functions (**Proc**, **Pseud**, **Quant**) are turned on for that bus and source. If a function is turned off **– – –** appears in place of the function name. Data boxes in the Function pane display the current parameter values for each active function.

Proc Amp Controls

Proc Amp Luma and Chroma controls are available. Touching the upper Proc Amp data box in the Function pane displays Luma controls (Figure 202 on page 294). Touching the lower Proc Amp data box displays Chroma controls (Figure 203).

Figure 203. Chroma Proc Amp Controls



CAUTION When adjusting Proc Amp controls, illegal colors could be generated. Illegal colors have equivalent red, green, and blue color components that take on negative values. Illegal colors can cause problems in picture monitors and other equipment downstream of the switcher. The amount of adjustment that can cause this problem depends on the original picture content. This problem does not occur for typical small adjustments.

Proc Amp Transfer Function graphics appear on both the Proc Amp Luma and Proc Amp Chroma menus. Two oscilloscope-like figures symbolize the input to output characteristics of the video processing. The rectangular figure shows Luma, and the round figure shows Chroma. These are only representations. The figures do not show actual video. See *Proc Amp Transfer Function Graphics Detailed Description* on page 297 for details.

The Proc Amp **ON** button below the graphics turns Proc Amp processing for both Luma and Chroma on and off (except Hue Rotation, which is controlled by PseudoColor). When on, the Proc Amp graphic traces are colored bright green and, if settings are not at nominal values, an **UNCAL** indicator is displayed announcing uncalibrated video (Figure 202). When off, no processing is applied regardless of the values displayed, and the Proc Amp graphic traces dim (Figure 203). Parameter values are maintained even when the function is off to permit convenient A/B comparison between processed and unprocessed video.

The **Reset to Unity** button returns only the settings for the currently displayed Luma or Chroma controls to their factory default values.

The Proc Amp Luma parameter group can modify the gain and offset for luminance, the overall gain for chrominance, and hue rotation. The range, nominal values, and units for these controls are shown in Table 6.

Table 6. Proc Amp Luma Parameters

Control	Minimum	Maximum	Nominal	Units
Luma Gain	0	200	100	%
Luma Offset	-100	+100	0	
Chroma Gain	0	200	100	
Hue Rotation[a]	-179	+180	0	degrees

[a] Hue Rotation is turned on and off by PseudoColor.

The Proc Amp Chroma parameter group can modify the gain and offset for individual chroma components Cb and Cr. The range, nominal values, and units for these controls are shown in Table 7:

Table 7. Proc Amp Chroma Parameters

Control	Minimum	Maximum	Nominal	Units
Cb Gain	0	200	100	%
Cb Offset	-100	100	0	
Cr Gain	0	200	100	
Cr Offset	-100	100	0	

Two sets of gain controls exist for chroma. One is an overall gain, found on the Proc Amp Luma menu, and the other set is the individual Cb and Cr gain controls found on the Proc Amp Chroma menu. The overall gain is the average of the Cb and Cr gain. When the overall chroma gain is adjusted, the Cb and Cr values both change by the incremental amount of the overall gain change.

Proc Amp Transfer Function Graphics Detailed Description

Lum:

The Luma figure is modeled after a waveform monitor that displays a luminance ramp signal that has been modified by the proc amp. The horizontal scale of the graph corresponds to the input luminance level to the proc amp, and the vertical scale corresponds to the output level from the proc amp. The scope trace starts at the black level in the lower left and ramps linearly to the white level at upper right. The dotted graticule lines signify the nominal black to white range. The solid graticule lines mark the absolute limits of the graph. The vertical scale is such that zero is at the black dotted line, 100 IRE is at the white dotted line.

Luminance gain is represented by the slope of the trace. At gain zero, the line is flat and level. Increasing the gain changes the angle of the trace. If the gain is adjusted high enough for the trace to exceed the absolute vertical limits, the line goes horizontal to represent clipping by the limiters in the proc amp.

Luminance offset (black level) moves the trace up and down without changing its slope.

Chroma:

The Chroma figure has a round screen modeled after a vectorscope. The oval trace displays what would appear if the vectorscope were fed a chroma key test signal with continuous hue changes and constant saturation that has been modified by the proc amp. The vertical axis of the oval corresponds to Cr gain, and the horizontal axis represents Cb gain. The

position of the center of the oval signifies offset in the Cb and Cr directions. For example, an increase in Cb offset moves the entire oval to the right. Labeled cross-hair graticules identify the Cb and Cr graph axes. A unity gain circle graticule is shown as a dotted line.

Hue rotation is indicated with a straight radial line from the center of the oval. The angle of this line is the hue rotation angle, and it is referenced to the horizontal right zero angle.

Increasing the hue angle rotates the radial trace counterclockwise. A dot at the end of the hue rotation radial line provides a visual reference to the Cb and Cr offset. When offset is added, the center of the oval goes off center, which can be easily seen when comparing the dot to the Cb and Cr axes.

Cr and Cb offsets can be used to correct black level color balance errors of a camera.

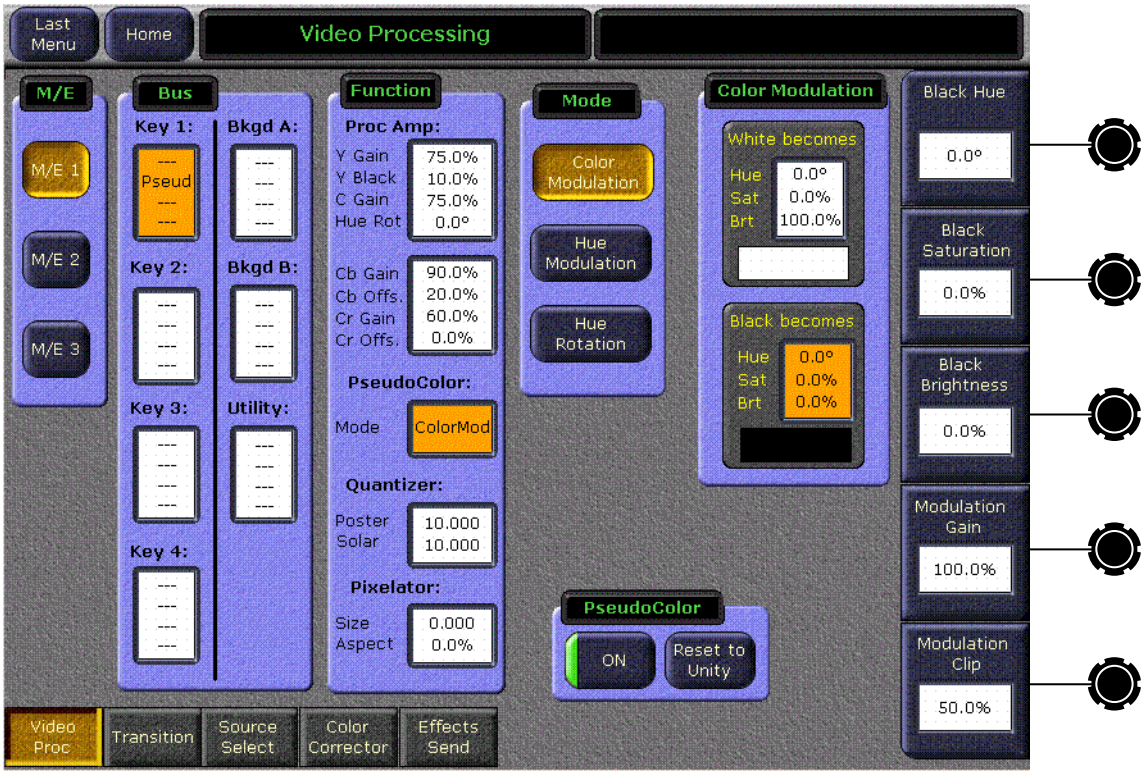
PseudoColor Controls

Touching **PseudoColor** in the Function panel displays the Pseudo Color control menu (Figure 204). The PseudoColor functions available are Color Modulation, Hue Modulation, and Hue Rotation. Touching the labeled Mode button brings up controls for that function.

The PseudoColor menu also has **On** and **Reset to Unity** buttons that operate like those on the Proc Amp menu.

Color Modulation

Figure 204. PseudoColor – Color Modulation Controls



Color Modulation uses the luminance component of the processed video signal to mix between two color mattes. Clip (**Modulation Clip**) and gain (**Modulation Gain**) parameters can then be used to control a matte wash between the two color mattes, which are set up similarly to the Base Matte and Wash Matte on the matte generator menu. When the luminance of the modulating video approaches white, the Color Modulator mixes the modulated video toward the matte labelled **White becomes**. When the luminance approaches black, the Color Modulator mixes toward the matte labelled **Black becomes**. A typical application is to convert color video to sepia tone.

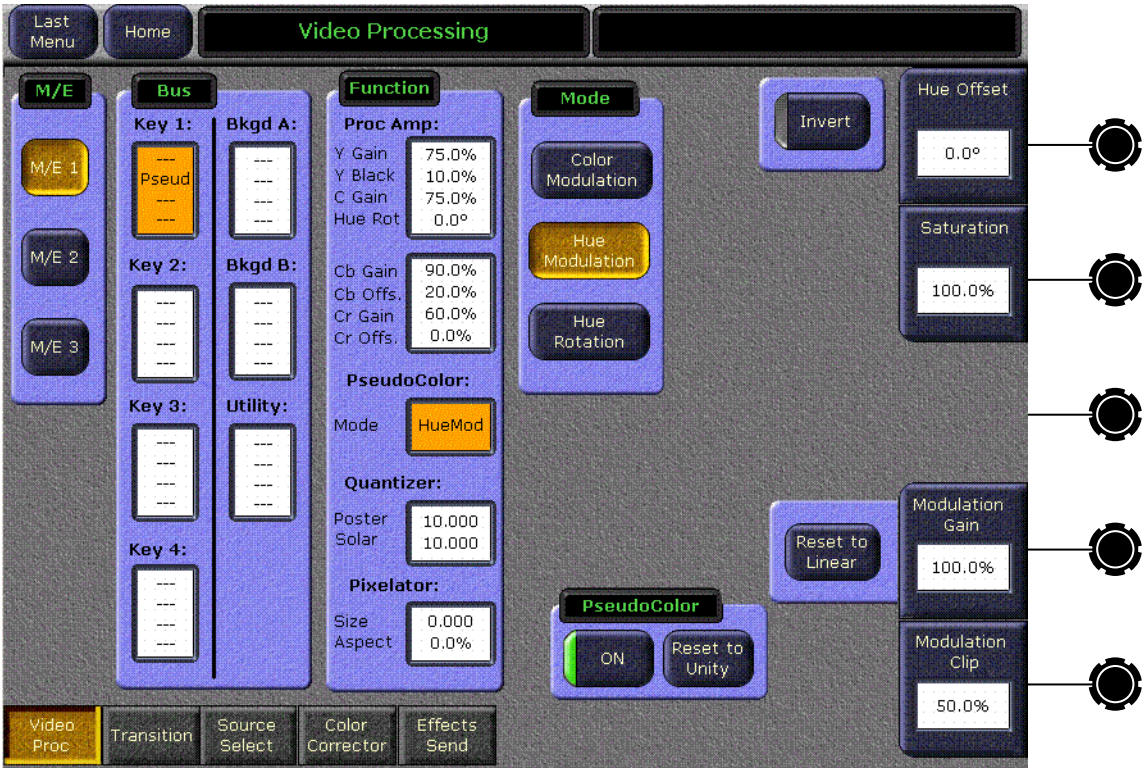
Note Incoming levels above clip hi and below clip low will not affect the output color, making large areas of the screen a fixed color. These controls should remain set to defaults unless the operator wants to restrict the range of incoming luminance levels that affect the output.

The data boxes in the Color Modulation pane delegate the three soft knobs at right to adjust **Hue**, **Saturation**, and **Brightness** for the selected color matte. These values appear in the data boxes in the Color Modulation pane. In addition, a color swatch approximates the chosen color.

The **Reset to Unity** button sets the Mattes to white and black, set s Modulation Clip to 50%, and set Modulation Gain to 100%.

Hue Modulation

Figure 205. PseudoColor – Hue Modulation Controls



Hue Modulation operates like Color Modulation, but instead of mixing between two color mattes, the modulating signal maps incoming luminance to matte hue. As the instantaneous luminance value of the incoming video changes from black to white, the instantaneous hue of the processed picture changes in hue angle. As the luminance increases, the hue value increases toward magenta, red, etc., counterclockwise on the vectorscope.

The direction of the lookup table is reversed by pressing the **Invert** button. When Invert is active, increasing luminance decreases the hue angle, clockwise toward cyan and green.

The **Hue Offset** control sets the hue angle derived from a black input. A Hue Offset of zero means that black would produce a matte with hue angle of zero, or approximately dark blue. As the Hue Offset is increased, the hue angle for a black input also increases. The range for the Hue Offset control is 0 to 359 degrees, and it wraps at 360 degrees and 0. The hue angle derived from a white input is approximately 180 degrees from that for the black input.

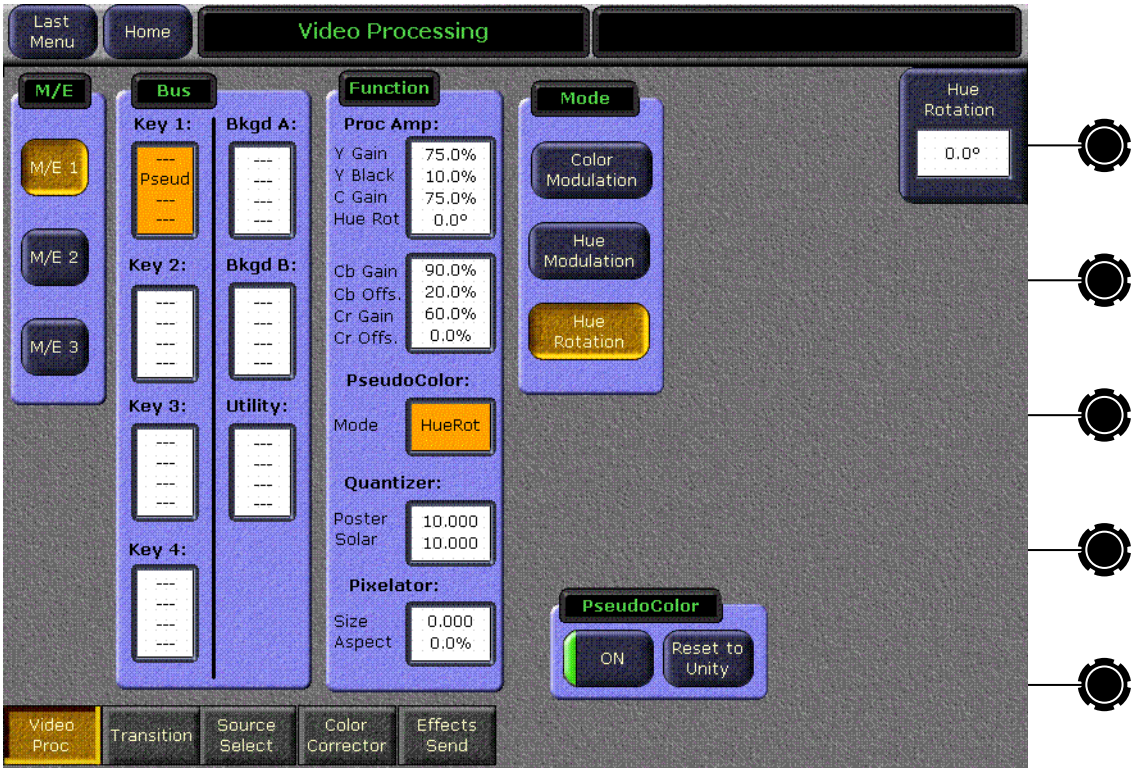
The **Saturation** control can be adjusted from 0 to 100%. 100% means the chroma levels are the same as 100% SMPTE bars. 0% means black and white. The luminance values pass through the Hue Modulation processor unaffected.

The **Modulation Gain** and **Modulation Clip** operate similar to standard Clip and Gain controls. Modulation Gain affects how far the hue will shift with a black to white luminance change. Modulation Clip and Hue Offset interact to control the starting and ending hues (black and white hues).

Note Incoming levels above clip hi and below clip low will not affect the output color, making large areas of the screen a fixed color. These controls should remain set to defaults unless the operator wants to restrict the range of incoming luminance levels that affect the output.

Hue Rotation

Figure 206. PseudoColor – Hue Rotation Controls

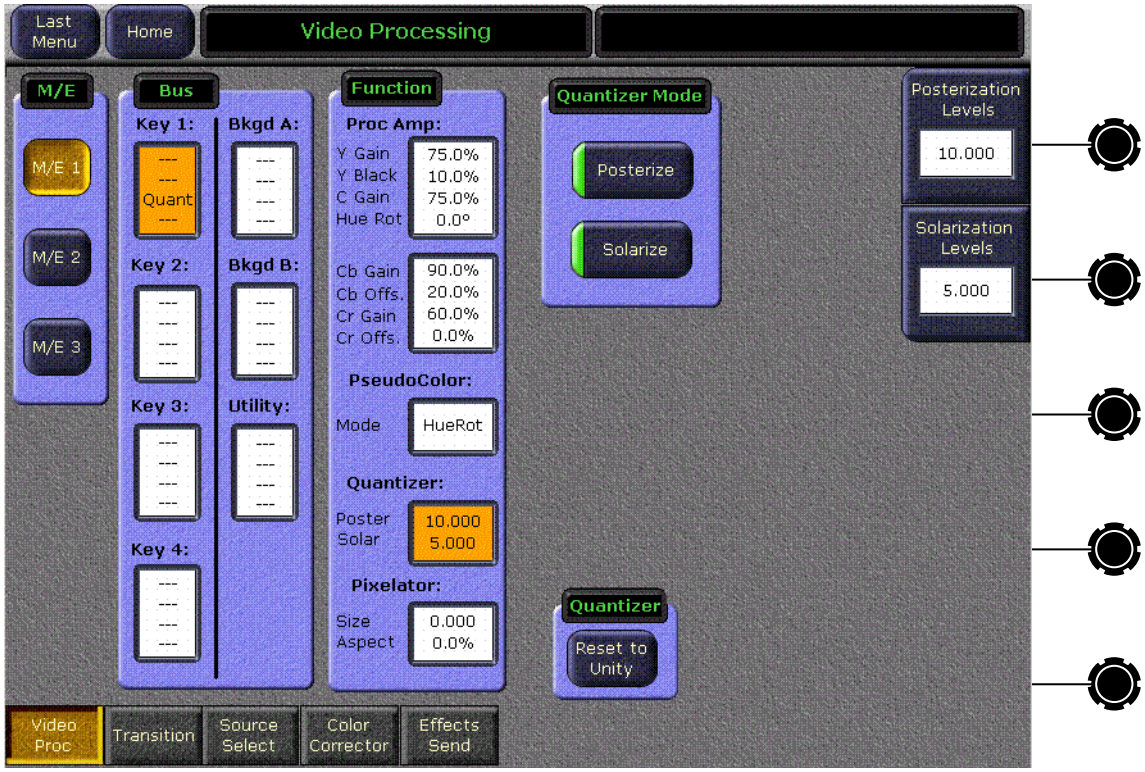


Hue Rotation is turned on and off only from this menu, using the **ON** button.

The **Hue Rotation** control adjusts the hue angle in degrees ranging from -179 to +180. Clockwise rotation of the soft knob decreases the value. This soft knob control also appears on the Proc Amp menu, but is only active in either location when Hue Rotation is turned on from this menu. Though Hue Rotation is conceptually a Proc Amp control, the Zodiak system actually uses Pseudocolor circuitry to perform Hue Rotation. The Pseudocolor Hue Rotation circuitry must be turned on before the feature can be used in either menu.

Quantizer Controls

Figure 207. Quantizer Controls



The Quantizer menu controls posterization and solarization. Posterization breaks smoothly changing luminance values into quantized levels. Solarization creates quantized chrominance levels.

Separate on/off controls for **Solarize** and **Posterize** in the Quantizer Mode pane allow activation of any combination of the two features.

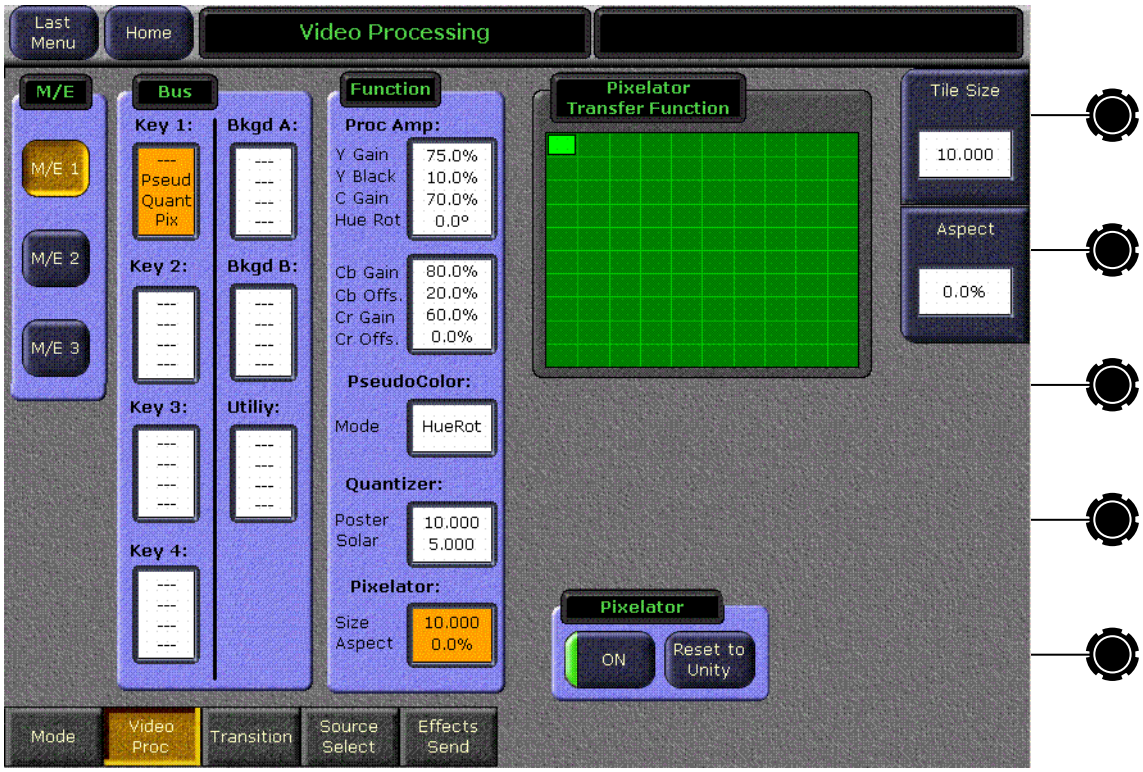
The **Quantization Levels** and **Solarization Levels** soft knob controls adjust the number of quantization levels. The values displayed range from 1 to 10, corresponding to the number of bits used to quantize the signal. For example, a value of 4 bits results in 16 levels, and a value of 5 bits results in 32 levels, etc. A value of 10 represents full 10 bit resolution, which results in no quantization effect. The actual number levels generated range from 1 to 1024, but the controls are logarithmic to better match human perception of quantizing.

The **Reset to Unity** button sets the quantization levels to 10 (no visible effect).

Pixelator Controls

Touching **Pixelator** in the Function panel displays the Pixelator menu (Figure 208). The Pixelator produces a mosaic appearance. A representation of the resulting mosaic effect is shown in the Pixelator Transfer Function display.

Figure 208. Pixelator Controls



The **Tile Size** soft knob adjusts size of the tiles, in pixels. (The reading is actually overly accurate, to accommodate interpolation. The actual width in pixels of a tile is rounded upward to the nearest multiple of 4).

The **Aspect** soft knob controls the tile aspect ratio. The range is -1.00 to +1.00.

The **Reset to Unity** button sets both values to zero, resulting in no mosaic.

Transitions Menu

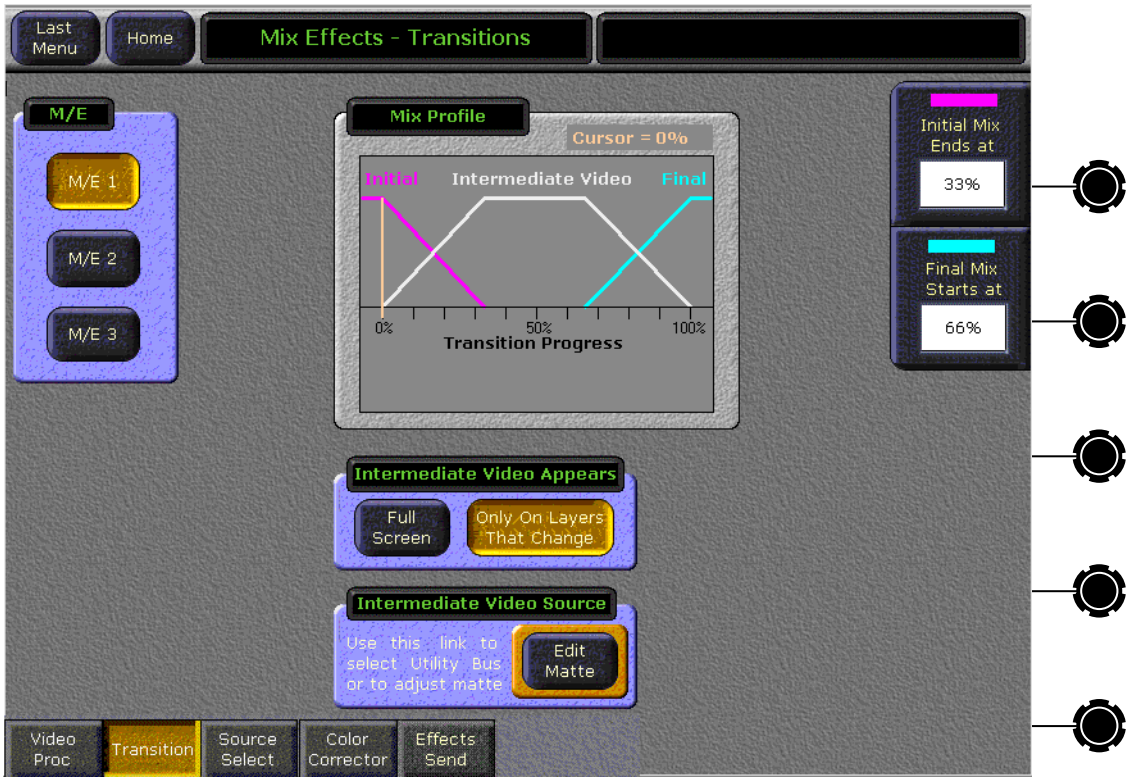
The Mix Effects – Transitions menu (Figure 209) provides controls for selecting and customizing a user transition type. When the **User Tran** button is selected as the transition type in an M/E Transition subpanel on the Main Control panel (see *Transition Types* on page 110), you can choose the type of user transition in this menu.

One user transition type is currently available – Mix Through Video. A Mix Through Video transition incorporates a third or intermediate video in the middle of a mix transition. This type of user transition allows mixing from one video through a matte or video from the Utility bus to a final video.

To customize a user transition, first select the Mix Effects in which you wish to define a user transition from the M/E pane on the left of the screen.

The Mix Profile display shows the mix ratio percentage currently selected for the transition. Each component of the mix, the initial, intermediate, and final video, is represented by a different color to make the profile of the mix easy to see. The ratio of initial, intermediate, and final video can be changed by using the soft knobs on the right of the screen to adjust the percentage values or by touching the data entry field and entering a value with the alphanumeric keypad.

Figure 209. M/E – Transitions Menu



Use the Initial Mix Ends At knob (or select the data pad to bring up a numeric keypad) to determine at what point the initial video will end and the intermediate video will start. Use the Final Mix Starts At control to determine where the intermediate video ends and the final video begins. The ratio is set by percentage of the video transition, with 100% being the completed transition and zero being the start.

Intermediate Video Settings

In the Intermediate Video Appears data pad, the intermediate video can be set to appear either **Full Screen** or **Only On Layers That Change**. Selecting **Full Screen** enables a full raster of intermediate video to appear during the mix transition. Selecting **Only On Layers That Change** restricts the intermediate video to appear only in layers that change during the mix transition.

In the Intermediate Video Source data pad use the **Edit Matte** button to link to the M/E Mattes menu (see the *Matte – M/E Menu* on page 270) where the intermediate video source can be selected as Matte or Utility (video). The Matte menu will automatically be delegated to the correct M/E.

To use a matte as intermediate video, select the **Matte** button in the Base Color – Source data pad on the right of the M/E – Matte menu. Matte values automatically delegate to the M/E Trans Wipe Border controls. Use the matte controls to set the desired matte settings for the intermediate video.

If you wish to use the M/E Utility bus video, select the **Utility** button in the Base Color – Source data pad. On the Main Control panel, select the **Utility** button in the Key Bus delegate subpanel for the M/E you are using and select the desired intermediate video source on the delegated Key bus. Refer to *Key Buses* on page 104.

For more details on setting up and using a Mix Through Video user transition, refer to *Mix Through Video Transition* on page 386.

Source Select Menu

A Source Select menu is accessible from the M/E and Keyer menus. The Source Select menu is used to change sources in real-time from the Menu panel. This menu makes it possible to select sources that are not mapped to any source select buttons. Infrequently used sources (like Black or a CG logo) may not be mapped on a bus, to free up buttons for use with other more important sources.

Two different Source Select menu layouts are available, depending on whether Key Layers (Figure 210) or Bkdg Layers (Figure 211) have been selected. The menus report Split Keys and indicate buses with sources that are On Air.

Figure 210. Source Select Menu, Key Layers Selected

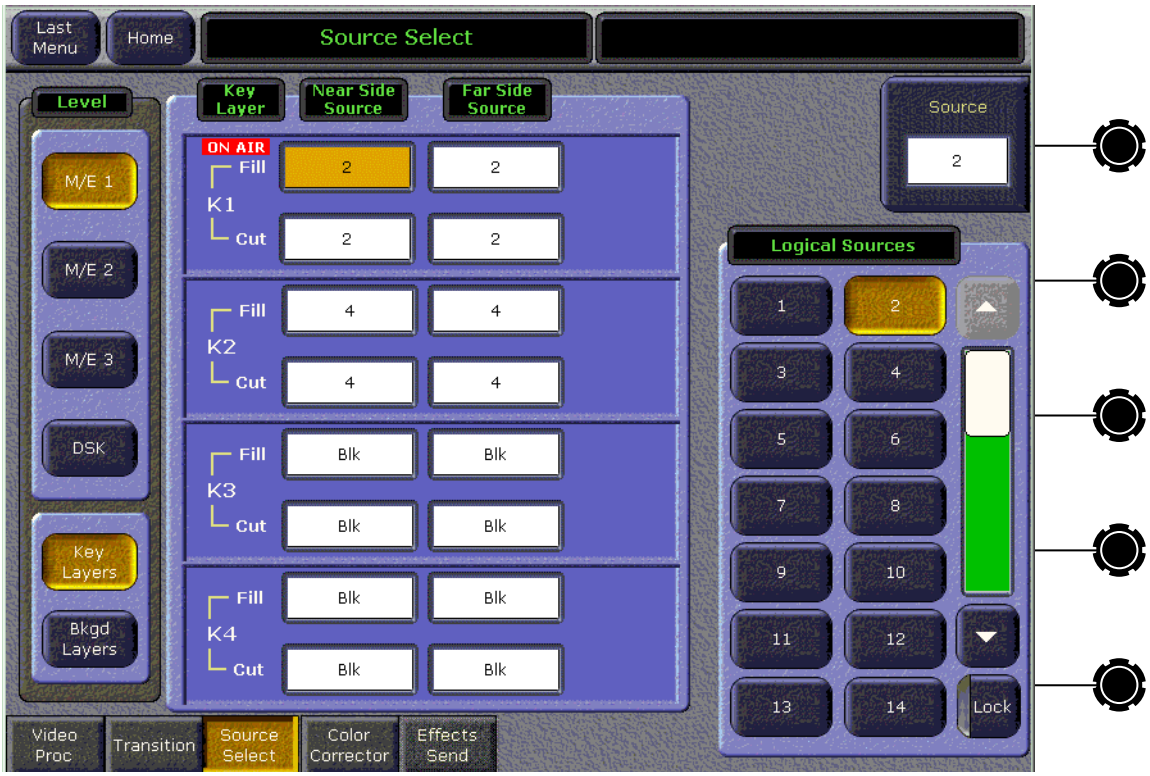
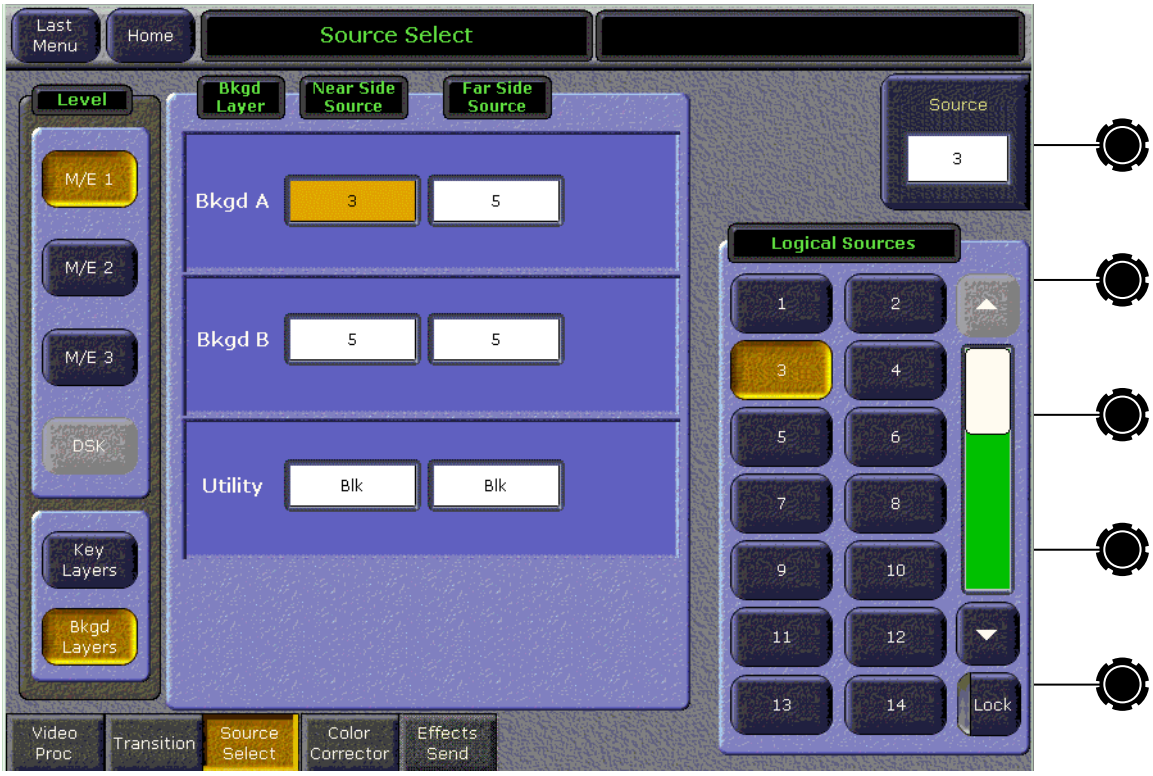


Figure 211. Source Select Menu, Bkgd Layers Selected



Sources are changed by choosing either the Key Layers or the Bkgd Layers, delegating the desired item (for example, M/E 1, Keyer 1 Fill, Near Side Source), and then selecting the source from the scrolling list on the right. You can tap the green area of the slider to display the next group of sources, and you can drag your finger on the slider handle to quickly scroll the list. Sources can also be selected with the Source soft knob.

Unlike source selections on the Main panel, which switches both near and far side sources unless a modifier button is used, menu source selections for near and far side sources are always independent.

The Source Select menu can be used to select a source, and then an E-MEM register can be learned. Subsequent recall of that E-MEM register will recall the source even if it is not mapped to a button.

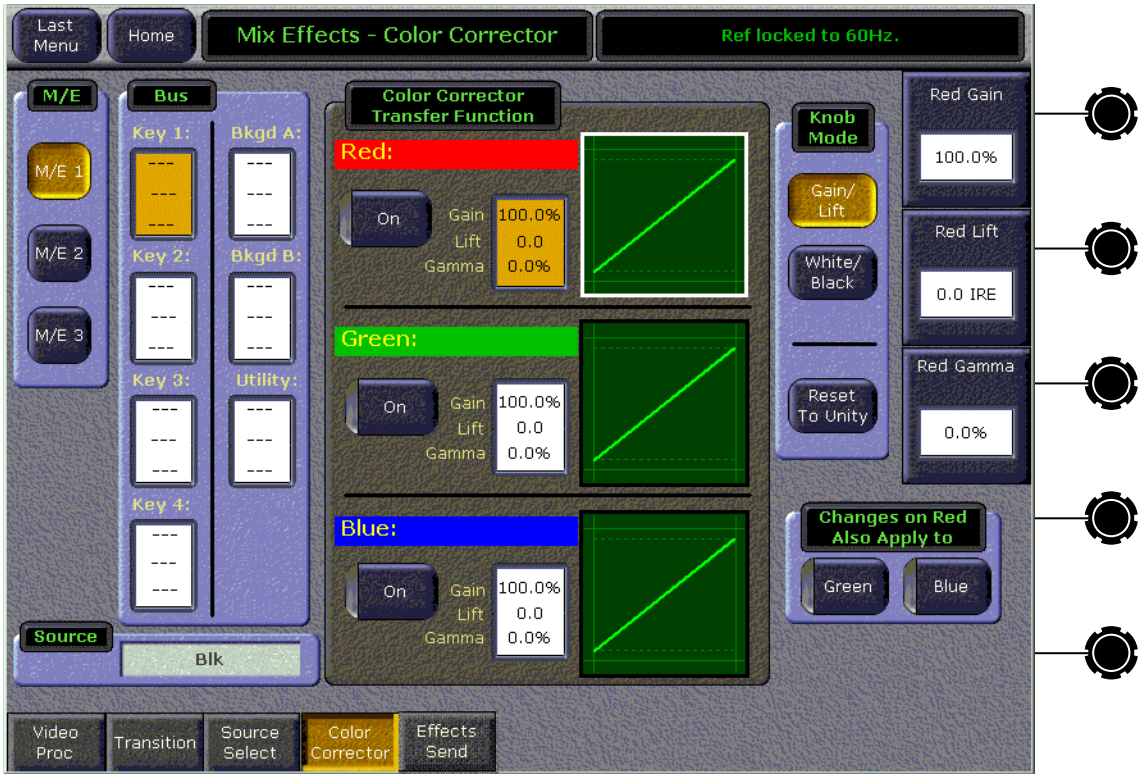
Color Corrector Menu

RGB Color Correction is a software enabled feature that converts the video signal on a particular video bus from color difference format to RGB (red, green, blue) color component format, applies separate offset, gain, and gamma to each RGB component, then converts from RGB back to color difference (Y, Cb, Cr) format. The color correction is applied on an input by input basis. The parameters are applied on the basis of a source and bus

intersection and stored as part of source memory. A different input on the same bus or a same input on a different bus, may have different color correction.

The Color Corrector menu is used to adjust RGB color on a selected bus and input. Touch **M/E**, **Color Corrector** to access the menu (Figure 212).

Figure 212. Color Correction Menu



The M/E pane button group selects the M/E, (for a 2-1/2 M/E switcher, the button for M/E 3 disappears). The Bus data box group selects the bus layer within the M/E. The data boxes for the Bus delegation contain **Red**, **Green**, **Blue**, or **---**. A color component in the data box indicates that color correction is being applied to the component(s). For components not enabled, the **---** is shown as a place holder.

The Source pane is a non-editable text box that shows the Name of the source currently selected on the crosspoints of the M/E and bus delegated above. It is to this source and only on the delegated M/E and Bus that the color correction will be applied.

The Color Corrector Transfer Function pane contains three data boxes which serve as delegators. Each of these data boxes contains the Gain, Lift, and Gamma values. The three oscilloscopes show the input to output transfer characteristics of each color component's processor. They do not show actual video.

