

Operation Reference

software release **5.3**

071-0161-00

FIRST PRINTING: **January 1996**
REVISED PRINTING: **February 1998**

MODEL 4000
DIGITAL PRODUCTION SWITCHER

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Preface

Welcome to the Model 4000

This *Model 4000 Operation Reference* provides detailed information about the control panel functions and associated menu selections used to operate the Model 4000-3, 4000 -2A, and 4000 -2B Component Digital Switching Systems.

The Model 4000 document library set consists of:

- *Operation Reference*
- *User Guide*
- *Installation and Service Manual*
- *Drawings Manual*
- *Parts Manual*
- *Installation and Planning Guide* (optional)

The *Model 4000 Operation Reference* lists and briefly describes every button, knob, control, lever, and menu selection the switcher has to offer. Use this manual in conjunction with the *Model 4000 User Guide* when learning switcher functions, and/or as a reference and “memory jogger” during daily switcher operation.

The *Model 4000 User Guide* contains a system overview, software configuration, startup, switcher concepts, and task-oriented procedures for switcher functions. This book may be used when learning about, or enhancing your knowledge of, switcher operations.

The *Model 4000 Installation and Service* manual contains a hardware overview, hardware system installation instructions, general maintenance information, and functional descriptions of the Signal Processor Frame and Control Panel power supplies, modules and mezzanine circuit boards.

Organization of This Manual

This manual is organized as follows:

Control Panel Descriptions – Describes the Model 4000 control panel functions.

Menu Descriptions – Describes the Menu Display Subpanel Menus (except Configuration Menus, included in the *Model 4000 User Guide* Startup Section).

Menu Trees – Graphical depiction of switcher hierarchical menu structure.

How To Use This Manual

This reference manual assumes you have read, or understood, the contents of the *User Guide* and the System Overview and Functional Descriptions in the *Installation and Service* manual, so that you will be familiar with the basic terminology used in this manual and the structure of the hardware/software system.

If you are a switcher pro, and you know the switcher like the back of your hand, then you'll probably dive right in, referring occasionally to this book and the *User Guide*.

If you are not a switcher pro, you should read or scan the Control Panel Descriptions section to get an idea of the functions of the switcher subpanels and controls.

For quickly locating specific areas of interest, refer to the Table of Contents at the front of each manual section. This "local" table of contents is provided behind each tabbed divider so that you don't have to go all the way to the front of the manual to locate the information in a particular section.

If you have any comments about this manual, we would like to hear from you. Please write to:

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PO Box 1114
Grass Valley, CA 95945

Conventions Used in this Manual

The following graphical and typestyle conventions are used throughout this manual.

Model Notations

Model -2A and -2B differences are denoted by Notes within the text, and -2A or -2B logos positioned in the margin adjacent to the text (see examples below).

-2A

This subpanel is only available on the -2A.

-2B

The -2B can have up to 32 inputs at a time assigned to crosspoint buttons.

Button References

A control panel button is shown as follows:



Or, when used in the text, is shown in **boldface type**:

AUTO SETUP

Panel Knob References

Similarly, a control panel knob is shown as follows:



LUM

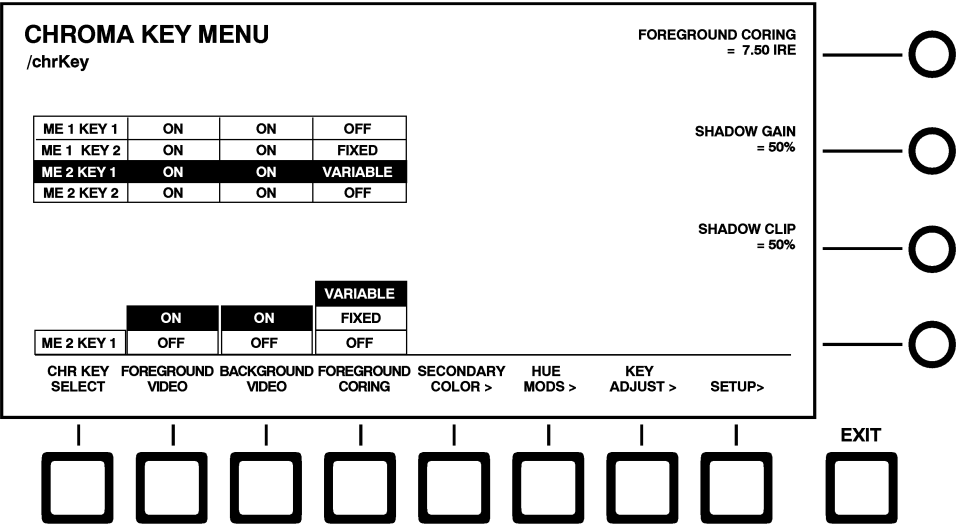
Or, when used in the text, is shown in **boldface type**:

LUMINANCE

Menu References

Many Model 4000 features may be accessed via the menu display and its associated “soft” buttons and “soft” knobs. The term “soft” means that the function of the button or knob is assigned via the currently displayed menu.

An illustration similar to the following may be used when you need to access a function via the menu



NOTE: For clarity, menus shown in the body of this manual will not display the “soft knobs” (the 4 shaded circles to the left of the menu), or the “soft buttons” (the 9 shaded boxes below the menu). The function labels (for example, “CHR KEY SELECT”, and “SHADOW CLIP”) will remain.

1

Model 4000 D I G I T A L *System Overview*

This section presents a general description of the Grass Valley Group Model 4000-2A, Model 4000-2B, and 4000-3 Production Component Digital Switching Systems.

The Control Panel and Signal Processor descriptions provide a basic knowledge of the Model 4000 basic architecture. All descriptions apply to all three models except when noted by either the

or -2A

-2B

or -3

symbol in the margin.

Basic Architecture

The Model 4000 is a component digital switcher. It can manipulate CCIR 601 serial component digital and analog component video and key signals through the use of 10-bit digital processing. Video inputs and outputs can be a combination of component analog and digital bit serial depending upon the configuration of your installation and the optional input and output modules installed.

-2A

The Model 4000-2A and 4000-2B provide two full function mix/effects subsystems, and a program/preset mixer. A dual (DSK 1 and DSK 2) downstream keyer (DSK) subsystem is also available. On the -2A model, the DSK is functionally similar to a mix/effect subsystem. (The DSK subsystem doesn't have Chroma Key capability; also PGM and PST Keys do not have Fill Mattes or Border Mattes).

-2B

-3

The Model 4000-3 Switcher provides three full-function mix/effects systems and a program/preset mixer with a dual downstream keyer. The full-function control panel is designed to meet live broadcast requirements with its undelegated key bus, a separate E-MEM section for each M/E, and up to 48 video or key inputs accessed directly from the control panel crosspoints.

Effects animation functionality may be used to build and run a sequence of effects. Effects are stored in E-MEM registers as a list of "keyframes" (see Section 2, Effects and Keyframes, for a definition of Keyframes). The E-MEM register operations are used to learn, recall, copy, and link effect registers.

Up to 64 physical external inputs may be configured. Forty-eight of these inputs may be mapped to switcher crosspoint buttons and used as video and/or key sources. Internal sources are also available, such as Black, Masks, Color Bars, and Background.

The layout of the Control Panel is logically structured for efficient control of video signals. The Menu Display Subpanel allows quick changes to switcher system parameters.

Standard Features

- Mix/ Effects Systems:
 - 4000-3 Three full Mix Effects Subsystems
 - 4000 2A/2B Two full Mix Effects Subsystems; Downstream Keyer on -2A functionally equivalent to M/E (except for Chroma Key, and no Fill or Border Mattes on PGM and PST Keys)
- Auto-Timed Inputs
- Shaped and Unshaped Video Input Conditioning
- Fineline Keying
- Unlimited Re-Entry
- Key Channel Throughout
- 10-Bit Data Processing Throughout
- Full Complement of Wipe Patterns
- E-MEM with Disk Storage
- 100 E-MEM registers for Keyframe effects
- Multiple-event Keyframes/Effects within a single E-MEM Register
- User-Preference Programming
- Safe Title/ Area Generators
- Extensive Masking
- Complex Matte Generators
- Analog Output Program/Preview Capability
- Default switcher state —User defined or GVG factory setting
- Chroma Key Autosetup

Optional Features

- Component Digital and Analog Input Capability, up to a total of 64 inputs
- Component Digital Output Capability
- BORDERLINE® on all Keyers
- Dual Chroma Keyers for each M/E
- Second Wipe Pattern Generator for each M/E and Program/Preset
- Kaleidoscope Run Control and Effects Recall¹
- Four-Channel Effects Send
- Aux Buses
- Timed Aux Output
- Key Outputs
- Preview Outputs
- Lookahead Preview, Auto Follow Preview, Push-to-Preview, and Preview Mode
- Tally Outputs
- DPM Port
- Redundant Power Supplies

Refer to the end of this section for descriptions of the optional features.

1. Requires a GVG Kaleidoscope DPM and the Kaleidoscope Interface Upgrade Kit (currently shipped, to customers who have purchased Kaleidoscope, with the 4.0 Software Release Package, Part No. 074825-07).

Physical Description

The switcher consists of three main areas: the Control Panel, the Signal Processor Frame, and the Frame Power Supply (see Figure 1-1) The electronic circuitry for the Model 4000 is contained on circuit boards and modules in the Signal Processor Frame and Control Panel.