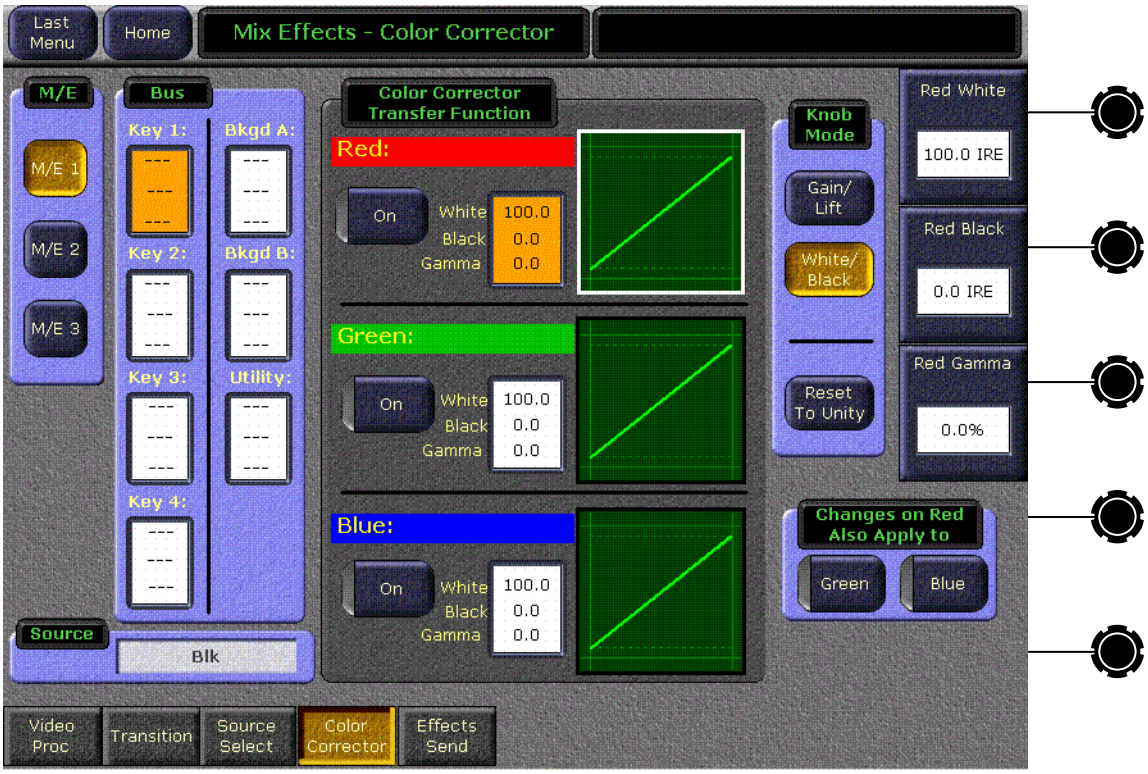
The Knob Mode pane has three buttons, the first two, **Gain/Lift** and **White/Black**, determine the mode for the knobs and the text boxes in the Color Corrector Transfer Function pane. When the third button, **Reset to Unity**, is touched it resets all values for the selected component to the Nominal values shown in Table 8.

If **Gain/Lift** is selected the knobs and boxes will appear as in Figure 212.

If **White/Black** is selected (see Figure 213), the following changes occur in the menu:

- The gain and offset are expressed in the oscilloscope in terms of the two end points of the transfer function without regard to where the scope trace would clip,
- Gain is changed to White,
- Lift is changed to Black, and
- Text boxes show the values for White and Black.

Figure 213. Color Corrector Menu in White/Black Mode



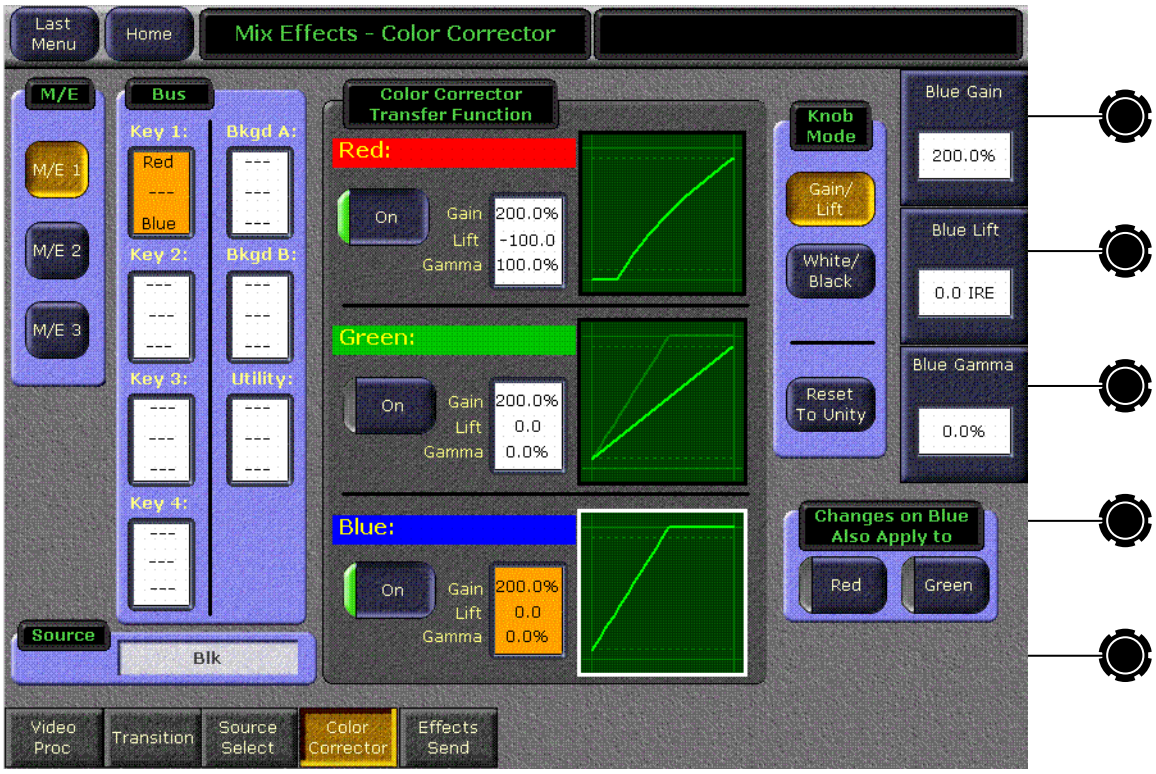
The value ranges are shown in Table 8.

Table 8. Color Corrector Value Ranges

Control	Minimum	Maximum	Nominal	Units
Gain	0	200	100	%
Lift	-40	+100	0	IRE
Gamma	-100	+100	0	%
Black	-40	+100	0	IRE
White	-40	+300	100	IRE

When one of the **Red**, **Green**, or **Blue** color component's data box is selected, the knobs for **Gain**, **Lift**, and **Gamma** are delegated and re-labeled for the specific component. In Figure 214, the Blue data box has been selected, so the knobs are labeled **Blue Gain**, **Blue Lift**, and **Blue Gamma**, and they control those values. If the Green data box had been selected, the knobs would be labeled **Green Gain**, **Green Lift**, and **Green Gamma** and would control the green channel's values, and similarly for Red. The border color for the oscilloscope for the selected component is changed from black to white.

Figure 214. Adjustments



The three color components have individual **On** buttons, which are LED push on/push off type buttons. As shown in Figure 214, the Red and Blue components have been enabled but the Green component has not. If a com-

ponent is not turned on, it is still possible to adjust its color correction values, but they are not applied to the video. When a component is not turned on, the scope trace for the component is made a darker shade of green to further indicate that the transfer function is not being applied to the video. To show that the color corrector for a component is turned off and passing signals at unity gain, a unity trace will appear over the top of a darker scope trace. In Figure 214, the Green component is not turned on, so it is showing two traces, a dark green and a unity trace; the Red and Green components are on showing a single trace. The scope traces change shape to show the transfer function that would be applied if the component's color correction processor were turned on.

The oscilloscope for each color component is modeled after a waveform monitor into which a black to white video luminance ramp is fed after being subjected to the color corrector modifications. The waveform monitor is set up to show red, green, and blue components. In a more abstract sense, the horizontal scale of the graph corresponds to the input color component intensity level to the color corrector, and the vertical scale corresponds to the output level from the color corrector. Nominally, the diagonal line in the figure is the unity trace, and it starts at the black level in the lower left and it ramps linearly to the white level at upper right. The dotted graticule lines signify nominal black to white range. The solid graticule lines mark the absolute limits of the graph.

The slope of the diagonal line is proportional to the component's gain. At gain zero, the line is flat and level. If the gain is adjusted high enough so that the trace would exceed the absolute vertical limits of the graph, the trace is modified to look as it would if the ramp signal were clipped by the limiters in the actual color corrector.

Component Lift (black level) is signified by moving the trace up and down without changing its slope. Component lift is the y-intercept, the b in y = mx + b, if the diagonal line were not limited as described above. The vertical scale is such that zero is at the black dotted line, 100 IRE is at the white dotted line.

Component Gamma is represented as curvature in the line. Gamma is an exponential function applied to the input such that the concavity of the curve is downward for positive gamma and upward for negative. At zero gamma, the trace is a straight line.

The **Changes on (Red/Green/Blue) Also Apply to** pane has two on/off buttons. The pane title and the button labels are dependent on the selection of the color component in the Color Corrector Transfer Function pane. If the user selects Blue as the color to be adjusted, as is shown in Figure 214, the title of the pane is, **Changes on Blue Also Apply to**, and the two buttons are **Red** and **Green**. When these buttons are active, the adjustments applied to the originally selected color component is also applied to the one(s) selected in the pane. For example, if the user chooses to adjust Blue and selects Red in the Changes on Blue Also Apply to pane, then any adjustments to Blue's Gamma value will be applied to Red's Gamma value. The Red oscillo-

scope's border will turn white to show that Red is attached to Blue. Changing from Blue to either Green or Red in the Color Corrector Transfer Function pane will cancel the attachment.

Touching the **Reset to Unity** button will reset all attached components.

Effects Send Menu

The Effects Send menu is accessible from the M/E and Transform Engine Menus by touching the **Effects Send** button (Figure 215).

Figure 215. Effects Send Menu

The buttons on this menu activate the **Int DPM** Effects Send loop on each keyer of each M/E. This menu allows you to turn the Effects Send loop on and off without having to first delegate that keyer on the Main panel.

Activating Effects Send is also a necessary precursor to using the Glow feature, which is standard on Zodiak systems.

Keyer Menus

The key type, key mode, and clip adjustments for any of the M/E or DSK keyers can be made from the Main panel using the M/E and DSK Keyers subpanels (see *M/E Keyer Subpanels* on page 114 and *DSK Keyer Subpanel* on page 119). These controls are on the Main panel for immediate access. However, some key adjustment for detail, such as opacity and mask controls, are accessible from the corresponding Keyer menu. The Keyer subpanels and the corresponding menus will reflect and track the changes made by either set of controls.

The Keyer menu controls are organized into several subcategories, each with different menu selection based on the type of key. These menus are accessed by touching the **Keyer** button, then the category is chosen from the **Mode**, **Priority** or **Mask** buttons at the bottom of the menu (Figure 216 on page 314). For a complete overview on key types and adjustments, refer to *Keying* on page 46.

Mode Menu

The Mode menu allows you to view or select the type of key for any of the four keyers in each M/E or the three DSK keyers from the Menu panel. (Note that not all M/E key functionality is present in the DSK keyers). Touching the **Mode** subcategory button brings up the Keyer Mode menu. Touch the keyer data pad in the M/E you wish to select, then select the **Mode** from one the selections described below. The mode may also be selected in the corresponding Keyer subpanel on the Main panel.

Key modes are selectable from the following choices:

- Fixed Linear
- Adjustable Linear
- Luminance Key
- Chroma Key
- Preset Pattern

Fixed Linear

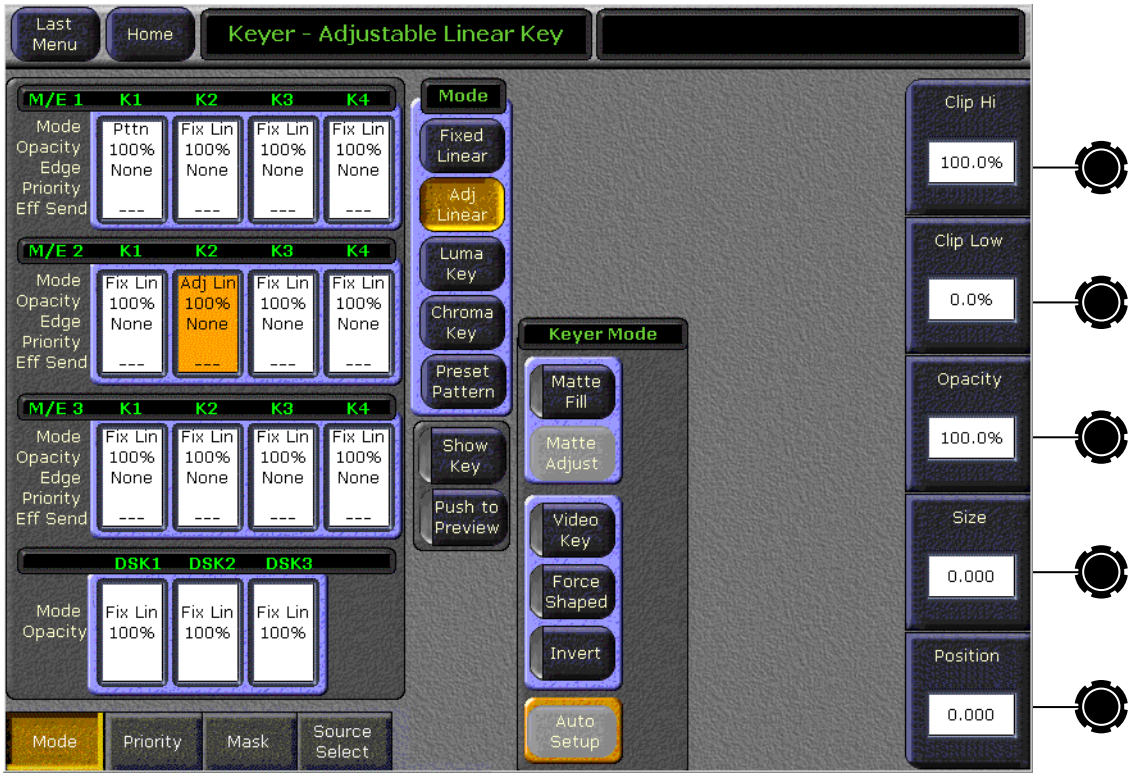
When Fixed Linear key mode is selected, the typical linear key (see *Linear Key* on page 52) can be adjusted for opacity with the Opacity soft knob on the right of the menu screen. The Fixed Linear controls are similar to Figure 216 on page 314. However, Clip and Gain controls are not active for this mode. The keyer uses Clip and Gain or (Clip Hi and Clip Lo) from the data entered in the Eng Setups – Sources menu. The Keyer Mode selections (**Matte Fill**, **Video Key**, **Force Shaped** and **Invert**) can be selected in the menu or will follow the selections made in the Keyers subpanel on the Main panel.

Adjustable Linear Key

An adjustable linear key is available by pressing both the **Lin Key** and **Lum Key** buttons simultaneously on the Main panel or by selecting the **Adj Linear** in the Keyer Mode menu (Figure 216). The Keyer Mode selections shown in the menu may also be selected.

Clip Hi, Clip Low, and Opacity adjustments can be made with the soft knob controls on the right of the screen. Clip adjustments can also be made from the Keyers subpanel on the Main panel and will be reflected in the menu. The Size and Position soft knobs control very small (subpixel) position of the key edge. For a concept overview of an adjustable linear key, refer to *Fixed and Adjustable Linear Keys* on page 53.

Figure 216. Keyer Mode Menu – Adjustable Linear Key



Luminance Key

A Luminance key can be selected in the corresponding Keyers subpanel or by selecting the **Luma Key** in the Keyer Mode menu. Further Keyer Mode selections shown in the menu may also be selected.

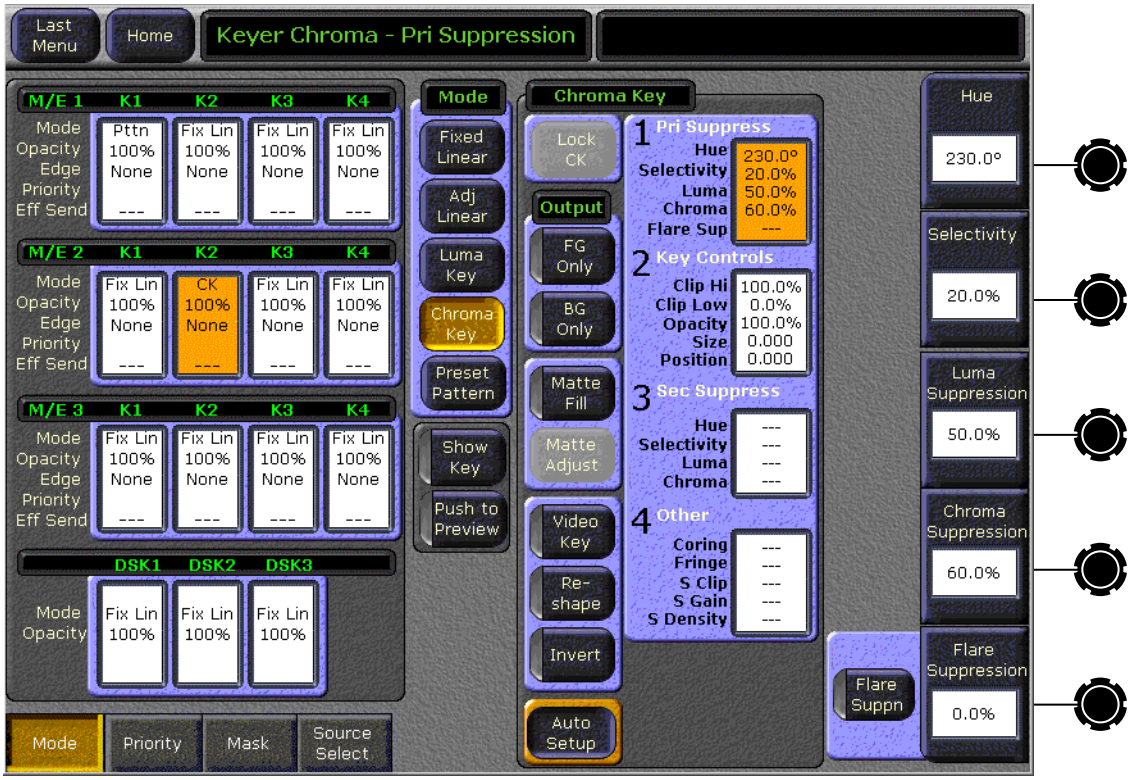
When a luminance key is selected, Clip, Gain and Opacity controls will appear on the right of the screen for adjustment with the soft knobs. For a discussion of luminance keying, refer to *Luminance Key and Self Key* on page 54.

Chroma Key

When a chroma key is selected, the menu (Figure 217) will display a summary of all chroma key parameter values at the same time. The parameter groups are numbered indicating the order the adjustments should normally be made. After the first two parameter groups have been adjusted, a reasonable key should be visible. Subsequent adjustment steps may improve the basic key in subtle ways.

See *Chroma Key Operating Notes* on page 376 for more information on setting up a chroma key. For a concept overview of chroma keying, refer to *Chroma Key* on page 55.

Figure 217. Keyer Mode – Chroma Key Menu

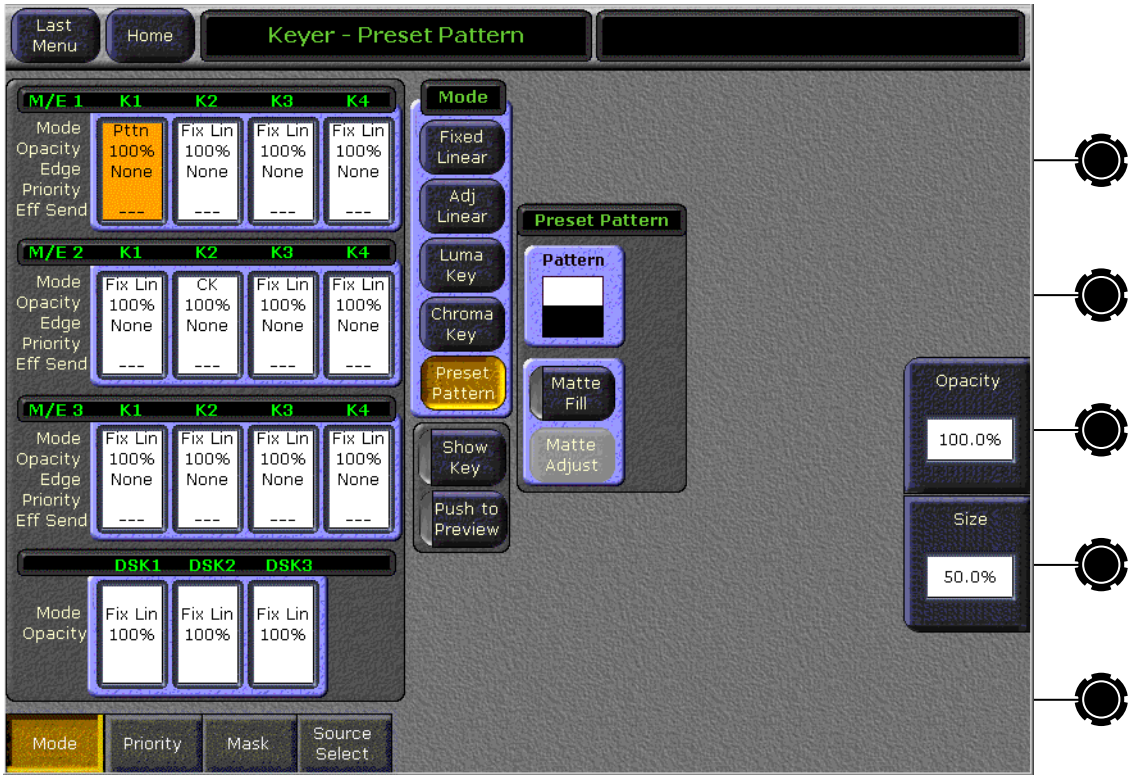


Preset Pattern

A preset pattern uses a wipe pattern generator, rather than an incoming key cut signal to define the hole cut in the background. When **Preset Pattern** is chosen as the keyer mode, the menu will appear as in Figure 218. When the **Pattern** data pad is touched, the Wipe menu (see *Wipe Menus* on page 322) will come up to allow pattern selection.

The Preset Pattern may be matte-filled by touching the **Matte Fill** data pad. The matte controls can be accessed by touching **Matte Adjust**. Opacity and size of the preset pattern can also be adjusted with the soft knob controls on the right of the screen.

Figure 218. Keyer Mode – Preset Pattern



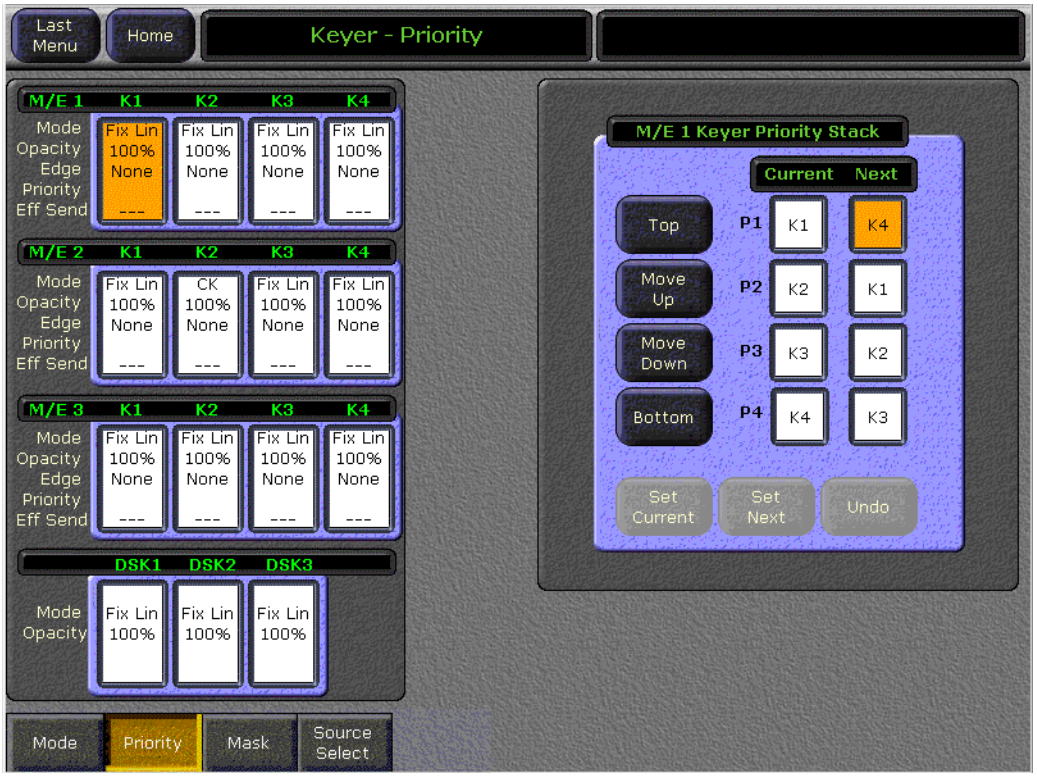
Keyer Priority Menu

Touching the **Priority** subcategory button takes you to the Priority menu (Figure 219). The Priority menu is used to change the stacking order of an M/E's keys. It is used in conjunction with the **Next Prior** button in the Keyer subpanel on the Main panel.

The parameter control area on the right has two columns, labeled **Current** and **Next**. The stacking order of the selected item in a column is controlled with the **Top**, **Move Up**, **Move Down**, and **Bottom** touch buttons. Changing the top to bottom order in the **Current** column will cause an immediate change in that keyers stacking order. The order in the **Next** column controls the order the keys will have after the next key priority transition. After the key priority transition, the **Current** and **Next** stacks will swap.

The **Key Prior** button in the Keyer subpanel on the Main panel provides an alternate method for setting key priority. Refer to *Key Prior Button* on page 118.

Figure 219. Keyer Priority Menu

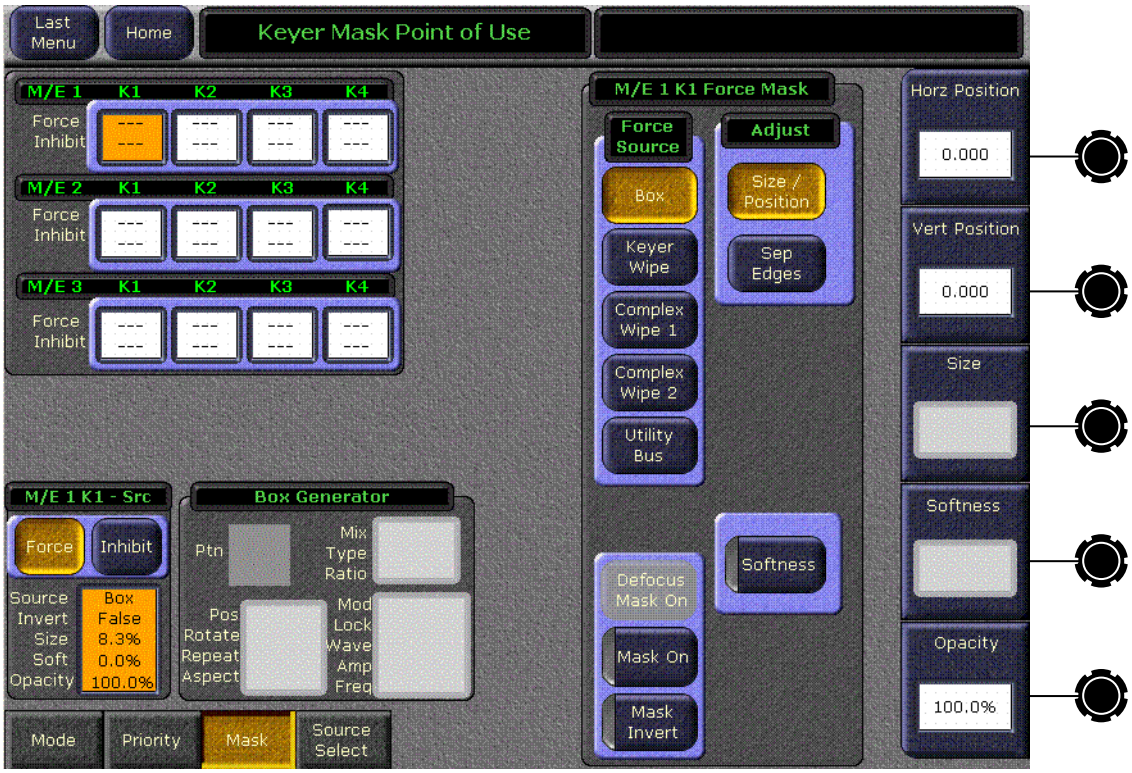


Keyer Mask Menu

Touching the **Mask** subcategory button takes you to the Keyer Mask Point of Use menu (Figure 220). The Mask menu allows selection and control of the keyer mask(s). Key masking defines areas that are protected from keying (Inhibit) or always key (Force). The shape of the mask can originate from a wipe pattern generator or by a selected mask signal (typically a key fill signal delivered via the Utility bus). Masking can only be done on M/E keyers.

The M/E (**M/E 1**or **M/E 2**) and keyer delegation (**K1** – **K4**) is made at the top left of the screen. Once a keyer has been delegated, choose the type of mask (**Force** or **Inhibit**, or both) from the data pad in the lower right corner. The example shown here is for a Box Inhibit mask on M/E 1 Key 1.

Figure 220. Keyer Mask Point of Use Menu



Mask Sources

For either type of selected mask (Force or Inhibit) five different mask sources are available and will appear in the data pad on the right of the screen. Only one mask source can be selected at a time.

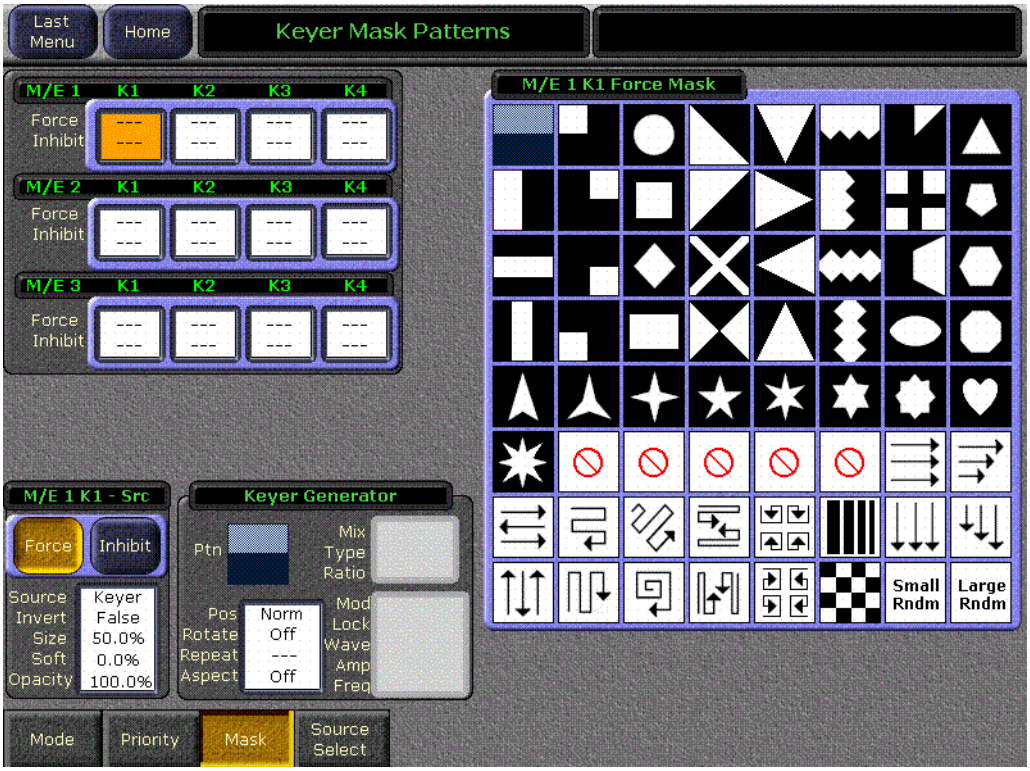
Box – When **Box** is selected as the mask source, the **Adjust** pane will appear with two selections: **Size/Position** or **Sep Edges** as shown in Figure 220.

- **Size/Position** – Allows adjustment of the size and position of the mask with the Horizontal, Vertical, Size, Softness, and Opacity soft knobs on the right of the screen.
- **Sep Edges** – Allows adjustment of the Top, Bottom, Left, Right, and Size of the mask with the soft knobs when the separate edges data pad is active (not shown).

Keyer Wipe – A Keyer Wipe mask source allows selection of a wipe pattern from the dedicated pattern generator for the keyer. Touch the **Ptn** button in the Keyer Generator pane to bring up the wipe pattern selections available (Figure 221). Select a pattern from the display. The selected pattern will appear in the **Ptn** data pad window.

Select the **Pos**, **Rotate**, **Repeat**, **Aspect** data pad below the **Ptn** data pad to bring up the pattern modifiers available for the keyer wipes. These include pattern positioner, rotate, H and V multiply, and aspect controls, similar to the wipe controls in Figure 226 on page 326. Modifiers are controlled by the soft knobs on the right of the screen.

Figure 221. Keyer Wipe Mask



Complex Wipe 1 and 2 – A mask can be generated from a complex wipe source. There are two complex wipe generators available, **Complex Wipe 1** and **2**. The pattern for the complex wipe is chosen in the same manner as the keyer wipe mask. The complex mask wipe can also be modified for position, rotation, H and V multiplication and aspect. In addition, wipes can be mixed and modulated (see *Pattern Modifiers Menus* on page 326).

Keyer and complex wipe masks must share the wipe generators with other functions with wipe capability in the switcher. This resource sharing must be considered when delegating one of the wipe generators to a mask. See *Resource Sharing and Point Of Use* on page 41 for more information.

CAUTION All controls in the C1 Generator box or the C2 Generator box affect the selected wipe pattern generator.

Utility Bus – The Utility Bus mask sources originate from the utility bus in the chosen M/E. Typically these are used to bring in garbage masks from a Still Store or some external device.

Mask On Button

The Mask may be turned on or off by selecting the **Mask On** button.

Mask Invert Button

The Mask Invert button inverts the sense of the delegated mask. When on, areas formerly masked will be visible, and previously visible areas will be masked. Masks are normally active in the center of the pattern. An inverted mask is active outside the pattern.

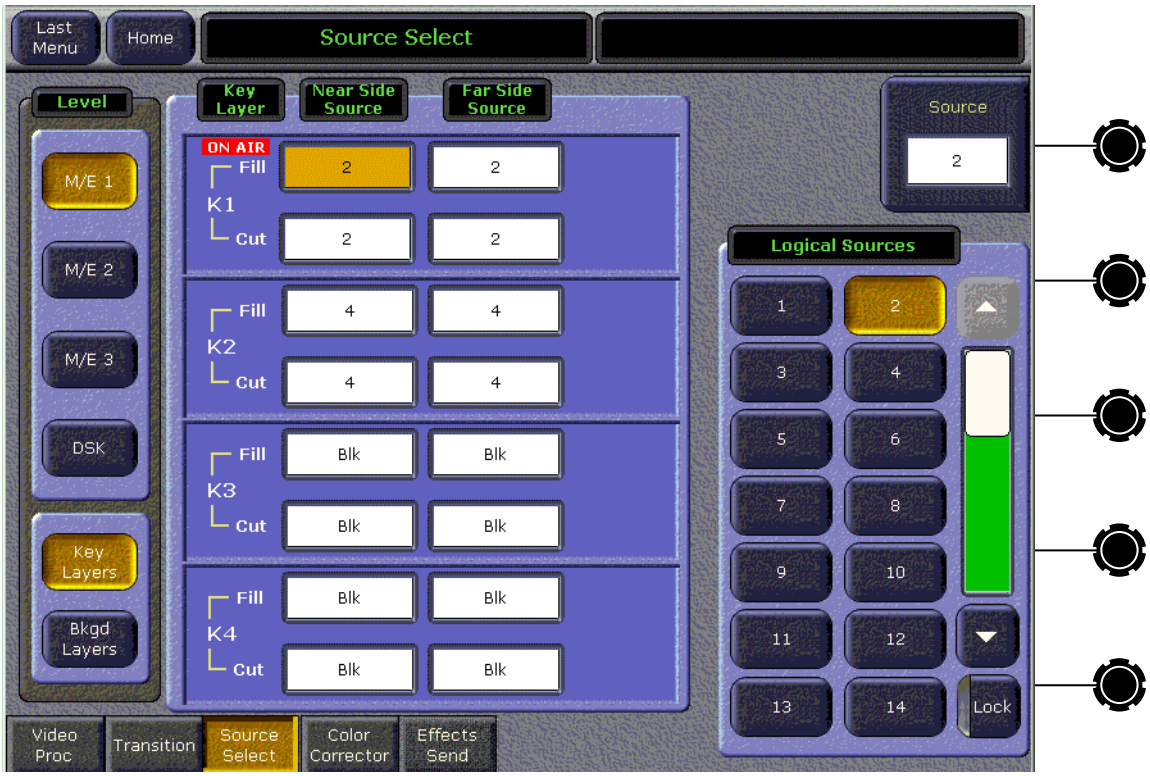
Defocus Mask On

This button is active when the Transform Engine option is enabled, the delegated keyer has Defocus turned on, and an **Inhibit** mask has been selected. When **Defocus Mask** is on, the Defocus effect can be masked so it is applied to only a portion of the image.

Source Select Menu

A Source Select menu is accessible from the M/E and Keyer menus (see *Source Select Menu* on page 305). The Source Select menu is used to change sources in real-time from the Menu panel.

Figure 222. Source Select Menu, Key Layers Selected



Wipe Menus

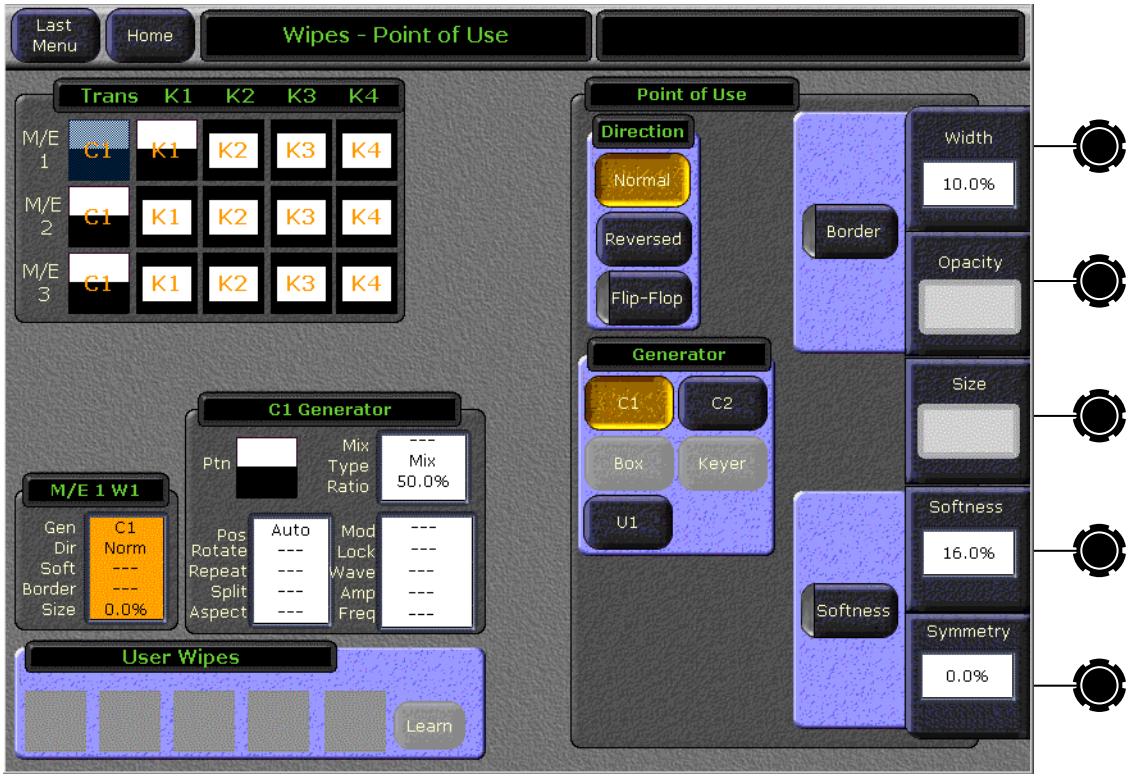
The Wipe menus allow selection and modification of wipe patterns for each of the full-function M/Es. The Wipe menus, like the Keyer menus, have a delegation area at upper left, which in this case contains pattern touch pads for every wipe pattern generator point of use. The currently selected shape is displayed on these touch pads. The **Wipe** button in the Transition sub-panel for each M/E is a DPOP button (double-pressing it brings up the Wipe menu).

Point of Use Menu

Selecting the **Wipe** button in the Home menu will bring up the Wipes – Point of Use menu (Figure 223). This menu displays a Point of Use parameter area on the right. A point of use is the location where a wipe pattern will be used, corresponding to one of the keyers or background transitions. The controls in the Point of Use pane affect each point of use of that wipe pattern separately. This allows applying different settings to the same pattern used at different places in the system.

The controls in the other panes in this menu affect the pattern generator itself. Pattern generator adjustments will affect all points of use employing that generator's pattern. The upper left delegation area identifies the generator connected to each point of use in gold text as well as the pattern selected on that generator.

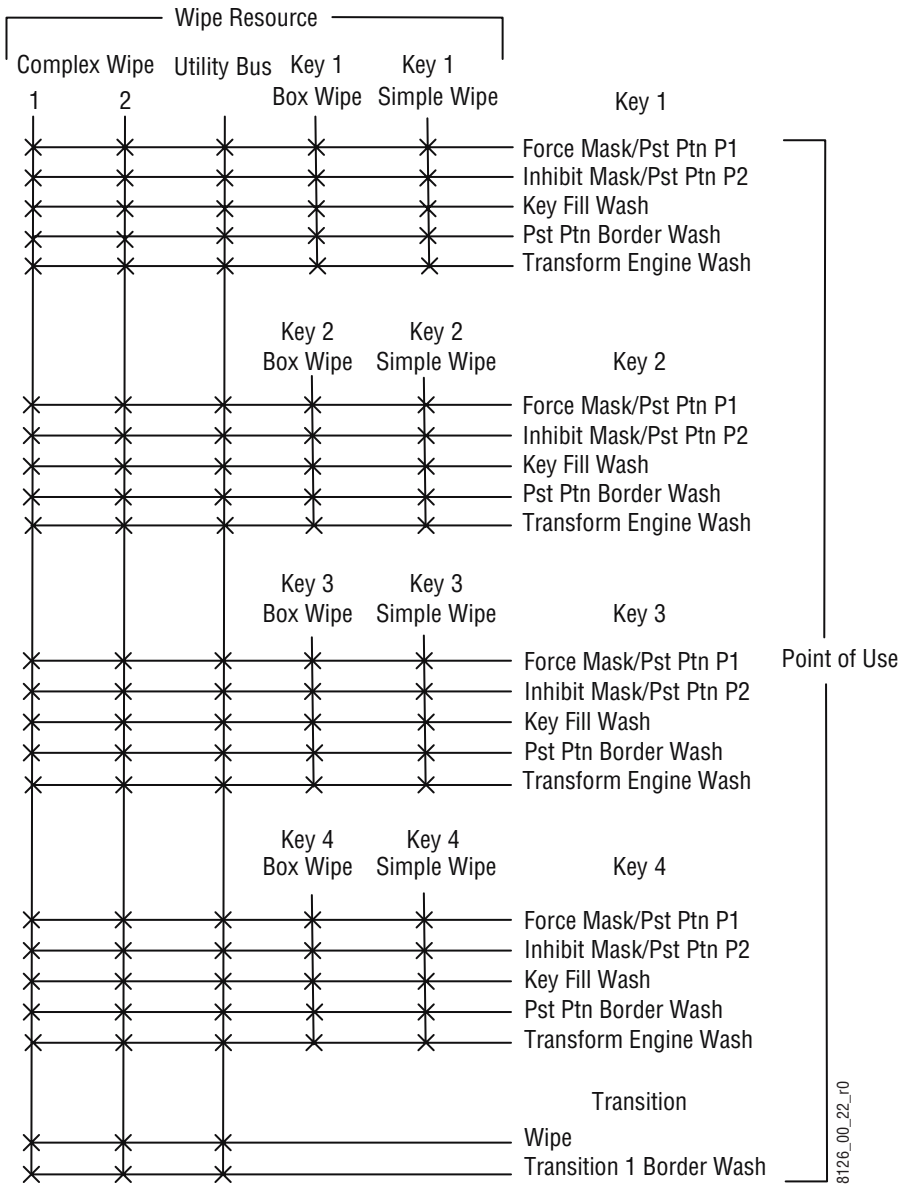
Figure 223. Wipes – Point of Use Menu



In this menu you can pick the wipe pattern generator that will be used by a point of use, pick the direction of the transition wipe pattern, specify its border and softness, etc. For operating simplicity, you may decide to use the Complex wipe generators (C1 and C2) for main transitions, and the simpler Box and Keyer wipe pattern generators for the keyers. However, the Zodiak system gives you the flexibility to use complex wipe generators with either main transitions or for keying and masking, and also the ability to use Utility bus video as the wipe pattern shape.

Wipe resources and points of use are diagramed in Figure 224.

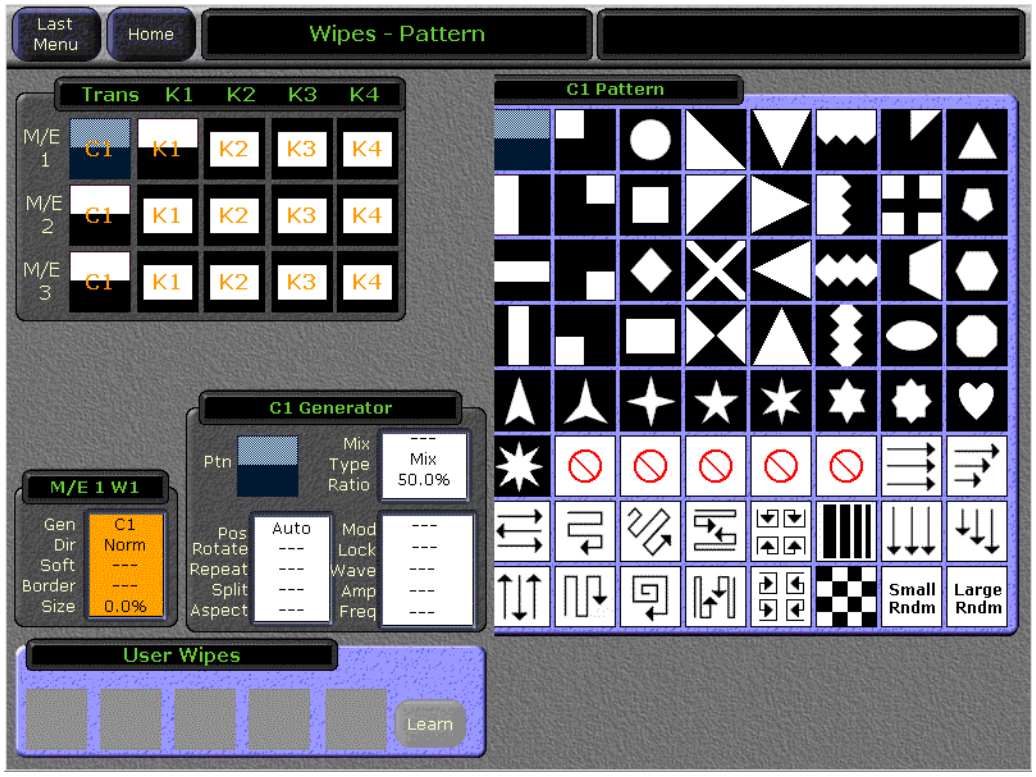
Figure 224. Typical M/E Wipe Switching Matrix and Point of Use



Pattern Selection Menu

Touching the **Ptn** touch pad in the C1 or C2 Generator window (the white area of the pattern will go blue) brings up the palette of wipe shapes available (Figure 225). Selecting a pattern will change the shape of the pattern in the **Ptn** touch pad and the C2 location in the delegation area to indicate the new pattern. Select any of the other white data pads to close the pattern window.

Figure 225. Pattern Selection Menu

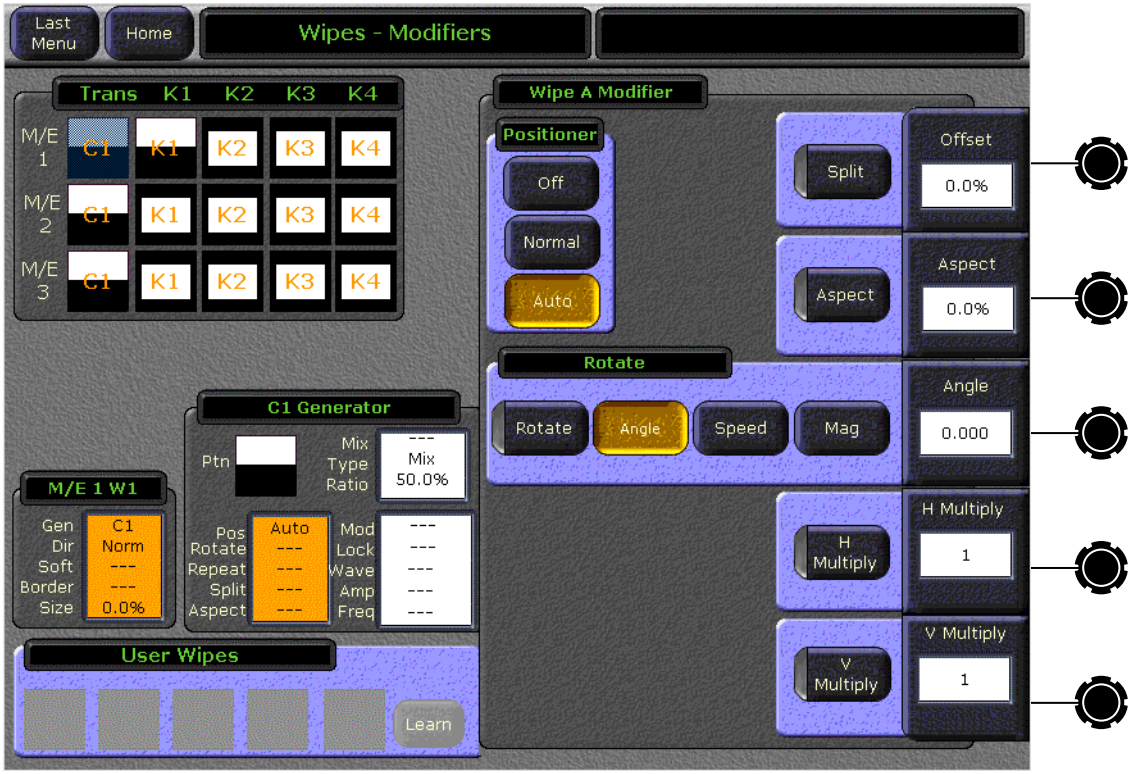


Pattern Modifiers Menus

The three other touchpads in the C1 or C2 Generator window bring up the available wipe pattern modifiers. The soft knobs on the left of the screen are used to control the various parameters. The knobs that appear will differ depending on the type of pattern modifiers chosen.

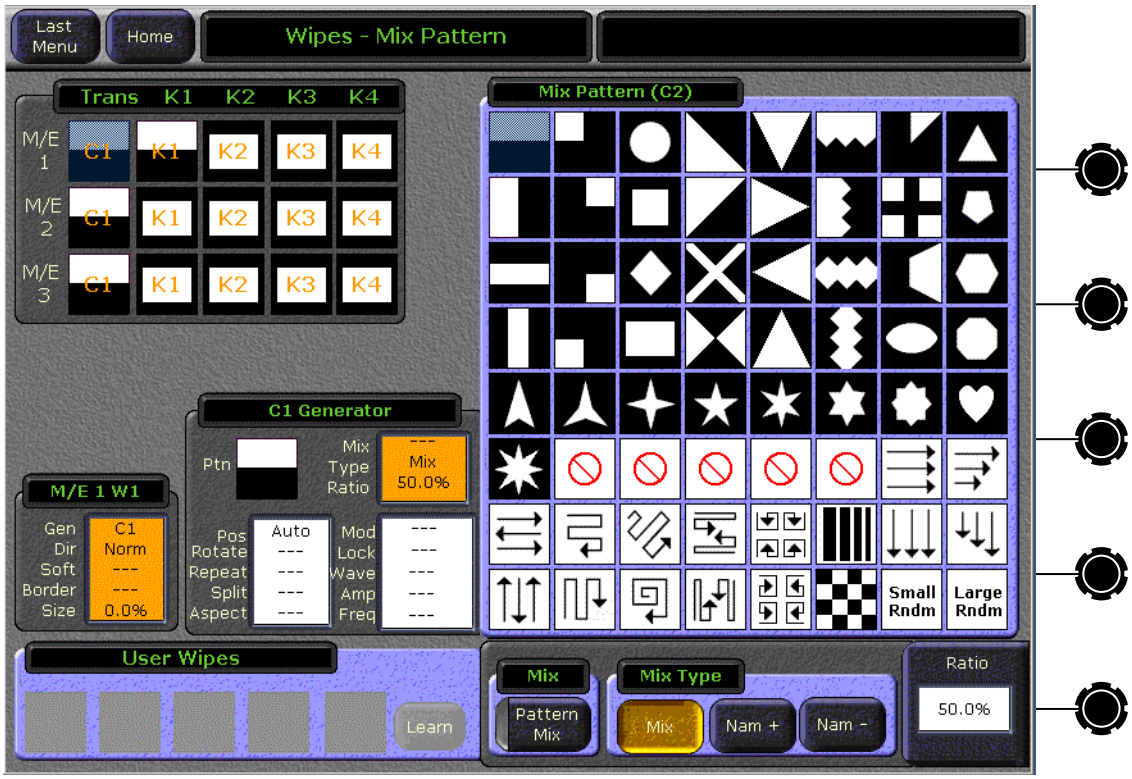
Pos, Rotate, Repeat, Split, Aspect – Allows control of the pattern positioner, the rotation and speed functions, the split and aspect functions and the repeat (H and V Multiply) functions (Figure 226). Modifier parameters are controlled with the soft knobs on the right of the screen.

Figure 226. Pattern Modifiers Menu – Pos, Rotate, Repeat, Split, Aspect



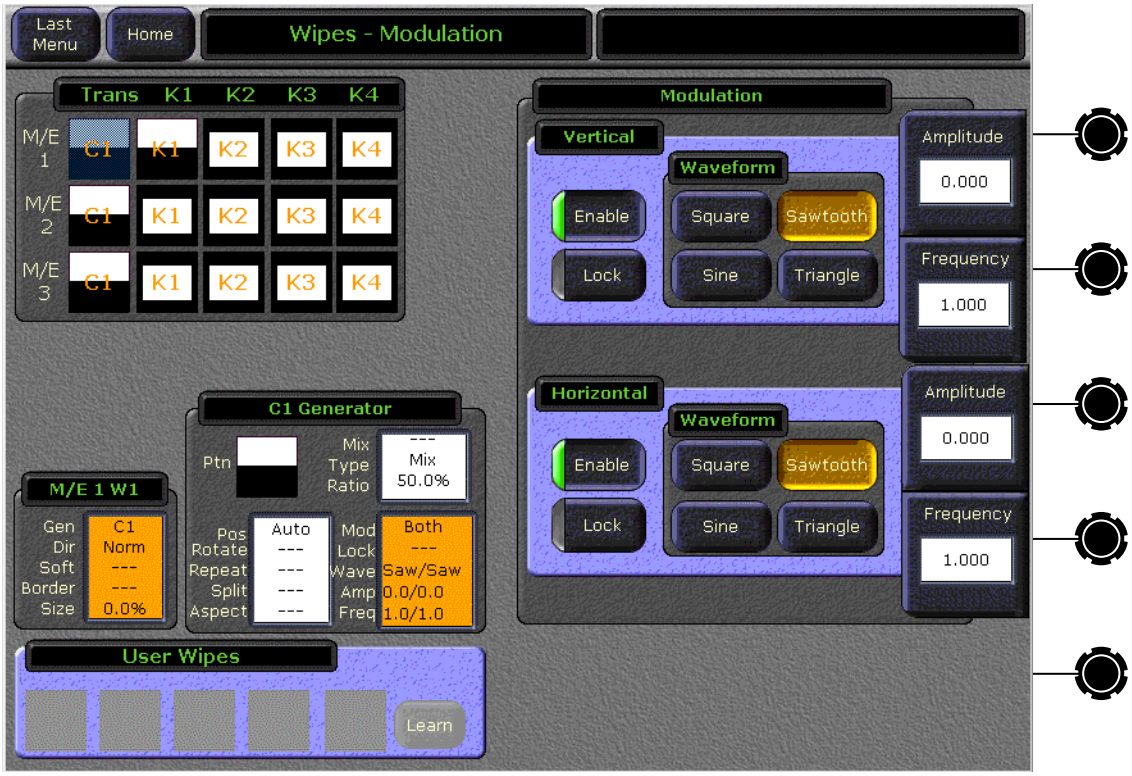
Mix, Type, Ratio– Allows control of the pattern mix function (Figure 227). Patterns from C1 Generator and C2 Generator may be mixed or non-add mixed with the **Mix Type** control data pad. The ratio may be chosen by touching the **Ratio** data pad to bring up the numeric keypad.

Figure 227. Pattern Modifiers – Mix Menu



Mod, Lock, Amp, Freq – Allows enabling and control of the modulation wipe functions (Figure 228). Patterns may be modulated vertically or horizontally with four different waveforms (Square, Sine, Sawtooth and Triangle). Soft knobs on the right of the screen control amplitude and frequency of the H and V modulation.

Figure 228. Pattern Modifiers – Modulation



Other Menus

As the Zodiak software is enhanced, additional menus, subcategories, and controls will become available (see the *Zodiak Release Notes* for the latest menu additions and changes). Once you understand the principles of Zodiak system menu organization and operation, you will be able to quickly learn these new menus and use them effectively for your work.

Section 5

System Operation

Introduction

The basic Zodiak system is operated using button, knob, and lever controls on the Main and Remote Aux panels, and touch screen and knob controls on the Menu panel. Text and number entry is also possible via a standard PC computer keyboard. The Main and Remote Aux panels are used during live operation for fast, real time control. The menus are generally used in conjunction with the panel controls to set up effects and for system configuration. Effects can be saved for future immediate recall, allowing fast and precise control of complex visual effects in real time.

Power Up

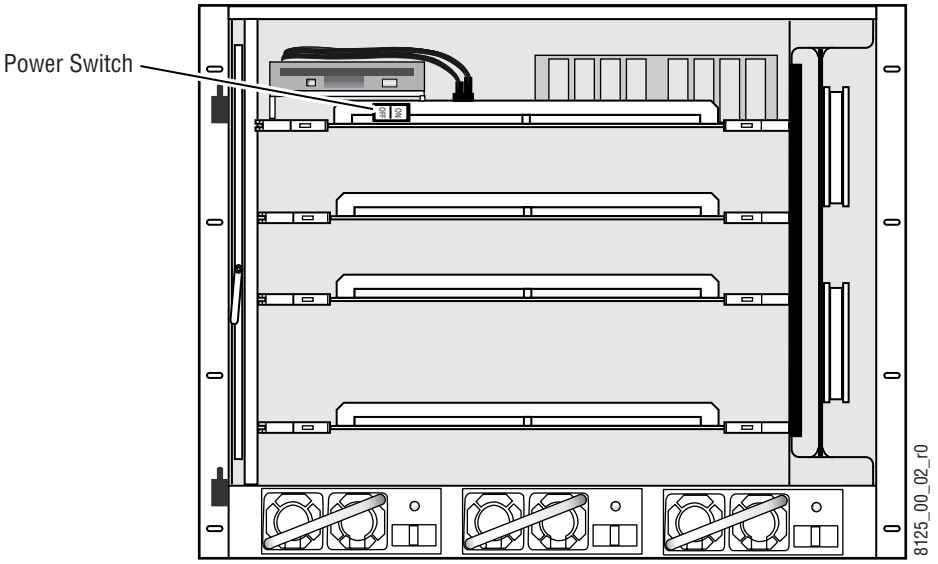
The Zodiak Video Processor frame and Main panel must be powered up for full system operation. The Menu panel receives its primary power from the Main panel.

1. Set the power switch on the Video Processor frame to On (Figure 229 on page 330).
2. Set the power switch(es) in the Main Panel tub enclosure to On (Figure 230 on page 330).

When the Zodiak system powers up or is reset, the first system elements activated are the PGM PST buses, transition, and keying controls. This permits rapid on-air recovery of basic system operations. Sources can be cut, mixed, and wiped, and keys can be placed on and off air while the rest of the system initializes. The Menu panel system is the last item to initialize after system power up. When the system is completely ready for operation the Menu panel will display a Zodiak menu.

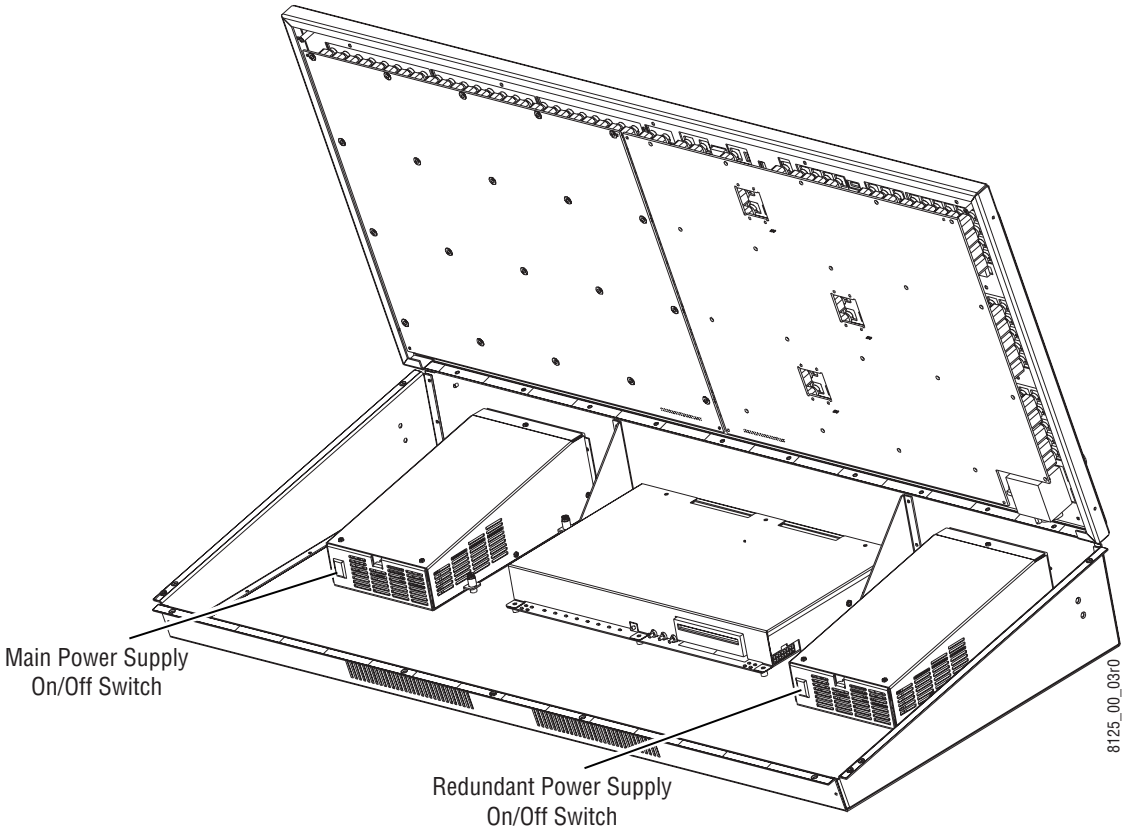
Note If a **Frame Not Connected** or similar message appears on a panel, communication with the Video Processor frame has been interrupted. The frame may need to be powered up or reset, the IP Address may be incorrect, or some other LAN problem may exist that will need to be corrected.

Figure 229. Video Processor Frame Front, Power Switch (Door Open)



CAUTION The front door of the Zodiak Video Processor frame must remain closed during normal system operation for proper cooling airflow.

Figure 230. Main Panel, Lid Open



Button Mapping

Button mapping assigns video sources to source selection buttons (Source Button mapping). Button mapping is also used to assign Aux buses to delegation buttons (Aux Deleg mapping). This allows you customize the Main Panel and each configured Remote Aux panel to meet your individual needs. Button mapping settings are included as part of User Preferences, and can be saved and instantly loaded for use at any time (see *File Operations* on page 338).

Local Panel Source Button Mapping

On the Zodiak system, button mappings on the Main Panel are set the same in each M/E, PGM/PST, and PVW/AUX bank for operating simplicity.

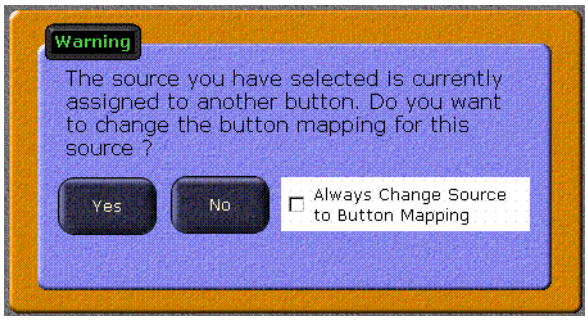
The Button Mapping menu is accessed by touching **Daily Setups**, **User Prefs**, **Button Mapping** (Figure 231).

Figure 231. Button Mapping Menu

1. Touch the **Local** Panel Type button to configure source to button mapping for the Main panel.
2. Touch the labeled Bank button(s) of the banks you wish to map. You can select one, some, for all of the banks to be mapped. Notice that a button for the Local Aux panel is included with the other local banks.

3. Scroll the Button list in the central pane and touch the unshifted or shifted button to be mapped.
4. Scroll the Sources list on the right and touch the desired Zodiak source in the right pane.
5. Repeat these steps until all the buttons have been mapped.
6. If you map a source to a button that is currently mapped to another source, a warning dialog box may appear (Figure 232).

Figure 232. Button Mapping Warning Dialog



- Selecting **Yes** maps the source to the button. The button originally mapped to that source becomes unassigned.
- Selecting **No** clears the window without making any changes.
- Selecting the **Always Change Source to Button Mapping** check box allows mapping already assigned sources without bringing up the dialog box. Resetting the Menu panel automatically clears the check box.

Remote Aux Panel Button Mapping

Source to button mapping for optional Remote Aux panels is also done in the Button Mapping menu. Buttons can be mapped differently on each Remote Aux panel. See the separate *Zodiak Installation and Service Manual* for Remote Aux panel installation and configuration procedures.

Note Remote Aux Panels must be installed and configured before their buttons can be mapped.

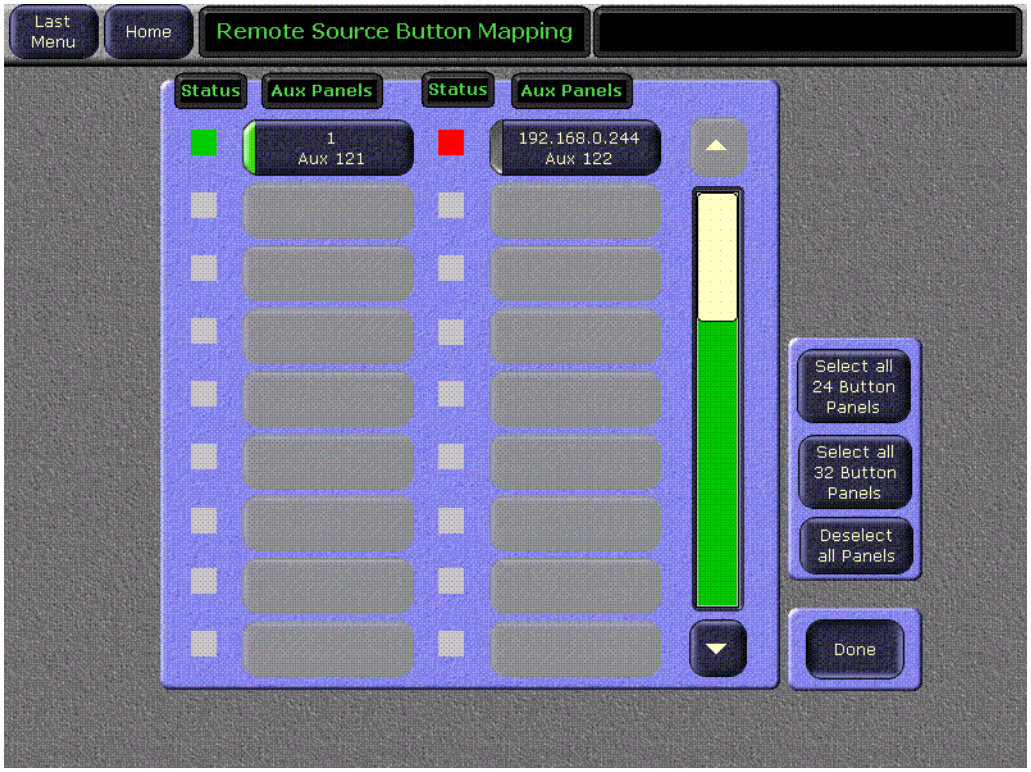
Configure source to button mapping for each Remote Aux panel as follows:

1. Select the **Remote** Panel Type button. This delegates the menu to control Remote Aux panels. The name of the last Remote Aux panel(s) selected for mapping appears in the Remote Panels data pad (Figure 233).

Figure 233. Remote Aux Panel Button Mapping

2. Touch the Remote Panels data pad to bring up a selection menu, permitting the selection of one or more Remote Aux panels (Figure 234).

Figure 234. Remote Aux Panel Selection Menu



3. Individual Remote Aux panels are selected by touching the buttons in the large pane. Buttons on the right allow selection of a group of Remote Aux panels, by type. Only the same type of Remote Aux panel can be selected with the Select All buttons or individually. An attempt to select both a 24 button and a 32 button panel will be rejected with a message posted indicating the panels are not the same type.

4. After selecting the desired panel(s), touch **Done** to return to the previous menu (Figure 233 on page 333). When multiple Remote Aux panels are selected, changing a button's mapping applies that individual button's mapping to all the selected Remote Aux panels.

5. Use the same Local Panel button mapping procedure (page 331) to map the source buttons on the Aux panel. Select the Local Aux source button in the central pane, then select the Zodiak source in the right pane.

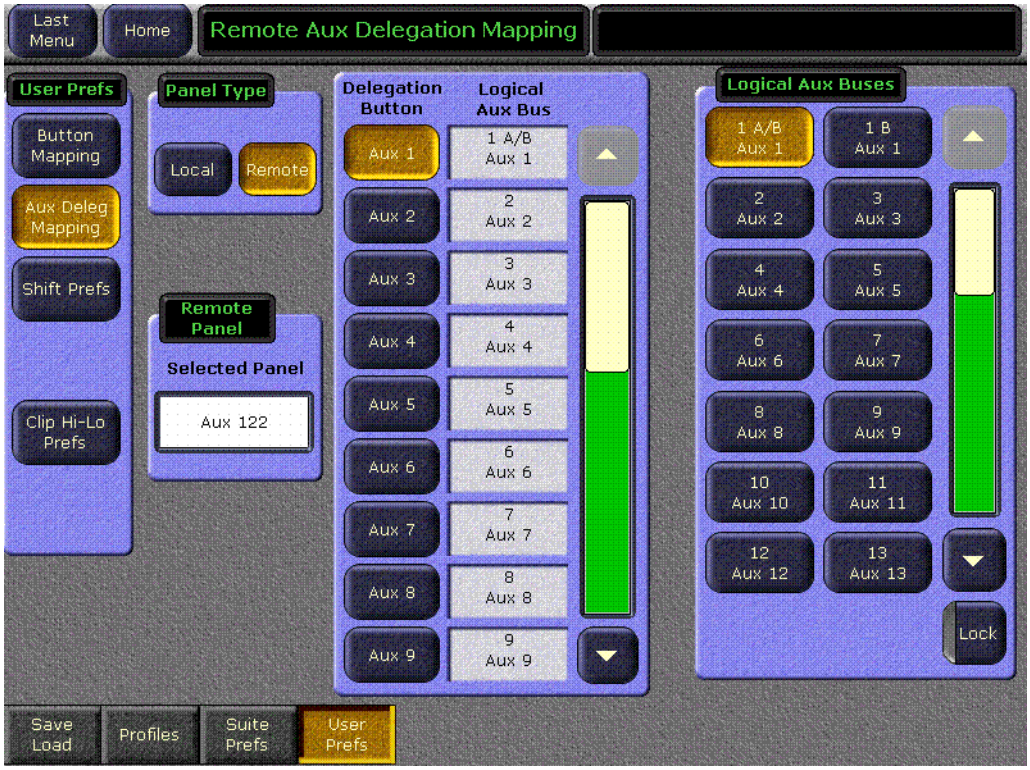
Note Button mapping settings for Remote Aux Panels are saved to the User Pref configuration file.

Aux Bus Delegation Button Mapping

The Aux Deleg Mapping menu is used to configure available Aux delegation buttons on the PVW/AUX bus on the Main panel and on multiple destination Remote Aux panels. This menu is accessed by pressing **Daily Setups**, **User Prefs**, **Aux Deleg Mapping** (Figure 235).

Aux bus configuration is explained in detail in Section 3 — Configuration in the *Zodiak Installation and Service Manual*.

Figure 235. Aux Bus Delegation Button Mapping Menu



To Map Local Aux Panel Delegation Buttons:

1. Touch the **Local** Panel type button.
2. Scroll the central pane and select the Aux Bus delegation button you wish to map.
3. Scroll the Aux Buses list on the right and select the desired Aux Bus for that delegation button.

To Map Remote Aux Panel Delegation Buttons:

1. Touch the **Remote** Panel type button.

2. Touch the Remote Aux Panel data pad and choose the Remote Aux panel to configure. Only one Remote Aux panel can be selected at a time.

3. Touch **Done** to return to the previous menu.

4. Scroll the central panel and select the Aux Bus delegation button you wish to map.

5. Scroll the Aux Buses list on the right and select the desired Aux Bus.

Note The number of Aux delegation buttons on a 24- or 32-Crosspoint Remote Aux panel will exceed the number of available Zodiak Aux buses.

Mapping Aux Bus Pairs

When Remote Aux panels control paired Aux buses, each Aux bus in the pair can be assigned to a different Aux delegation button on a 24- or 32-Crosspoint multi-destination panel. In this case, both the A Channel (Video) and B Channel (Video or Key) can be controlled by separate Aux buses. With a single destination Remote Bus panel, only one channel of the pair can be delegated for control. A and B Channel source selections can also be made using the Aux Bus menu.

Bus Linking

Bus linking allows a source selection on one bus to change the source on another bus. Suite configuration settings permit the establishment of a one-to-one relationship between different buses (a *Controlling* bus can affect one other *Linked* bus). Once this link is established, sources on the Controlling bus can be associated with sources on the Linked bus, such that selecting that source on the Controlling bus causes the Linked bus to select that associated source.

Multiple sources on a Controlling bus can be associated with a single Linked bus source, so selecting any of those Controlling bus sources selects that same Linked bus source. Controlling bus sources can also be given no association, so selecting that Controlling bus source has no effect on the Linked bus.

The collection of all the source associations between two buses makes up a Link Mapping table. This table resides in the Controlling bus and determines what commands the Controlling bus will send to a Linked bus when a bus link is active. The Link Mapping table can be copied to another bus, permitting rapid setup of multiple bus links.

Examples

A typical use of Bus Linking is to have the buses of one M/E follow the selections on another with a few source substitutions. For example, if there's a special camera only used for the primary customer's feed, a Linked bus used for a secondary customer's feed might select a wide shot whenever that camera was selected on the Controlling bus.

Another example is to prevent feedback when selecting a studio wide shot. Many modern sets include monitors, and these will typically be fed from an aux bus of the switcher with program output selected. When the wide shot camera is selected on PGM-PST A bus, the camera might pick up the monitor wall and generate video feedback. This can be prevented by associating all source selections on PGM-PST A except the wide shot camera to select PGM-PST A on the aux bus. The wide shot camera source is then associated to an alternative graphics source on the aux bus appropriate to the show.

Another possibility is to program the M/E 2 A row as an extension of the PGM-PST A bus for shows that need instant access to more than 32 sources without pressing the Shift button. In this case M/E 2 A is the Controlling bus and PGM-PST A is the Linked bus. In this scenario, the easiest way to set this up is to link the buses and map the sources one to one, then set the shift preference for M/E 2 A to Shifted. An alternative method is to map each source on M/E 2 A to a specific alternate source on PGM-PST A. Other M/E 2 buses could be linked for additional extended selection. A third alternative is to map all sources on M/E 2 A to select M/E 2 A on PGM-PST A.

Bus Linking Operation

Once the Bus Linking associations have been established and enabled, selecting a source on a Controlling bus that is associated with a source on a Linked bus will make the Linked bus select its associated source. The following special operating rules apply.

Source Override

Holding down a source select button on a Linked bus prevents that bus from changing its sources when Controlling bus source selections change.

Bus Pair Rules

Zodiak source selection buses can operate in pairs. M/E keyer buses operate in video fill/key cut mode. Aux buses can be configured in pairs, either as video fill/key cut or as video/video for external DPMs. When an bus pair is involved in bus linking, the following rules apply:

- Key cut selections on video fill/key cut bus pairs does not affect the key cut source on a linked bus (split key cut selections don't link).
- The fill/A side of the Controlling bus is always sent to the fill/A side of the Linked bus.
- If the Controlling bus is in video/video mode, the B side selection will be sent to the Linked bus.
- If the Linked bus is in video-video mode, a B side source change from the Controlling bus will change the Linked bus's B side.
- A video only bus behaves as if it is the A side of a bus pair.

File Operations

The Zodiak system has a file browser. You can browse through selected folders on the local Zodiak Menu Processor hard disk, the Zodiak Video Processor frame hard disk, and the entire network file hierarchy of mapped drives.

Features

The Zodiak file browser supports the following features:

- Navigation through the C:\ZodiakUser folder on the local Menu Processor hard disk, the Frame:C:\User folder on the Video Processor frame hard disk, and access all mapped drives including Zip disk,
- Save and Load User Profile, Suite Profile, Source Memory, E-MEM, and R-MEM files,
- Sort files by name and type, and in reverse alphabetical order,
- Create new folders,
- Copy/Paste, and Delete files,
- Rename files and folders, and
- Select multiple files.

Introduction

Zodiak system files are *saved* to the location that has been navigated to with the browser, creating copies of the information currently in use by the Zodiak system. Files are *copied* from one location to another without affecting the current operation of the Zodiak system. File information is *loaded* to Zodiak system RAM, and this immediately affects the operation and capabilities of the Zodiak system.

File operations are available from several menus (File Ops, Daily Setups, Eng Setups, E-MEM). The same basic operating procedures are used at each location.

User and Suite preference files saved to specific file locations on the Frame:C\ drive and Zip drive automatically become Profiles. Profiles provide a rapid method of loading preferences. Available profiles appear as buttons on the Profiles menu (see page 346).

File Type Icons and Extensions

Files are represented by icons. The file type is included in the icon displayed on all File Operations menus (Table 9).

Table 9. Zodiak System File Extensions

Icon Example	File Type	Extension
	User Prefs	.GVU
	Suite Prefs (includes Default KF)	.GVS .GVD
	Source Mem	.GVM
	Eng Setup	.GVE
	E-MEM Reg	.GVR
	R-MEM Reg	.GVY
	SS Image (includes SS Meta)	.GVI .GVA

Zodiak files are named by the user when saved, and this name appears below the icon.The extension is added to the file automatically when saved, but is not displayed as part of the file name itself. Do not try to add an extension to the file name when saving files (the dot and other illegal characters are not allowed in Zodiak file names).

Zodiak Drive Access

The Zodiak File Operation menus can access only the Frame:C:\User\ folder of the Video Processor frame hard drive, and only the C:\Zodiak User\ folder on the Menu Display Processor hard drive (in the Menu Display). Local and network drives mapped on the Menu processor network system are also accessible (including Zip). Standard Windows functionality

automatically maps all local drives during startup. Mapping network drives to a drive letter using the Windows Explorer allows them to appear at the top of the File Operation menus on that menu system.

Unless Windows is set up to share a local drive to other computers on the network, other menu systems will not display them. For this reason, the Menu Display Processor hard drive is not recommended for effects or configuration storage. Instead, store the files you wish to share on the User folder on the Video Processor frame hard drive. Files you wish to back up off the system can be saved to Zip.

File Storage Organization

The file browser gives you great flexibility for choosing and creating storage locations for your files. Any number of folders can be created in various locations. File folders and the files themselves can be named in any manner. To prevent accidentally saving and loading incorrect files, your facility should establish file storage and naming conventions and follow them consistently.

The engineer in charge can create default User and Suite profiles that are not to be modified by anyone. These can provide a known starting point for users when they build their own preference files.

Only a few frequently used preference files should be saved as Profiles to the Frame User directory (no more than a dozen). Otherwise it will be difficult to find the desired Profile quickly.