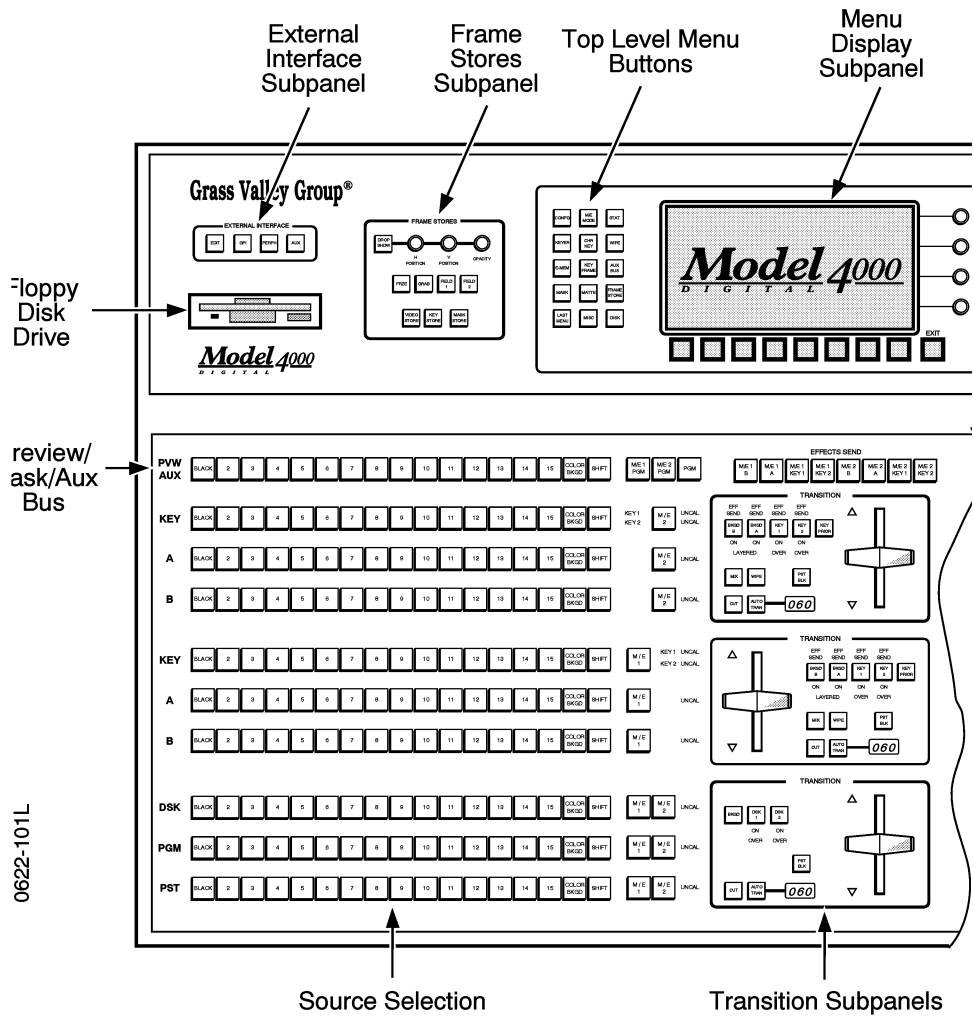
Signal Processor Frame

The Signal Processor Frame is a large rack-mounted unit that houses the system Controller, Mix/Effect logic and processors, Input/Output interfaces, and Expansion circuit modules.

In addition to the basic system, a typical system may have several options such as Chroma Keyers, Secondary Wipe Generators, and Effects Send. Most options are available as circuit board modules (or submodules called “mezzanine” boards) to be installed in the Signal Processor Frame.

Refer to the Model 4000 *Installation and Service* manual for a complete description of the Signal Processor.

A main processor and separate M/E processors reside within the Signal Processor Frame. Since each M/E has its own processor, failure of one processor does not disable the entire switcher. Individual effects can continue to operate independently in a limited capacity.



Control Panel

The Control Panel is the operator interface for the Model 4000 system. The operator performs all actions via buttons and knobs and a software-driven menu.

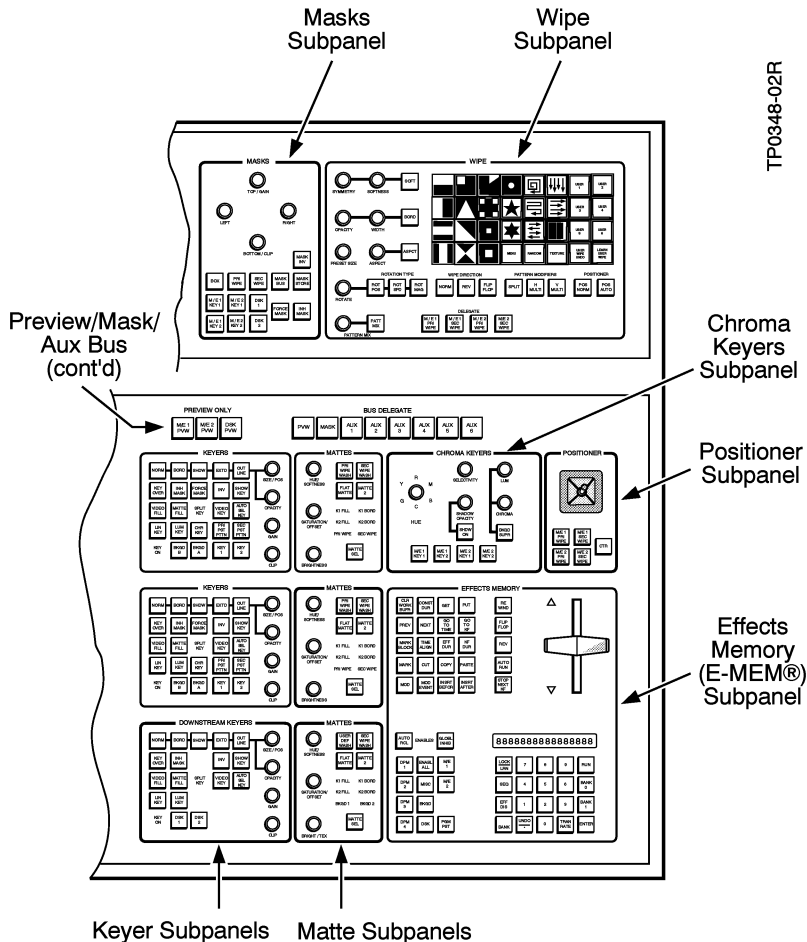
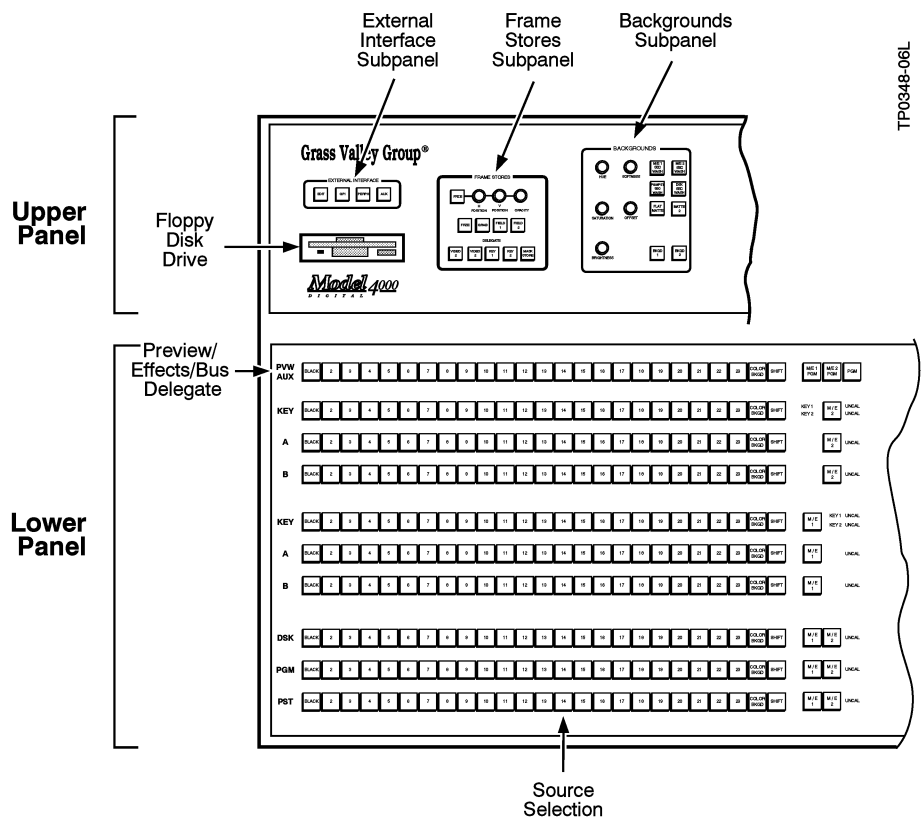


Figure 1-1. Model 4000-2B Control Panel.

The Control Panel also provides connectors for a status terminal and the data link to the Signal Processor Frame.