Experienced users may want to create their own sets of preference files and save only critical ones in the Frame User directory. Other files can be loaded using the browser from any directory or be placed in the default User directory on a personal Zip disk (to become accessible as profiles).

Save important files to Zip disk for backup, clearly label each disk (perhaps including the date), and store them in a safe place.

System Upgrade Backup Files

When you upgrade from one software release to a newer one, configuration and E-MEM files are moved to a new Frame:C\User\OLD folder. These files can be used with the latest software if backup files on Zip are not available.

The moved effect files are stored in numbered bin folders that contains all the EMEM registers (up to 100) that resided in that bin when the upgrade occurred. The bins are numbered 0-9, corresponding to bins A-G.

These are one time only backup files, and are not automatically updated when configurations are changed or effects are edited on the Zodiak system.

Formatting Zip Disks

If you have unformatted Zip disks, or Zip disks formatted for other platforms (e.g., Mac), they will need to be formatted for use on the Zodiak system. This is done using standard Windows disk operations. A mouse is required (to right click), and if you name the volume you will need a keyboard.

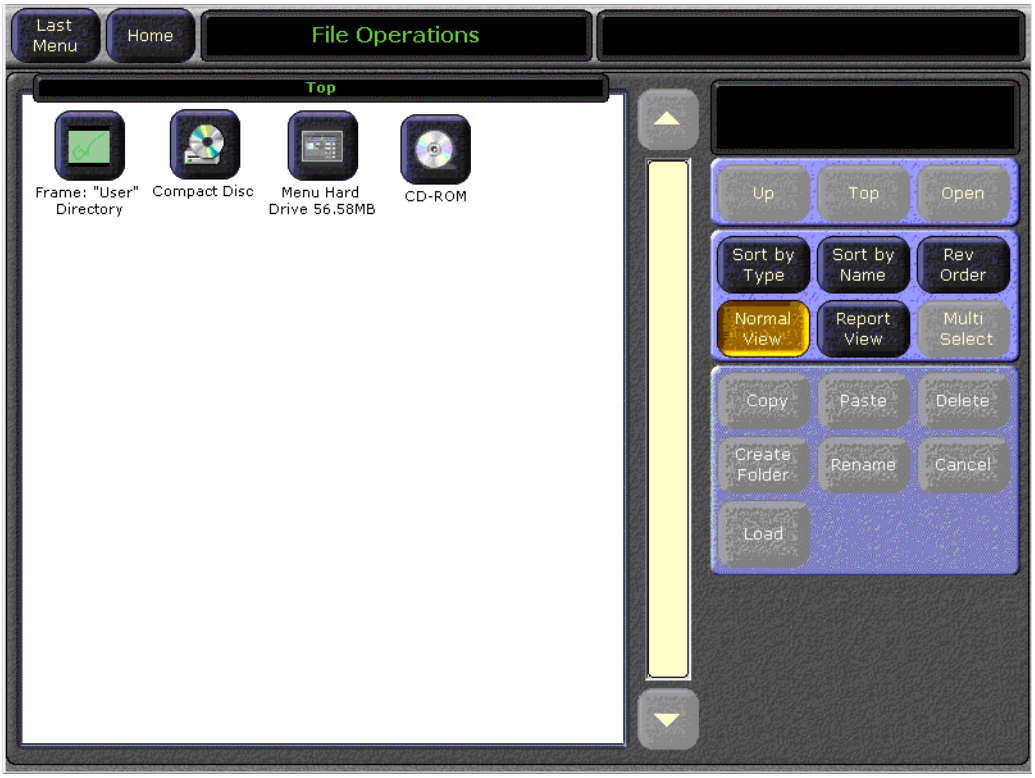
CAUTION Formatting will erase any existing data residing on the disk.

1. Insert the Zip disk to be formatted into the Zodiak system removable drive.
2. Go to the Windows desktop by touching the upper right message area of any Zodiak menu and exiting the menu application by answering **Yes** to the prompt.
3. Double click **My Computer**, then right click on the Removable drive icon (usually D:).
4. Select **Format** from the drop down menu.
5. If you wish, name the disk by entering a Volume label.
6. Click **Start**, then **OK** at the precautionary message.
7. When done, a Format Complete dialog box will appear. Click **OK**.
8. Double click on the **Zodiak Menu** icon to return to normal system operation.

File Operations Menu

The File Operations menu is used for managing Zodiak system file storage. The File Operations menus is accessed by pressing the **File Ops** button in the Home menu. The File Operations menu example in Figure 236 shows the typical top level directories accessible from the Zodiak Menu panel.

Figure 236. File Operations Menu



On the left side of the File Operations menu is a file display pane equipped with a scroll bar. This pane shows icons and names of the files, folders, and drives contained in the currently selected directory. When at the Top level, the Frame User Directory icon is displayed that provides access to the User directory on the Video Processor frame hard disk, where files can be saved as Profiles. Other drives accessible on the Zodiak network, such as the Frame floppy disk drive, the Menu hard drive and the CD-ROM also appear.

The current path is displayed at the top of the pane. Touching an icon selects that item. Touching a selected icon de-selects it (when Multi Select is off). Double touching a folder or drive icon opens it.

On the upper right, below the top line message area, is a file operations message pane. The current file activity is reported. Prompt messages also appear, and error messages are displayed if problems occur.

Below the message area are navigation and action touch buttons. The navigation buttons control what directory is selected for the file display pane.

The **Up** button moves up one hierarchy level.

The **Top** button brings up the top directory that displays the local and network drives along with information on disk space remaining. The icons will also indicate if there is a disk present in the floppy and Zip drives (No Disk). Also displayed is the Frame User Directory, which provides access to the Zodiak Video Processor frame. Individual files and folders located on the Zodiak Menu panel Windows desktop are not shown.

The **Open** button opens the selected folder or drive. Files cannot be opened.

The **Sort By Type** and **Sort By Name** buttons orders the entries in the panel by the chosen category. The **Rev Order** button selects A to Z or Z to A order for the chosen category.

The **Normal View** button arranges the icons in rows and columns. The **Report View** button arranges the icons in a single column and displays additional information. These buttons are mutually exclusive.

The **Multi Select** button, when on, allows the selection of multiple files. When off, only one file can be selected at a time. Turning this button off when items are selected causes all items to become deselected.

The **Copy** button initiates a Copy/Paste action, as described below.

The **Paste** button completes the Copy/Paste action, as described below.

The **Delete** button deletes the selected file or folder. When you try to delete a file, a warning message box will appear asking for verification. Drives cannot be deleted.

The **Create Folder** button creates a new folder in the selected directory. A text entry popup is used to enter the name of the new folder.

The **Rename** button renames the selected file. A text entry popup is used to enter the name of the file.

Note Use clear naming conventions and logical directory structures when creating folders and renaming files so you can reliably reload the correct versions of these files when you need them.

Copy/Pasting Files

1. Navigate to the directory containing the file to be copied, using the buttons on the right.
2. Touch the file(s) to be copied.
3. Touch the **Copy** button. A file display pane will split, and a new pane with its own scroll bar will appear below it. **Up**, **Top**, and **Open** navigation buttons will also appear for the lower pane (Figure 237). Files can only be pasted to the new lower pane. The **Delete**, **Create Folder**, and **Rename** functions apply to the upper pane only, and are inactive during a Copy/Paste operation.

Figure 237. File Operations Menu with Copy Pane

4. Navigate the lower pane to the desired directory, using its navigation buttons.
5. Touch the **Paste** button. A message indicating the file is being copied will be displayed, and when finished the lower pane will go away.

CAUTION Copy and Pasting a file with the same name as an existing file will overwrite that file without any precautionary message.

Moving Files

1. Follow the Copy/Paste procedure described above.
2. Select the original file in the original directory and touch Daily Setups Save-Load Menu

The Daily Setups Save-Load menu is used to save and load User Profiles, Suite Profiles, and Source Memory. Only these file formats are supported in this menu. The menu is accessed by touching **Daily Setups**, **Save Load** (Figure 238).

Figure 238. Daily Setups - Save Load Menu

The Daily Setups Save-Load menu is similar to the File Operations menu, with a file display pane on the left and some of the same navigation and action buttons on the right. An additional Save pane of controls is on the lower right.

To Save a Preference, Source Memory, or Profile File:

1. Touch the button of the type of file you wish to save (User Profiles, Suite Profiles, or Source Memory).
2. Navigate to the desired destination directory and/or create a new folder for the file using the buttons in the upper right.

Note If you want to access the saved User or Suite Profile as buttons from the Profiles menu (page 346), you must save to the appropriate default Suite or User folder in the Profiles directory on the Frame:C or Zip drive.

3. Touch the File Name data pad and enter the name you wish the saved file to have.

4. Touch the **Save** button.

CAUTION Saving a file with the same name as an existing file will overwrite that file without displaying any precautionary message.

To Load a Preference or Source Memory File:

1. Navigate to the directory containing the file you wish to load, using the buttons in the upper right.

2. Touch the icon of the desired file so it is highlighted.

3. Touch the **Load** button.

CAUTION The Load button immediately replaces information the Zodiak system is currently using with the selected file information. When configuration files are loaded, significant changes to Zodiak system operation are possible.

User and Suite profiles saved to the Profiles folder can be loaded from the Profiles menu as described in the next section.

Profiles Menu

The Profiles menu is used to load User and Suite Profiles saved in the Frame:C/User/Profiles folder. Profiles provide a rapid method of loading sets of preferences for common activities, such as shows that are done daily. Two types of profiles (User, Suite) are available. Each User profile contains all the User Pref settings, and each Suite profile contains all the Suite Prefs settings. Source Memory settings are not included in a Suite Profile, but can be saved and loaded from the Daily Setups Save-Load menu.

The Profiles menu can load Suite and User Profiles only from the default directories (SUITE and USER) on the Video Processor frame or Zip drive listed in Table 10. User and Suite Preference files saved in these default directories appear as buttons on the Profiles menu (Figure 239).

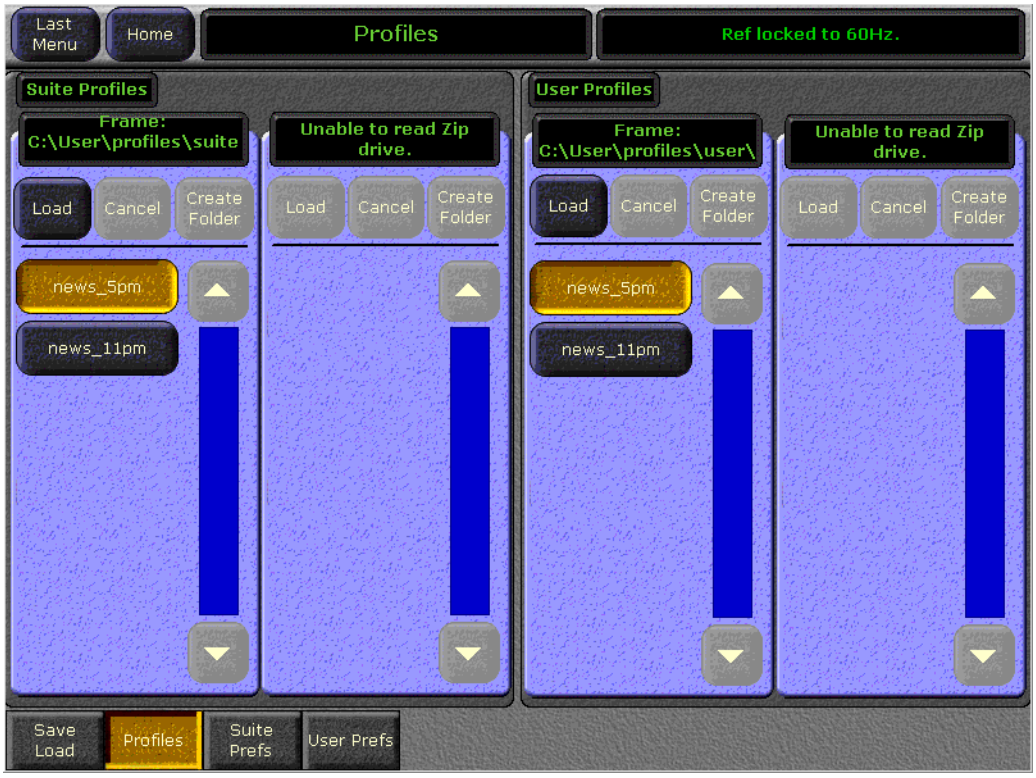
Table 10. Default Directories for Profiles Menu

Device	Suite Profiles Path	User Profiles Path
Frame	Frame:C:\User\profiles\suite	Frame:C:\User\profiles\user
Zip	[Zip Drive]:\profiles\suite	[Zip Drive]:\profiles\user

Note The FrameC:\User\profiles, FrameC:\User\profiles\suite and FrameC:\User\profiles\user folders cannot be renamed from the Zodiak file operations menus (this would cause problems with Daily Setups Profiles).

The Profiles menu is accessed by touching **Daily Setups**, **Profiles** (Figure 239).

Figure 239. Profiles Menu



Suite Profile controls are located in two panes on the left side of the screen, and User Profile controls are in two panes on the right. Each area has a pane that accesses the default folder on the Frame:C drive, and the other pane accesses the default folder on the Zip drive (if a formatted disk with those folders is present in the drive).

If the default Profile directory with the Suite and User folders is not present in the Frame:C\User directory or the Zip drive, the **Create Folder** button will become active and allow you to create the appropriate folder for storing User or Suite preferences.

Loading Profiles

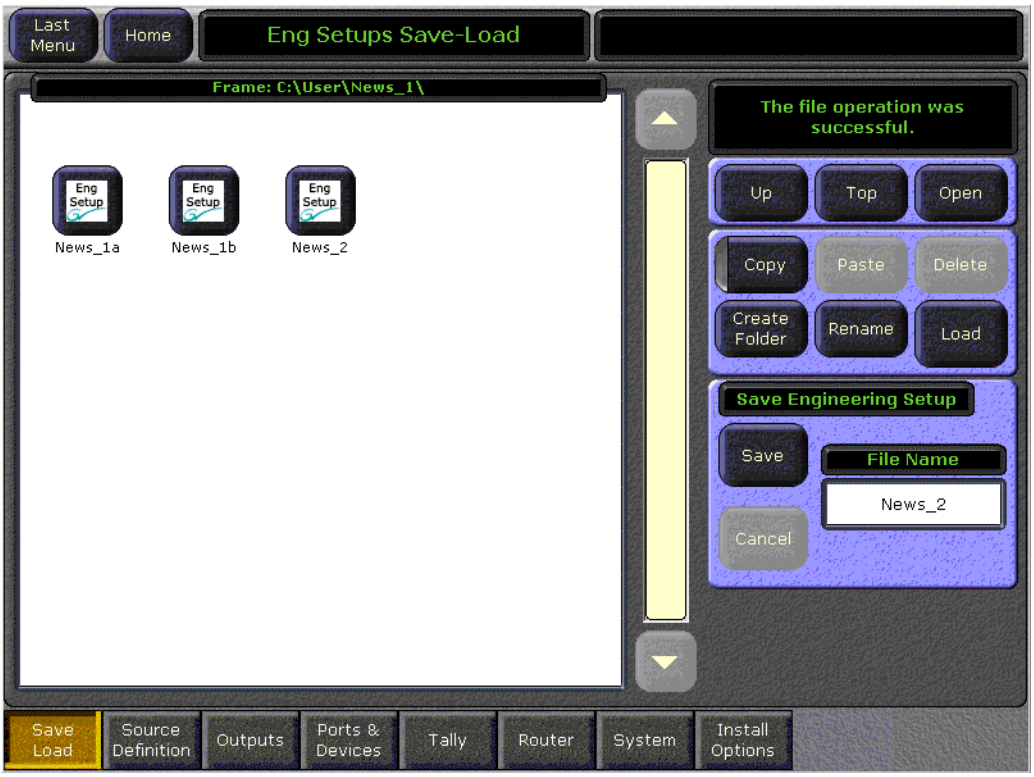
Note User Profile files can be safely loaded while on-air, since changes to these settings do not affect Zodiak system outputs. Suite Profiles may affect system outputs, however, so should not be loaded while on-air.

1. If necessary, scroll the list of profiles in the appropriate pane using the scroll controls to display the desired profile.
2. Touch the desired profile button on the list. The button highlights. This indicates that profile has been selected, but does not change any current system preference settings.
3. Touch the **Load** button to load the selected profile into the Zodiak system's active memory. This alters all preference settings to match the profile's settings, and takes only a few seconds.

Eng Setups Save-Load Menu

The Eng Setups Save-Load menu is used to save and load Engineering Setups information. Only this file format is supported in this menu. The menu is accessed by touching **Eng Setups**, **Save Load** (Figure 240).

Figure 240. Eng Setup Save-Load Menu



The Eng Setups Save-Load menu is similar to the Daily Setups Save-Load menu (page 345) and operates in the same way, except there is only one type of Engineering Setup file.

Set the desired Eng Setup parameters in the Source, Outputs, Ports & Devices and System menus then name and save the setup into a file in a destination folder.

CAUTION The Load button immediately replaces information the Zodiak system is currently using with the selected file information. When configuration files are loaded, significant changes to Zodiak system operation are possible.

E-MEM Save-Load Menu

The E-MEM Save-Load menu is accessed by touching **E-MEM**, **Save Load** (Figure 241).

Figure 241. E-MEM Save-Load Menu

Saving and loading E-MEMs is similar to the file operations described above, except you can choose to save all the current E-MEMS, one or more banks of E-MEMs, and one or more single E-MEM files.

E-MEM files are named by their bank and register number. For example, the filename for E-MEM register 5 in Bank 2 would appear as EMEM25. File names consist of the bank and register appended with .GVR. It is

important that these files retain these names, as the number determines which register will receive the data when files are loaded. In fact, E-MEM files saved locally to the Frame:C drive cannot be renamed. If you try to rename an E-MEM file on the Frame:C drive an error message will appear in the message area. If for some reason an E-MEM file needs to be renamed, copy it to a local drive and rename it.

Saving E-MEMs

Save All E-MEMs

When the **All** button is selected, all 100 registers will be saved into the directory named in the Target Location data pad. To save to another location other than the current directory, touch the data pad and type the directory name with the alphanumeric keypad, then touch **Enter**. Press the **Save** button to save all 100 E-MEM registers (**Register 0 – 99**) into the named directory.

Save E-MEM Banks

To save E-MEM banks, touch the **Bank(s)** button. You may save a single E-MEM bank or a range of contiguous banks. To save a single bank, enter a single bank number (**Bank 0 – 9**). To save a multiple range of banks, enter the banks numbers with a period (.) between the first and last number to indicate the contiguous bank range.

For example, to save Banks 3 through 5, enter 3.5. When you do this, the display will change to indicate that Registers 30 through 59 are being saved. Touch **Save** to save the selected banks in the directory shown in the Target Location or choose another location by touching the data pad and entering another directory name.

Save Single E-MEMs

To save E-MEM registers, touch the **Reg(s)** button. You may save a single E-MEM register or a range of contiguous registers. To save a single register, enter a single register number (**Register 0 – 99**). To save a multiple range of contiguous registers, enter the register numbers with a period (.) between the first and last register to indicate the contiguous range.

For example, to save Registers 0 through 25, enter 0.25. The display will change to **Register 0 – 25** to indicate the register range being saved. Touch **Save** to save the selected registers in the directory shown in the Target Location or choose another location by touching the data pad and entering another directory name.

Loading E-MEMs

To load E-MEMs from saved folders or files, touch the desired file or entire folder and touch the **Load** button. The navigation buttons will gray out as shown in Figure 242. The status of the loading process will appear in the message area.

CAUTION The Load button immediately replaces existing E-MEM register data with the new E-MEM data. While this does not directly affect the work buffer, as soon as the register runs to the next keyframe or is recalled the work buffer will reflect the new data, and so can change the Zodiak system program output signals.

Figure 242. E-MEM Menu – Load Operation

Transitions

Manual Transitions

Manual transitions are preset with the next transition element buttons. Any elements that are active when a transition is performed will change state. Active keyers will transition from on-air to off-air or visa-versa. Background transitions will occur between the A and B buses with a flip flop at the end of transition, ensuring the A bus is always on-air and the B bus is off-air when a transition is not in progress. Any element not selected in the next transition element group retains its current state. Combinations of elements can be included in the same transition by selecting more than one transition element button.

To Perform a Lever Arm Transition

Setup:

1. Select the next transition button(s) for the element(s) involved (**Bkgd**, **Key 1-4**, **Key Prior**.). Selecting one element button disables any others selected. Holding down one button while pressing another selects both elements, allowing all the transition elements to be activated if desired.
2. Select the type of transition (**Mix**, or **Wipe**).
3. Select any new sources involved in the transition:
   - If performing a background transition, select the new source to transition to on the B bus.
   - If you are transitioning in a new key, select that new source on the key bus.
   - If you are changing key priority, specify a new key priority in the Keyer Priority menu.
4. If desired, select a transition modifier (**Trans PVW** or **Preset Black**).

Perform:

5. Move the transition lever arm. The picture will transition only the elements selected. Other elements will remain unchanged.

To Perform an Auto Transition

Setup:

1. Setup for an Auto Transition is the same as a lever arm transition (see page 352) with the following added step:
2. Specify the duration of the transition by turning on the **Trans Rate** button, selecting the flashing button of the desired element, and entering a value in <seconds • <frames> • <field> format (*Time Value Entry* on page 99). Different durations can be specified by repeating this process for each element.

Perform:

3. Press the **Auto Trans** button. The picture will transition only the elements selected at the specified rate(s). Other elements will remain unchanged.

Transitions Using E-MEM

Transitions can also be built into E-MEMs. See *E-MEM Transitions* on page 361

E-MEM Operations

Recalling Registers

The Zodiak system is optimized for rapid effects recall, generally accomplished with a single keystroke. To access a different bank, two keystrokes may be required.

Note If recalling effects from the Master E-MEM subpanel with **Auto Recall** off, you first need to specify which levels you wish to control with the Enable buttons.

To Recall A Register in the Same Bank

1. Press the E-MEM subpanel keypad number of the desired register.

To Recall A Register from a Different Bank

1. Press the ↑ **Bank** button , then press the keypad number of the desired bank.

2. Press the E-MEM subpanel keypad number of the desired register.

Alternatively, you can press the **Bank 0** or **Bank 1** to select either of those banks without using number and Enter keystrokes.

To Run an Effect

With Auto Run Off

1. Recall the desired effect.
2. Press **Run**.

With Auto Run On

1. Recall the desired effect. The effect will run as soon as it is recalled.

E-MEM Sequences

To Learn a Sequence of Registers

1. Press **Learn**, **Seq**.
2. Press the bank and register keypad buttons of the desired registers in the order you wish them to run.If you wish you can add a delay time at each register by pressing **Trans Rate** and entering a time value.
3. Press **Learn**.

To Play a Sequence of Registers

1. Press **Seq**.
2. Press the bank and register keypad button of the starting register.

To Break a Sequence

1. Press **Learn**, **Seq**.
2. Press the bank and register keypad button of the register to end the sequence.
3. Press the same bank and register button you just pressed.

Basic Effect Editing

Effect editing involves changing work buffer values using panel and/or menu controls, then applying these values to the effect. This discussion concerns basic effect editing, using the Master Timeline for the examples.

Inserting a Keyframe

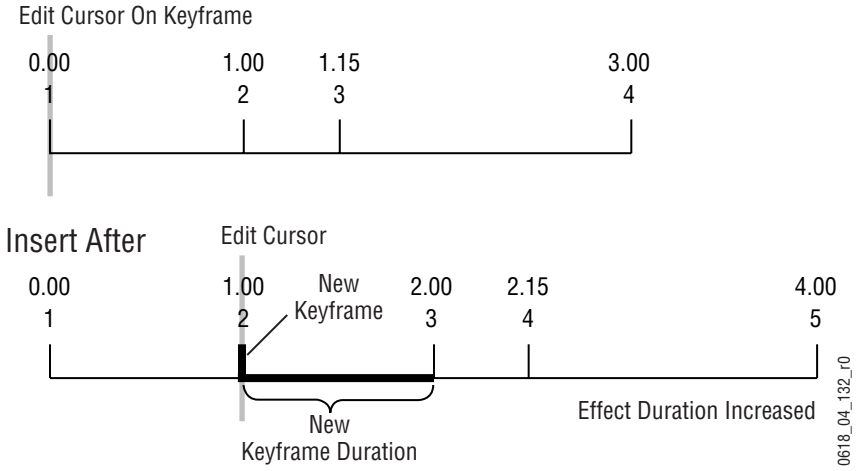
The Insert Before and Insert After operations are used to insert new keyframes onto the timeline of an effect. The result of the Insert operation varies depending on whether the edit cursor is on an keyframe or between keyframes (on the path).

An inserted keyframe has both work buffer values and a duration. The keyframe duration is calculated by the Zodiak system (time to the next keyframe) and is not actually contained in the keyframe data. This permits added flexibility during effect editing.

Inserting on a Keyframe With Insert After

When the edit cursor is on a keyframe, pressing **Insert After** inserts a new keyframe after the current one. The insert occurs after the duration of the keyframe the cursor is on, at the next numbered Master Timeline keyframe location. This inserted keyframe's duration is, by default, the duration of the keyframe the cursor was positioned on before the insert, though this value can be changed by the operator (see page 358). The edit cursor also moves to the start of the new keyframe. This operation will increase the duration of the effect by the duration of the inserted keyframe. (Figure 243).

Figure 243. Insert After

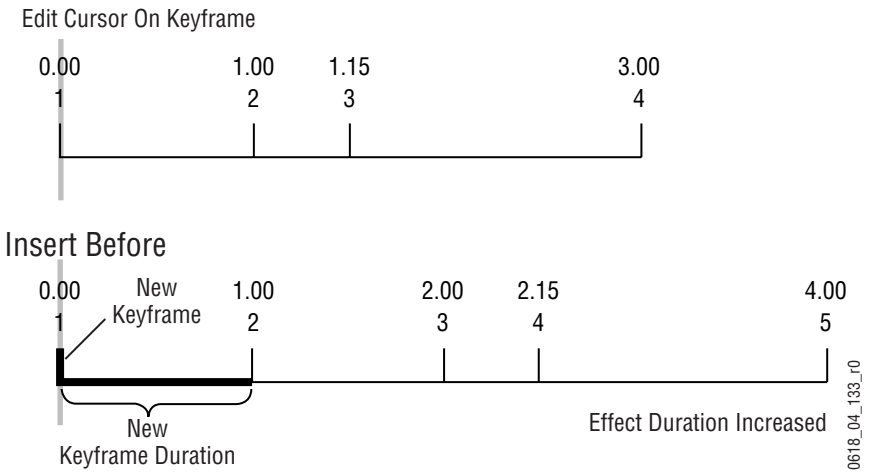


Inserting on a Keyframe With Insert Before

When the edit cursor is on a keyframe, pressing **Insert Before** inserts a new keyframe at that timeline location. The old keyframe, and all the keyframes that follow, are moved to the right the length of the new keyframe's dura-

tion. This operation will increase the duration of the effect by the duration of the inserted keyframe, which by default is the duration of the keyframe the cursor was originally positioned on before the insert, though this can be changed (see page 358). Note that keyframes are renumbered after the insert. In the example, what was keyframe #1 becomes keyframe #2 (Figure 244).

Figure 244. Insert Before



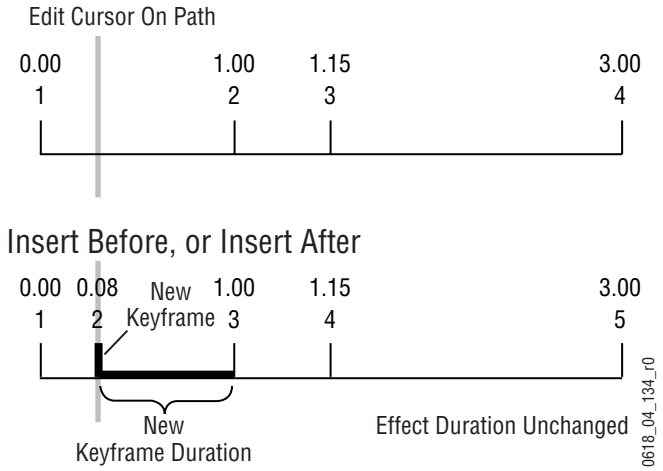
Using Insert After or Insert Before on a Keyframe

In an existing effect, an Insert After at the keyframe 2 location would seem to be the same as an Insert Before at the keyframe 3 location, but this is usually not true. The work buffer material inserted into an effect is typically based on an existing keyframe, with some modifications. For Insert After keyframe 2, the starting point for the inserted work buffer data will be keyframe 2 values. For Insert Before keyframe 3, however, the inserted material will be based on keyframe 3 values. If the starting parameters in keyframe 2 and 3 are different from one another, the look of the resulting effect will vary depending on which Insert operation is performed.

Inserting on the Path

When the edit cursor is not positioned on a keyframe, the insert operation inserts a new keyframe at the current location. This is called *inserting on the path* (Figure 245 on page 357). The default duration of new keyframe inserted on the path will be the time between the cursor location and the next keyframe on the Master Timeline. The **Insert After** and **Insert Before** buttons perform the same operation when you insert on the path.

Figure 245. Insert on Path



Note that after inserting on the path, the preceding keyframe's duration is shortened and the new keyframe's duration extends to the next keyframe. When keyframes are inserted on the path the overall effect duration does not change.

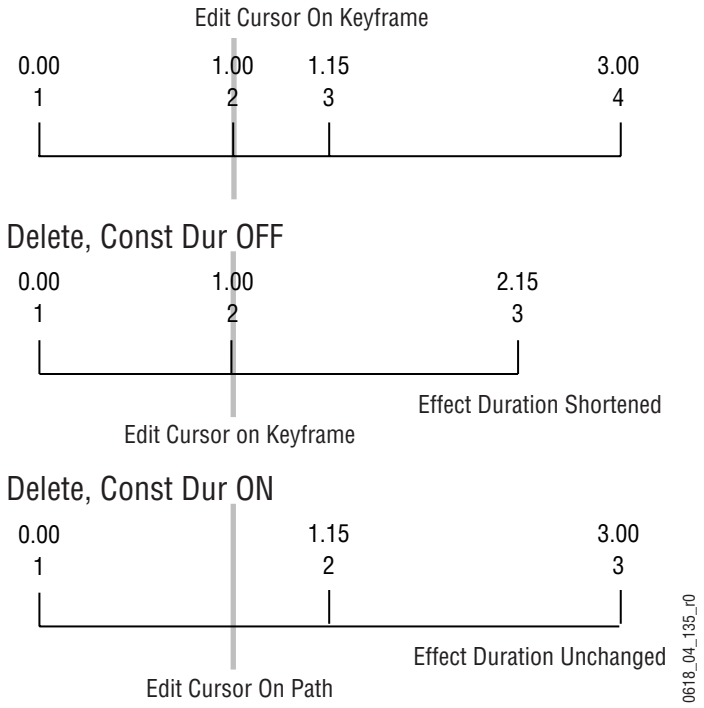
When an empty register is recalled, no keyframes exist yet for the cursor to be on or between. In this situation, because the cursor is not on a keyframe the Insert operation inserts on the path. This is why either Insert button can be pressed to create the first keyframe in a new effect.

Deleting a Keyframe

When the edit cursor is on a keyframe, pressing **Cut** removes that keyframe from the effect. The **Cut** button is inactive when the edit cursor is on the path.

Delete behavior is affected by Constant Duration mode. When Constant Duration is OFF, the duration of the deleted keyframe is also removed from the effect (time to the next keyframe). When Constant Duration is ON, the duration of the previous keyframe is increased by the deleted keyframe's duration, so the total duration of the effect is unchanged. After a delete operation, any keyframes following the deleted keyframe are renumbered accordingly (Figure 246).

Figure 246. Delete Keyframe



Note that after a **Cut** with Constant Duration ON the cursor is located on the path, not on a keyframe. You will need to move the cursor to a keyframe before you can use **Cut** again.

Editing a Keyframe Duration

Showing Keyframe Durations

Pressing the **KF Dur** soft button bring up a numeric keypad for assigning a value. Once assigned, keyframe durations will be displayed on the Master E-MEM readout. When the cursor is moved from keyframe to keyframe, the value will change to reflect the duration of the keyframe where the cursor is located. When the cursor is moved between keyframes, the duration shown is the distance from the current time to the next numbered Master Timeline keyframe. The time value displayed is used by default when a new keyframe is inserted into an effect.

Changing the Duration of a New Keyframe

The value for a new keyframe's duration may be set from the keypad. For example, the following procedure was used for Figure 247.

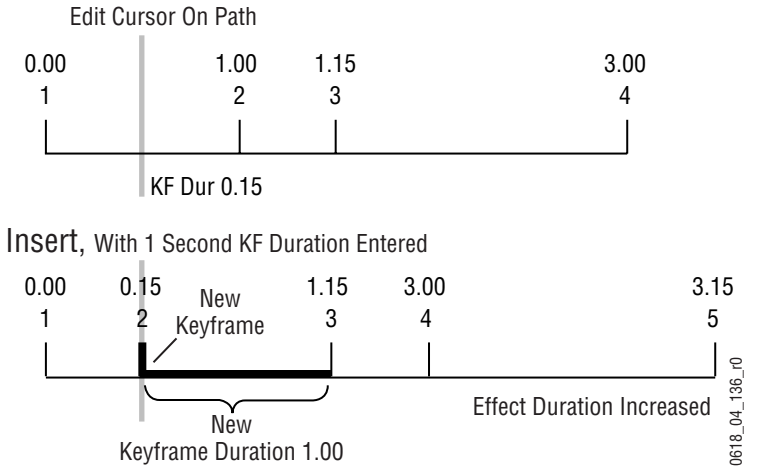
1. Move the edit cursor to the desired location in the effect, in this case on the path midway through a one second keyframe.

2. Press **KF Dur** to bring up the numeric keypad.

3. Type a 1.0 duration value on the keypad and press Enter to change the value displayed on the readout.

4. Press **Insert Before** or **Insert After** to insert the new keyframe with the specified duration.

Figure 247. Insert KF with Duration Specified



Modifying an Existing Keyframe Duration

The duration of an existing keyframe can also be modified. For example, the following procedure was used for Figure 248.

1. Move the cursor to the keyframe whose duration you wish to modify. You cannot modify a keyframe duration when the cursor is on the path. In this case, the keyframe duration is 15 frames.

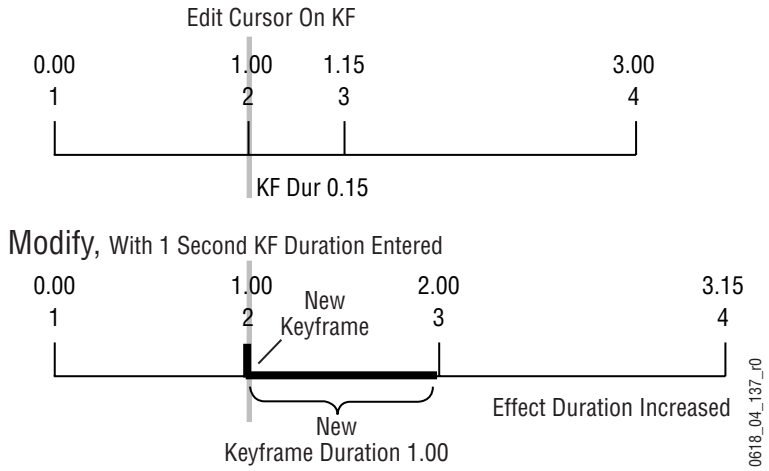
1. Press the **KF Dur** button so it is lit.

2. Type a **1.0** duration value on the keypad and press **Enter** to change the value displayed on the readout.

Note Pressing the **Trim** button will increase or decrease the duration value by the amount specified.

3. Press **Modify** to apply the new duration value to the keyframe.

Figure 248. Modifying an Existing KF Duration



Restoring KF Duration Default to the Keypad

The keypad retains the last duration value entered until it is changed on the keypad, or until the edit cursor is moved to a new location with a different duration. You can reset the keypad to the factory default one second duration at any time

1. Press the **KF Dur** button so it is lit.
2. Press • , **Enter**

E-MEM Modify All Operations

The Modify All function can be used to modify selected values of all the keyframes in an effect that are on levels delegated for editing. Keyframes on levels not delegated for editing are unaffected.

Modify All operations only affect parameters that have been modified in the work buffer from the values of the current position of the time cursor. Typically this position is the current keyframe, but it could be the interpolated state on the path between keyframes. If the cursor is on the path, the Modify All function will also add a keyframe to the effect at that location. Modifications to the work buffer are made by pressing a button, turning a knob, or entering a value with the key pad.

Two different types of Modify All functions are available:

- *Modify All Relative* operations calculate a difference between the current value at the time cursor position and the current work buffer value for each changed parameter. This difference is applied to all the affected key frames in the effect. For example, a hue change of 30 degrees will shift different hues by that amount, and will not change them to the same hue. This function is performed by double pressing the **Modify All Rel** button in the Timeline – Edit menu (see page 231).
- *Modify All Absolute* operations replace the current value of parameters of all affected keyframes in the effect with the current value of each changed parameter in the work buffer. For example, if a hue was changed 30 degrees to make it red, different hues on other keyframes will be changed to red, not shifted 30 degrees. Exact values, not differences, result. This function is performed by touching the **Modify All Abs** button on the Timeline-Edit menu.

Mode changes are always absolute. Turning a function on turns it on for all affected keyframes, and does not toggle on functions off.

To perform a Modify All operation:

1. Delegate for editing the levels in the effect you wish to be affected by the modifications.
2. Move the time cursor to the location in the effect you wish to use as a baseline for the operation.
3. Change the desired parameters by pressing a button, turning a knob, or entering a value with the key pad.
4. Press the **Mod** button on the Main panel or the **Modify** buttons in the menu to complete the operation.

E-MEM Transitions

Transitions can be built into E-MEM resisters. Recalling and running these E-MEMs will make the transitions occur as programmed. The lengths of transitions in effects is determined by keyframe duration, not the transition duration used for manual transitions. When you build effects with transitions, keep the E-MEM transition rules in mind, which are different from the rules used for manual transitions. The beginning and ending states of the buses and transition elements must be set properly.

Though background and keyer transitions are described here as separate procedures, effects can easily be built that include both background and key transitions in the same keyframe by selecting the appropriate next transition element buttons.

E-MEM Transition Rules

- A background transition will occur only when the **Bkgd** next transition element is selected on the initial keyframe AND the source selected on the B bus of the initial keyframe matches the source selected on the A bus of the following keyframe.

Note The decision to perform a background transition is based on keyframe values, regardless of the state of Bus or Source Holds. If a Hold is active you will not be able to tell by looking at the currently selected sources whether a background transition will occur.

- A keyer transition will occur only when the **Key 1-4** background transition element(s) for the keyers involved are selected on the initial keyframe AND a keyer changes its on/off state at the following keyframe.
- If Effects Dissolve is on, when an effect is recalled transitions will occur between the previous switcher state and the first keyframe of the effect, following the rules above. If Effects Dissolve is off effect recalls will cut to the first keyframe of the effect.

To Build Background E-MEM Transitions:

When building background transitions make sure the A and B background bus selections are consistent through out the effect. Otherwise the background video may cut to different sources when keyframes are encountered. Plan ahead to the next transition when you create keyframes in an effect that has multiple background transitions.

1. Go to the keyframe in the effect where you wish the background transition to begin.

Note Adding new transition keyframes to the end of an effect is the easiest way to build effects containing background transitions, though using this method is not required.

2. Select the **Bkgd** next transition button.
3. Select the type of transition (**Mix**, **Wipe 1**, or **Wipe 2**).
4. Select the new source to transition to on the B bus.
5. Press **Modify** to change the keyframe to the values set above.
6. Perform the transition by moving the lever arm or pressing the **Auto Trans** button. This lets you preview how the transition will look (though the transition duration used may not match the keyframe duration specified).

Note Performing the transition is not required (pressing **Cut** accomplishes the same goal, which is to put the switcher into the next desired state). The transition type button selection and the keyframe duration determines how the transition will be performed when the effect runs.

7. If there will be another transition immediately following this one, select on the B bus the source that will transition to in the next keyframe. This prevents undesirable background cuts from occurring.
8. Press **Insert After** to add this keyframe to the effect.
9. Repeat the steps above for any additional background transitions.
10. Rewind and run the effect to check its operation. The transitions will occur as programmed.
11. After the effect runs properly, you can go back and modify keyframes with Source Holds where needed.

If unwanted background cuts occur, go to the keyframe where the cut occurs, identify the source selected on the A bus, go to the previous keyframe, select that same source on the B bus, and then press **Modify** to properly setup that source in that keyframe for that next transition.