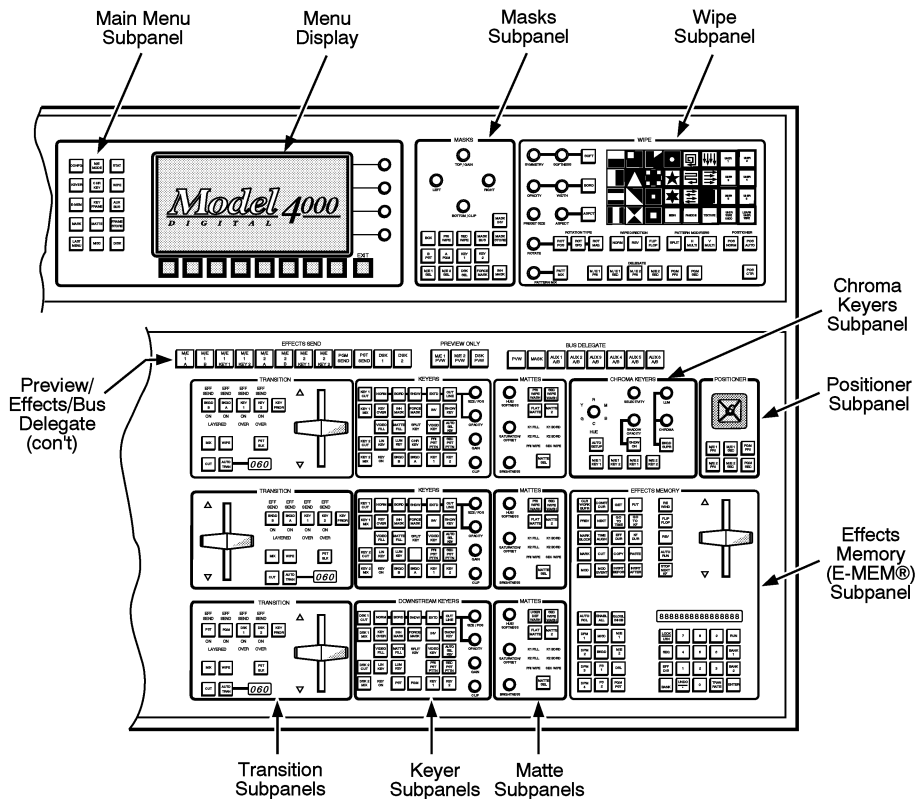
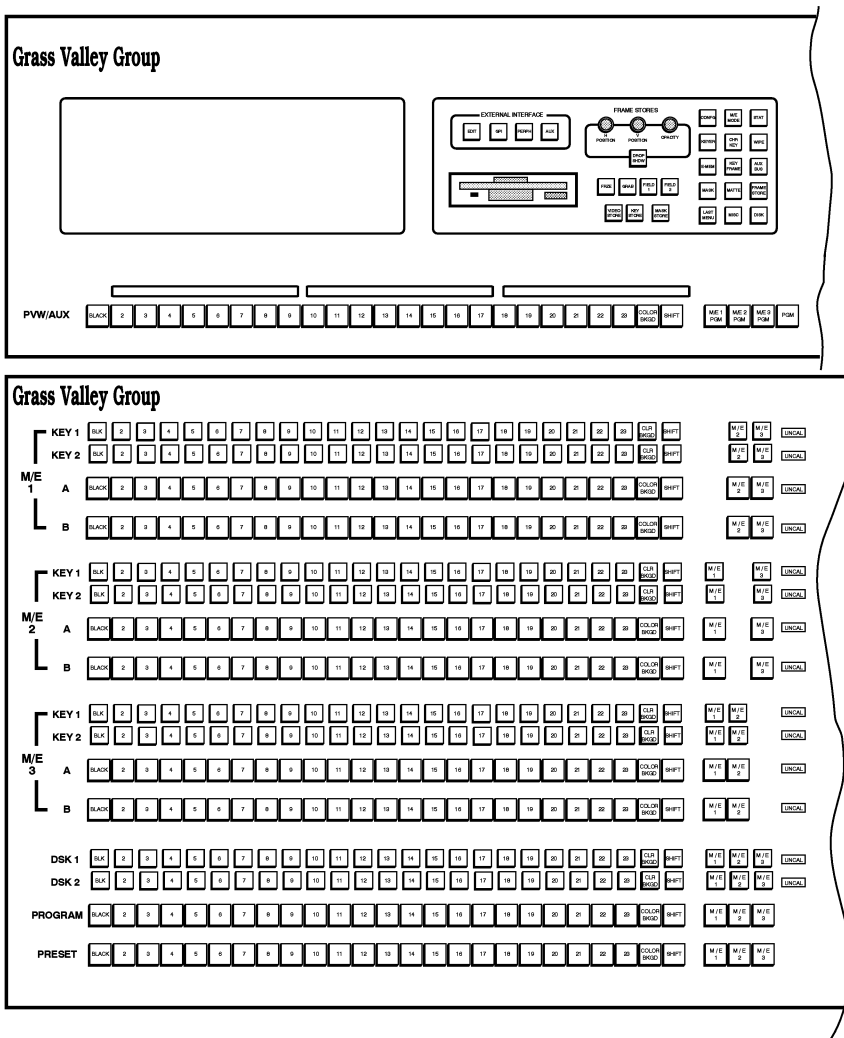
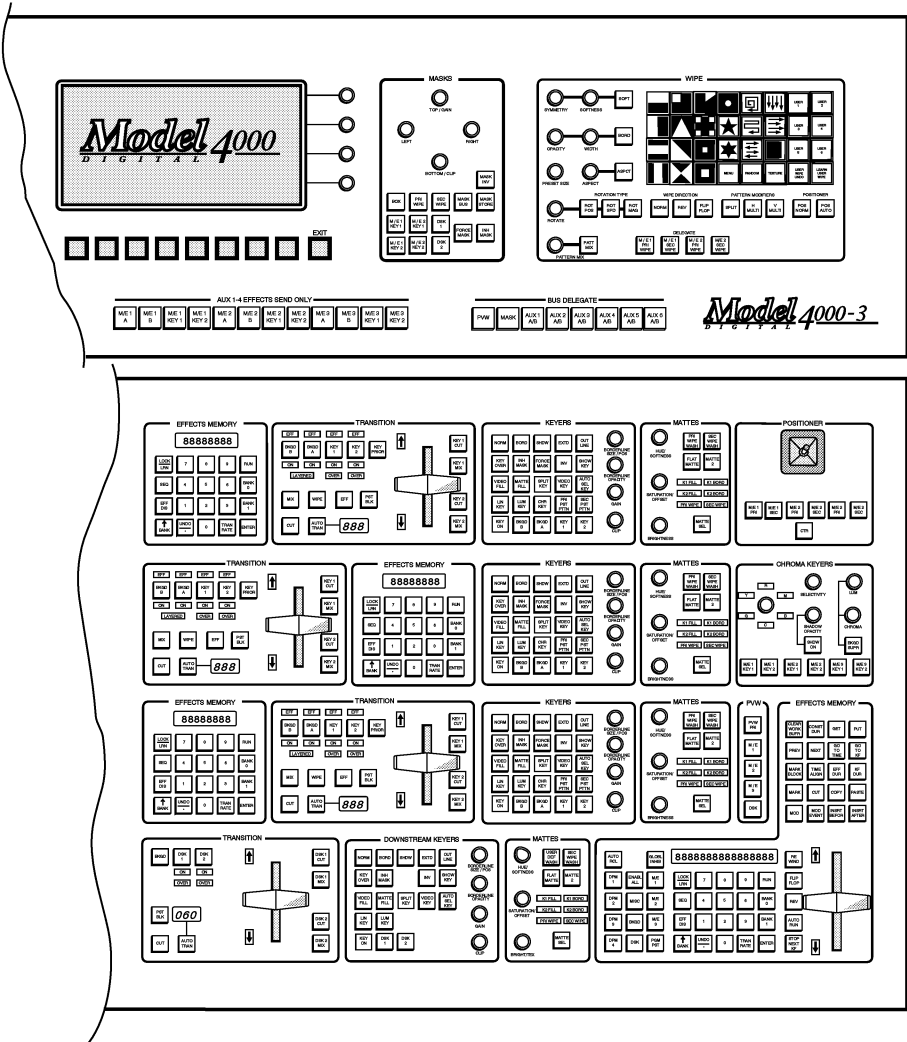


Figure 1-2. Model 4000-2A Control Panel





TP0702-02R

Figure 1-3. Model 4000-3 Control Panel

Power Supplies

Two power supplies are used in the basic Model 4000 system: a control panel power supply, located in the control panel tub, and a 19 inch rack mount power supply used by the Signal Processor Frame. Optional Redundant power supplies are available.

Video and Key Inputs and Outputs

Inputs

Three types of input modules may be installed in the Signal Processor Frame to suit the needs of your installation. The following types of input modules are available.

NOTE: *Each of the serial or analog inputs can be treated by the switcher as either a video input or a key input.*

- Serial Component Digital Module – provides 8 inputs, auto-timed within a range of ± 18 microseconds. Serial Component Digital Modules are optional in the Model 4000-2A. Up to eight modules may be installed for 64 inputs.
- Analog Component Module – each optional Analog Component Module provides 2 analog component video inputs (RGB, YUV, Beta, or MII) and 2 analog Key inputs. Up to 8 Analog Component Modules can be installed. Every Analog Component Module is associated with a Serial Reentry Module which is included in the option set. Refer to Figure 1-4.
- Chroma Key Input Modules—Up to 3 optional component analog Chroma Key Input Modules may be installed. Each module provides 2 inputs for a total of 6 inputs to the optional Chromatte™ Chroma Keyer. The format for each input is user-selectable from RGB, YUV, Beta or MII.

Refer to the Startup section of this manual for information on assigning input formats and adjusting the timing.

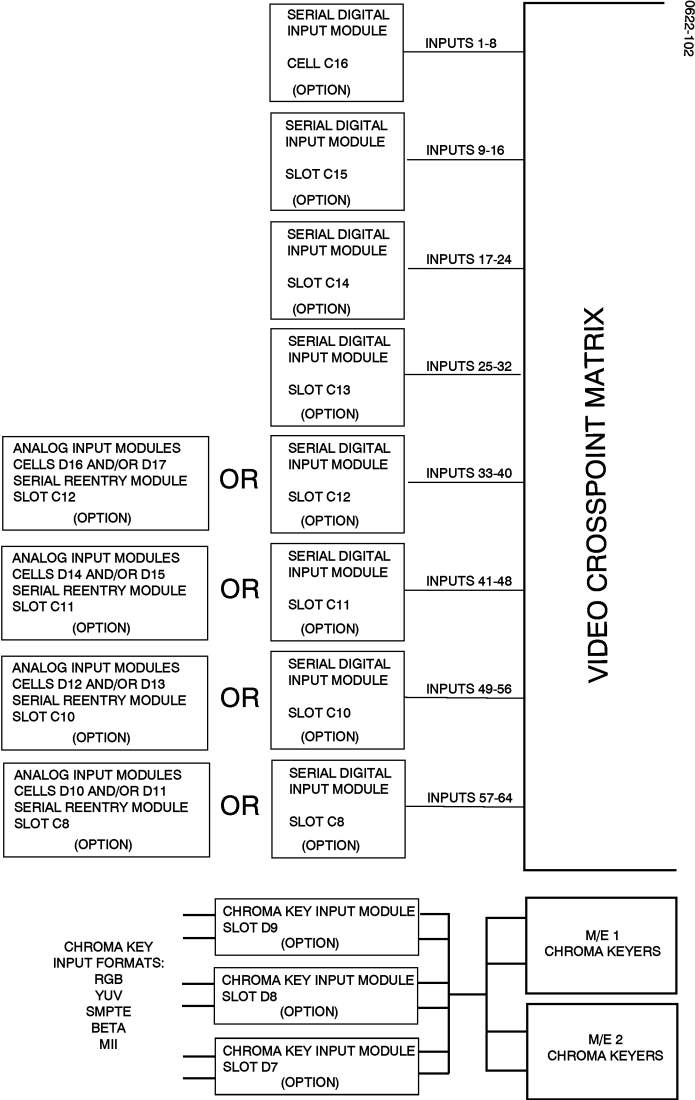


Figure 1-4. Video and Key Inputs

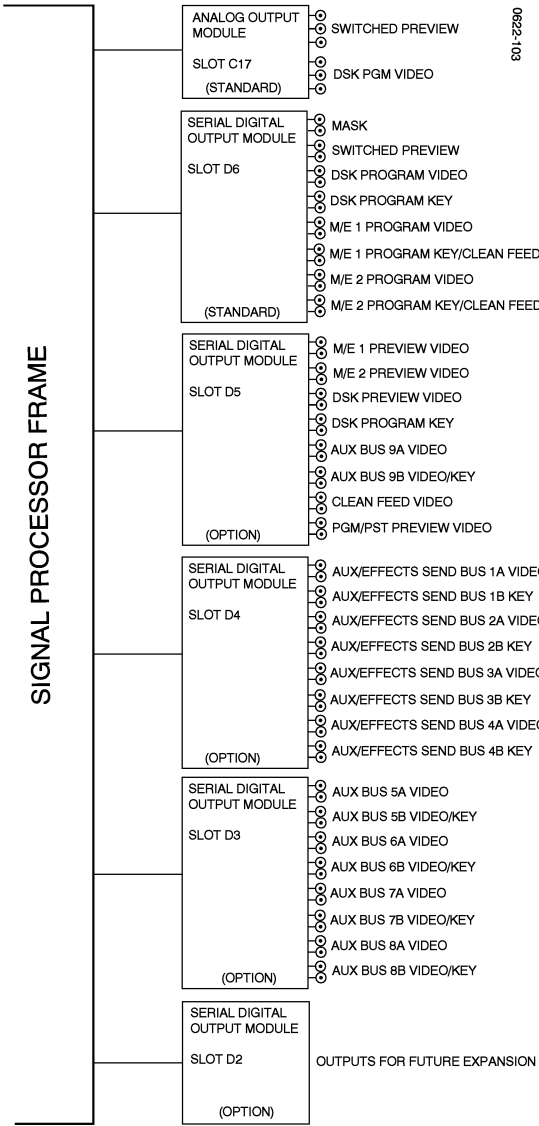


Figure 1-5. Video and Key Outputs

Outputs

Output modules are placed in both the upper and lower rear bays of the Signal Processing Frame. The following module types are available:

- Serial Output Modules (5 optional, each adding 8 outputs each with two BNCs)
- Analog Output Module (1 standard with RGB/Y, CR, CB and Key outputs)

The standard Analog Output Module includes the following outputs:

- DSK Program Video
- Switched Preview Video

The optional Serial Output Modules include the following outputs:

- DSK Program Video and DSK Program Key
- Mask Bus
- Switched Preview Video
- M/E 1 and M/E 2 Program Video
- M/E 1 Program Key/Clean Feed Video (switchable)
- M/E 2 Program Key/Clean Feed Video (switchable)
- M/E 3 Program Key/Clean Feed Video (switchable)
- PGM/PST Preview Video and DSK Preview Video
- M/E 1 and M/E2 Preview Video
- AUX Buses 1A/B--9A/B
- Clean Feed Video

Functional Description

General Overview

Figure 1-6 shows a simple video flow diagram for the Model 4000.

Video and key signals enter the input modules of the Model 4000, which consist of component analog and/or component serial digital formats. The analog signals are converted to digital format, and all inputs are timed and conditioned.

The digital signals are then passed to the Video and Effects Section where keying and mixing take place. This section also provides effect modifications, such as wipes and keyframing, that can be applied to selected inputs.

In the Output Section, digital video and key signals are routed to the Serial Digital Output Modules and the standard Analog Output Module before leaving the Signal Processor.

Video Processing

Input video and key signal selections are made by the Crosspoint Matrix under control of the system Controller, according to operator assignments entered via the Control Panel.

In addition to primary (external) video, secondary (internal) sources such as Masks, M/E re-entry video, and optional Frame Store are available as inputs to the crosspoint matrix.

Any suitable component digital signal from the Crosspoint matrix may feed the Chromatte™ Chroma Keyer Module option. Analog Component signals may also be used as Chroma Key sources.

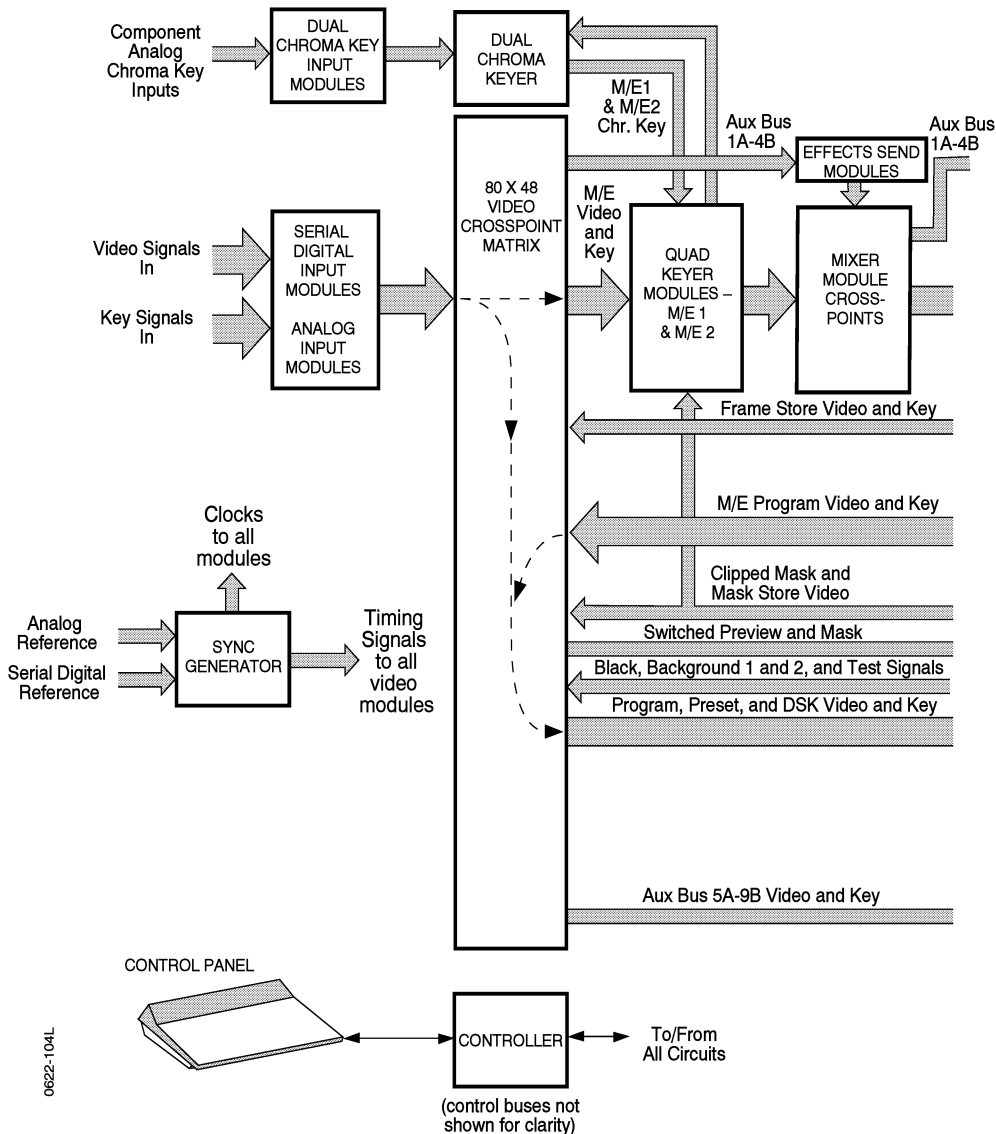
Keyers in each Mix/ Effects bank provide outputs to the Mixer Interface crosspoints for sending outside the switcher for external processing or for routing to the M/ E mixers and wipe generators. The Effects Send outputs can be directed to the Frame Store option for image capture.

Each M/ E, and the DSK, has two keyers and two background buses (A and B) as inputs. In standard mode, Keyers 1 and 2 can be mixed into a composite video and key which can be forwarded to the DSK, another M/ E, or output. In layered mode, Backgrounds A and B are also used as keyers, the same as Keyers 1 and 2.

Preview capability allows monitoring of sources at many points in the signal flow. You can preview video from the M/ E mixers, Flip/Flop Mix and DSK mixer, switched preview bus, or mask bus.

Eight level-sensitive GPI inputs are provided. You can assign each of the GPI inputs via the GPI Input menu to perform a specific function when triggered.

The editor interface consists of an asynchronous RS-422, 38.4K baud serial communications port, managed by a communications processor. Refer to the *Model 4000 Serial Protocols* manual for information on software functions and protocols observed by the editor port.