To Build Keyer E-MEM Transitions:

Individual keyers transition on or off (there is no keyer preset bus). To cross fade between keys, use two keyers and have one key transition in while the other transitions out. You can include any combination of keys in a single transition, using the transition rules to determine the exact behavior of the transitioning keys.

1. Go to the keyframe in the effect where you wish the key transition(s) to begin.
2. Select the **Key 1-4** next transition button(s) for the keyer element(s) involved. Selected keys that are on will transition off, and keys that are off will transition on.
3. Select the type of transition (**Mix**, **Wipe 1**, or **Wipe 2**).
4. Press **Modify** to change the keyframe to the values set above.
5. Change the on/off state of the keys you wish to transition.
6. If you are transitioning in a new key, select the source on that key bus. If you are transitioning out a key, do NOT change the source selected on the key bus for that keyer (this prevents an unwanted cut).
7. Press **Insert After** to add this keyframe to the effect.
8. Repeat the steps above for any additional keyer transitions.

9. Rewind and run the effect to check its operation. The transition(s) will occur as programmed.

To Change the Length of an E-MEM Transition:

Change the keyframe duration of the first keyframe involved in that transition.

1. Go to the first keyframe for that transition.
2. Press **KF Dur** and then enter a value in <seconds • <frames> • <field> format.on the keypad.
3. Press **Modify**.

To Prevent Elements from Transitioning in E-MEMs:

To ensure a transition for an element does not occur, simply make sure the next transition button for that element is off in the keyframe by selecting another element's button.

To ensure no transition occurs at all at a keyframe (any changes will be cuts), you can select only the next transition button for a keyer and make sure its state does not change in the next keyframe. A change of state in a keyer is required for a transition to occur when the effect runs.

The transition rules have one subtile limitation. The next transition element buttons are an interlocked group. All these buttons cannot be turned off simultaneously (at least one element is always selected). This means you cannot uses these buttons to prevent any transition from occurring when all the elements are in use. To workaround this special case, add another keyframe to the effect to transition the keys with a one field transition (which is the same as a cut).

Return to Normal Technique:

A useful technique to use when building effects for use on-air is to first establish a normal switcher state for the particular show. This normal state could, for example, have only the **Bkgd** next transition element selected, a **Mix** transition type, all four keyers off, and one second transition durations. This normal state permits immediate cuts or dissolves to and from any element, probably the most common requirements during a live show.

Running the effect departs from the normal state to do whatever is required. When the effect comes to the end of its run, the next to last keyframe controls the transition that occurs at the end of the effect. The last keyframe has no following keyframe and so does not transition, and that keyframe effectively has no duration. You can set the next transition elements in this last keyframe to the normal state without fear of causing

unanticipated transitions. This return to normal technique permits completely controllable seamless shifts between your effect recalls and runs and your live switching.

When building effects for the show, take care that the beginning and ending of every effect works well with the normal state. You also may wish to apply a Source Hold to the first keyframe to ensure the last source selected remains unchanged going into the effect.

E-MEM 300 Mode

Overview

300 Mode is an alternative Master E-MEM method of operation that mimics the behavior of the Grass Valley Group Model 300 switcher. In this mode, Master E-MEM Learn operations store the register numbers of the individual M/Es, allowing the recall of different combinations of M/E registers with a single button press. In this operating mode Master E-MEM Learn operations do not change any existing contents of the individual M/E E-MEM registers. Only M/Es are affected. Other E-MEM levels (DPM, Still Store, etc.) behave the same in either Normal or 300 Mode. The current Master E-MEM operating mode is saved and loaded as a Suite Preference.

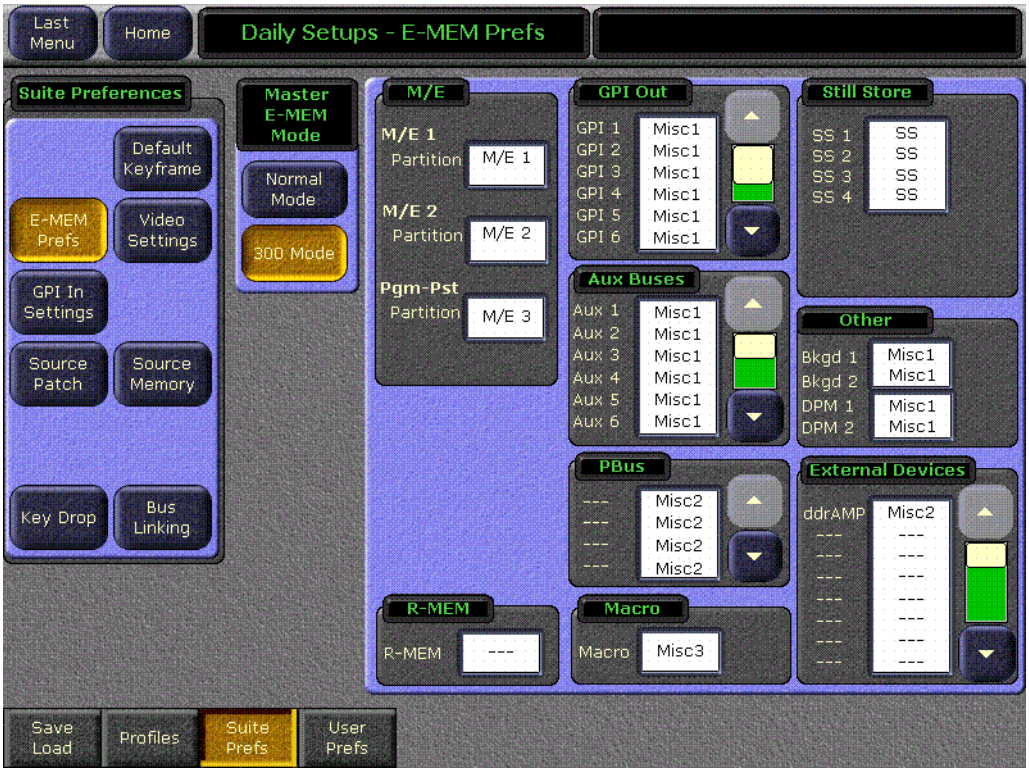
When operating in 300 Mode, the user Learns the first keyframe of each effect into individual M/E E-MEM registers using that M/E E-MEM subpanel. If an effect has additional keyframes, they are created using Master E-MEM keyframe editing (delegating that M/E and using Insert, Modify, etc.). When all the individual M/E effects registers are complete, the user selects the desired register on each individual M/E E-MEM subpanel, delegates the M/E levels involved, and then Learns that Master E-MEM register. Recalling that Master E-MEM register then brings up the individual M/E registers that were learned (along with the settings of any other non-M/E delegated levels).

In general, you will need to decide which Master E-MEM operating mode you wish to use, and then build all your effects for use in only that mode. While effects built in one Master E-MEM mode will recall and run on a system operating in the other mode, the results will probably not be what you expect. If you find your effects behaving oddly, check that the correct Master E-MEM operating mode is selected.

E-MEM Prefs Menu

The Master E-MEM operating mode is selected on the E-MEM Prefs menu, accessed via **Daily Setups**, **Suite Prefs**, **E-MEM Prefs** (Figure 249).

Figure 249. E-MEM Prefs Menu



300 Mode Operation

Use the following procedure to operate in Master E-MEM 300 Mode:

1. Select 300 Mode by going to the E-MEM Prefs menu (touch **Daily Setups**, **Suite Prefs**, **E-MEM Prefs**) and touching **300 Mode**. Alternatively, you can recall a Suite Pref that was saved with this mode selected.

2. Setup the first keyframe on one of the M/Es, press the individual M/E's E-MEM **Learn** button, then select the bank and register on that subpanel to which you wish to save those settings.

3. If that effect will have multiple keyframes, delegate the Master E-MEM subpanel to only that M/E and edit the effect using keyframe editing, Inserting, Deleting, and Modifying keyframes as required.

4. Repeat Step 2 and Step 3 for all the effects you plan to use on that M/E.

5. Select a different M/E, and repeat the steps immediately above for all the effects for that M/E. Continue until you have built all the effects on all the M/Es you intend to use.

Note Unlike Grass Valley 4000 switchers, Zodiak systems allow keyframe Inserts between keyframes. When you change Master E-MEM delegations, the effect time cursor does not move, so it may be between keyframes on the newly delegated M/E. On a 4000 switcher, since this location is not on a keyframe you would be prevented from inserting, but a Zodiak system allows this. When using 300 mode, check that you are at the correct location in the effect on a newly delegated M/E before you insert any keyframes.

6. Select the individual M/E registers you wish to recall together on each individual M/E E-MEM subpanel involved.

7. Delegate the Master E-MEM subpanel to the desired M/Es, press the Master E-MEM **Learn** button, then select the bank and register on the Master E-MEM subpanel to which you wish to save those settings.

8. Repeat the above step for all the combinations of M/E effects you wish to recall together, being sure to Learn them to different Master E-MEM registers.

9. To recall any of the desired combinations of M/E effects, simply press the appropriate Master E-MEM bank and register keypad buttons. You can use **Auto Recal**l to automatically delegate the levels involved in that effect.

Note In 300 Mode, if an empty M/E register has work buffer values set but they haven't yet been learned on that individual M/E, performing a Learn on Master E-MEM will not save those settings to that register. Only the register number is saved for that Master E-MEM register in 300 Mode. There is no indication of this except the register will continue to report itself empty on the E-MEM readout displays.

E-MEM and Macro Interaction

Macros and E-MEMs can interact in two fundamentally different ways. An E-MEM can be programmed to execute one or more macros, or a macro can be created that recalls one or more E-MEMs. With care, operating both control mechanisms together can be extremely powerful. However, improper use can create infinite loops or other undesirable behavior. It is especially important that your Zodiak system be loaded with the correct E-MEMs and Macros and is operating in the correct mode, or unpredictable system behavior will result from the mismatched E-MEMs and macros.

Macros in an E-MEM

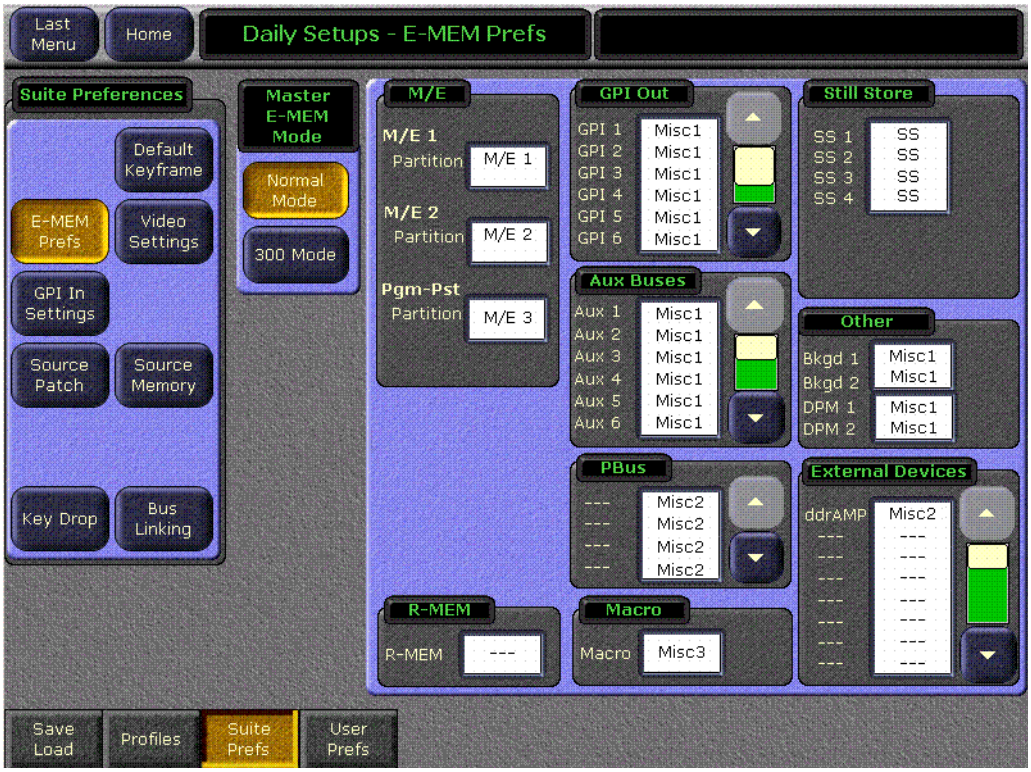
A macro can be added to an E-MEM keyframe and be executed when that E-MEM register is recalled and run. Only the macro register number (and its Enabled state) is saved to the E-MEM register, not the actual macro commands. If a macro is subsequently changed, any E-MEM specifying that macro register will run the modified macro.

See *E-MEM Recalls in a Macro* on page 420 for related information.

E-MEM Prefs Macro Sublevel Assignment

A Macro sublevel can be assigned to any E-MEM level (default is **Misc 3**). This assignment is accomplished with the E-MEM Prefs menu, accessed via **Daily Setups**, **Suite Prefs**, **E-MEM** prefs (Figure 250).

Figure 250. E-MEM Prefs Menu



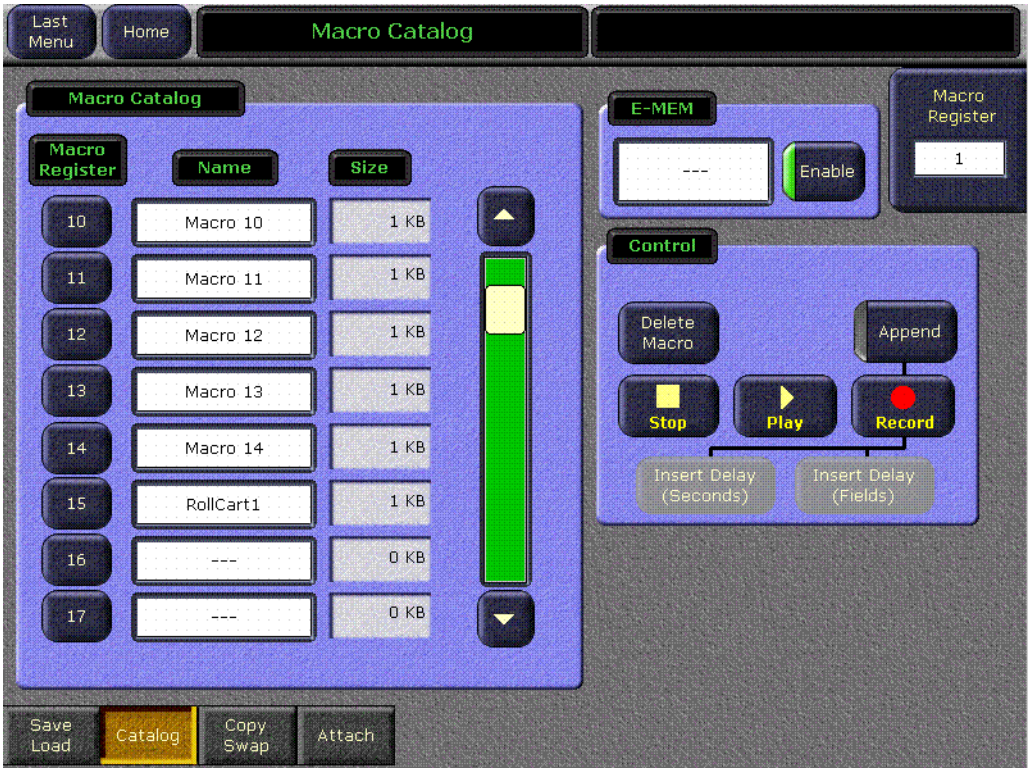
Preventing Assigned Macros from Running

If you want to be able to prevent any assigned macro from running in an effect, make sure the Macro sublevel is assigned to a separate level, and then enable or disable that level to turn all the E-MEM macros on or off.

To Add a Macro to an E-MEM

The Macro Catalog menu is used to add a macro register number and its Enabled state to an E-MEM effect. The menu is accessed via **E-MEM, Catalog** Figure 251).

Figure 251. Macro Catalog Menu



1. Touch the **E-MEM** data pad to open the Macro selection menu (Figure 252).

Figure 252. Macro Attach Selection Menu

2. Select the desired macro in the menu. The name of the selected macro appears in the data pad. The **Enable** button enables or disables that specific macro. It defaults to On whenever a macro is selected.

Note Do not attempt to use the Macro Catalog pane on the left or the Macro Register knob control on the right to associate a Macro to an E-MEM. The E-MEM data pad is used for this purpose.

3. Navigate to the desired location in the current effect.

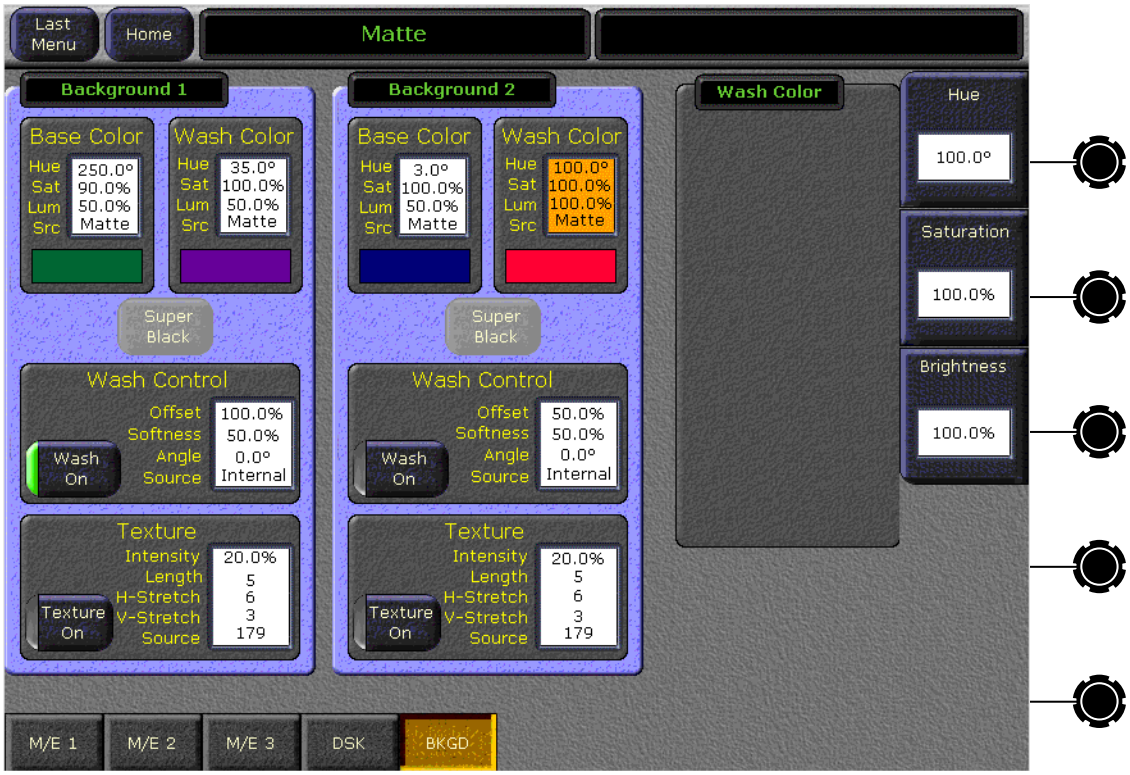
4. **Insert** or **Modify** a keyframe to associate that macro and its enabled state to that location in the effect.

Matte Menu Controls

Use the following procedure to change matte settings in any of the Matte menus.

1. Go to the Mattes menu by touching Matte in the Home menu.
2. Touch BKGD to bring up the Background 1 and Background 2 menu panes. If not already selected, touch the **Base Color** data pad of the desired Background (1 or 2). Use the top three soft knobs to adjust **Hue**, **Saturation**, and **Brightness** of the base fill color.
3. Touch the **Wash On** button below the Background 1 Base and Wash color data pads so its indicator illuminates to create a wash matte.
4. Touch the **Wash Contro**l data pad to bring up **Offset**, **Softness**, and **Rotate** soft knob controls. If necessary, use the **Offset** and **Softness** knobs to make the wash edge visible on the screen. You can also turn on the **Rotate** button, and then adjust the angle of the edge using the **Rotate** soft knob.
5. Touch the **Wash Color** data pad to delegate the soft knobs on the right to adjust **Hue**, **Saturation**, and **Brightness** of the wash fill color (Figure 253).

Figure 253. Matte Menu, Wash Color Selected



6. Touch the **Texture On** data pad to activate various texture knob controls. Texture can be toggled on and off with this button.
   - **Intensity** controls the amount of added texture (which is also controlled by the Mattes subpanel **Texture** knob).
   - **Length**, **H Stretch**, and **V Stretch** modify the characteristics of the edge texture.
   - **Source** selects the seed value used to create the texture. Textures are generated by a pseudo random number generator, based on a seed value. The random numbers created are repeated to form various textures. 255 different seed values are available.
   - While the appearance of a texture cannot be predicted from its seed value, if all texture parameter values are saved to E-MEM, recalling that register will exactly reproduce the original texture.

Because all background matte parameters are keyframeable, you can build effects with constantly changing backgrounds using multiple keyframes.

Split Key

Sometimes you may wish to use the key cut signal of one source with the key fill or video signal of another source. For example, you may have a Character Generator creating matte filled characters, but wish to use a different signal to fill the characters. A split key is used to accomplish this.

On the Zodiak system, the source select buses by default tally the key fill signal. When the **Split Key** button is held down the key cut signal is tallied.

To Perform a Split Key:

1. Set up a standard key by pressing one of the **Key 1-4** Transition Element buttons in the Keyers subpanel, then selecting the source on that key bus that contains the fill signal you wish to use for the split key.
2. Hold down the **Key Split** button in the Keyers subpanel, then press the key source select button of the source with the desired key cut signal. The new key cut signal is then used with the selected key fill signal.

To Restore a Normal Key:

1. Determine what source is being used for the key fill signal by observing the key source select bus of the split key and see what source is currently selected.
2. Hold down the **Key Split** button, then press the source button of the key fill signal identified above. The original key cut signal for that source is then used for that key.

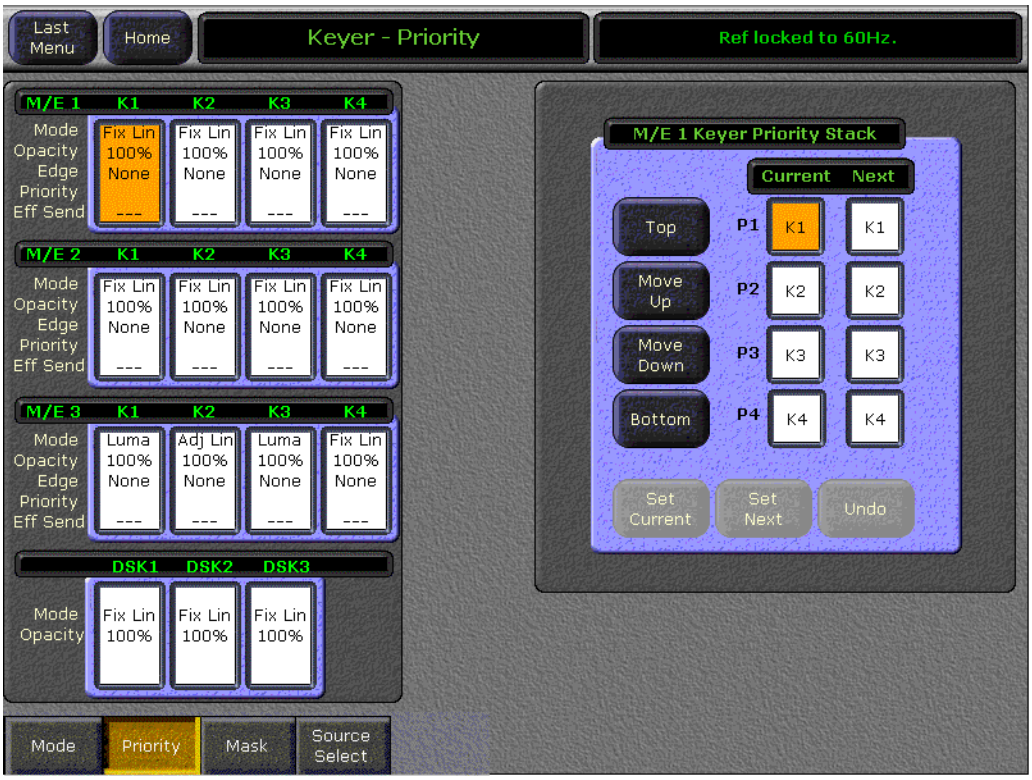
Keyer Priority

Video switchers with only two keyers per bank use a simple key over, key under mechanism to control the stacking of the keys. Only one key can be located over the other. The Zodiak system has four keyers per M/E and three keyers in the DSK, so more complex stacking is possible. Keys can be placed between other keys, using key priority.

To Change the Current Keyer Priority:

1. Go to the Keyer – Priority menu by touching the **Keyer** button in the Home menu, then touch the **Priority** category selection button (Figure 254).

Figure 254. Keyer Priority Menu, Current Stack Selected



2. If not already set up, turn on the desired keys and arrange them so they overlap, observing the Program monitor. This will make the changes in key priority visible. For demonstration purposes, you can use four preset pattern keys.

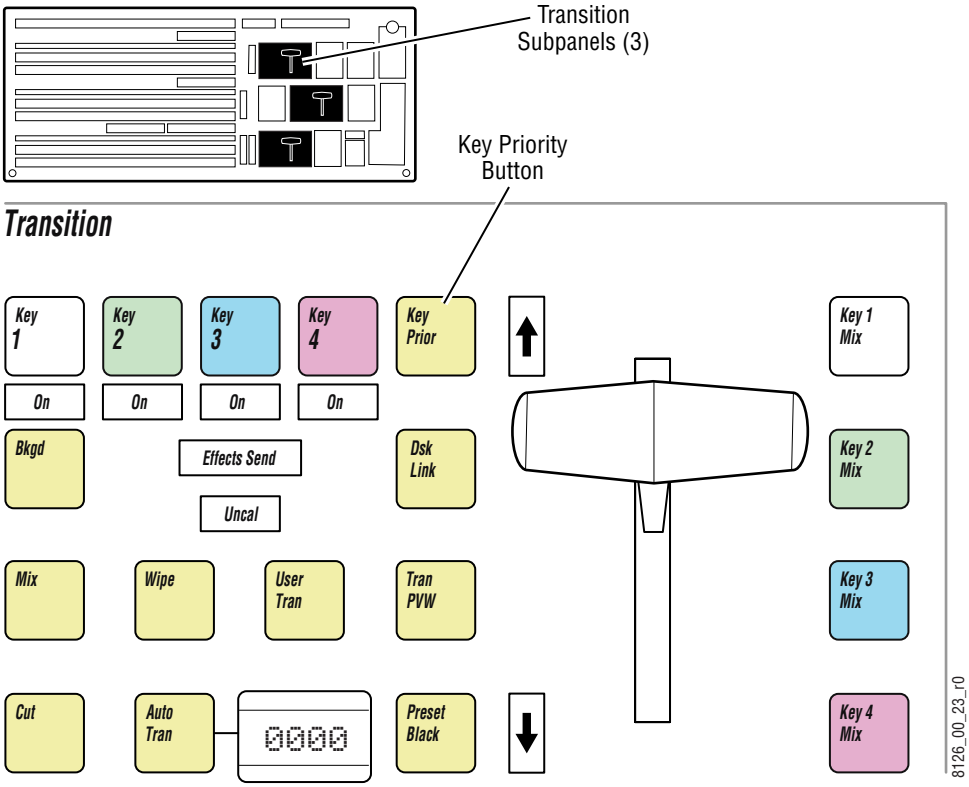
3. Touch the keyer you wish to move in the stack in the Current column, then use the **Top**, **Move Up**, **Move Down**, and **Bottom** buttons on the left to place the key in the desired location. The key priority order changes immediately, as a cut.

To Transition Between Different Keyer Priorities:

Key priority transitions use a Current priority stack and a Next priority stack. The transition occurs between the two stacks.

1. Press the **Key Prior** Transition element button in the Transition subpanel for the M/E you are using.

Figure 255. Transition Subpanel



2. If not already set up, turn on the desired keys and arrange them so they overlap, observing the Program monitor. This will make the changes in key priority visible. For demonstration purposes, you can use four preset pattern keys.

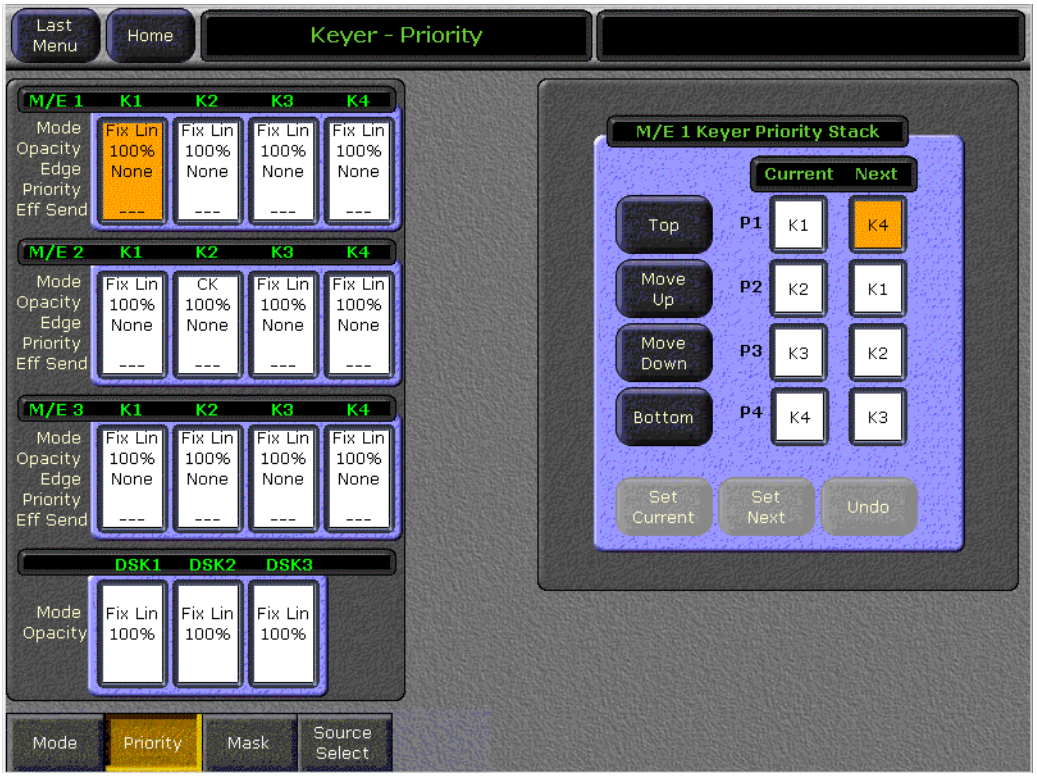
3. Delegate that M/E for preview in the Preview subpanel. This shows the end result of the transition (the Next priority).

4. Go to the Keyer-Priority menu by pressing the **Keyer** button in the Home menu, then touch the **Priority** category selection button.

5. The current stack in the menu is automatically set to what is currently being output. You can change the Current priority stacking order if desired, as described in *To Change the Current Keyer Priority:* on page 373.

6. Set up the Next priority stacking order, selecting the keyers in the Next column and then using the **Top**, **Move Up**, **Move Down**, and **Bottom** buttons (Figure 256). The new stack will be visible on the preview monitor.

Figure 256. Keyer Priority Menu, Next Stack Selected



7. Select the type of transition, using the **Mix** or **Wipe** buttons in the Transition subpanel. If you selected a wipe, go to the Wipes menu by double pressing one of the **Wipe** buttons, and then touch the pattern and any modifiers to be used with the wipe.

8. Move the lever arm or press the **Auto Trans** button in the Transition subpanel to perform the key priority transition. The transition is shown on the Program monitor.

Chroma Key Operating Notes

The Zodiak system features chroma keyers with powerful controls. These controls offer subtle adjustments to allow successful keying of difficult subject matter (fine hair, smoke, translucent objects, etc.), and to overcome some problems resulting from imperfect chroma key set coloring or lighting.

Section 3 - Concepts of the *Zodiak User Manual* includes chroma key background information useful for understanding the chroma key controls. The following information provides more detailed instructions on how to set up a chroma key using the Auto Setup feature and the manual controls in the Keyer menu.

Auto Setup

The first step of setting up most chroma keys is to use Auto Setup. Auto Setup automates the first steps to achieving a chroma key. Auto Setup performs the following:

- Calculates primary suppression Hue and Luminance.
- Sets primary suppression Selectivity and Chroma to defaults.
- Calculates Clip Low, and sets Clip Hi to default.
- Sets all the secondary suppression values to duplicate the primary suppression values, but turns secondary suppression off.
- Changes Opacity temporarily to 100% to permit an accurate backing color sample, and then returns it to its original setting.
- Sets Key Position and Size values to default (0).

Two different Auto Setup algorithms are available, one for well designed and lighted sets (**Reshape** off), and the other for more challenging sets (**Reshape** on). Depending on individual circumstances, additional manual adjustments may be required after you use Auto Setup.

After an Auto Setup has been initiated, you can cancel it by pressing the Auto Setup button again, but the chroma key will retain the default settings imposed.

To Chroma Key Using Auto Setup:

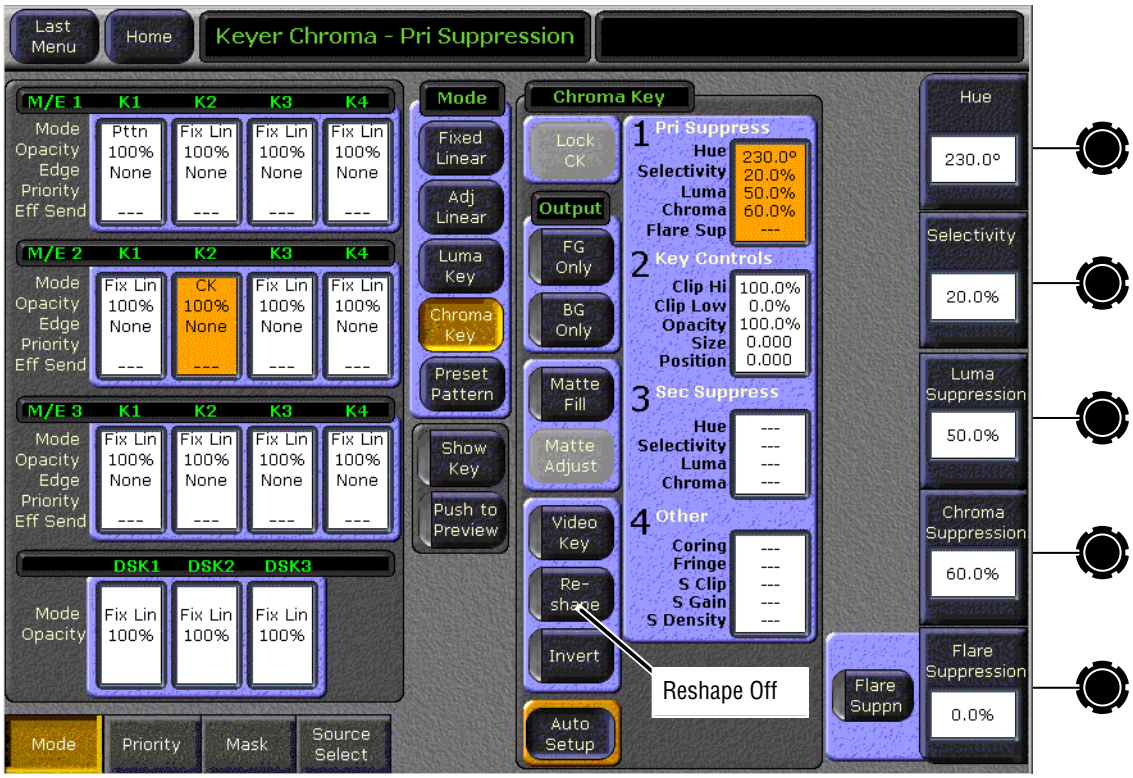
1. Press one of the **Key 1-4** Transition buttons on an M/E to delegate the keyer you wish to use.
2. Choose on the selected keyer's key bus the chroma key source containing the chroma key backing color.

3. Select **Chroma** as the key type in the Keyers subpanel, if necessary (source memory may automatically select this key type).

4. Choose on the A bus the source that will be used to replace the backing color of the chroma key source.

5. Go to the Keyer menu (double press the **Keyer 1-4** button for that keyer in the Keyer subpanel) and make sure **Reshape** is off for the keyer you are using (Figure 257.).

Figure 257. Keyer menu, Chroma Keyer Reshape Off



6. Press the **Auto Setup** button in the Keyers – Chroma Key menu. Preview for that M/E will now display the chroma key source with a superimposed cross hair cursor. The cursor actually represents a box of 16 x 16 pixels.

7. Use the joystick to position the cursor on the backing color. Select a darker area, if one exists, to optimize the backing color suppression.

8. Press the button on top of the joystick. The chroma key will be set up automatically using the average of the colors selected by the cursor box. Because **Reshape** was off, fine edges of the key will be preserved.

9. If this chroma key is acceptable, you are done. If set, lighting, or other conditions prevent the result from being acceptable, you need to decide whether to adjust the chroma key manually or use Auto Setup with **Reshape**.

   - Manual adjustment permits retention of fine edge detail (see *Manual Chroma Key Adjustments*). In particular, if there are problems with translucent areas (hair, smoke) secondary suppression controls can be useful (see *Secondary Color Suppression* on page 383).
   - Auto Setup with Reshape produces a chroma key with harder edges, but accommodates wider set variations (see below).

To Chroma Key Using Auto Setup with Reshape:

If the set is lit unevenly or has other problems, Reshape is available to help solve the problem. A better alternative, if time permits, is to adjust the lighting on the set to even out the backing color. This may improve the key so that Reshape is not needed.

1. If you decide you must use Reshape, follow the Auto Setup procedure described above, but in Step 5 touch Reshape on in the Keyer menu to turn it on (its green indicator will illuminate). After selecting the backing color area and touching the top button on the joystick, the chroma key will be set up with coarser values better able to handle set variations.

2. If this chroma key is acceptable, you are done. If you are still not satisfied, you can fine tune the chroma key using manual adjustments.

Manual Chroma Key Adjustments

If the Auto Setup of the hue fails to provide a suitable chroma key, additional controls are available in the Keyer Menu for fine tuning the key. Chroma key manual set up consists of choosing the best set of compromises to provide adequate detail and color fidelity to meet your needs. While using this menu you need to view the chroma key scene on a monitor. A vectorscope and waveform monitor can also be very useful when setting up a chroma key. During set up you need to focus your attention on particular areas of the foreground, background, and/or composite. The areas you look at will change depending on the individual controls being used. The **FG Only** and **BG Only** buttons can be used to remove extraneous picture information, allowing you to view only those areas of the composite.

Chroma key set up procedures follow a recommended order, as indicated by the numbered steps displayed on the menu. However, requirements can vary depending on each individual scene. You may need to go back to earlier steps and readjust previous settings to optimize the key. Understanding what the chroma key controls do will help you decide what adjustments are required for your individual situation.

Access Keyer Menu and Delegate Keyer

Press the Keyer Menu panel button, then touch the **Mode** category selection button to access the Keyer Chroma menu. You can also double press the **Chr** button in the Keyers subpanel to access this menu. Delegate the keyer you wish to set up on the left side of the screen, then touch the **Chroma Key** Mode button (Figure 258).

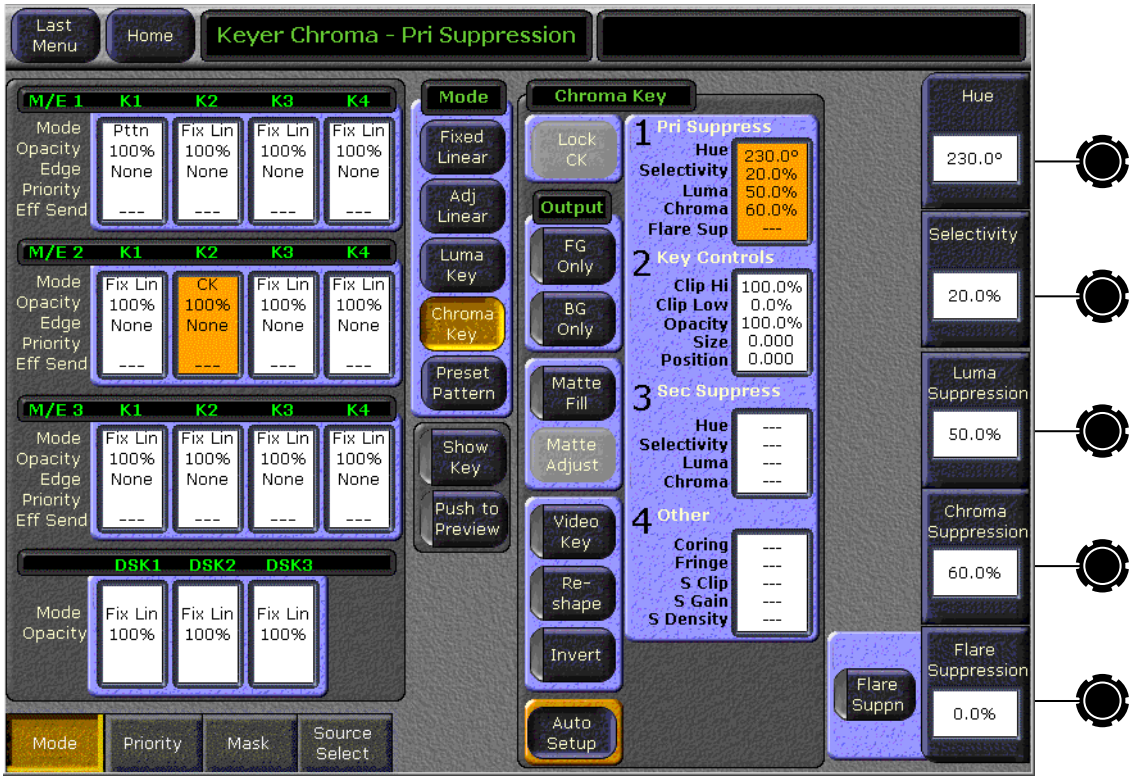
Primary Suppression

Primary suppression is the most critical chroma key parameter, and the easiest to set. Auto Setup should take care of this, but manual adjustments can be made if desired. If primary suppression is set wrong, however, it will be impossible to achieve a good chroma key with the other controls.

Primary Suppression should be set while looking at the foreground. Ideally the backing color will appear as a small dot on the vector scope and a perfectly flat line on the waveform display, but this never occurs due to set lighting variations, shadows, etc. This means you will need to pick the best suppression for the overall look of the key.

1. Touch the stage 1 Pri Suppress data pad, if necessary, to activate these controls (Figure 258).

Figure 258. Keyer Chroma Menu, Pri Suppress Controls



2. Adjust Hue, Selectivity, Chroma, and Luma primary suppression to eliminate the backing color.

   - **Hue** can be set accurately with Auto Setup. **Hue** should center on the primary color of the backing area of the foreground scene. Depending on where **Luma** and **Chroma** primary suppression are set, adjusting **Hue** may not make any noticeable change on the scene. **Chroma** suppression should be preset to 100% and **Luma** set to 0%. Hue can then be tuned to remove the backing color.
   - **Selectivity** may need to be increased if there are colors in the foreground image that are being suppressed. **Selectivity** should be set as low as possible without including colors that should not be suppressed.

     For example, when keying on green, a greenish yellow shirt might be affected by the suppression. If so, adjust the selectivity high enough to reject that color. Too high a selectivity is one of the classic causes of a noisy key. If the foreground subject is stationary, consider using a force mask instead of increasing selectivity.
   - **Chroma** suppression can be set accurately with Auto Setup. To adjust, increase **Chroma** suppression and observe the backing color dot on the vector scope move toward the center. You want to center it exactly, so no chroma exists in the backing area. 100% chroma suppression is the correct setting for all chroma keys. At this point, you will probably see a line through the center of the vector scope. With increased selectivity, this line will become an arc.
   - **Luma** suppression adjustments may be necessary if shading is visible in the backing area with **FG Only** selected, or if the shading adversely affects the background image. Primary Luma suppression is hardly ever desired when Reshape is on. To adjust, increase **Luma** suppression and observe the backing color move toward black. You want to make the backing color just black. Increasing this control too much will make the chroma key hard and noisy. When not enough, highlights will be added to the background. Note that incomplete luminance suppression is not necessarily bad. The highlights added to the background will match the shading on the backing wall, adding natural shadows and perhaps eliminating the need to add artificial shadows.
   - All the above adjustments may need to be revisited later.

3. Another potential artifact of chroma keying is a tinting of the overall foreground subject due to lighting splash from the backing color or lens flare. **Flare Suppression** adds a small amount of color to the entire foreground image to cancel the splash or flare. Typically less than 2% of the backing color is needed to neutralize the flare.

Key Controls

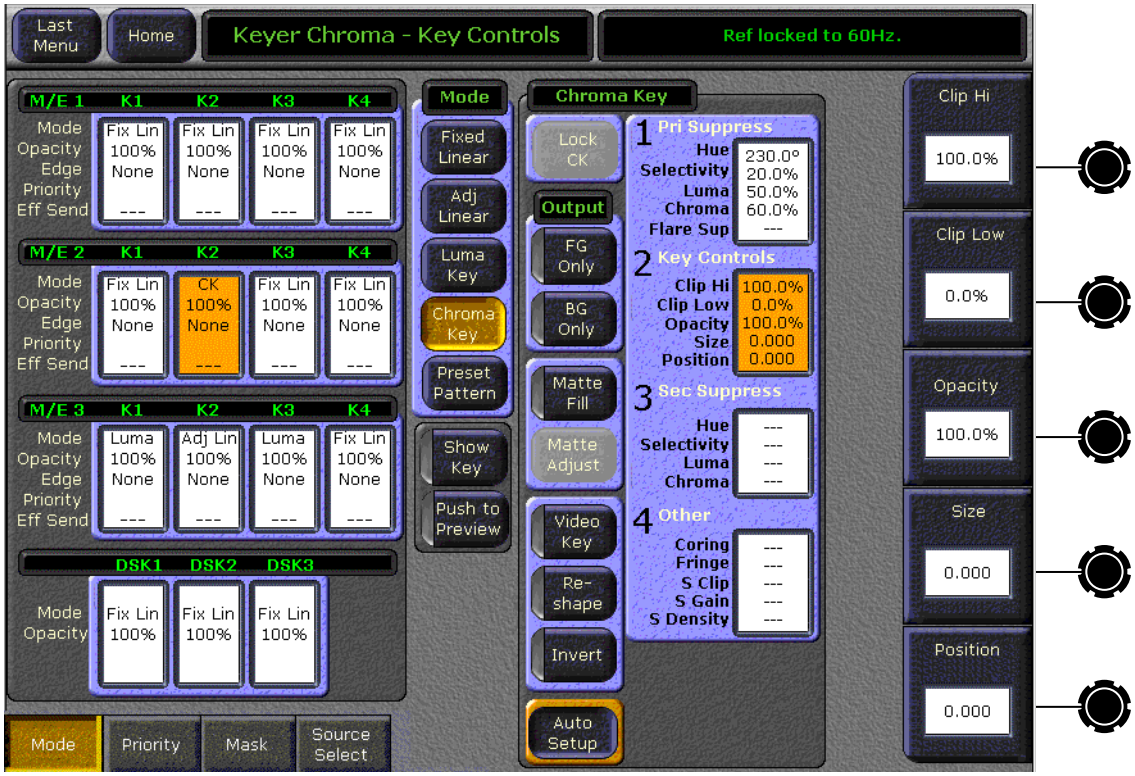
The purpose in adjusting **Clip Hi** and **Clip Low** is to cause the proper hole to be cut in the background. All areas of the backing color should be full background while all areas of the foreground should make the background completely invisible. The easiest way to do this is to observe the key signal while making your adjustments.

The smaller the difference between **Clip Hi** and **Clip Low**, the higher the keyer gain. High gain amplifies noise present in the transition between transparent and opaque. The correct setting is with **Clip Hi** and **Clip Low** set to just barely achieve opacity and transparency, respectively.

1. Touch the stage 2 **Key Controls** data pad to activate these controls. You can now manually adjust keyer clipping controls.

2. Touch **Show Key** in the Keyer menu (Figure 259) and look at the M/E preview output on a picture and waveform monitor.

Figure 259. Key Controls



3. Adjust **Clip Hi** so that all areas of the foreground objects are white. If **Clip Hi** is set too low (too far clockwise), much of the translucent areas will be forced to be fully opaque, hardening the key and darkening the transition area between background and foreground.

4. **Clip Low** can be set accurately with Auto Setup. Adjust **Clip Low** so that all areas of the backing color are black. If **Clip Low** is set too high (too far counter-clockwise), translucent areas will be forced fully translucent, hardening the key.

Note When adjusting clip levels, remember that areas on the edge of the foreground subject should show as shades of gray. Gray indicates areas of translucency, which is desirable in chroma keying.

5. Check the final results with **Show Key** off and the chroma keyer in normal mode (**FG Only** turned off). Note that incorrect adjustments can create a hard, noisy key.

6. If the chroma key now looks good, you are done. If dark edges are present, there may be too much primary **Luma** suppression or **Clip Hi** or **Clip Low** may be set improperly. If adjusting these parameters fails to solve the problem, you should consider activating the Reshape feature.

Reshape

Reshape is useful when shading variations exists in the backing color. A better alternative, if time permits, is to adjust the lighting on the set to even out the backing color. This may improve the key so that Reshape is not needed. Reshape helps with backing color suppression at the expense of a harder looking key with more noticeable edge artifacts.A drawback of Reshape is loss of detail in the keyed edge. For example, smoke and hair in the foreground will probably be lost.

1. Touch the **Reshape** button to activate this feature.

2. Set primary **Luma** suppression to 0.

3. You can now readjust the **Clip Hi** and **Clip Low** controls if necessary to fine tune the key as described above.

4. When **Reshape** is on, key resizing and positioning also become available to clean up the key edges.

   - Size narrows the key signal and can remove much of the blue or green edge on the foreground subject.
   - Position moves the key signal left and right, and can be used to reduce a color edge along only one side of the foreground.

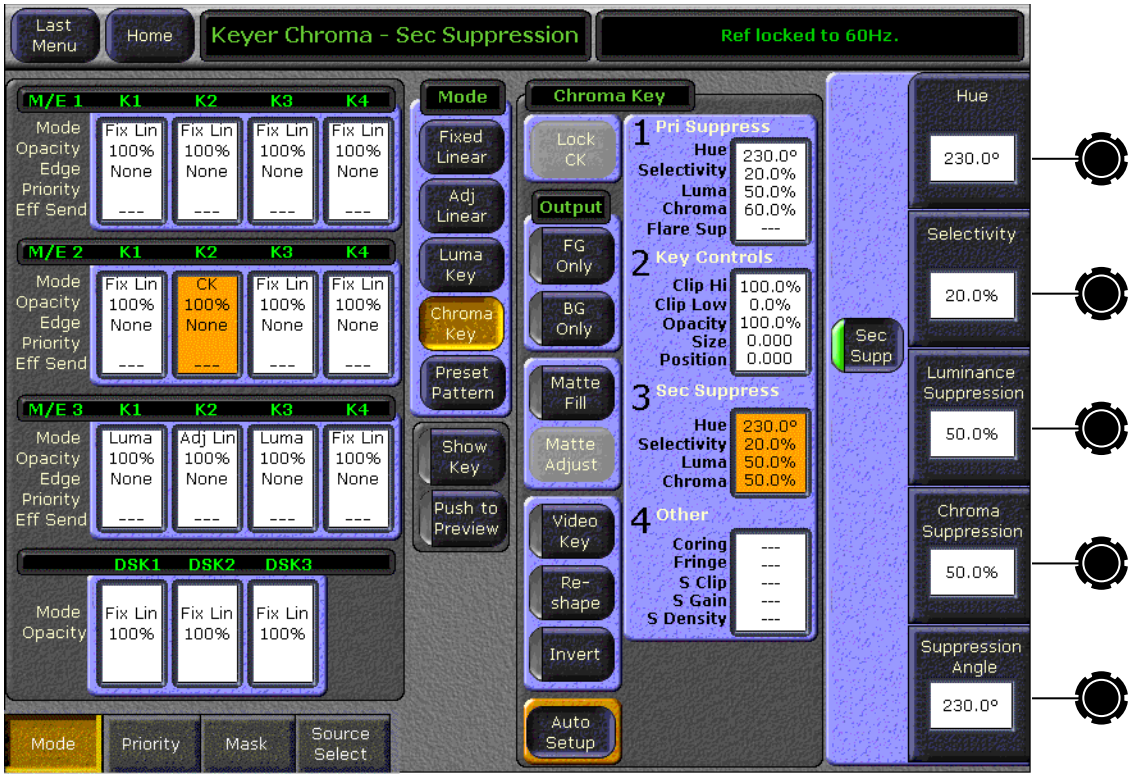
Secondary Color Suppression

Secondary color suppression is intended to improve the color of translucent areas (e.g., glass or smoke) or fine detail near the edge of a foreground subject (e.g., hair). These areas can be take on some of the backing color. Much less secondary suppression will be needed than is used for primary suppression, because the foreground color is only partially corrupted by the backing color. Because there is a mixture of backing color and foreground color, the secondary suppression Hue and the direction (Angle) will be different from primary suppression. Primary suppression removes the backing color, while secondary suppression corrects the color in translucent areas.

Note If Reshape has been applied, it is unlikely enough edge detail will remain to use secondary color suppression.

1. Touch the stage 3 **Sec Suppress** data pad and then touch the **Sec Supp** button to activate this feature (Figure 260).

Figure 260. Sec Suppress Controls



2. Adjust secondary suppression **Hue** and **Selectivity** so that the translucent area is affected, but opaque areas of the foreground are not. The final hue will lie somewhere between the backing color (primary suppression hue) and the uncorrupted foreground color.

3. When making this adjustment, it is helpful to turn the secondary **Chroma Suppression** to maximum, and the secondary **Suppression Angle** to produce an unnatural color in the affected area. This makes the changes to secondary suppression more obvious.

4. **Selectivity** should be kept as wide as possible. You should only narrow selectivity (increase its value) if you cannot avoid changing opaque areas of the foreground.

5. Adjust the secondary **Angle** so that changing secondary **Chroma** suppression moves the color in the desired direction. You are trying to match the color of the translucent areas to an opaque (uncorrupted) area of the foreground subject.

6. Decrease secondary **Chroma** suppression for the best match between corrupted (translucent) and uncorrupted (opaque) areas. Interaction between secondary suppression **Angle** and **Chroma** suppression may require repeating these adjustments.

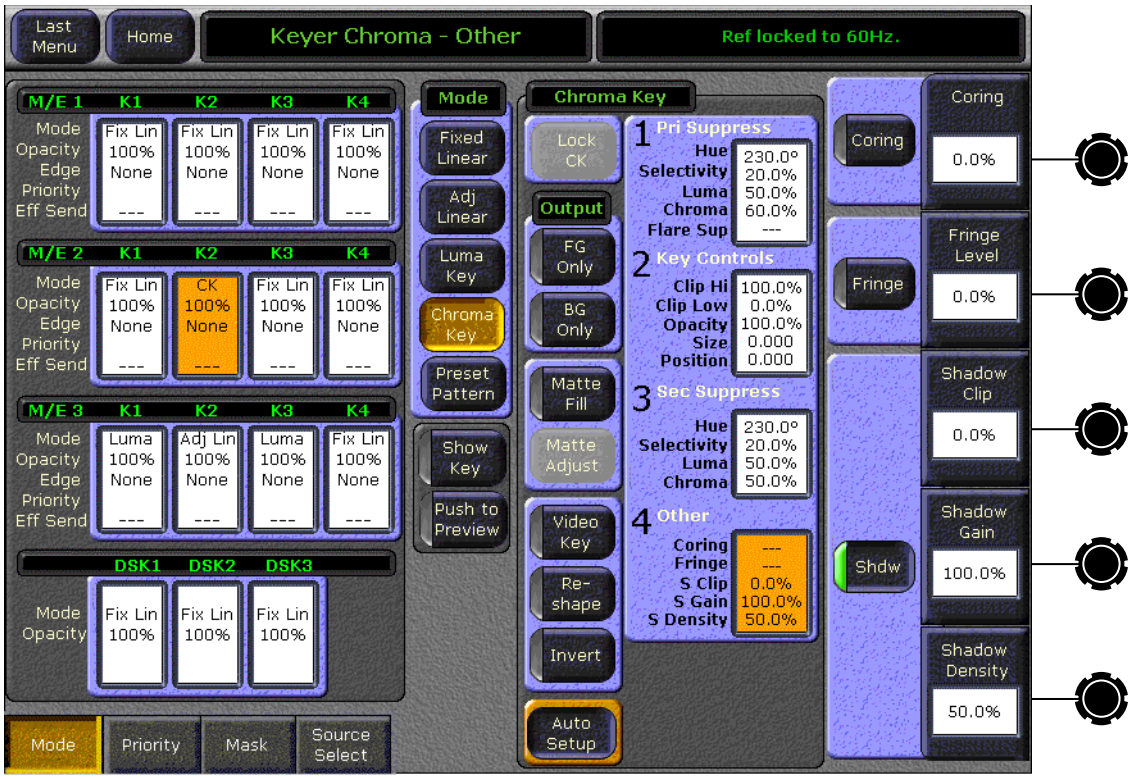
7. Increase secondary **Luma** suppression to balance lightness of the translucent and opaque areas.

8. Repeat secondary suppression **Angle**, **Chroma** suppression and **Luma** suppression for best results.

Other Chroma Key Controls

Additional chroma key controls are available by touching the stage 4 **Other** data pad (Figure 261). Coring, fringe, and shadow controls can be individually activated by touching the labeled buttons.

Figure 261. Other Controls



Coring replaces any pixels in the luminance signal after primary suppression that are below the adjustable threshold with black. This eliminates noise resulting from incomplete suppression. While coring can improve some keys, it can easily be over done. Coring thresholds much above black will affect dark grays that are actually part of the foreground subject, making the chroma key composite look unnatural.

Fringe is used to restore color to the gray portions of the foreground color resulting from secondary suppression adjustments. This control is only active when secondary suppression is on.

Shdw provides controls of shadows that fall on the backing. **Shadow Clip** and **Shadow Gain** allow selecting the range of the luminance portion of the foreground that produces a shadow. **Shadow Density** is an opacity control for the shadow and adjusts how much shadow is added to the background.

Mix Through Video Transition

In addition to the standard Mix and Wipe transition between an M/E A and B bus, a customizable User Transition is available. The currently available User Transition is a Mix through Video (or Matte) effect. A Mix Through Video transition incorporates a third or intermediate video in the middle of a mix transition. This type of user transition allows mixing from one video through a matte or video from the Utility bus to a final video.

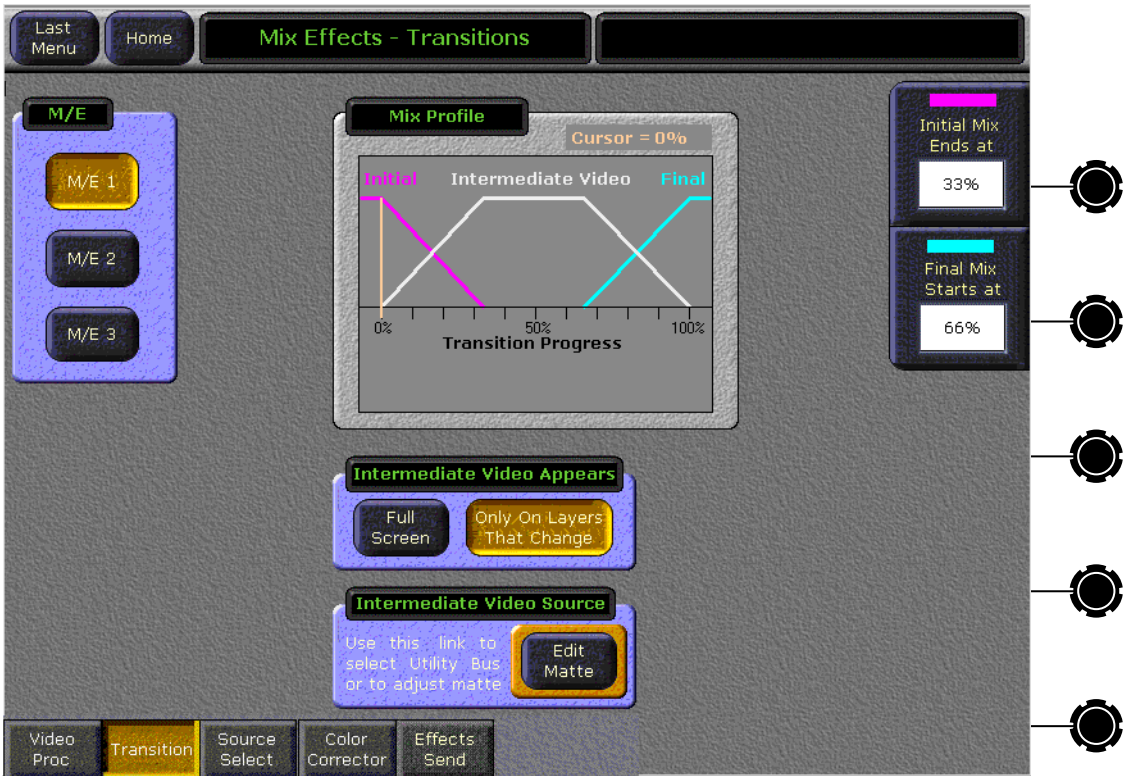
The intermediate video or matte can be applied to the entire screen or just the portion that will change during the transition. The desired intermediate video can be taken from the M/E Utility bus or can be a matte value from the matte generator.

There are a number of interesting effects that can be created using this transition type. One common application is to add a white "flash" in the middle of a mix transition.

To set up a simple white flash effect do the following:

1. Open the M/E menu (Figure 262) in the Zodiak Menu panel application by selecting **M/E** in the Home menu.
2. Select the M/E in which you wish to do the effect in the M/E data pad on the left of the screen.

Figure 262. M/E Menu – Mix Through Video Transition

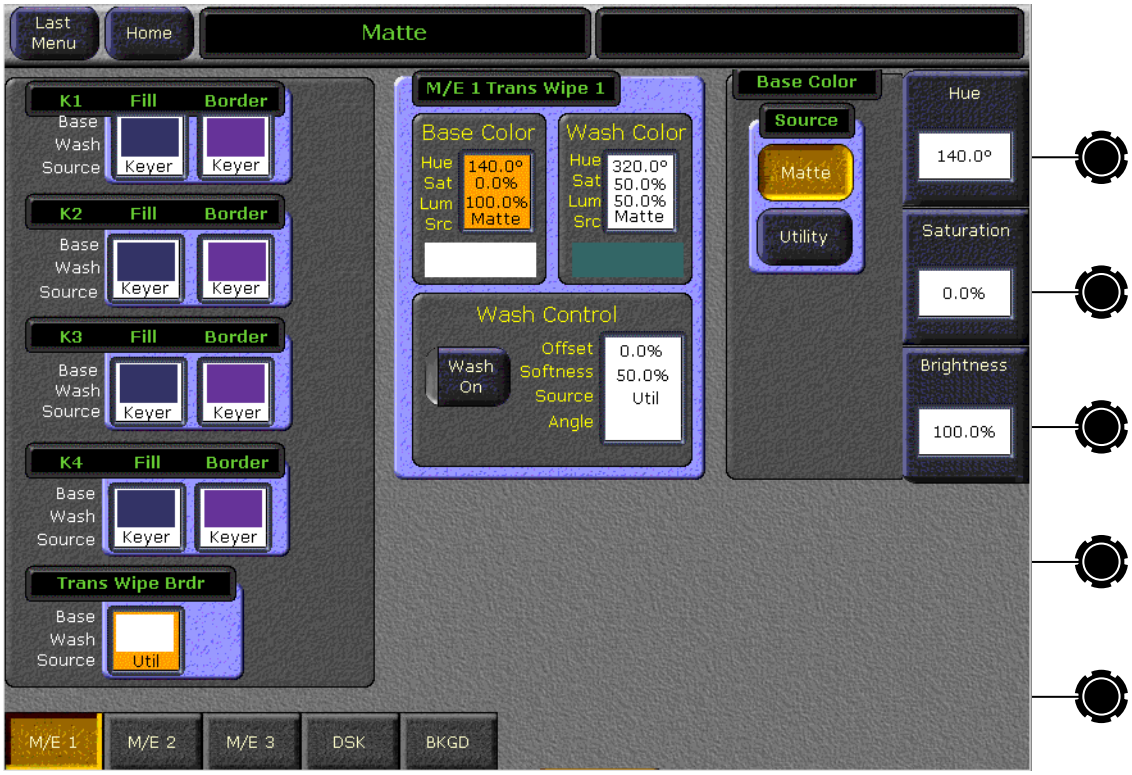


3. Select the **Edit Matte** button in the Intermediate Video Source data pad to bring up the M/E Matte menu for the M/E you have selected (Figure 263).

4. In the M/E Matte menu, select the **Matte** button in the Source pane in the Base Color pane.

5. Set the Brightness to 100% and the Saturation to 0% with either the soft knobs or the popup keypad to create a white matte. The matte will appear in the Base Color box.

Figure 263. Set Up White Matte



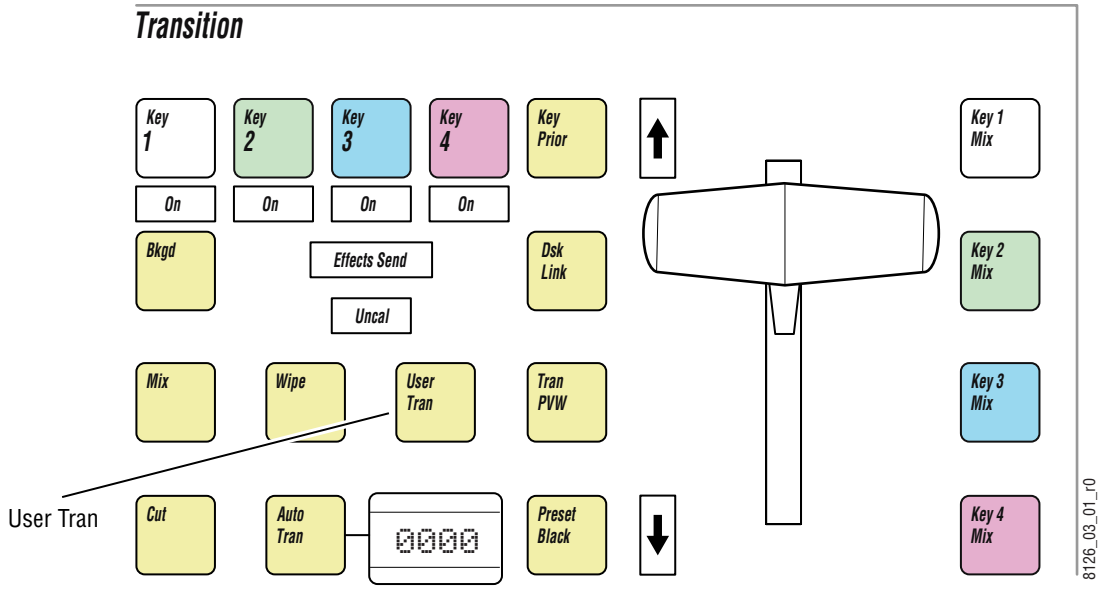
6. Return to the User Transition menu by touching the top left message area (Matte), then the **M/E** button in the Home menu.

7. In the M/E menu (Figure 262), touch the **Full Screen** button in the Intermediate Video Appears pane to create a full raster effect.

8. On the Main panel, select a video source on the corresponding M/E A bus and a different video source on the B bus to transition to.

9. Select the **User Tran** button in the corresponding M/E Transition subpanel (Figure 264). For a simple white flash between sources, select a **Bkgd** transition only (no key).

Figure 264. User Tran Button



10. Move the lever arm or press the **Auto Tran** button to perform the transition and see the white flash effect.

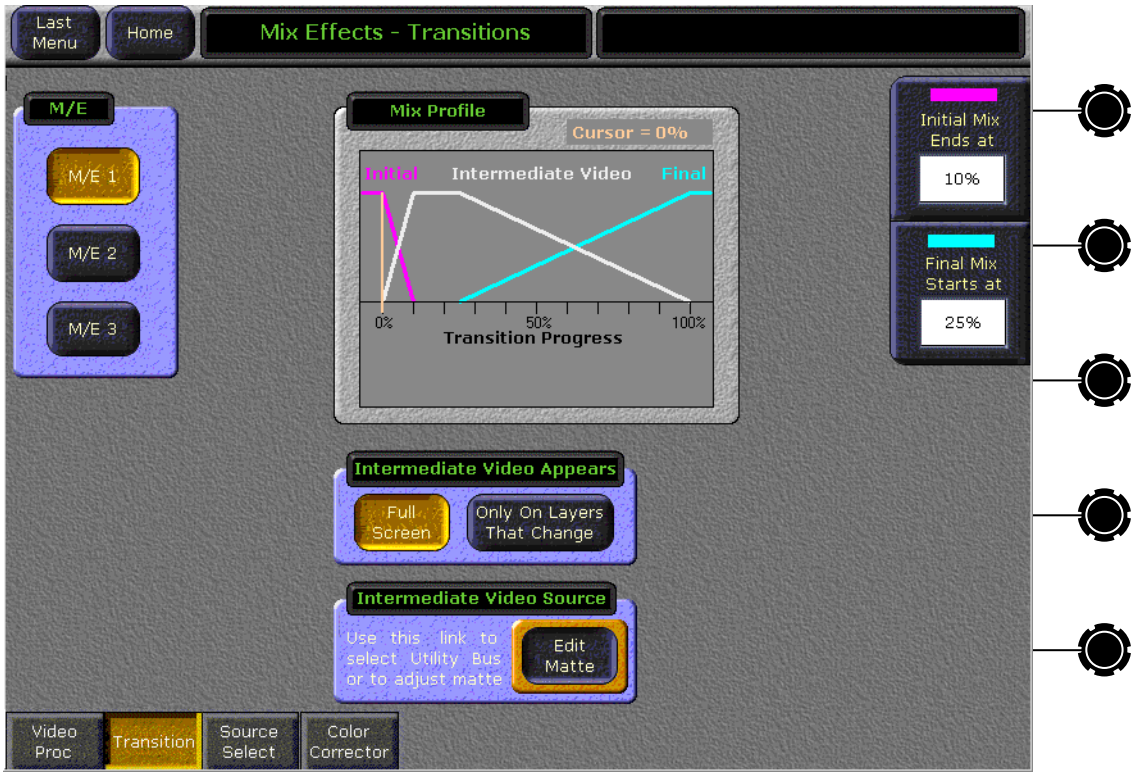
Note that the point in the transition at which the initial video mixes to the intermediate video is set with the Initial Mix Ends At data pad on the right of the M/E menu (Figure 262 on page 386). The point in the transition at which the intermediate video changes to the final video is set with the Final Mix Starts At control.

The transition values shown in Figure 262 are set for a gradual mix up to and down from the intermediate video as shown in the Mix Profile pane provided. Use this visual tool along with the initial and final mix controls to set the rate of mix between the initial (magenta trace), intermediate (white trace) and final video (cyan trace) for the desired effect. The orange trace is a cursor that indicates the progress of the transition. It will reset to 0% at the end of a transition.

For an effect more closely resembling a camera flash, change the Initial Mix Ends At to a lower number to sharpen the slope of the mix from the initial to the intermediate video as shown in Figure 265. You can also set

the Transition Rate in the Transition subpanel to a faster rate to enhance the flashing effect when using an Auto Transition. Experiment with the values to vary the effects.

Figure 265. Changing Mix Values



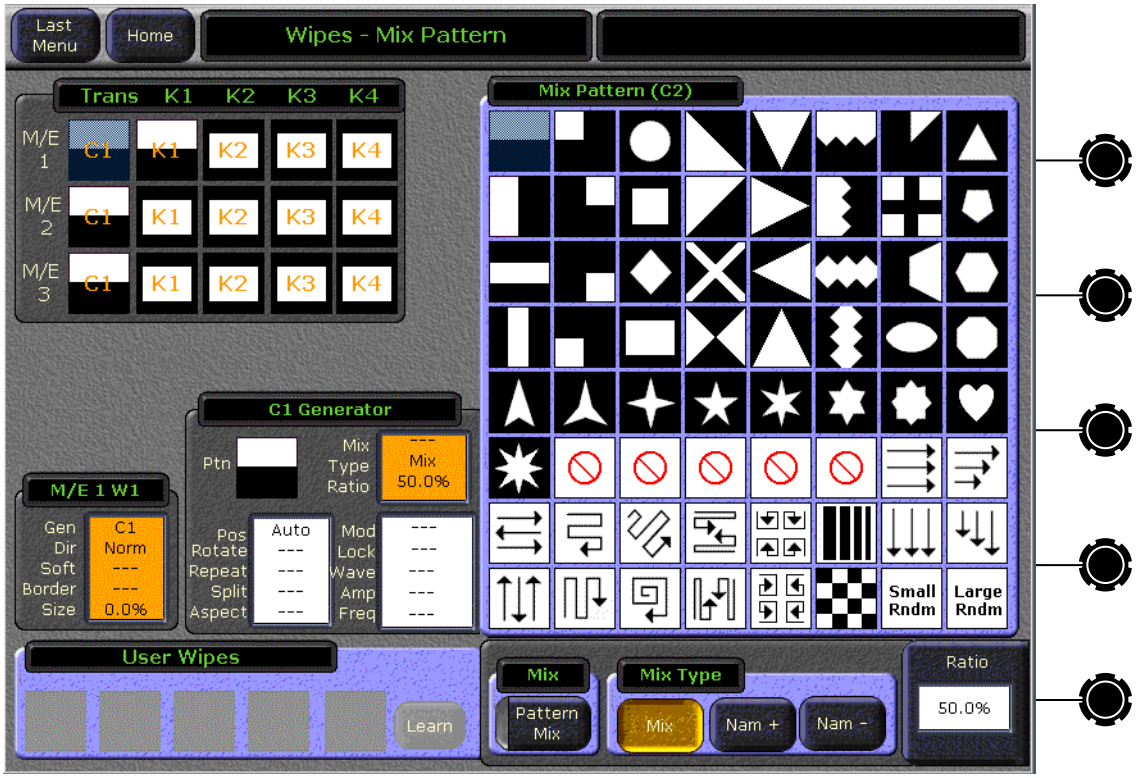
Pattern Mix

The Zodiak system can combine the complex wipe pattern generators (**C1** and **C2**), to create a wide variety of customized wipes.

To Create a Pattern Mix:

1. In the M/E you wish to perform the pattern mix, double press the **Wipe** button in the Transition subpanel on the Main panel. This selects **Wipe** as the next transition type and also opens the Wipes menu with C1 delegated for control.
2. Select the C1 pattern to be used by touching the **Ptn** data pad in the C1 Generator pane, and then selecting one of the displayed patterns.
3. Touch the **Mix**, **Type**, **Ratio** data pad located to the right of **Ptn** data pad in the C1 Generator pane. Additional control buttons will appear at the bottom of the menu and the pattern selection display will delegate to C2 for selecting the pattern to be mixed (Figure 266 on page 391).
4. To preview the effect, delegate the M/E for preview in the Preview subpanel on the Main panel.
5. Press the **Trans PVW** button in the Transition subpanel, and move the lever arm part way. This will display the C1 pattern on preview.
6. In the C2 pattern selection display in the Wipes menu, touch the desired pattern to be mixed with C1.
7. Touch the **Pattern Mix** button in the Mix pane at the bottom of the screen so its indicator illuminates. The preview monitor will now show the combined C1 and C2 pattern.
8. You can select the type of pattern mix with the Mix type buttons (**Mix**, **NAM +**, **NAM –**). The **NAM** buttons are used for And or Or pattern mixing.
9. You can also adjust the amount each wipe pattern contributes to the mix with the **Ratio** control soft button at the bottom right of the screen. At 50%, each pattern contributes equally. At 25%, the other pattern contributes only 25% to the final pattern.

Figure 266. Pattern Mix Menu



Transform Engine Effects

This section provides some basic instruction for using the optional Transform Engines in the Zodiak keyers.

Building a Cube and Using Easy Cube

The procedure below instructs you on how build a 3-D cube using three Transform Engine channels (only three channels are needed since only three sides of a cube are visible at a time).

Note To create seamless cubes, use the negative crop value from one channel as the Source Z Locate of the other channel. Use the horizontal Crop values to determine the sides of a solid, and use the vertical Crop values to determine the top and bottom sides of the solid.

The following procedure creates a half-size three sided cube using three keyers of an M/E.

1. Select on the A bus of the M/E the background image over which you wish to have the cube appear.

2. Select the sources for the three sides of the cube on three keyers of the M/E (M/E 3 is used in this example).

3. Turn on all three keyers on that M/E. You will see only one keyed image because the other two are hidden behind it.

4. Turn on the Transform Engines for all three keyers by pressing the **Int DPM** button in the Keyers subpanel.

5. Delegate all three keyers for control by the Joystick subpanel by pressing all three keyer delegation buttons at the same time.

6. Set all three keyers to half-size using the Joystick subpanel. Press **Int DPM**, **Locate Size**, **Z** to delegate the Master E-MEM keypad to control Z size. Then type **• 5** on the keypad and press **Enter**. The keyed images will be reduced in size, revealing part of the background.

   You will now crop the sides of all the keys to make them square. This is done using the Transforms menu. Touch **Transform**, **Transforms** in the Home menu to access it. Because the menu can control only one keyer at a time, the adjustments are made to each keyer individually.

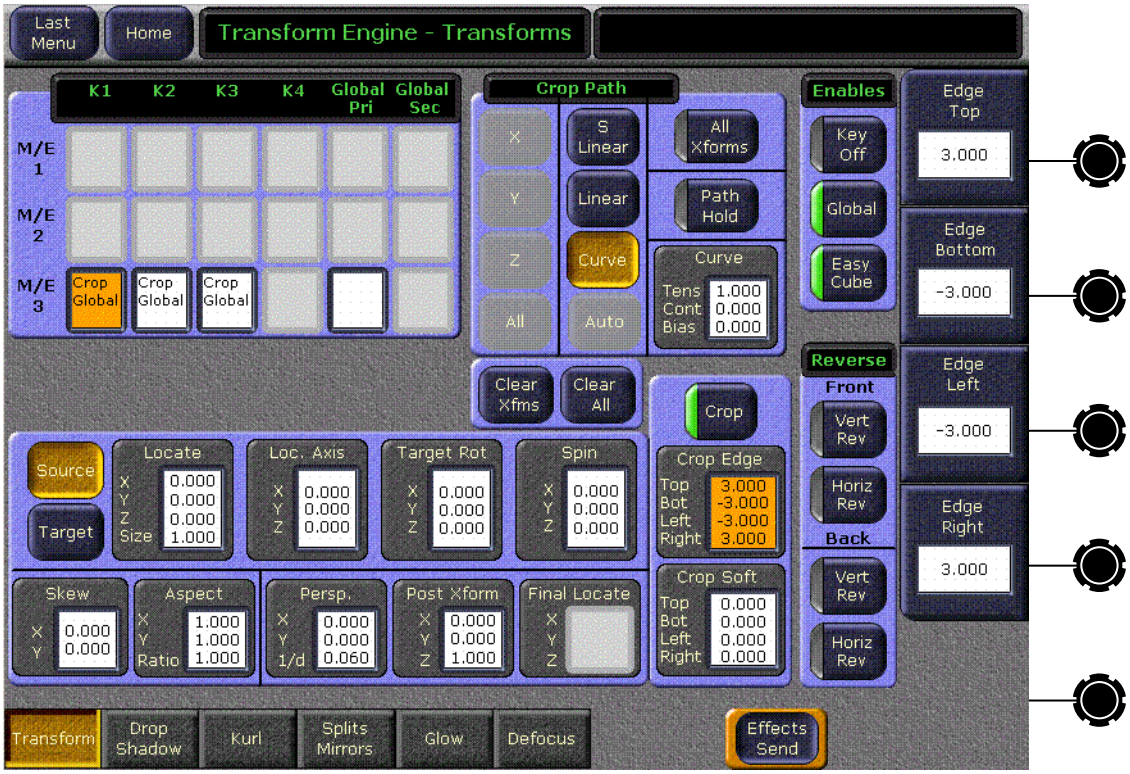
:

Edge	Value
Top	3
Bottom	-3
Left	-3
Right	3

7. Select the first keyer in the delegation matrix (Figure 267). Touch the **Crop** button and the Crop Edge data pad, and enter the values shown. You may only need to change the Left and Right values, as default values for Top and Bottom are usually 3 and -3

8. With the first keyer still selected, turn on the **Global** and **Easy Cube** functions in the Enables pane on the menu. This prepares the keyer for cube manipulation. The key will be controllable with the global channel, and when the global channel is rotated the key side moving out of view will automatically translate to the visible front of the cube, simulating a complete six sided cube.

Figure 267. Transforms Menu



9. Repeat Step 7 and Step 8 for the other two keyers.

   You now need to edit each key Z value to match the negative of the crop value. The second and third key sides will need to be rotated first.