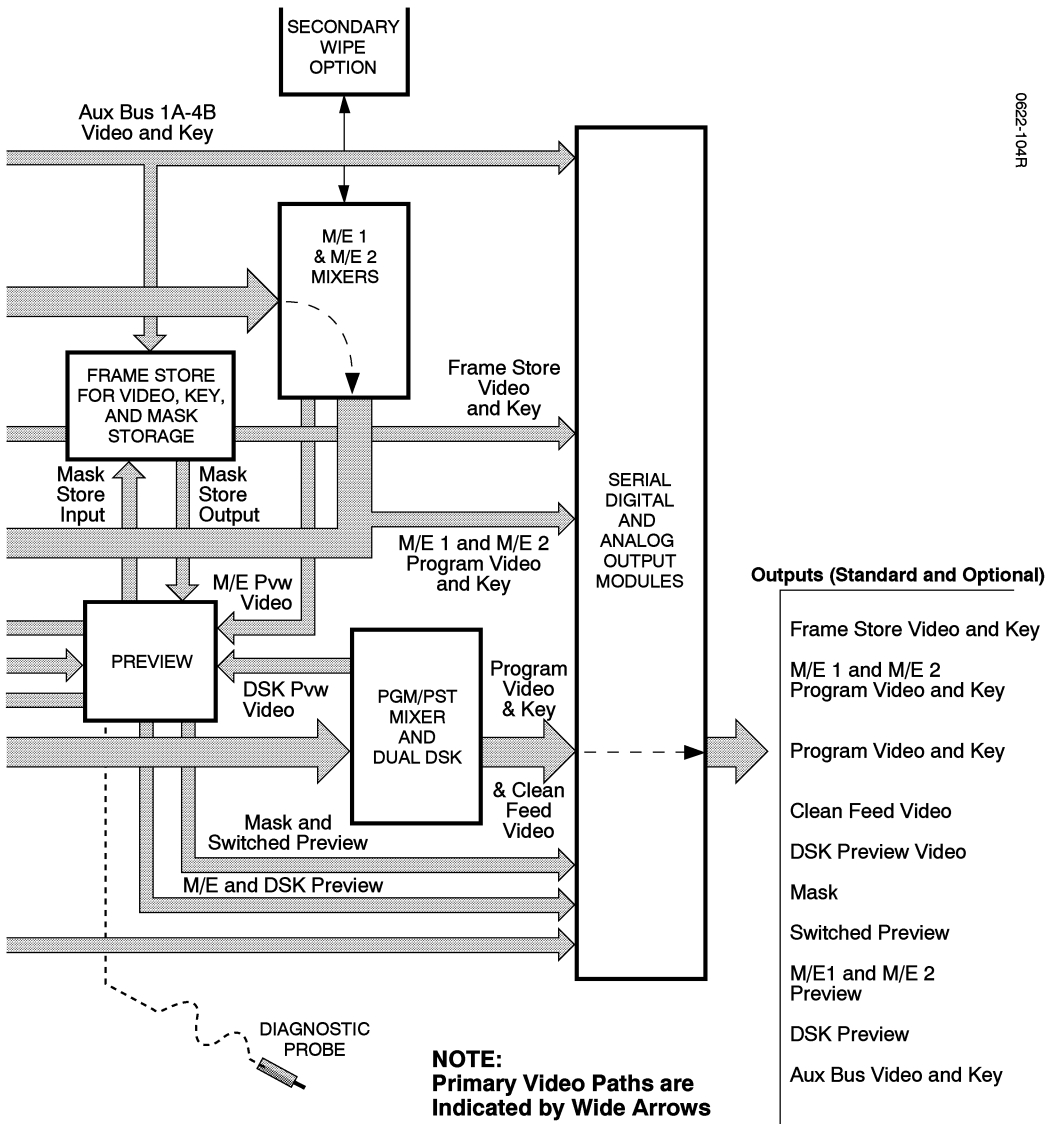


Figure 1-6. Video Flow Diagram (Typical)

0622-104R

Description of Options

The following options are currently available for the Model 4000 switcher. For more details on these options, refer to the appropriate subpanel descriptions later in this manual.

Chromatte Advanced Chroma Keyer

Each foreground keyer in M/E 1 and M/E 2 has access to an optional component chroma keyer. Either an internal component digital signal or an external component analog signal from one of the Chroma Key Input Modules can be used as the chroma key source. Color background suppression, foreground suppression and shadow processing are included as features.

BORDERLINE Key Edge Generation

BORDERLINE® Key Edge Generators are available for each keyer in the switcher. The Borderline feature is implemented as a submodule that plugs onto the Keyer module of any M/E.

Each Borderline generator supports 1, 2, or 3 line wide borders for border and outline modes and 1 to 6 line wide edges for shadow and extrude modes. Fill within the key edges may be either video or matte.

Secondary Wipe Generator

A Secondary Wipe Generator option provides a second pattern for each of the M/E systems. (On the -2A, a second pattern is available on the DSK and Program/Preset systems.) Submodules mount on the M/E 1, M/E 2, M/E 3, and DSK Mix/Wipe Modules for enhancing the mix/effect systems.

Effects Send

Effects Send provides a method of integrating digital effects devices into the switcher mix/effects system. Up to four send channels can be used to route the video and key from an M/E to and from an external digital effects system.

Frame Store

Using software version 5.3 and later, the Frame Store option takes the output of an M/E Keyer, sends it to the Frame Store module, then returns the output of the Frame Store to the Mix/Wipe circuit of the same M/E in the switcher. This provides the effect of inserting the Frame Store right into the M/E, between the Keyer and the Mix/Wipe systems.

Clean Feed

A DSK clean feed video output of the wipe/mix signals (the two background bus video signals without any keys added) is provided by one of the optional Serial Digital Output Modules.

Look Ahead Preview

Lookahead Preview functionality (with Auto-Follow and Push-to-Preview) is provided for both M/Es with this option. Submodules mount on the M/E Mix/Wipe Modules.

Tally Relay

The Tally Relay module provides external tally outputs that reflect the switcher status. A rear-panel interconnect board provides the relay contacts on two connectors for on-air Tally A and on-air Tally B. Pinouts for the Tally connectors are given in the Installation section of the System Information manual.

Remote Aux Bus

The Remote Aux Control Panel Option allows you to control the Model 4000's aux buses from a remote location. As many as 32 Remote Aux Panels can be daisy-chained to the switcher. There are three Remote Aux Panel configurations available, identified by the number of rack units (RUs) each occupies in the equipment rack.

The Models 4000-2A and 4000-3 panels are designed to control 48 external inputs (24 unshifted and 24 shifted).

The Model 4000-2B panel is designed to control 32 external inputs (16 unshifted and 16 shifted).

Timed Aux Output

The Timed Aux Output Module provides four independent output pairs (video/key) from aux buses 5A through 8B for use with Kaleidoscope and DPM systems.

Model 4000

D I G I T A L

2

Control Panel Descriptions

User control of the Model 4000 Switcher is provided through a control panel containing a source-select button matrix, various subpanels, and a Menu Display Subpanel used for setting up switcher parameters not otherwise accessible via the control panel. The Menu Display Subpanel, and all menus, are described in Section 3, Menu Descriptions.

This section provides an overview of the Model 4000-2A, 4000-2B, and Model 4000-3 control panels, and detailed descriptions of the subpanels. Operation of the three models are essentially identical; however, the 4000-3 has one more Mix/Effect system, and an E-MEM subpanel for each M/E.

NOTE: *This section is currently written to the software version 5.3 level.*

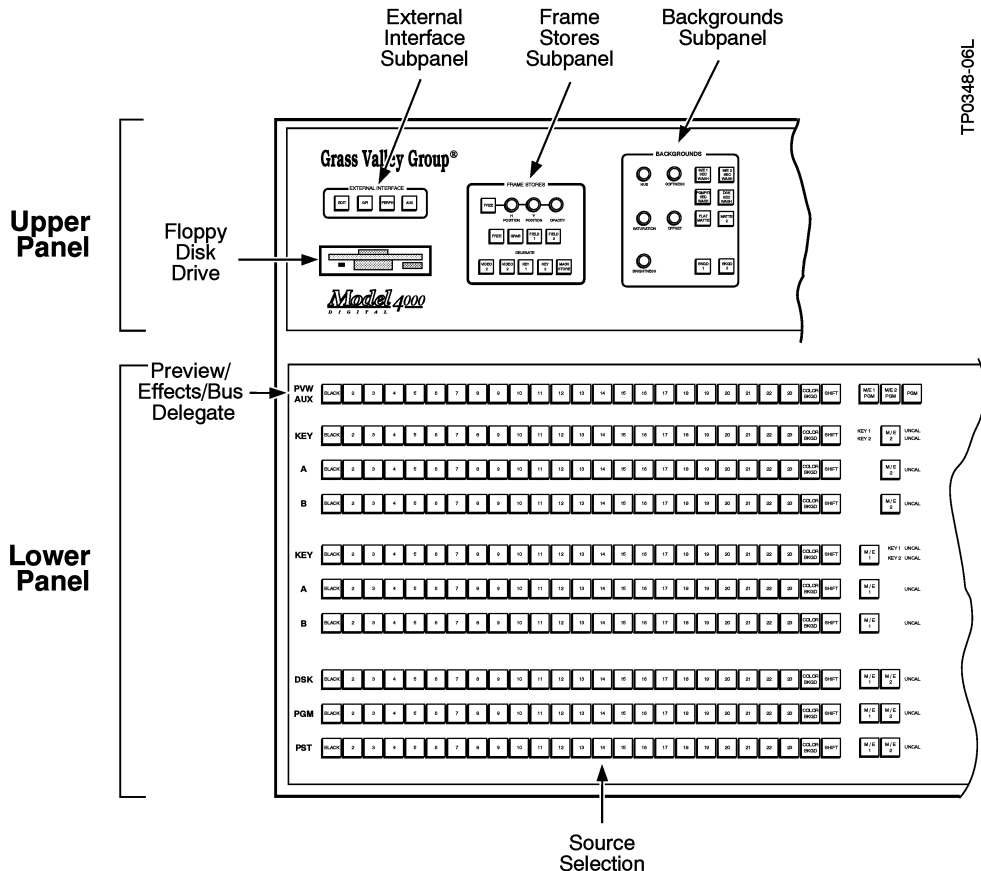
Main Control Panel

The control panel is physically divided into two areas referred to as the “upper” and “lower” panels (see the -2A Control Panel in Figure 2-1).

The upper panel contains the Menu Display Subpanel, as well as the Wipes, Masks, Frame Store, and External Interface subpanels. A 3.5-inch floppy disk drive used for storing setups and other data is also located on the upper panel.

Menu control for selecting and executing software functions is provided by the “top level” menu buttons at the left of the display,

eight “soft” buttons below the display, and four “soft” knobs at the right of the display. The term “soft” means that the functions of these buttons and knobs are defined by software.



The most frequently-used controls are placed on the lower panel for ready access. Rows of subpanels for the Mix/ Effects and Program/ Preset/ Downstream Keyer systems are provided in line with the corresponding source selection buttons for making transitions, keying, creating mattes, and manipulating effects.

Buttons for Preview bus, Mask bus, and Auxiliary bus selection are located along the top of the lower panel.

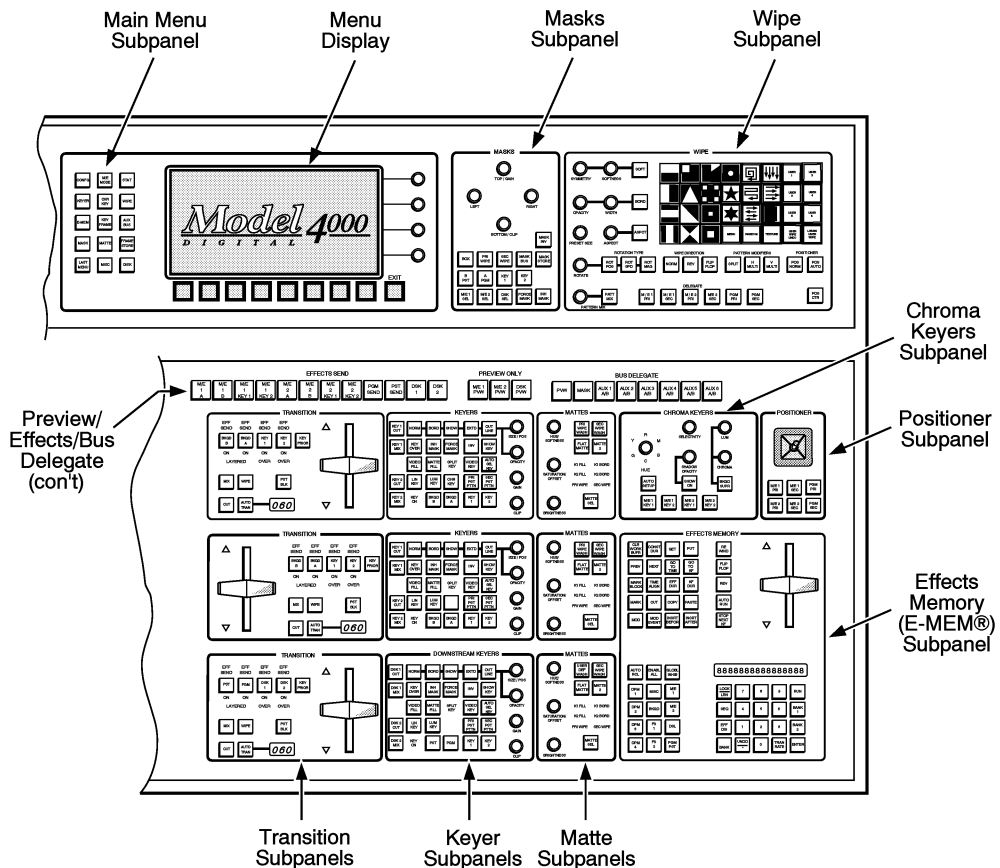


Figure 2-1. Functional Areas of Upper and Lower Control Panels (-2A panel pictured)

Source Selection

The Source Select portion of the control panel consists of Primary source select buttons, Secondary (re-entry) source select buttons, **SHIFT** buttons, and Key Bus delegation and uncalibrated indicators (see Figure 2-2).

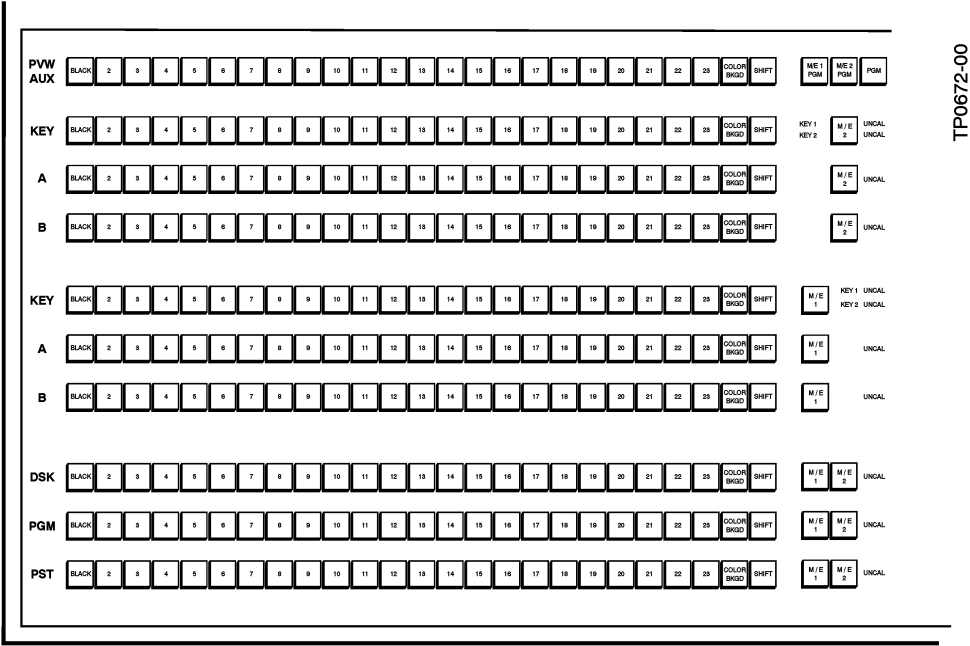


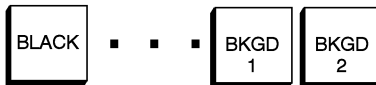
Figure 2-2. Source Select Panel

All buttons on the Source Select panel have three levels of illumination:

- OFF indicates not selected;
- DIM or “low tally” indicates selected, but not on-air;
- BRIGHT or “high tally” indicates selected and on-air.

Only one button in each row is illuminated at any time (not including the **SHIFT** button).

Primary Source Selection (Primary Crosspoints)



Each row of primary source selection buttons consists of 24 buttons on the -3 and -2A panel, or 16 buttons on the -2B panel. Each button may be named according to its source, and the name label placed under a clear lens cap.

Each input, including **BLACK** and **BKGD**, can be mapped to any vertical column of source select (“crosspoint”) buttons. Thus, each column of buttons may be visualized as an input bus of video or key crosspoints.

Primary video and key inputs to the switcher are numbered 1 through 64. Each input can be treated as either a video signal or a key signal, as defined in the Configuration menu.

Sixty-four inputs may be assigned at one time to the crosspoint buttons – 24 “unshifted” and 24 “shifted” selections (described below).

-2A -2B
-3

Thirty-two inputs may be assigned at one time to the crosspoint buttons – 16 “unshifted” and 16 “shifted” selections (described below).

In addition, you can map both a video signal and a key signal to a column of crosspoint buttons.

The assigned signal(s) on each input column may be switched onto any output bus (horizontal row) by pressing the crosspoint button at the intersection of the column and the row.

Any video/key input may be selected on any number of output buses; however each output bus can have only one output signal selected on it at one time.



The **SHIFT** button located at the right end of each primary source selection row is used to access the shifted inputs. To select a shifted input, hold **SHIFT** down (button lamp comes on) and press a crosspoint button on that bus. The **SHIFT** button lamp then remains lit to show that the selection is a shifted selection. The Shift mode will turn off when an unshifted selection is made on that bus.

Any shifted crosspoint bus may be locked into a shift-locked state. This allows ready access to those input sources mapped to shifted crosspoints. Refer to Setting User Preferences in the *4000 User Guide* for details on crosspoint bus shift lock.

Crosspoint Name Display

-3

The Model 4000-3 displays crosspoint names on the upper Control Panel. The displayed crosspoint names are defined using the Configuration/Inputs/Map Inputs/Name Crosspoint Button Menu. While you may define up to nine characters for a button name, the Control Panel display only allows up to four characters; the first four characters as defined in the Name Crosspoint Button Menu. (Refer to your *Operation Reference* manual for descriptions of this menu.)

Crosspoint Button Caution Indication

A primary crosspoint button may flash if the timing of a selected input cannot be corrected by the automatic input timing circuit. This flashing caution can be disabled through the Configuration menu.

Secondary Source Selection (Re-entry Crosspoints)



The secondary source (“M/E re-entry”) buttons, **M/E 1**, **M/E 2** and **M/E 3**, are located at the right end of each row of primary crosspoint buttons. Unlimited re-entry is supported for outputs of the Mix/Effects (M/Es).

The program output of either M/E may be re-entered as an input on the other M/E or in the PGM/PST Mix/DSK system, or it may be used as a key source on the other M/E or the DSK.

Since multiple re-entry is allowed, lockout logic prevents one M/E from entering a second M/E at the same time the second M/E is entering the first. If a circular re-entry is attempted, the request for the second re-entry will be ignored.

Key Delegation and Uncal Indicators

KEY 1
KEY 2

The **KEY 1** and **KEY 2** indicator LEDs, located adjacent to the re-entry source selection buttons and in line with each row of key crosspoint buttons, light to indicate which keyer the row of buttons is currently delegated to control.

UNCAL

Each **UNCAL** indicator LED, located in line with a row of source select buttons, lights if one or more of the following variables are set to non-default values for the selected crosspoint on that bus: opacity, luminance gain, chroma gain, D.C. Offset, coring, or horizontal key position.

Auto Delegation

A single subpanel or subpanel section can be used to control two or more identical devices or functions. Some of the subpanels on the Model 4000 are delegated to other subpanels under conditional control of the operator or system. This feature is called “auto delegation.”

The effect of auto delegation is that pressing a button on one subpanel may activate the controls on another subpanel. For example, the single Chroma Keyer Subpanel is used for controlling all Chroma Keyers, and is activated by pressing the **CHR KEY** button on either of the M/E Keyer Subpanels.

Auto delegation is normally on, but can be turned off via the User Preferences menu.

Table 2-1 shows some of the delegations that may be invoked when operating the switcher.

Table 2-1. Subpanel Delegation

Subpanel	Button Pressed	Delegated Subpanel	Conditions and Comments
Transition (M/E)	KEY 1 or KEY 2	Keyer, Key Bus (same M/E) Mask Chroma Keyer	INH MASK or FORCE MASK must be on CHR KEY must be on
Transition (M/E) (Layered Mode)	BKGD B or BKGD A	Keyer (same M/E)	
Transition (M/E)	WIPE	Wipe	
Transition (DSK)	DSK 1 or DSK 2	Downstream Keyer, DSK Bus Mask	INH MASK must be on

Table 2-1. Subpanel Delegation (Continued)

Subpanel	Button Pressed	Delegated Subpanel	Conditions and Comments
Any Input Bus	BKGD 1 or BKGD 2 Crosspoint	DSK Matte	Lights BKGD 1 or BKGD 2 indicator on DSK Matte Subpanel
AUX/Mask/PVW Bus	Any PREVIEW ONLY Crosspoint	Preview Bus	
Keyer (M/E)	KEY 1 or KEY 2	Key Bus (same M/E) Mask Chroma Keyer	INH MASK or FORCE MASK must be on CHR KEY must be on
Keyer (M/E)	PRI PST PTTN or SEC PST PTTN	Wipe	
Keyer (M/E)	CHR KEY	Chroma Keyer	
Keyer (M/E)	INH MASK or FORCE MASK	Mask	INH MASK or FORCE MASK button must be turned on by the press
Keyer (M/E) or Downstream Keyer	Any Borderline mode button except NORM	Matte (same M/E or DSK)	Lights K1 BORD or K2 BORD indicator on Matte Subpanel, depending on Keyer or DSK delegation
Keyer (M/E) or Downstream Keyer	MATTE FILL	Matte (same M/E or DSK)	Lights K1 FILL or K2 FILL indicator on Matte Subpanel, depending on Keyer or DSK Subpanel delegation
Downstream Keyer	DSK 1 or DSK 2	DSK Bus Mask	INH MASK must be on
Downstream Keyer	INH MASK	Mask	INH MASK button must be turned on by the press

Table 2-1. Subpanel Delegation (Continued)

Subpanel	Button Pressed	Delegated Subpanel	Conditions and Comments
Matte (M/E or DSK)	PRI WIPE WASH or SEC WIPE WASH	Wipe* Matte	If Wipe BORD is on
E-MEM	Register Recall	Keyer and Key Bus	
Mask	PRI WIPE or SEC WIPE	Wipe	
Wipe	BORD	Matte (same M/E)	BORD button must be turned on by the press Lights PRI WIPE or SEC WIPE indicator on Matte Subpanel

*On an M/E Matte Subpanel: Pressing the **PRI WIPE WASH** button causes the Wipe Subpanel to be auto delegated to the primary wipe pattern generator for the calling M/E. Pressing the **SEC WIPE WASH** button on the M/E Matte Subpanel causes the Wipe Subpanel to be auto delegated to the secondary wipe pattern generator for the calling M/E.