10. In the Transform menu, press the delegation button of the first keyer so only that keyer is delegated for that M/E. Touch **Source** and **Locate** in the middle pane. This will bring up the **X**, **Y** and **Z** size data pads on the right of the screen.

11. Touch the **Z** data pad to bring up the keypad and type **– 3** (or use the soft knob) and press **Enter**.

12. Delegate only the second keyer on the Transform menu, touch **Target Rot** and **X** (on the right of the screen), then type **– • 2 5** on the keypad (or use the soft knob) and press **Enter**.

13. With only the second keyer delegated, touch **Locate**, **Z**, then type **– 3** on the keypad (or use the soft knob) and press **Enter**.

14. Delegate only the third keyer on the Transform menu press **Target Rot**, **Y**, then type **• 2 5** on the keypad (or use the soft knob) and press **Enter**.

15. With only the third keyer still delegated, press **Locate** and **Z**, then type **– 3** on the keypad (or use the soft knob) and press **Enter**.

16. Go to the Transforms subpanel and press the **Global Ch** button to delegate control of the Joystick subpanel to the global channel. You can now select **Spin** on the subpanel and spin the position of the cube with the joystick. When turned completely around you will see the cube is incomplete, with only three sides.

Alternatively, the cube above can be created using only the Transform menu by entering the data in Table 11 after selecting the background and key sources, turning on the keys, and turning on **Int DPM** (Step 1 through Step 4 on page page 391).

Table 11. Half Size Cube Data

Parameter	Key 1	Key 2	Key 3
Global	On		
Easy Cube	On		
Crop	On		
Crop Edge	Top = 3 Bottom = -3 Left = -3 Right = 3		
Source/Target	Select Source Space		
Locate	X = 0 Y = 0 Z = -3 Size = 0.5		
Target Rot	X = 0 Y = 0 Z = 0	X = -0.25 Y = 0 Z = 0	X = 0 Y = 0.25 Z = 0

The above example is for a cube with centered crops. For crops that are not equidistant from the edges of the picture (3-D slab), take the negative crop, add it to the positive crop, divide by two, and use this value to move the axis for the side of the cube you are working on. This centers the axis so you can use the negative crop value rule described above to build your 3-D slab. When done, move the axis back to the center of the screen using Post Xform and entering a negative of the axis value.

Still Store Operations

General Still Store Information

Standard features include:

- Playback, Create Edit, and Cache Still Store menus,
- Animation clips, permitting up to 1.8 seconds of full raster animation with key (2.15 seconds at 25 fps). With fenced storage (1/25) animation up to 45 seconds (54 seconds at 25 fps) is possible,
- Partial raster (fenced) image capture,
- Clip begin mark, end mark, and looping,
- Input and output crop and position controls,
- Program output presets, and
- Still and clip storage to folders, and folder creation, copying, and deleting.

Output Based Menu Control

For the fastest response time, Zodiak Still Store menu operation is based on outputs. In general, you select the Still Store Program output channel you wish to control and then make the desired changes. For example, with Still Store Program output 1 selected, selecting a different cached still image immediately sends that new still image to that output. If the selected still was not cached, the caching process begins immediately to bring the image to that output as rapidly as possible.

Image File Size and Disk Management

A full frame Still Store video image requires about one MB (1024 KB) of storage space, and a video with key image requires about two MB (2048 KB). Approximately 1800 full frame video images can be saved to the Still Store hard disk, and about 250 can reside on a Zip disk (half that number for video with key images). For a full frame animated clip, each frame requires the above storage space, so a 10 second full frame clip at 30 fps without key requires about 300 Mb (double that for video with key).

When a disk becomes filled, new material will not be able to be captured or recorded. A Still Store menu control is available to delete an individual still or clip from disk, to free up disk space. Note also that fenced recordings (described later) are not full frame, which reduces the storage requirements per image and improves access times.

Caching Times

Still Store images and clips are stored on disk. Some time is required to load the data from disk for display or playback. The Zodiak Still Store uses a cache to permit immediate image display and clip playback. Images on disk are transferred to the cache automatically during normal operation.

The time required to transfer files between the cache and disk varies. Stills images transfer fairly rapidly, requiring about two seconds or less. Animation clips, however, may contain large amounts of data and can take considerably longer to load and save. The approximate clip load and save times listed in Table 12 are multiples of real time. For example, a one second full frame clip with an accompanying key takes 36 seconds to load from disk, and 150 seconds to save to disk.

Table 12. Approximate Animation Clip Load and Save Times[a]

	Video Only		Video and Key	
Raster Size	**Load Time**	**Save Time**	**Load Time**	**Save Time**
Full	18 x	75 x	36 x	150 x
1/4	6 x	12.5 x	12 x	25 x
1/9	2.7 x	4.5 x	5.4 x	9 x
1/25	1.8 x	2 x	3.6 x	4 x

[a] These are the best case times. Load/Save times may be longer using the 550 Mhz CPU board, or if effects, such as Transform Engine or E-MEM, are running.

Cache Management

Items are cached from the currently accessed folder automatically when they are loaded to Still Store outputs. When the cache becomes filled, some existing cached stills and clips will need to be uncached to make room for new material. In general, items that have not been loaded to an output for the longest time will be the first to be uncached.

When items are loaded to a Still Store output, they are automatically locked to prevent them from being uncached during use.

Item Numbers, Storage Locations, and Folders

Stills and clips are identified by number (0001 - 2000). Each number represents a unique storage location in the current directory, but does not specify any particular amount of storage. A prefix identifying the item type (Still or Clip) is added to the number, and this name is displayed for that item in the Still Store menus. Saving an item as particular number overwrites any item previously stored to that location, regardless of whether it was a Still or Clip.

The Zodiak Still Store system can access different directories, or folders. Each folder has its own independent set of storage location numbers. Only the currently accessed folder is used for save and cache from disk opera-

tions. E-MEM effects also only access the current folder, and identify Still Store items just by their number, not by their folder. This permits flexibility in Still Store material management. See page 399 for more information.

The names of stills created by previous software versions (Still 1 through Still 50) will reside in the DEFAULT directory. These items are automatically renamed Still 0001 through Still 0050 when saved.

Each Still Store still or clip actually consists of two files, one for video/key data (.gvi extension) other for meta data (.gva extension). The Zodiak system automatically handles these pairs of files as one entity. If you should ever work with the files directly, the file names must not be changed, and the files must always be managed as pairs. If one file is deleted, for example, its pair must also be deleted.

Position, Crop, and Fenced Record

Position and crop controls affect how an image is displayed. Position controls relocate the image itself, and crop controls mask the sides of the image to display only a selected area. These controls do not change the actual image data saved to disk. Position and crop metadata is saved along with the image file to define what position and crop values are to be applied to the image. This metadata can be overridden or edited to change how the image displays.

A fenced recording, on the other hand, saves only the selected portion of the image to disk. This can be used to reduce the amount of data saved, which increases the number of images able to be stored and improves loading speed. Fence size cannot be undone without re-recording the image.

Positioning and cropping is on line and pixel boundaries. An image cannot be moved perfectly smoothly with the Still Store (if smooth motion is desired use a Transform Engine).

Source Selection and Video Key Pairs

Sources are selected for capture using the Still Store Aux bus (select **Still Store**). The Still Store Aux bus always operates as a video/key pair. Still Store outputs used for capture and playback can be set up to operate as video/key pairs, or as video only. If the Still Store output being used for capture is set up for video only, any accompanying key signal on the Still Store Aux bus will be discarded. If a video only source is selected for a Still Store output pair, a duplicate of the video image will be captured to the key channel of the Still Store output pair. If the Still Store Aux bus is set up with a split key, that split key will be captured to a paired Still Store.

Shaped and Unshaped Still Store Video

The Still Store automatically adjusts for shaped and unshaped video (as specified by the source definition for the captured source), and the captured video will be processed as such all the way through to the final Zodiak system output. For example, suppose paired Still Store output 1-2 is keyed on an M/E. If a still that was captured as a shaped video/key pair is selected on that Still Store output, the M/E will automatically use shaped key processing. If a different still that was captured from an unshaped video/key pair source is selected on that Still Store output, the M/E will immediately switch to unshaped key processing. Shaping information is included in the metadata for each Still Store item.

Still Store Configuration

Zodiak Still Store outputs are internal sources. They are managed the same as standard external Zodiak sources, like cameras and VTRs, except Still Store outputs do not appear in the Eng Setup-Define Sources menu. They are available on the Eng Setup-Outputs menu, and so can be assigned to any output connector, and are also available on the Daily Setups-User Prefs-Button Mapping menu. Once a Still Store output has been mapped to a source selection button that Still Store source can be selected for use on that bus.

Preview and Capture

During image capture, a Still Store output temporarily displays its input. The input can be previewed the same as any other Zodiak source, by selecting a Still Store video only source directly on a M/E output, or by selecting a Still Store video/key pair source and setting up a key on a M/E.

Still Store Operation

General Operation

In general, the Still Store feature is operated by selecting a source, grabbing a still or recording a clip, saving the captured image to a folder, then loading the image from that folder to a Still Store output. The Still Store menus can be used to select stills and play clips.

Folder Selection

Still Store save and cache from disk operations work within the currently selected folder on the Still Store hard drive. E-MEM effects containing Still Store settings also operate using the current folder.

CAUTION Changing folders during live production is not recommended.

When folders are changed, Still Store material may become inaccessible or the wrong material may be loaded if items with the same names are saved to different folders. One way to eliminate this potential problem is to use only the DEFAULT Still Store folder, and this simple approach may meet all your needs. However, if you use multiple Still Store folders you must be sure you are accessing the correct folder before performing these operations.

To Change the Current Still Store Folder:

1. Touch the path data pad below the scrolling selection window in either the Playback or Create Edit Still Store menu.
2. Use the navigation controls to go to the desired folder, then touch it so it is highlighted.
3. Touch **Use Selected**. The highlighted folder will now be used for Still Store load and save operations.

If you must change folders during a production to acquire specific items, you should load the new items to Still Store outputs so they are cached, then immediately return to the original folder. The new cached items will remain available for use.

Folder Creation

Only folders in the Still Store hard drive C:User directory can be used directly by the Zodiak Still Store to save and load Still Store items. The Still Store hard drive is accessible from the Still Store folder browser and from the File Operations menu.

To Create a New Still Store Folder from a Still Store Menu:

1. Touch **Still Store** to go to the Still Store menu, and access either the **Playback** or **Create Edit** menu.
2. Touch the path data pad below the scrolling selection window to open the Still Store folder browser.
3. Touch **Create Folder** and enter a unique folder name.

Folders can also be created on the Still Store hard drive from the File Operations menu, following standard operating procedures.

Important Folder and File Management Information

If you save Still Store material into multiple Still Store folders, you will need to manage this practice. Storing randomly numbered Still Store items in arbitrarily named folders can lead to the loss of access to material or the presentation the wrong material, at perhaps the worst possible time.

Careful folder creation and consistent still and clip numbering practices can be a powerful tool for Still Store material management. Different management techniques can be used. A few examples are listed below.

- Organize by unique item and folder number. For example, create folder "5" for the 5:00 news, and save items 0500-0599 in it. Create folder "6" for the 6:00 news and save items 0600-0699 in it, etc. Then access only that folder when that show is in production. The unique item numbers will ensure the correct items are always used for each show.
- Organize by show, with shared numbers. Save all the Still Store material for a particular show into a folder named for that show, and access only that folder when that show is in production. If you use similar E-MEM effects in different shows, but need unique Still Store material for each show, saving the Still Store material with the same numbers into different show folders allows the same effect to be used for different shows. Note that once items have been cached, E-MEMs will load the cached material with that name to the Still Store outputs and will not seek out material from other folders. Remember to run your effects in advance to be sure the proper material has been cached.
- Organize common material. If you have common Still Store material used by several shows, you can store it into a separate folder. Then if you know exactly what material is required for a show (including any Still Store E-MEM effects that will be used) you can access that common folder, cache the material you need (including running the E-MEM effects), then access the show folder that contains its unique material during production. The cached material remains available when the new folder is accessed, and is sure to remain available if it is kept loaded to an output. However, if a common item is unloaded from an output and items are saved during production (especially long clips), that common item may be uncached, making it inaccessible unless the folder is changed.

Regardless of the specific Still Store management technique used, it is important to apply it consistently.

Preview

Existing stills and clips can be previewed before placing them on-air in the standard manner. Images in the process of being captured can also be previewed before they are saved.

Existing Images

You can load an existing video only still or clip to Still Store Program output 4, then press the **Still Store** button in the Preview subpanel to display that output on switched preview. Note that if outputs 3 and 4 are configured as a video/key pair, you can only preview the key signal using this method.

To preview a different Still Store output, press the **PVW Pri** button on the Preview subpanel, then press the **PVW Pri** button on the Local Aux panel, and then choose the Still Store output on the selection bus. The output will be displayed on switched preview. Still Store outputs need to be mapped to source selection buttons on the Local Aux panel to use this method.

You can also preview an existing video only still or clip the same as any other source. After it is loaded to a Still Store output, press that Still Store output's source selection button on the B bus of an M/E configured with a preview monitor.

To preview an existing video/key pair Still Store image or clip so you can inspect its keying quality, load the item to a paired Still Store output, select that Still Store output source on an M/E's keyer bus, and set up a key on that M/E. The Still Store should be keyed over a known background (like a matte) so you can clearly determine what part of the keyed image originates from the Still Store.

Images Not Yet Saved

When you select **Show Input** on the Still Store Create Edit menu, the Still Store temporarily passes the source input of that Still Store to its output. When a Still Store output is paired and a video/key input source is selected, selecting **Include Key** will also pass the separate key signal of that source to the paired Still Store output. The incoming Still Store source material can then be previewed using the methods described above.

When a still is grabbed or a clip is recorded, the result of the capture is displayed on that Still Store output. A clip can be rewound and played to ensure it was recorded correctly.

When previewing an unsaved image, if you delegate a different Still Store output, the unsaved image will be discarded.

Input Source Selection

Still Store input sources can be selected using the Local Aux panel.

1. Select a Still Store output on the Still Store menu.
2. Press the **Still Store** bus delegation button on the Local Aux panel.
3. Press the button for the desired source on the Local Aux panel source selection bus.

The Still Store supports split keys set up on the Local Aux panel.

Still Capture and Save

1. Select a Still Store output on the Still Store menu. If you plan to capture a video/key pair the Still Store output selected must be paired.
2. Preview the selected Still Store output (see *Preview* on page 400).
3. Select the desired source for the still capture (see *Input Source Selection* on page 401).
4. Touch **Show Input**. The input source will appear on the monitor being used for preview.
5. If you will be capturing a video/key pair, touch **Include Key**.
6. Touch **Grab V & K**. The source image will be captured. Note that although this image is currently being displayed by the Still Store, it must be saved in order to use it in the future.

Note Images that have not been saved are only held temporarily. Selecting a different item or changing Still Store output delegation discards unsaved images.

7. If you are capturing a video/key pair and the key signal is not provided along with the video signal (for example, a reel with video and key presented sequentially), cue to the key material and touch **Grab Key**.

Note A separate monitoring mechanism will be needed to view and cue sequential key images on a graphics reel. The input cannot be previewed on the Still Store once the video has been captured. You can wire a monitor directly to the playback deck or use an available M/E to temporarily view the source material.

8. If you wish to position or crop the image, touch the corresponding data pad and specify the desired modifications.

Note Make sure you are in the correct folder before you save Still Store items.

9. Touch **Save** to bring up a dialog box offering save options. You can either:
   - Type in a specific number for the item,
   - Type zero (0) to have the system select the smallest available item number, or
   - Touch **Enter** to save it to the current item number.

Clip Record and Save

1. Follow steps Step 1 through Step 5 of the Still Capture procedure above.

2. Touch the Record data pad and enter a duration for the recording, in frames (you may want to specify a slightly greater duration and mark the in and out points precisely later).

CAUTION Long duration recordings can uncache a lots of other Still Store material, and saving long recordings can fill the cache with locked items, making other Still Store material inaccessible. See *Cache Management* on page 407 for more information.

3. Controls are also available to specify a partial raster fenced recording and choose the placement (horizontal and vertical) of the area to be captured. Single frame fenced recordings are possible to save storage space.

Note Recordings are given the Clip prefix name even if they have only one frame.

4. If your source is not live, cue the source material. If you are using an external device controlled by the Zodiak system (Profile VDR or VTR), you can cue and play the material using the Zodiak Machine Control subpanel.

5. To initiate the recording touch **Record** on the Still Store menu. If the source is not live you also need to play the source material. The recording will proceed for the specified duration, then stop.

Note Images that have not been saved are only held temporarily. Selecting a different item or changing Still Store output delegation discards unsaved images.

6. If you wish to position or crop the image, touch the corresponding data pad and specify the desired modifications.

Note Make sure you are in the correct folder before you save Still Store items.

7. Touch **Save** to bring up a dialog box offering save options. You can either:

   - Type in a specific number for the item,
   - Type zero (0) to have the system select the smallest available item number, or
   - Touch **Enter** to save it to the current item number.

Marking Clip Begin and End Points

When an animation clip is recorded, there may be material at the beginning or end that should not go to air (black, etc.). Once a clip has been saved, it can be trimmed for playback.

1. With the clip loaded to a Still Store output and that output delegated, touch **Show Details**, then touch the **Begin/End** data pad bring up the mark controls.
2. Using the **Jog Time** soft knob or the **Jog Forward** and **Jog Back** buttons, go to the first frame to be looped and press **Mark Begin**.
3. Go to the last frame to be played and press **Mark End**.
4. Touch **Save** to save the clip with the modifications.

Looping Clip Playback

Looping can be used to repeat playback of a section of material in a clip.

1. With the clip loaded to a Still Store output and that output delegated, touch **Show Details**, then touch the **Loop** data pad bring up the loop controls.
2. Using the **Jog Time** soft knob or the **Jog Forward** and **Jog Back** buttons, go to the first frame to be looped and press **Loop To**.
3. Go to the last frame to be looped and press **Loop From**.
4. Set the number of repetitions of the loop with the **Count** soft knob. The first play through is not included in this number, so for example if you want the clip to play three times enter the number **2**. Entering any negative value creates an endless loop.
5. Touch **Save** to save the clip with the modifications.

Selecting Loop Points

To avoid jumps at the loop point, the original source material (a graphics animation, for example) needs to have motion that repeats. In some cases the entire animation is designed to loop, in which case the **Loop To** point will match the begin point, and the **Loop From** point will match the end point. In other cases, the animation is designed with a non-looping head and/or tail, which can be used to transition into and out of the looping section. You will need to find appropriate loop points to make a looped clip of this type play seamlessly.

1. Find the repeating section of the clip and set a **Loop To** point on a frame just inside its start. The first frame of a repetitive section is not always the best choice.
1. Go to the frame later in the clip that matches the lop frame you just set.

2. Jog back one field, and set it as the **Loop From** point.

3. Set a negative loop count so the clip loops constantly and start playback. Watch the animation carefully at the loop point. If a jump is visible, adjust the Loop To and/or Loop From points using the soft knobs while the animation is running until the jump disappears.

4. Stop the clip playback, set the Count to the desired number of repeats, and touch **Save** to save the clip with the modifications.

Loading Items to Still Store Outputs with the Still Store Menu

Items can be loaded directly to an output, or preset so it can be taken to the output later. If you are using video/key pair items, the Still Store output you select should be paired.

Direct Load

1. Touch the Program output button of the desired Still Store output.

2. Touch the desired item in the scrolling list on the right (you may need to touch the **Show Details** button to reveal the list). If cached, the item will be displayed on the output immediately. If not cached, there will be a delay before it is displayed, the length of which depends on the amount of data being cached.

Preset Load

1. Touch the Preset output button of the desired Still Store output.

2. Touch the desired item in the scrolling list on the right (you may need to touch the **Show Details** button to reveal the list). The item preset will be cached if necessary.

3. When you wish to display the item on that Still Store output, press the Arrow button between the Preset and Program buttons.

Clip and Still Caching

Loading a clip or still will automatically cache it, if necessary. However, you will want to be sure all the material you need for a show is cached in advance, to permit immediate access to the material. Material can be cached in a variety of ways:

- Load the item to a Still Store Preset or Program output using the Still Store menu (see page 405).
- Load the item to a Still Store output using the Machine Control subpanel (see page 406).
- If you created E-MEMs specifying Still Store material, recall and run these E-MEMs before the show (see page 408). An effect may not run correctly the first time if the Still Store material was not cached, but running the E-MEM in advance initiates cache operations that will make the material instantly available later.

Note When the cache is full, loading new material will cause existing cached material to be overwritten. Generally the oldest material cached will be the first material overwritten.

When an output channel is involved in a disk file transfer that channel is not available for use, and only one disk file transfer is supported at a time. The other Still Store output channels remain available during a transfer, however, and can be used to access and display any currently cached material.

Once material is cached, it remains available even if the current folder is changed (the items will be shaded). Once an item originating from a different folder becomes uncached, however, it becomes inaccessible until the folder in which that item resides is accessed again.

Machine Control

Zodiak Still Store stills and clips can be loaded to Still Store outputs and played using the External Devices Control menu.

Duplicating a Still Store Item

A Still Store item loaded to a Still Store output cannot be saved directly as a different Still Store item. However, a Still Store output can be fed as an input to a different Still Store channel and then be captured or recorded and saved, to duplicate the original item. Choose a different folder location or a new name when saving the new item, to prevent overwriting the original item.

Crop, position, and freeze options set on the output Still Store channel feeding the Still Store input are incorporated into the image itself with this technique, and so they will not be adjustable later. Because the images are digital there should be no degradation of image quality.

Cache Management

The Zodiak system manages the cache automatically, uncaching old material to make room for new. However, automatic caching has limitations you should be aware of. In general, keep storage requirements in mind when working with the Still Store, especially if you are working with long clips.

- It is possible to record long animated clips that requires most or all of the available cache space. If long clips are loaded to outputs, that portion of the cache will be locked and it may not be possible to cache new material. Unloading a long clip from the output removes the lock and makes it available for uncaching. However, once a long clip is uncached it will take time to cache it again if it is still needed.
- When animation clips are recorded, the system calculates the amount of cache space required and frees up that space at the onset of recording. As mentioned above, a long clip can require a large amount of cache space, so recording a long clip will uncache a lot of material. Aborting a recording in progress will not prevent the material from being uncached, since the system clears the required space when the recording begins.

Still Store menu controls are available to clear the cache manually.

1. Go to the Still Store Cache menu (touch **Still Store**, **Cache**).
2. Choose which items to uncache:
   - To clear all unlocked cached items, touch **Uncache Unlocked**. All items not currently loaded to an output will be removed from the cache.
   - To clear the entire cache, touch **Unlock All**, then touch **Uncache Unlocked**. All items, including those loaded to outputs, will be removed from the cache. Loaded output images go blank, even if on-air.

Disk Management

Like the cache, the capacity of the disk onto which Still Store material is saved is limited. Once a disk is filled, new material will not be able to be saved to it. If this occurs you will need to delete material from the disk.

The Still Store Playback menu has a **Delete** button that can be used to delete an individual still or clip from the Still Store hard drive, to free up disk space. This button also removes the item from the cache.

An entire folder of Still Store items can also be deleted from the Still Store using the Still Store Folder browser.

1. Touch **Still Store** to go to the Still Store menu, and access either the **Playback** or **Create Edit** menu.
2. Touch the path data pad below the scrolling selection window to open the Still Store folder browser.

3. Use the navigation controls to display the folder containing the items to be deleted, then touch it so it is highlighted.

4. Touch **Delete**. A pop up message will appear asking if you are sure. Choose **Yes**. The folder and all its contents will be deleted from the drive.

If you delete the DEFAULT directory, you should immediately create a new one in exactly the same location on the Still Store C: drive. This directory is used for automatic Still Store Loader application transfers.

Still Store E-MEM Operations

Still Store E-MEM Enable Buttons

Selected Still Store settings and parameters can be saved in E-MEM effects for reuse. The Still Store outputs are assigned by default to the E-MEM enable buttons listed in Table 13. These assignments can be changed from the E-MEM Prefs menu.

Table 13. Default Still Store Output Channel E-MEM Assignments

Still Store Output Channels	E-MEM Enable Button
Ch1, 2	SS A
Ch 3, 4	SS B

Still Store E-MEM Parameters

The following Still Store settings are keyframeable:

- Item load from the current folder to each Still Store output,
- Each Still Store output Video/Key Pair state (on or off),
- Position,
- Crop,
- Freeze Frame Mode, and
- **Start at KF** trigger.

Inserting or modifying a keyframe in an effect will save the above settings on that keyframe for that E-MEM level. These settings will be enacted later when the E-MEM register is recalled or run.

S-Linear path controls are applied to all interpolated Still Store E-MEM operations. Note that positioning and cropping is on line and pixel boundaries. These aspects of an image cannot be moved perfectly smoothly with the Still Store (if smooth motion is desired use a Transform Engine).

E-MEM Clip Playback

Each time a Still Store **Start at KF** trigger command is encountered in an effect, the clip is cued and plays from that cue point. You must make sure effect keyframes that follow the initial start trigger within the duration of the clip do not have **Start at KF** on, or the clip will be recued. Clips cannot be played backwards or paused.

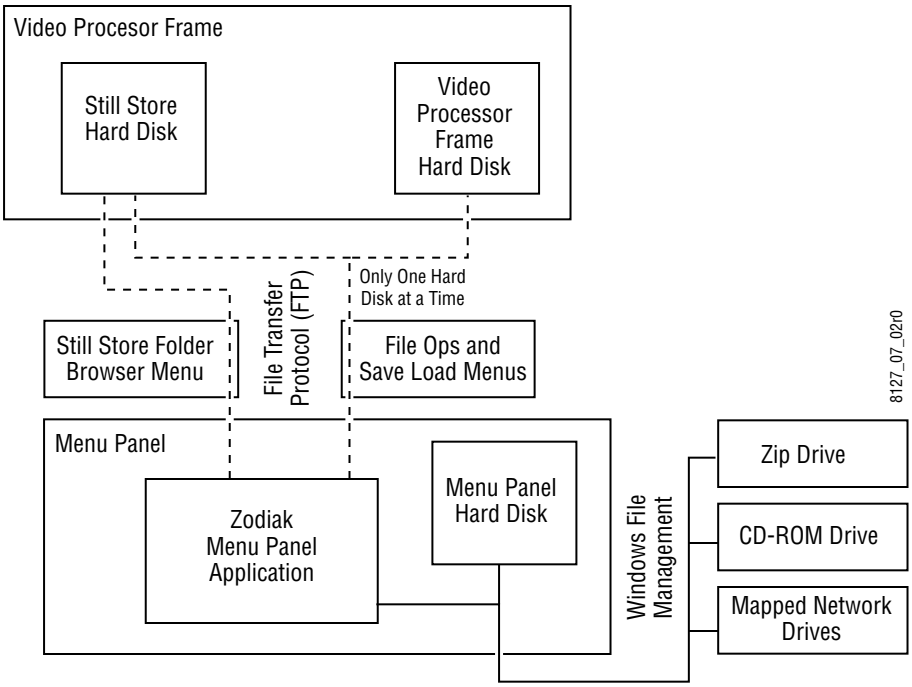
If you want to create an effect that cues and plays a clip when an EMEM register is recalled, you can turn the **Start at KF** button on and then learn a new E-MEM register. This puts the trigger on the first keyframe of the effect. As with all E-MEM Still Store operations, the item will need to be cached in advance for proper playback.

Still Store File Transfers

The Zodiak Still Store saves and loads images only to and from the C:User directory on the Still Store hard drive. This drive is separate from the hard drive used by the Zodiak Menu panel, and separate from the Video Processor hard drive located on the Control module in the Video Frame.

The Zodiak Menu application runs on the Menu panel hard drive. This application uses standard Windows file management mechanisms to access and transfer data to and from the Menu panel hard drive, Zip, CD-ROM, and mapped network drives. However, the Menu application uses the File Transfer Protocol (FTP) mechanism to interact with the Still Store hard disk (using the Still Store Folder Browser menu), and to interact with the Video Frame hard disk (using the various File Operations menus). Note that in Release 5.0 the Still Store Folder Browser cannot access the Video Frame hard disk. The File Operations menu can access either the Still Store hard disk or the Frame hard disk, but can only access one of these drives at a time (Figure 268).

Figure 268. Hard Drives Access



The FTP mechanism only permits file transfers between different drives. For example, a folder of Still Store items on the Still Store hard drive cannot be copied from one location on that drive to a different location on that same drive. However, the folder can be copied from the Still Store hard drive to, say, a Zip drive. Once on the other drive, it could then be copied back to a different location on the Still Store drive. Because only one hard disk can be accessed at a time through the File Operations menu, files also canto be copied directly between the Still Store and the Video Frame hard drives, but may be copied in two steps as described above.

File Operations File Copy

Each Still Store still or clip actually consists of two files, one for video/key data (.gvi extension) other for meta data (.gva extension). The actual pair of file names for a particular item, e.g. Still 100, are I0000100.gvi and I0000100.gva. Both files are necessary for proper display by the Still Store, so these files always need to be managed in pairs. If one file is copied or deleted, for example, its pair must also be copied or deleted.

To Copy Still Store Items:

1. Touch **File Operations** to go to the File Ops menu.
2. Touch **Top**, if necessary, to go to the top of the file hierarchy, then select the Still Store: User Directory icon.

3. Use the navigation controls to go to the folder containing the items to be copied.

4. Open the folder, touch **Multi-Select** so it is enabled, then touch the pair of files for the item to be copied. You must select both the .gvi and the .gva extension files for a complete copy of that item.

5. Touch **Copy**. A lower pane will appear.

6. Navigate to a destination on a different drive in the lower pane, using the lower navigation controls.

7. Touch Paste. The Menu system will not be usable during the transfer process.

8. If you will not be using the original images, you can delete them from the Still Store to free up disk space and avoid confusion that may result from the existence of duplicate files.

Still Store File Renaming

Still Store files can be renamed in the File Operations menu, though this is not recommended. If you decide to change file names, the following rules must be followed:

- The image and metadata files must retain the same base file name.
- Only one pair of files with the same base file name should appear in any directory.
- The base file name format must not be altered (Ixxxxxxx.gvi or Ixxxxxxx.gva). The only change allowed is to edit the number to make the files unique. Valid numeric values are 0000001 through 002000.

File Operations Folder Copy

You can copy an existing folder that contains Still Store images to another drive. If you use a folder management technique that limits the number of Still Store items in any one folder, the copy can be performed relatively quickly. However, if you have filled the DEFAULT directory with hundreds of stills, the copy process may take considerable time. During the transfer process the Zodiak menu cannot be used. You will also need to ensure there is enough space on the destination drive to receive the files. A completely full DEFAULT directory of 2000 stills will not fit onto a single Zip disk, for example.

If you know you will be transferring Still Store items at the time they are captured or recorded, you can create a new folder and save the items to it. Then you will be able to transfer only these items by copying the folder.

To Copy a Folder of Still Store Items with the File Operations Menu:

Follow the steps described above, but at Step 4 instead of opening the folder and selecting a pair of files, select the folder itself, then complete the procedure.

Still Store Folder Browser Copy

A folder of Still Store items can also be copied using the Still Store Folder Browser, using the same procedure above. However, because files are not displayed on the Still Store folder browser, you will not know what files are being copied. It is better to use the File Operations menu for copying Still Store items.

Still Store Loader

The Still Store Loader utility program can be used to transfer image files between a PC and the Still Store. Only full raster images can be transferred, and video and key pair images need to be transferred individually. The Still Store Loader program does not pass crop or position metadata, and does not support fenced images or animation clips. This program is included on the Zodiak Software CD, and can be installed onto any PC, including the Zodiak Menu panel.

Still Store Loader transfers files only to the Still Store C:User/DEFAULT directory. If this directory has been renamed or deleted Still Store Loader will not work. See *Appendix — Still Store Loader* on page 421 for more information.

Direct FTP File Transfers

Still Store images, being files, can be transferred between computers using FTP. If files are transferred in this way into a Still Store directory, the items will not immediately appear in the Still Store menu browser. A Still Store menu change directory operation (or a system reset) is required before the browser will display FTP transferred items.

The FTP server built into the Zodiak system is tested with the Microsoft Internet Explorer browser and the Microsoft FTP utilities. These are the recommended programs to use for FTP with Zodiak systems. Some browsers and FTP utilities are not compatible with the Zodiak FTP software. These browsers do not recognize the Phar Lap Real-Time Operating System FTP server used by Zodiak, and do not follow the established standard of performing binary transfers when communicating with an unrecognized FTP server. If your browser or FTP program does not work with a Zodiak system, use the programs recommended above instead, or contact the maker of that browser or FTP program to request a fix.

Macros

Introduction

Macros provide a mechanism to record a series of actions and then play them back by pressing a single button. Macro steps specify commands sent to the Video Processor frame, rather than simple button presses. Macros are fundamentally different from E-MEMs. E-MEMs store the complete state of a portion of the switcher (level and sublevel) into keyframes. For example, an E-MEM keyframe for M/E 1 captures all the source selections, keyer settings, transition type, wipe patterns, etc. for all the buses of M/E 1 at the time that keyframe was added to the E-MEM register. A macro, on the other hand, affects only the specific elements involved in the recording of that macro. For example, a macro can be recorded that sets up only the Preset bus with a particular source and selects a specific wipe pattern and transition rate. You can recall an E-MEM to put the M/E in a known state, and when you want to prepare that specific transition to just that source, simply play the macro. In this example, different macros can be recorded with different sources to allow rapid and reliable variations on the E-MEM effect that was originally recalled.

A macro can contain several steps. Macros are executed as quickly as possible in the order the steps are recorded, but there are no guarantees for timely execution. It is also possible to insert delays in a macro sequence during recording to accommodate external devices or allow for completion of internal system events.

Macros add enormous power and flexibility to the Zodiak system. Simple tasks can be recorded into a macro quickly and easily for rapid and reliable playback. Complex series of actions can also be programmed into a macro, but careful planning is required to ensure the macro accomplishes its intended actions for all the conditions under which it may be played back.

Note Macro attachments are saved and loaded with User Prefs. Be sure the User Prefs you load are compatible with the Macro registers you are currently using, to avoid accidentally running incorrect attached Macros.

Macro Recording

Macros are recorded into macro registers. The Zodiak system has 100 macro registers. The number of steps in any specific macro or the total number of macro steps across all macros is limited only by the amount of available memory in the Video Processor frame. Macro registers can be saved to disk and reloaded, making the total number of pre-made macros available to a Zodiak system unlimited.

Macros apply to the point of use active during the macro recording. For example, recording a macro that turns on Matte Fill on M/E 1 Keyer 1 will affect M/E 1 Keyer 1 when it is played back, regardless of what keyer the panel happens to be delegated to when the macro is played.

Macros record triggers, not the result of a trigger. For example, a macro containing a Key Mix transition, when run, will trigger the key transition from its current state to the other state. If the keyer is on, it will mix off, and if off, it will mix on.

Macro Playback

Macros can be played back from the keyer bus when delegated to Macro operation, and can also be played back from the Macro menu. Macros can also be attached to other panel buttons for playback. Forty-eight macros are available for immediate playback on the delegated Macro row on the Main panel, 23 unshifted and 23 shifted buttons. For consistency the farthest left shifted macro button is the 51st of the 100 macro registers, which means macros 24 through 50 are not available on this row. All 100 macro registers can be played back from the Macro menu, and any macro register can be made available on the Menu panel via attachments.

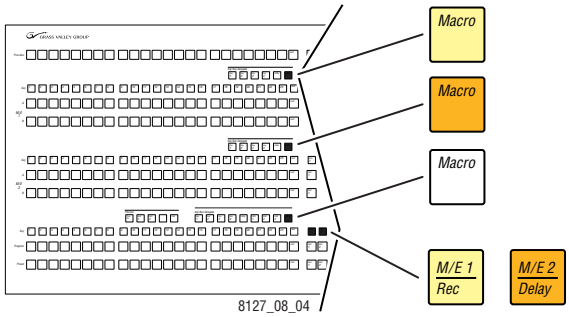
Macro Attachments

Macros can be attached to other Main panel buttons. Attached macros can either augment the button's normal function or replace it. A Pre Attach macro executes when the button is pressed, followed by the button's normal action. A Post Attach macro executes after the button's normal action. A Replace Attach macro substitutes the macro for the button's normal action. Any combination of Pre, Post, or Replace Attach macros can be associated with the same button. This makes it possible to have a single button press play three separate macros, though this is not a typical scenario.

Macro Shortcut Buttons

The PGM PST KEY M/E re-entry buttons are labeled with additional macro capabilities (Figure 269). When macro delegation is on (**Macro** is illuminated), holding down one of these buttons momentarily activates that macro mode.

Figure 269. PGM PST Macro Shortcut Buttons



While the keyer row is delegated to macro operation, holding down **M/E 1 Rec** initiates macro record mode. With the **M/E 1 Rec** button held down, select a macro register button to record into and then release the **M/E 1 Rec** button. Perform the operations to be recorded. When done, press the flashing **M/E 1 Rec** or macro register button to terminate the recording. Pressing the macro register button twice and holding it down after the second press activates macro append mode (as long as the button is held down).

While the keyer row is delegated to macro operation and a macro record is in progress, holding down **M/E 2 Delay** activates macro insert delay mode. Each button on the macro delegation row has a specific delay value. The unshifted buttons increase in value by tenths of a second. The shifted buttons increase in value by fields.

Macro Menus

The Macro menus provide access to many Zodiak system macro functions. See *Macro Menus* on page 193 for specific information.

Using Macros

Delegating the Macro M/E and Keyer Row

- Press the **Macro** button on the keyer row of the desired M/E.

Recording a Macro with the Main Panel Shortcut Button

1. With the **Macro** button illuminated, hold down the delegated **M/E 1 Rec** shortcut reentry button.
2. Press the keyer row button of the desired macro register. Use the **Shift** button to access shifted macro registers.
3. Release the **M/E 1 Rec** shortcut reentry button.
4. Perform the steps you wish recorded into the macro, in the order they are to be performed, using the Main panel and/or the Menus.
5. Complete the recording by pressing the blinking keyer row macro register button.

Recording a Macro with the Menu Panel

1. Go to the Macro Catalog menu (touch **Macro**, **Catalog**).
2. Touch the macro register number button of the register you wish to record into on the scrolling list.
3. Touch the **Record** button.
4. Perform the steps you wish recorded into the macro, in the order they are to be performed, using the Main panel and/or the Menus.
5. Touch the **Stop** button to end the macro recording.

You can name the macro either before you record it, or after it has been recorded, by touching the name data pad for that macro register to bring up a keypad.

Inserting a Delay

While recording a macro, hold down the delegated **M/E 2 Delay** shortcut reentry button, then press the keyer source select button of the desired delay time. The **Shift** button changes the time intervals to fields. Multiple selections can be made to insert longer delays.

Playing Back a Macro Register

1. Turn on Macro mode with the **Macro** button.
2. Select the macro to be played
   - On the Macro menu, touch the macro register button of the desired macro register, then touch the **Play** button.

Attaching a Macro to a Panel Button

Using the Menu and the Main Panel

1. Go to the Macro Attach menu (touch **Macro**, **Attach**).
2. Touch the button of the Main panel section where the button you wish to make the attachment to is located (**M/E 1-3**, **Misc**).
3. Touch the **Enable Attach** and **Show Attach** buttons.
4. Touch either the **Pre Attach**, **Repl Attach**, or **Post Attach** button.
5. Select, on the main panel, the macro register button with the desired macro.
6. Press the main panel button or buttons to which you wish to attach the macro.

Note The macro will continue to be attached to any button pressed on the main panel until the attachment is ended.

7. Deselect **Enable Attach** and **Show Attach** button to end attachment.

Using Only the Menu

1. Go to the Macro Attach menu (touch **Macro**, **Attach**).
2. Touch the button of the Main panel section where the button you wish to make the attachment to is located (**M/E 1-3**, **Misc**).
3. Display the name of the button you wish to make the attachment to on the screen, scrolling the list if necessary.
4. Touch the data pad for that button of the desired type of macro attachment (**Pre**, **Replace**, **Post**). The Macro Attach selection menu will appear.
5. Touch the button for the macro register to be attached. The selection menu will close and the name of the macro just attached will be displayed.

Playing an Attached Macro

1. Go to the Macro Attach menu (touch **Macro**, **Attach**).
2. Turn on the attachment playback feature by touching the **Attach Enable** button so it is illuminated. You may also want to touch the **Show Attach** button so that panel buttons with macros attached can be identified (they blink low tally).

3. Press the panel button that has the macro attached.

Removing a Macro Attachment

Using the Menu and the Main Panel

1. Go to the Macro Attach menu (touch **Macro**, **Attach**).
2. Touch either the **Pre Attach**, **Repl Attach**, or **Post Attach** button. Any button can be pressed. All attachments will be removed.