*On the DSK Matte Subpanel: Pressing the **SEC WIPE WASH** button causes the Wipe Subpanel to be auto delegated to the secondary wipe pattern generator for M/E 1.

Menu Delegation (DPOPs)

The Model 4000 also delegates certain menus to open when specific buttons on the subpanels are *double-pressed*. This is called a Double Press Operation, or “DPOP.” (The second press must occur withless than a half-second.) Table 2-2 lists the buttons that support this function.

NOTE: An opened menu is delegated, where appropriate, to the button that opened the menu. For example, double-pressing the **KEY 1** delegation button on the M/E 1 Keyer panel causes the keyer menu to open and the menu controls to be delegated to keyer 1 of M/E 1.

Table 2-2. Menu Delegation

Subpanel	Button Double-Pressed	Delegated Menu	Comments
Transition	BKGD B	M/E Mode menu	
Keyer (M/E)	KEY 1 and KEY 2	Keyer menu	
Keyer (M/E) (Layered Mode)	BKGD B, BKGD A, KEY 1, and KEY 2	Keyer menu	
Keyer (M/E)	PRI PST PTTN or SEC PST PTTN	Wipe Modifier menu	Used to set PST PTN DIRECTION
Keyer	CHR KEY	Chroma Key menu	
Downstream Keyer	DSK 1 and DSK 2	Keyer menu	
Chroma Keyer	M/E 1 KEY 1 through M/E 3 KEY 2	Chroma Key menu	
DSK Matte	USER DEF WASH	Matte menu	Used to set USER DEF WASH ANGLE

Table 2-2. Menu Delegation (Continued)

Subpanel	Button Double-Pressed	Delegated Menu	Comments
Wipe	Wipe Pattern MENU	Wipe Pattern menu	
Wipe	M/E 1 PRI through M/E 3 SEC	Wipe Modifier menu	
Wipe	Wipe Pattern TEXTURE	Wipe Texture menu	
Source Select Any of the following delegated buses: M/E 1 Key 1 M/E 1 Key 2 M/E 1 Key A M/E 1 Key B M/E 2 Key 1 M/E 2 Key 2 M/E 2 Key A M/E 2 Key B DSK 1 DSK 2 Aux 1 through Aux 7 (if configured as a video <i>and</i> a key)			
	Any Primary or Secondary Crosspoint	Clear Key Memory menu (submenu under Misc menu)	

Transition Subpanels

A Transition Subpanel is supplied for each M/E and for the PGM/PST/DSK mixer (see Figure 2-3 and Figure 2-4). Controls common to all Transition Subpanels are: a **lever arm** for manual transitions; transition direction indicators; **CUT**, **AUTO TRAN**, **MIX**, **WIPE**, and **PST BLK** buttons; and a three digit LED display that shows the auto transition duration in frames.

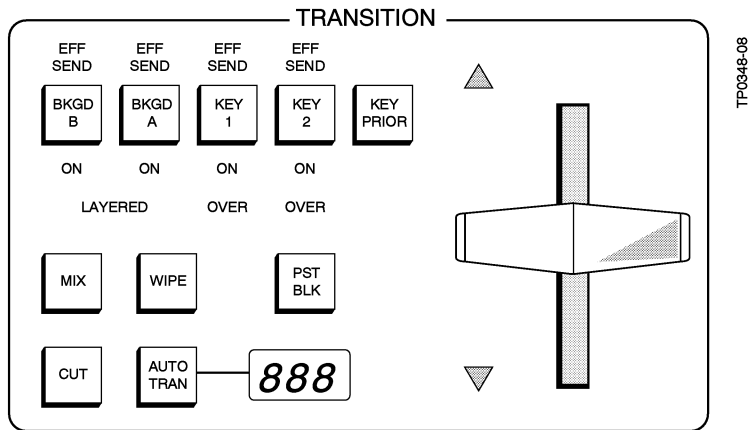


Figure 2-3. Mix/Effects Transition Subpanel

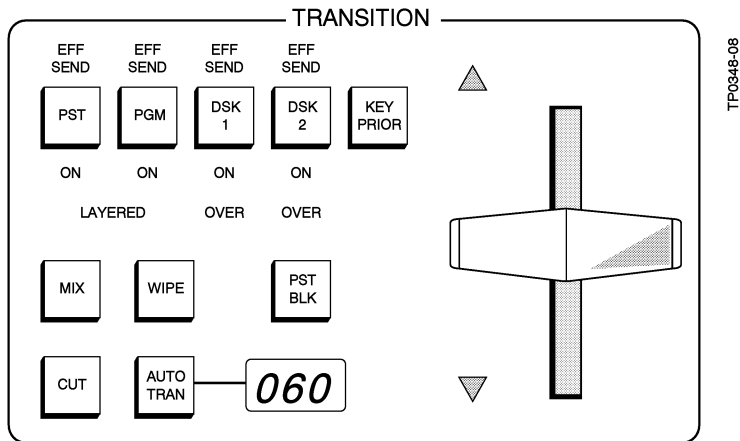


Figure 2-4. DSK Transition Subpanel

Next Transition Buttons

The five next transition buttons in each M/E and Program/Preset – **(BKGD A or PGM), (BKGD B or PST), KEY 1 or DSK 1, KEY 2 or DSK 2,** and **KEY PRIOR** – select the M/E and Program/Preset output signals that will change during the next transition.

ON

An **ON** indicator located beneath each next transition button is lit when the associated signal is an active part of the M/E output in layered mode.

NOTE: *The way the M/E Next Transition buttons operate depends on whether the M/E is operating in Standard Mode or in Layered Mode. The mode of operation is set in the M/E MODE menu, described later in this section.*

M/E Next Transition Buttons (*Standard Mode*)

In Standard Mode, only the **BKGD A, KEY 1, KEY 2,** and **KEY PRIOR** next transition buttons and the **ON** and **OVER** indicators below the **KEY** buttons are functional. (The **BKGD B** button and the **ON** indicators below the **BKGD** buttons are not functional and the **LAYERED** indicator is not lit.)

The transition can affect Background only, Key 1 only, Key 2 only, or any combination thereof. Multiple-layer transitions are selected by simultaneously pressing more than one button.



Pressing **BKGD A** or **PGM** selects background video to change during the next transition. That is, the background video output of the M/E or the DSK will change from the source selected on the A Background/PGM bus to the source selected on the B Background/PST bus.



At the end of the transition, the inputs selected on the background buses will interchange, or "flip-flop." The "new video" on the B Background bus will transfer to the A Back-ground bus, and the "old video" on the A Background bus will transfer to the B Background bus.



Activating the **KEY 1** or **DSK 1** or **KEY 2** or **DSK 2** button (lamp lit) causes the next transition to bring on or remove the selected key. Selecting **KEY 1** or **KEY 2** delegates the M/E Keyers Subpanel and KEY bus to the selected keyer so that the characteristics of that key may be adjusted (see Keyer Subpanel description).



One or both of the KEY buttons can be activated at the same time and one or both keys can be on (**ON** indicator lit) at the same time.



Pressing **KEY PRIOR** causes the next transition to swap the Key 1/Key 2 priority. This can be performed as a mix, wipe, or cut transition. Key priority always involves both Key 1 and Key 2

OVER

The **OVER** indicator indicates whether Key 1 is over Key 2, or Key 2 is over Key 1.

M/E Next Transition Buttons (*Layered Mode*)

LAYERED

In Layered Mode, *all* of the next transition buttons and indicators are functional and the **LAYERED** indicator is lit. In this mode, **BKGD B** and **BKGD A** are keyers.

The transition can affect Background A only, Background B only, Key 1 only, Key 2 only, or any combination thereof. Multiple-layer transitions can be selected by simultaneously pressing more than one button.

NOTE: *Flip-Flop operation occurs only when operating in Standard mode. Operating in layered mode causes the A and B Background layers to transition in a manner similar to the Key 1 and Key 2 layers (see the descriptions for Key 1 and Key 2).*



In Layered mode, the **BKGD A** and **BKGD B** buttons also delegate the Keyers Subpanel. (The key bus delegation remains unchanged when the keyer subpanel is delegated to either of the background layers.)

Transition Type Buttons

The *type* of transition at the next transition is determined by the **WIPE**, **MIX**, and **PST BLK** buttons.

The **WIPE** and **MIX** buttons are mutually exclusive; pressing one selects it and de-selects the other.



A **WIPE** transition uses the output of the wipe generator to shape the selected transition(s). Your selected wipe pattern appears over the old video/key and moves across the screen, revealing the new video/key as it moves. Use either the **lever arm** or the **AUTO TRAN** button to perform the **WIPE** transition.



Pressing **MIX** selects a transition that mixes video, keys or backgrounds, during the change from one source to the other. A mix transition gradually fades the new video and/or key over the old video and/or key. You can use either the **lever arm** or **AUTO TRAN** button to perform a **MIX** transition.