1. Touch the **Show Attach** button so that panel buttons with macros attached blink low tally.
2. Without selecting a macro register, press the blinking button that has the attachment you wish to remove. The blinking button will turn off.
3. Touch **Show Attach** to turn off the mode.

Using Only the Menu

1. Go to the Macro Attach menu (touch **Macro**, **Attach**).
2. Touch either the **M/E 1**, **M/E 2**, **M/E 3**, or **Misc** button.
3. Scroll through the list until a macro is displayed in the Pre, Replace, or Post columns.
4. Touch the data pad for the displayed macro, the Macro Attach selection menu will appear.
5. Touch the **None** button. The macro is removed.

Appending a Macro with the Main Panel Shortcut Button

1. With the **Macro** button illuminated, press the **M/E 1 Rec** shortcut reentry button twice and hold it down after the second press.
2. Press the macro register button on the delegated keyer row of an existing macro to which you wish to append additional steps.
3. Release the **M/E 1 Rec** shortcut button.
4. Perform the additional steps using the Main panel and/or the Menus.
5. Complete the append by pressing the blinking keyer row macro register button.

Appending a Macro with the Menu Panel

1. Go to the Macro Catalog menu (touch **Macro**, **Catalog**).
2. Touch the macro register number button of the register you wish to record additional steps into.
3. Touch the **Append** button.
4. Perform the additional steps, using the Main panel and/or the Menus.
5. Touch the **Stop** button to end the macro append.

Saving Macro Registers

1. Go to the Macro Save-Load menu (touch **Macro**, **Save Load**).
2. Navigate to the folder into which you wish to save the Macro files. You can create a new folder if you wish.
3. Select **All Macros** or enter a range of macro register numbers.
4. Touch the **Save** button.

Note Only the macro registers themselves are saved with this procedure, not any macro attachments.

Loading Macro Registers

Macro registers are loaded similarly, by selecting the macro register file or a folder of macros in the Macro Save-Load menu and touching the **Load** button.

Note Only the macro registers themselves are loaded with this procedure, not any macro attachments.

Macros and E-MEMs

Macros and E-MEMs can interact in two fundamentally different ways. A Macro can be created that recalls one or more E-MEMs, or an E-MEM can be programmed to execute one or more Macros. With care, operating both control mechanisms together can be extremely powerful. However, improper use can create infinite loops or other undesirable behavior. It is especially important that your Zodiak system be loaded with the correct E-MEMs and Macros and is operating in the correct mode, or unpredictable system behavior will result from the mismatched E-MEMs and macros.

E-MEM Recalls in a Macro

The state of the **Effects Dis** and **Seq** buttons are sent as part of each E-MEM recall command. When recording E-MEM recalls to a Macro, make sure these states are correct when you build the Macro. For example, if you want the E-MEM effect to automatically run as a Sequence, make sure that button is on when the E-MEM recall is recorded into the Macro.

Certain E-MEM commands that directly affect the work buffer require special field-rate processing. This ensures all necessary processing occurs once per field and is in sync with all the other changes occurring in that same field. Delays are needed for multiple time cursor changes (**Next KF**, **Prev KF**, **Begin**, **End**, **Go To KF**, **Go To Time**, and **Rewind**). If you wish to use two or more of these commands adjacent to each other in a macro, a delay of at least one frame between them is required for consistent system behavior.

See *Macros in an E-MEM* on page 367 for related information.

Appendix — Still Store Loader

Introduction

The Still Store Loader utility program is used to upload and download Zodiak Stillstore images to and from a PC on the network.

The Still Store Loader software application is designed to run on a networked computer. Still Store Loader can take image files from any mounted drive and transfer them to a Zodiak Stillstore (download) using FTP. Still Store Loader can also receive still store images from a Zodiak Stillstore (upload).

Besides uploading and downloading images, Still Store Loader can be used to:

- Reposition images,
- Preview images at full size on the PC monitor,
- Command the target device to generate a matte of a specified color to fill any empty areas around the downloaded image, and
- Save files to disk.

Still Store Loader works with the following file types:

- .tif files,
- 24-bit and 32-bit .bmp files, and
- Still video files created by the Still Store Loader application or a Zodiak Stillstore.

Note A Zodiak still video file actually has two components, a .gva metadata file and a .gvi image file. The Still Store Loader application handles both files automatically, but you will see additional files when directly viewing a Windows directory of the files.

Installing Still Store Loader on a PC or a Zodiak System

The Still Store Loader software application can be installed on the Zodiak system, for use on the Menu panel, or on a PC. Typically Still Store Loader is installed on a computer located in the graphics department, to allow instant downloads of graphics to the Zodiak Stillstore system.

PC Requirements

The PC can be configured with either a Win95, Win98, Win2000, or WinNT 4.0 operating system. 32 MB of RAM is recommended for Win95 and Win 98, and 64 Mb is recommended for Win2000 and Win NT 4.0.

PC IP Address

The PC must be configured for networking using TCP/IP protocol with its own unique IP Address, and must be connected to an Ethernet network that can access the Zodiak system, which may require a Gateway server. Contact your network administrator if you have questions regarding networking the PC.

PC Monitor Set Up

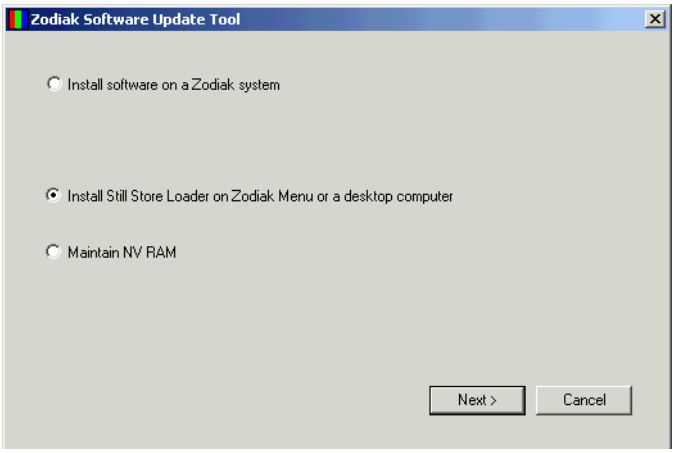
It is recommended that you set up your PC monitor to its highest quality to improve image viewing on the PC. Choose 32-bit True Color or 24-bit (16,777,216) color, if available.

Installation Procedure

The Still Store Loader application is included on the Zodiak Software CD.

1. Insert the Zodiak Software CD into the drive of the system on which it will be installed.
2. When the initial Zodiak Software Update Tool screen appears, select **Install Still Store Loader on Zodiak Menu or Desktop Computer** (Figure 270).

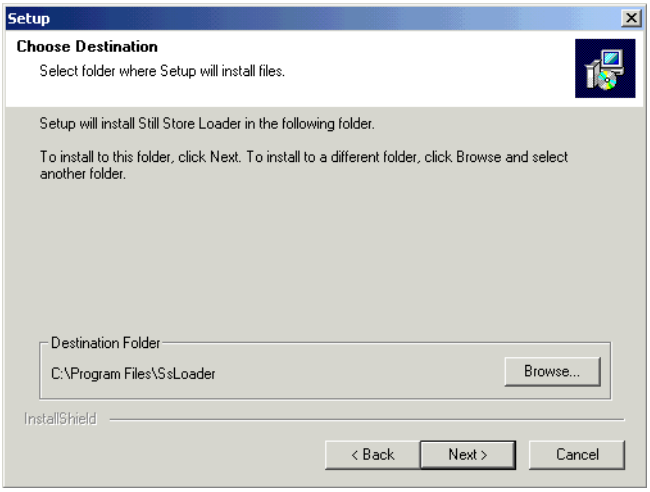
Figure 270. Zodiak Software Update, Still Store Loader Selected



3. Click on the **Next >** button, and then click **OK** on the following screen.

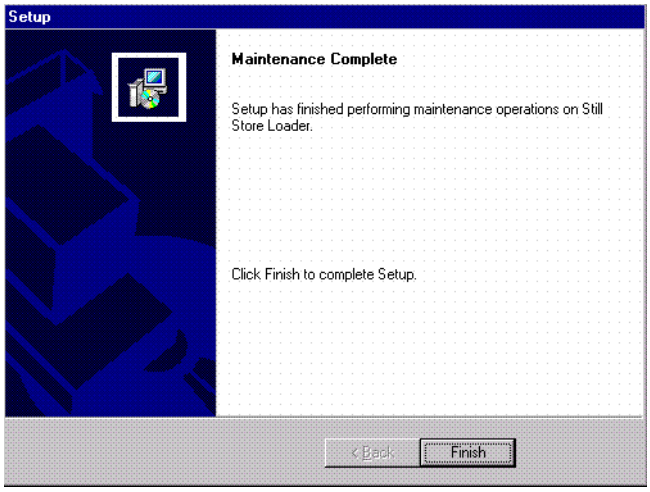
4. Choose where you wish to install the program. The default C:\Program Files\SsLoader folder is recommended (especially if installing on the Zodiak system), and can be selected now by clicking on the **Next >** button (Figure 271). You can use the **Browse** button to choose a different location if you wish.

Figure 271. Still Store Loader Installation Destination



5. The installation occurs after the **Next >** button is pressed, and when finished the following screen appears (Figure 272). It is recommended you restart the computer now by clicking **Finish**. However, you can choose to restart the computer later if you wish.

Figure 272. Still Store Loader Installation Reset Computer



Using Still Store Loader

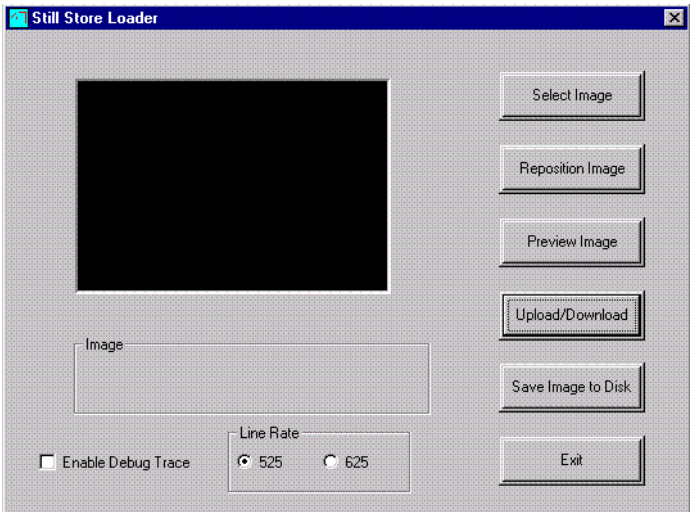
Once Still Store Loader is installed, you can use standard Windows procedures to launch the application (e.g. clicking on the **Still Store Loader** icon located on the desktop). These procedures vary depending on the Windows OS version and your computer's current configuration.

If Still Store Loader application is installed on the Zodiak Menu panel, it can run in the background while the system is in operation. With the application running, you can press **Alt**, **Tab** on an optional keyboard connected to the Main panel to switch between the Still Store Loader and Zodiak Menu applications.

Main Application Window

When the Still Store Loader application is launched, the main application window appears (Figure 273).

Figure 273. Still Store Loader Main Menu



An image display area is located in the upper left side of the window. This area will be blank until an image is opened. Information about the currently opened image appears below the displayed image.

A column of buttons for the following functions appears on the right side of the window. These functions are activated by mouse click.

- **Select Image**
- **Reposition Image**
- **Preview Image**
- **Upload/Download**
- **Save Image to Disk**
- **Exit** (Quits the Still Store Loader program.)

Line Rate

The Line Rate radio buttons located at the bottom of the window permit selection of 525 or 625 line rates for the uploaded and downloaded images.

Debug

Clicking on the **Enable Debug Trace** check box opens a separate debug window. The debug window is closed by clearing the check box. This feature is not used during normal system operation, but may be useful for field diagnostics.

Version Number

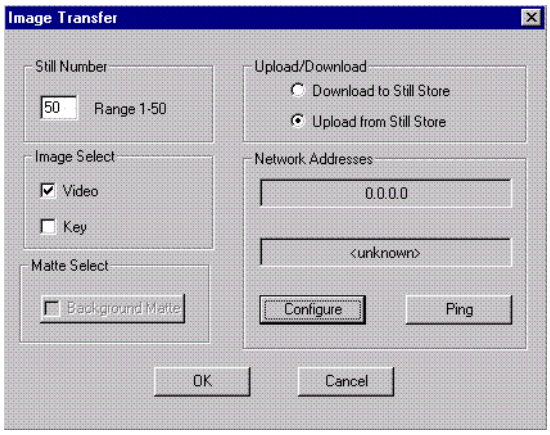
Clicking on the colored icon on the upper left of the title bar and then clicking on **About SsLoader** displays the Still Store Loader application version and copyright information.

Selecting the Zodiak Stillstore Device

The first time you use Still Store Loader, you will need to select the network address of the Zodiak Stillstore location on the network. This is the same IP address as the Zodiak Video Processor frame.

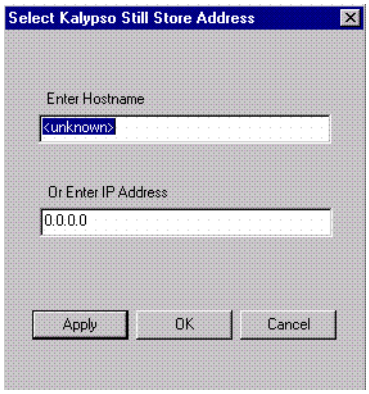
1. Go to the main application menu.
2. Click on the **Upload/Download** button to display the Image Transfer dialog box (Figure 274).

Figure 274. Image Transfer Dialog Box



3. Click on the **Configure** button. The Select Kalypso Stillstore Address dialog box appears (Figure 275).

Figure 275. Select Address Box



4. Enter the Hostname or IP Address of the Zodiak Video Processor frame. The Stillstore circuitry is located on the Control Processor/DSK/Still Store module. If the Hostname or IP Address is valid, clicking **Apply** updates the corresponding data in the other field. Entering new data into either field automatically blanks the other field.

   If the IP Address or Hostname is not valid, an error message will be displayed. Press **Cancel** and enter a valid identification.

Note If you don't know the Hostname or IP Address, contact your Network Administrator for this information.

5. Touch the **Ping** button to test communications to the Zodiak Stillstore located in the Video Processor frame. A **Ping Reply OK** message appears when communication succeeds.

6. Click **OK** to close the Select Address box, then click **Cancel** to exit the Image Transfer dialog box.

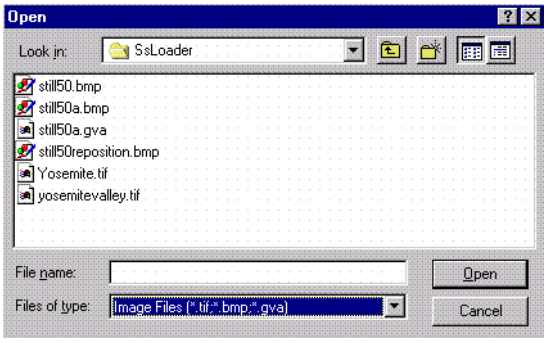
The last device identified is retained until it is changed in the Select Address dialog box, even if you exit and reload the Still Store Loader application program.

Downloading an Image From PC to Zodiak Stillstore

1. In the main application window, select the appropriate line rate (**525** or **625**) by clicking on a Line Rate radio button.

2. Click on the **Select Image** button. The Open File dialog box appears. To view all allowed file types, select **Image Files (*tif, *.bmp, *.gva)** from the Files of Type drop down list (Figure 276).

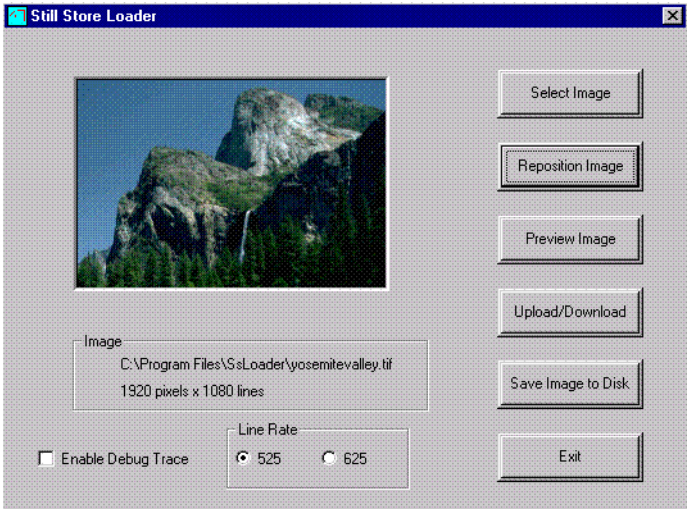
Figure 276. Open File Dialog Box



3. Select a file from the list displayed by clicking on the file's name. Only one file may be selected at a time. The name of the currently selected file is displayed below the list.

4. Click **Open**. A status bar indicates the progress of the image load. When loading is complete, the image is displayed on the main application window, along with the file's path and image size (Figure 277).

Figure 277. Opened Image

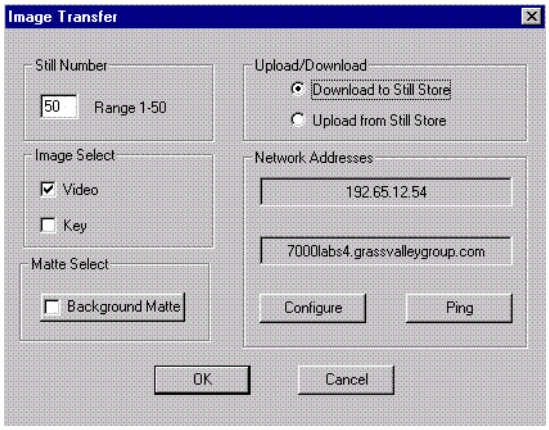


5. If desired, you can reposition or preview the image with the **Reposition** and **Preview Image** buttons. See *Repositioning an Image* on page 430 and *Previewing an Image* on page 432 for instructions.

6. Click on the **Upload/Download** button. The Image Transfer dialog box appears.

7. If not already selected, click on the **Download to Still Store** radio button (Figure 278).

Figure 278. Image Transfer Dialog Box, Download Selected



8. Select the Still Number (1-50). If this still number currently has a still it will be overwritten.

9. If not already properly selected, click the **Video** or **Key** check box in the Image Select area.
   - The **Video** setting is used for downloading standard stills, and will download the image to the video portion of a video/key still.
   - The **Key** setting will download the image to the key portion of a video/key still.
10. If desired, you can have the target device fill any empty image area with a matte color by clicking on the Background Select **Background Matte** radio button. See *Using Background Matte* on page 433 and for instructions.
11. The Zodiak Stillstore in the Video Processor frame on the Menu (Facility) LAN must be identified before you can download an image to it. If the correct device is not displayed under Network Addresses, you need to click on the **Configure** button and identify the target. See *Selecting the Zodiak Stillstore Device* on page 426 for instructions.

CAUTION Before actually downloading an image, be sure the existing Stillstore number that has been selected is not in use, and it is OK to replace that image. The download process overwrites the existing image during the transfer process.

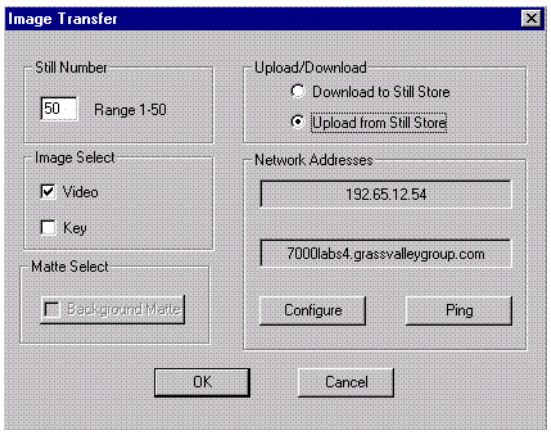
12. Click **OK** when all the selections are complete. This will close the Image Transfer dialog box and begin the transfer. The Image Transfer Status bar indicates the progress of the transfer. The time involved depends on the size of the image.
13. Upon a successful transfer, the message "Download completed OK" appears. Click **OK** to close this message box.

The Zodiak Stillstore checks for downloaded stills every ten seconds. When the system detects a newly downloaded image, it is automatically processed and will be available about two seconds later.

Uploading an Image From Zodiak Stillstore to PC

1. Go to the Still Store Loader Main menu.
2. Click on the **Upload/Download** button to go to the Image Transfer dialog box.
3. Click on the **Upload from Still Store** radio button (Figure 279).

Figure 279. Image Transfer Dialog Box, Upload Selected



4. Select the Still Number to be uploaded. Background Matte is not available for uploading images.

5. Click the **Video** or **Key** check box in the Image Select area.
   - The **Video** setting is used for uploading standard stills, and will upload the image from the video portion of a video/key still.
   - The **Key** setting will upload the image from the key portion of a video/key still.

6. If necessary, enter the network address of the target device (see *Selecting the Zodiak Stillstore Device* on page 426).

7. Click **OK** when all the selections are complete. The image will be uploaded into the Still Store Loader application. The Image Transfer Status bar indicates the progress of the transfer.

8. Upon a successful transfer, the message "Upload completed OK" appears. Click **OK** to close this message box.

Once uploaded to the Still Store Loader application, the image can be previewed, saved to disk, repositioned, and downloaded back to the same or a different target device.

Repositioning an Image

You can use Still Store Loader to reposition an image to a desired location for downloading. This is useful, for example, for placing your station logo (with a black matte) in the desired screen position.

1. Go to the Still Store Loader Main menu.

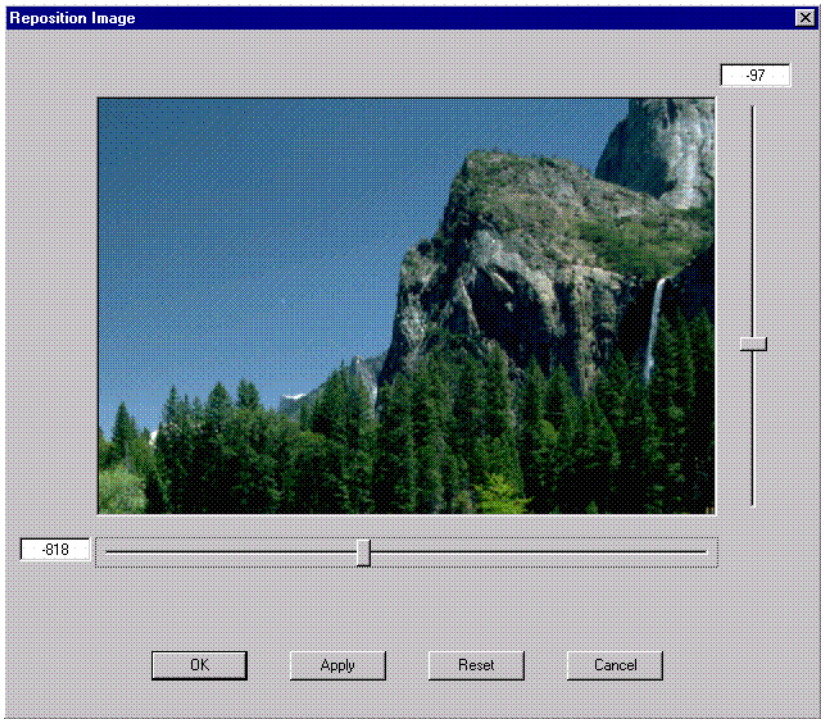
2. You can reposition the image three different ways:

   a. Place the cursor over the image, then click and hold the left mouse button to drag the image on the screen.

b. Click on or drag the horizontal and vertical sliders.

c. Type positive or negative absolute pixel values in the horizontal and vertical text boxes to position the image. The entered values are applied to the image's placement by typing **Enter**, clicking in the other axis text box, or by clicking on the **Apply** button Figure 280.

Figure 280. Repositioned Image



3. If not satisfied with the result, click on the **Reset** button to return the image to the default position in the top, left-hand corner of the screen and reposition the image again.

4. Click **OK** to accept the image reposition and return to the main application window.

When downloaded, the image will be placed in the Stillstore page memory in the relocated position. Any portion of the image repositioned outside the display area will be omitted.

Repositioning a Zodiak Video File (.gva) and re-saving it as a .gva file permanently removes (crops) video that has been positioned off the view area. The entire image is saved when .tif and .bmp files are repositioned, however.

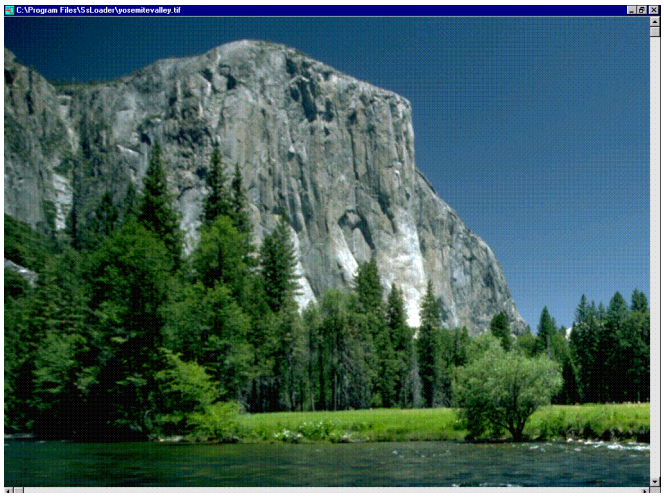
The last reposition location will be used for the display of new images selected and loaded to the Still Store loader application. Use the **Reset** button to restore the default display location of a newly selected image.

Previewing an Image

You can use Still Store Loader to preview an image. Preview displays a full size version of the image on the PC screen.

1. Go to the Still Store Loader Main menu.
2. Click **Preview** to see a full size version (Figure 281).

Figure 281. Preview Image



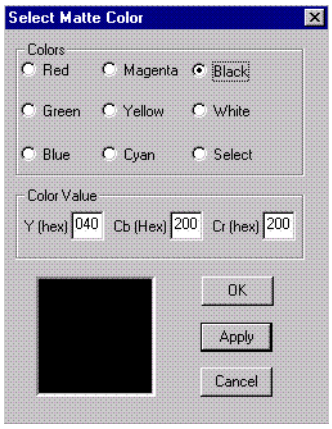
3. If the image is larger than the PC screen, you can view different portions of the image with the scroll bars, or by dragging the image with the mouse cursor.
4. Click on the Minimize or Close box to hide or stop previewing the image.

Using Background Matte

Background Matte is a download feature only. The selected matte color is applied by the target device to the portions of the raster not occupied by the downloaded image.

To add a background matte to a downloaded image:

1. Go to the Image Transfer dialog box by clicking the **Upload/Download** button on the main application menu.



2. Click on the **Background Matte** check box to open the Select Matte Color dialog box.
3. The matte color can be selected in two ways:
   a. You can choose a pre-defined matte color by clicking on one of the labeled radio buttons.
   b. You can create a custom matte color by entering Y, Cb, and Cr Hex values in the labeled window areas.

   The Y, Cb, and Cr values of the color will be indicated in Hex, and a sample of the selected color appears in the display area at the bottom of the window.
4. Click **OK** to accept the matte color. The window will close and the Background Matte radio button in the Image Transfer dialog box will be selected.

You can now download an image to the Zodiak Stillstore. The matte and new image will completely overwrite the existing Stillstore page.

Note Once a matte has been added to a framestore page it is incorporated into the image. If that framestore page is uploaded back to Still Store Loader, the uploaded image will be full raster containing pixels of the matte color.

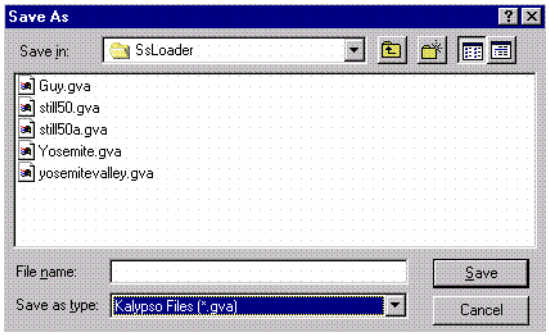
To disable the background matte function, click on the **Background Matte** radio button to clear it.

Saving an Image to Disk

To save the image currently loaded and displayed by Still Store Loader to disk.

1. Go to the Still Store Loader Main menu.
2. Click on the **Save Image to Disk** button. The Save As dialog box will be displayed (Figure 282).

Figure 282. Save As Dialog Box



3. Type in a file name and select a file type (.gva, .tif, .bmp),
4. Navigate to the appropriate drive and folder as desired.
5. Click **Save**. The file will be saved to the selected destination.

Glossary

Auto Transition

A transition having a predefined duration generally initiated by pressing a control panel button.

Aspect

The ratio of a picture's horizontal and vertical dimensions when correctly displayed (4:3, 16:9).

Background Bus

A row of buttons on an M/E used to select background video signals. Typically labeled A and B, with A representing the current output, and B representing the next output.

Background Transition

A transition between the background video signals selected on an M/E.

Background Video

Video that forms a background scene into which a key may be inserted.

Backing Color

The color in a chroma key scene that will be replaced with another video signal.

Bit Rate

The number of bits per second passed from one point to another.

Black

A black video signal generated within the switcher.

Box Wipe

A rectangular wipe pattern. For masking, the Zodiak system provides a special box wipe pattern generator allowing independent control of the placement of each side of the box.

Chroma

The depth or saturation of color. Chroma, hue, and luminance make up the three characteristics of television color.

Chroma Key

A video key effect in which one video signal is inserted in place of areas of a particular color in another video signal. Blue and green are the chroma key colors most frequently used.

Clean Feed

A final output of the switcher that does not include downstream key effects or fade to black. Also see *Programmable Clean Feed*.

Clip

A threshold level adjustment to which the keying attribute (luminance, chrominance) is compared for generating the internal key control signal. Clip, in conjunction with gain, sets the switching point between the background and the key fill. Also see *Gain*.

Clip High, Clip Low

An alternative to Clip and gain keying, providing independent control of the points where the background video and the key fill video are each fully visible.

Complex Wipe Pattern Generator

A wipe pattern generator with additional capabilities (for example, matrix wipes).

Component Video

A video signal that keeps color and luminance information separate. RGB; Y, R-Y, B-Y; and Y, Cr, Cb are examples of component video.

Composite Video

An encoded video signal that combines color information with luminance information. NTSC, PAL, and D-2 are examples of composite video.

Compositing

Combining two or more video signals together into one output signal.

Control Signal

A signal used to perform an alteration or transition of video signals. For example, control signals are used for keying, masking, and wipe transitions.

Control Surface

The set of controls available to a single operator. These controls may reside on separate but related control panels.

Cross Fade

See *Mix*.

Crosspoint

An electronic switch, usually controlled by a button on the panel, that allows video or audio to pass when the switch is closed.

Cut

An instantaneous switch from one picture to another. Switching circuitry allows cuts only during the vertical interval of the video signal to prevent disruption of the picture.

VDR (Video Disk Recorder)

A video recorder and playback device using hard disk storage in place of video tape.

Delegate

To assign panel controls to a particular operating function. Some panel controls (buttons, knobs, joystick) can affect more than one function. The operator can choose an alternative function by delegating the panel controls to that function (typically by pressing or holding down a panel button).

Deserializer

A device that converts serial digital information to parallel.

Dissolve

See *Mix*.

DPOP (Double Press Open)

Pressing a control panel button twice rapidly to open a related menu. On the Zodiak system, buttons supporting DPOP are labeled with a graphical indicator.

Effect

A setup of panel controls specifying the sources involved and any processing applied to those sources. Effects can be learned (saved) and recalled by the E-MEM effects memory system.

Effect Transition

Recalling an E-MEM effect so that a transition is automatically performed at the start of the recall.

Effects Processor

The portion of a switcher that performs mixes, wipes and cuts between background and/or effects key video signals.

E-MEM Effects Memory

A feature that permits control panel setups to be stored for later recall.

Engineering Setups

On the Zodiak system, a collection of configuration settings that establishes an essential baseline for system operation and integrates the Zodiak system into a facility.

Ethernet

A form of high speed data transport between devices on a network.

Fade To Black

A mix transition to black.

Field

One scan of an interlaced video image. In interlace systems, two fields are required to make a complete picture (video frame) because alternate lines are scanned.

Fill Video

A video signal which fills a hole cut in background video by a key control signal.

Fixed Linear Key

A linear key that uses predetermined Clip and gain settings that are not adjustable.

Flip-Flop

A transition where the sources selected on the background buses (for example, preset and program) of an M/E are exchanged at the end of a transition. The original preset bus source becomes selected on the program bus, and the original program bus source becomes selected on the preset bus.

FPGA

Field Programmable Gate Array.

Frame

One complete scan of a video image. For interlace video, alternate lines are scanned, and so a frame containing all the picture information consists of two fields.

Frame Rate

The number of frames presented per second. For interlace systems the frame rate is half the field presentation rate.

Gain

An amplification factor applied to a key control signal by a keyer that determines how much, if any, of the background and key fill video will be mixed together at the key edge areas. Low gain (1, or unity) generally results in a linear key.

General Purpose Interface (GPI)

An interface that allows limited remote control of some of a device's functions.

House Sync

Sync generated within a facility that is used as a reference for generating and/or timing other signals.

Hue

The location of a color on the color spectrum (i.e. red, yellow, green, blue). Chroma, hue, and luminance make up the three characteristics of television color.

Interlace

A system of video scanning where the odd and even numbered lines of a picture are presented consecutively as two separate interleaved fields. The two fields required to make a complete picture are called a frame.

Jitter

An undesirable variation in the timing of transitions in a digital signal.

Joystick

A hardware positioner with control of multiple axes.

Key

An effect where a portion of a background scene is replaced by a new video. Key cut and key fill signals are involved, though in some cases the same signal may be used for both (self key).

Key Cut

In key effects, the key cut signal is used to specify where to cut a hole in the background that will be filled with the key fill video. The key cut signal determines the shape of the key effect.

Key Fill

In key effects, the video signal which fills the hole cut in the background video.

Key Invert

Reversing the polarity of a key, such that material formerly keyed out will be keyed in, and vice versa.

Key Mask

A key mode which allows use of a wipe pattern generator to prevent some undesirable portions of the key cut signal from cutting holes in the background video.

Key Priority

The stacking order of multiple keys. The keyed signal with the highest priority appears in front of all the others. Keyed signals appear below higher priority keys and in front of lower priority keys, in a stack. A key priority transition changes the order of the keys without changing the background output.

Key Frame

A complete definition of an effect at a single point in time. Default keyframe values can be set for a suite.

Learn

To save a panel setup using E-MEM.

Linear Key

A key in which the keyer signal is faithfully reproduced in the final key effect. Linear keying preserves soft key edges, and generally has a gain of 1, or unity.

Look Ahead Preview

Video that shows the result of the currently setup next transition.

Looping, Loop-Through

An input that includes two connectors. One connector accepts the input signal, and the other connector is used as an output for connecting the input signal to another piece of equipment. On Zodiak, only the analog reference input is loop though.

Luminance

The brightness of the picture or area of the screen being considered. Chroma, hue, and luminance make up the three characteristics of television color.

Luminance Key

A key effect in which the portions of the key cut signal that are greater in luminance than the clip level cuts the hole in the background scene. Generally used when the key cut and key fill signals originate from the same source. Luminance key clip and gain is adjustable.

Mask

See *Key Mask*.

Matte

Internally-generated color video which can be adjusted for luminance, hue, and chroma. Matte can be used to fill areas of keys and borders.

Matte Fill

Using matte video to fill the hole of a key effect.

Matte Generator

A video generator that produces matte signals.

M/E

Abbreviation of mix/effects, pertaining to the circuitry and controls involved in compositing video signals.

Mix

A transition between two video signals in which one signal is faded down as the other is faded up.

Multiplier

A control circuit in which a control signal is multiplied with one or more input video signals. The resulting video output level varies from full on to full off according to the state of the control signal.

Object

An individual a functional area of a system, typically one of several having similar capabilities.

Pattern Border

A variable width border that occurs at the edges of a wipe pattern.

Pixel

A picture element. A pixel is a digital sample of the luminance and color values of a picture at a single point.

Preference

See *Suite Preference* and *User Preference*.

Profile

Model name of a Video Disk Recorder.

Point of Use

A location in the system where a resource is used. A resource is generally used at different locations at different times. However, with some resources it is possible to use the same resource at different locations at the same time.

Preset Bus

A row of source buttons used to select the source that will be output by that M/E during the next background transition. Also called the B bus.

Preset Pattern

A key effect in which a wipe pattern that has been preset to a desired size and location is used to cut the key hole. The characteristics of the pattern are set using pattern controls.

Preview

A video signal that is viewed before it is output by the switcher. See also *Look Ahead Preview* and *Switched Preview*.

Program Bus

A row of source buttons used to select the source for the current output of that M/E. Also called the A bus.

Programmable Clean Feed

A type of clean feed where different keys can be selected for inclusion or exclusion from the clean feed.

Recall

To restore a previous panel setup that has been learned using E-MEM.

Reclocking

The process of clocking the data with a regenerated clock to remove jitter.

Resource

A capability of the system, typically consisting of a set of circuitry.

Register

A place to store an effect.

Saturation

The degree of purity of a color. Adding white to a color reduces its degree of saturation.

Self Key

A key effect in which a single video signal serves as both the key cut and key fill.

Sequence

On the Zodiak system, a feature allowing a series of E-MEMs to be recalled in a specific order with a single command.

Serial Digital Video

Passing video data bits in serial form (one bit after another), along a single wire. Standard Definition serial digital video (SMPTE 259M) operates at 270 M Bits/sec. (2 x 13.5 MHz x 10 bits).

Serial Interface

An interface which allows the switcher to be controlled remotely by a computer editor or other serial controller. Data is passed serially between the editor and the switcher at selectable baud (transmission) rates.

Serializer

A device that converts parallel digital information to serial.

Soft Border

A wipe pattern border which is mixed on the edges to give a soft effect.

Soft Edge

A pattern edge between two video signals in which the signals are mixed for a soft effect.

Source

1) An external device providing video. A source may provide only one video signal, or it may provide two signals (key fill and key cut).

2) The video signal(s) from a source, along with the source definition information associated with that source. See *Source Definition*.

Source Definition

A definition of the video signals making up a source, the device type and name of source, and the default processing and other parameters to be used for that source. The Zodiak system is based on source selection, rather than choosing crosspoints.

Source Memory

A feature where the last keying and video processing settings for a source are retained and re-imposed when that source is re-selected. Default source memory values can be set for each source on each bus.

SPOP (Single Press Open)

Automatically opening a related menu when a control panel button is pressed. On the Zodiak system, buttons supporting SPOP are labeled with a graphical indicator.

Stack

See *Key Priority*.

Still Store

A device that captures, saves, and outputs a still video image. On the Zodiak system the the SuperStore option is a still store with additional capabilities, including animation.

Suite

One or more control surfaces configured for use on the same project.

Suite Preference

A collection of settings used to configure a suite to create a consistent working environment for all involved.

Switched Preview

An special output of the system connected to a dedicated monitor. The operator can select and switch various system video signals to that output to preview them.

Sync

(1) General term for a synchronizing signal or signal component. Digital systems generally employ an analog external timing reference signal (such as color black or tri-level sync) to synchronize different pieces of equipment. Within the digital signal itself, however, synchronizing information is carried by special digital codes inserted at the beginning and end of each active line.

(2) In analog television systems, sync is the portion of the video signal which occurs during blanking and is used to synchronize the operation of cameras, monitors, and other equipment. Horizontal sync occurs within the blanking period in each horizontal scanning line, and vertical sync occurs within the vertical blanking period. A color black signal is often used for synchronizing different pieces of analog equipment.

Tally

A light which lights up to indicate that the associated button has been selected or to indicate that the associated input to the switcher is on-air.

Terminate, Termination

To complete a circuit by connecting a resistive load to it.

Transition

A change from one picture to another. Cut, mix, and wipe are transitions.

User Preference

A collection of control surface configuration settings available to a user that allows customizing of the working environment.

Vertical Interval

The portion of the video signal that occurs between the end of one field or frame and the beginning of the next.

Video Fill

A video signal used to fill the hole made by a key cut signal.

Video Path

The path that video takes through the switcher.

Wash Matte

A type of matte that contains two elements rather than a single flat color. For example, a wash matte can have one color that mixes gradually across the screen to another color.

Wipe

A transition between two video signals that occurs in the shape of a selected pattern.

Wipe Pattern Generator

Circuitry that creates patterns that can be used to create wipe transitions, preset patterns, key masks, and matte washes.

Work Buffer

An active area of memory where the current effect parameters are stored, allowing the operator to use and modify the effect without changing the data stored E-MEM.

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