Pressing the **PST BLK** button selects a two-stage transition that inserts black between the two video sources being mixed, wiped, or cut. For example, instead of mixing directly between the A Background/PGM and B Back-ground/PST buses during a background transition, a preset black transition mixes, wipes, or cuts from the A Back-ground bus to black. When a second transition is performed, black mixes, wipes, or cuts away to the B Background. After completion of the two transitions, **PST BLK** turns itself off automatically.

In addition to this automatic cancellation, you can toggle **PST BLK** on and off manually. If you turn off **PST BLK** while the transition is on the black limit, the M/E or PGM/PST output will immediately switch from black to the original signal. If you turn off **PST BLK** when it is off limit, the transition to or from black will stop.

The **PST BLK** function is provided in each M/E and in the PGM/PST mixer. **PST BLK** affects only the effect where it is selected and not the entire switcher. The button lights when pressed and turns off automatically when the second transition is complete. The **BLACK** video input button on the A/PGM Bus remains lit while

the M/E/DSK is on the black limit. The preview monitor continues to show the final result of the two-stage preset black transition.

MIX and **WIPE** are unaffected when **PST BLK** is turned on. **MIX** and **WIPE** can be changed at any time during a preset black operation.

Preset Black always fades to a full screen black regardless of whether the switcher is operating in layered mode or standard mode.

An abort of Preset Black occurs when the operator selects a crosspoint on the A Background bus while the M/E transition is on the black limit. This abort causes the following to occur: the preset black transition is cancelled, the **PST BLK** button lamp turns off, all keys are dropped, and the selected crosspoint is taken fully on-air. If the abort occurs in Layered Mode, the M/E is forced to Standard Mode to ensure that the selected crosspoint is a full raster image.

A new background source may be selected on the B Background/PST bus when you are at the midpoint of a preset black mix. In the same manner, next-transition delegation buttons, keyer modes, or keyer sources may also be changed. None of these changes will abort the preset black transition.



Configuring the BLACK Crosspoint – When mapping inputs to pushbuttons, one of the choices in the CONFIG menu is **BLACK**, and another choice is **NONE**. Your selection will have an effect on how **PST BLK** operates, and what will happen in the event the controller CPU fails.

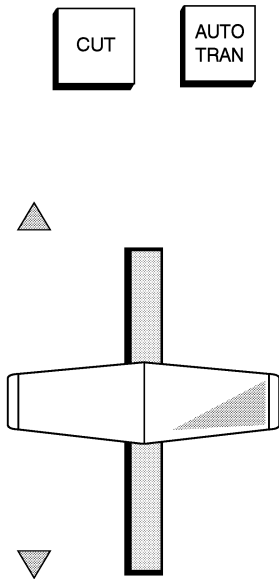
When the first transition during a preset black operation is completed, the **BLACK** crosspoint is automatically selected on the A Background bus. If black has not been assigned to any pushbutton, the **PST BLK** button is disabled and the preset black function is not permitted. On the other hand, if black has been assigned to more than one pushbutton, preset black will select the left-most **BLACK** pushbutton.

If a pushbutton is assigned to **NONE**, black appears when that button is selected; however the preset black function will not use this as the **BLACK** crosspoint. This action permits the user to have a known signal appear when an undefined pushbutton is pressed, while also allowing the preset black function to select a specific **BLACK** crosspoint.

To summarize operation: if the user has **NONE** assigned to one or more pushbuttons, but does not have black assigned to any pushbutton, the preset black function will think black is not available and will be disabled as described above.

Processor Failure – The **BLACK** crosspoint is also important in the situation where the Controller main CPU fails while one of the M/Es is performing a re-entry. When it fails, the M/Es are required to abandon their re-entry crosspoints and select **BLACK** on the same bus. In the case where black was never assigned to a pushbutton, the M/E selects the left-most crosspoint on the bus.

Transition Controls



You can perform a transition using any of three different controls: the **lever arm**, the **AUTO TRAN** button, or the **CUT** button.

The **lever arm** is used to perform “manual” transitions. The **BKGD A or PGM, BKGD B or PST, KEY 1 or DSK 1, KEY 2 or DSK 2**, and **KEY PRIOR** buttons, or any combination thereof, can be delegated to the **lever arm** to perform the transition. You can move the **lever arm** in either direction due to the flip-flop architecture of the buses. Moving the **lever arm** from one limit to the other always performs a complete transition.

Using the **lever arm**, it is possible to start a transition, stop it at any point, reverse it, and even return to the original limit, without completing the transition. The green arrow at the top or bottom of the **lever arm** travel lights to indicate the direction that the **lever arm** has to move to complete the transition.

You can use the **lever arm** in combination with the **AUTO TRAN** button to perform a transition. You can start the transition by moving the **lever arm** off its limit, and finish the transition by pressing **AUTO TRAN**. The transition is completed at a rate proportional to the rate set for a full **AUTO TRAN** transition. For example, if the **lever arm** is moved halfway and the transition is completed by pressing **AUTO TRAN** at a rate of 200 frames, the remaining half of the transition will take 100 frames.

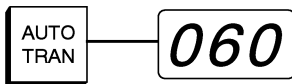
NOTE: *The **lever arm** will be left off-limit any time you begin a transition with the **lever arm** and finish it with **AUTO TRAN**. The **lever arm** will not function properly again until is moved to either limit (this action will not change the M/E output). While the **lever arm** is non-functional, both **lever arm** direction indicators are on.*

Pressing **CUT** cannot, however, complete a transition begun with the **lever arm**. In this case, **CUT** reverses the inputs during the background transitions. During key transitions, it changes the logic state of the key.

E-MEM recall operations result in another set of conditions for **lever arm** transitions. When an E-MEM recall places a transition at a point different from that of the lever arm, the lever arm becomes inactive until it is moved to catch up with the transition.

For example, assume the lever arm is on a limit and an E-MEM recall puts the transition at some midpoint. In such a case, the lever arm would be inoperative until you moved it far enough to catch up with the transition. At that point, you could use the lever arm to complete the transition or return it to the beginning limit. (Or, you could press **AUTO TRAN** to complete the transition.)

Another example of use with E-MEM is a case where the lever arm is off limit and an E-MEM recall puts the transition on a limit. In this instance, both lever direction lights would be lit, indicating the lever arm is inoperative. Moving the lever arm to either limit will turn the direction lights off and reactivate the lever arm. (You could also use **AUTO TRAN** to resume the transition, since auto transitions continue to function even when the lever arm is inoperative.)



Pressing the **AUTO TRAN** button starts an automatic S-linear transition at the rate displayed on the LEDs next to the button. The **AUTO TRAN** button supports the same transitions as the **lever arm**: **BKGD A** or **PGM**, **BKGD B** or **PST**, **KEY 1** or **DSK 1**, **KEY 2** or **DSK 2**, **KEY PRIOR**, or any combination thereof.

You can specify a transition rate by entering a value from 0 to 999 frames on the Effects Memory Subpanel numeric keypad. A zero frame transition is equivalent to a cut. (Refer to the Effects Memory Subpanel description later in this section for further information on setting the rate.) The lamp in the **AUTO TRAN** button remains lit for the duration of the transition.

Pressing **AUTO TRAN** a second time during a transition stops the transition at the current point. The transition can be completed by pressing the button a third time or by moving the lever arm to its opposite limit. The lever arm becomes active when it catches up with the auto transition in progress. Pressing the **CUT** button leaves the transition where it stopped, but reverses the two videos or the logic state of a key. Similarly, you can start a transition by using the lever arm and complete it by pressing the **AUTO TRAN** button. However, performing a transition in such a manner leaves the lever arm off limit.



Pressing the **CUT** button causes an immediate transition. The M/E or PGM/PST output changes instantaneously. (The lamp in the **CUT** button lights for one-half second.) The **CUT** button supports the same transitions as the lever arm: **BKGD A or PGM, BKGD B or PST, KEY 1 or DSK 1, KEY 2 or DSK 2, KEY PRIOR**, or any combination thereof.

Mix/Effects Effects Memory Subpanel (4000-3 Only)

The Effects Memory (E-MEM®) subpanel for each M/E (see Figure 2-5) allows you to learn and recall effects setups for the mix/ effects system in which the subpanel resides. It also provides effects dissolves and sequences between effects stored in its own registers.

Refer to the Master Effects Memory subpanel description, later in this section, for a description of the use of the mix/ effects E-MEM panels when controlled by Master E-MEM to produce the overall output of the switcher.

NOTE: Much of the following information is repeated in the description of the Master E-MEM panel; however, it is included here so that you can see the differences between the operation of the mix/effects E-MEM panel and that of the Master E-MEM keypad and readout.

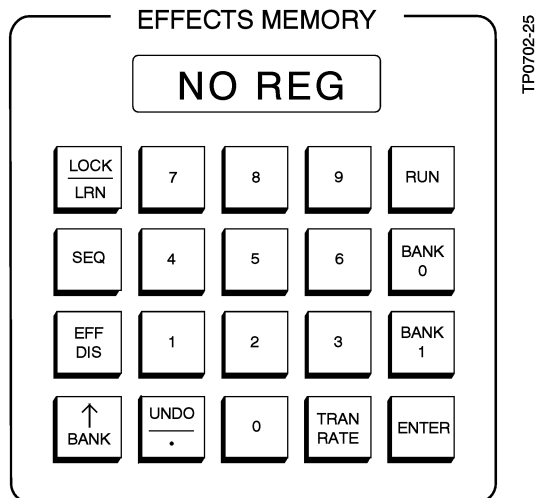


Figure 2-5. Mix/Effects E-MEM Subpanel (4000-3)

Learn and Recall Operations

Effects setups are stored in E-MEM registers. The following parameters are learned and recalled in learn/recall operations on the mix/effects E-MEMs: standard or layered mode operation, crosspoint settings, transition settings, keyer settings, masks and mattes, chroma key settings, wipes, positioner settings and full additive mix (FAM) settings.

E-MEM Registers

There is a total of 100 registers in each mix/effects E-MEM, grouped in ten banks of ten registers. Each register belongs to a specific bank (0 through 9) and has a unique number (0 through 9) within that bank. For example, register 46 means bank 4, register 6.

When the system is powered up, the keypad readout comes up with a “NO REG” message.

Learning Effects

To learn an effect setup into a register, press the following sequence of buttons on the E-MEM subpanel:

LRN, BANK, bank number, register number

NOTE: If the next desired register is in the current bank, you may omit **BANK** and **bank number** in the above sequence.

Also, if the desired bank is 0 or 1, you may substitute **BANK 0** or **BANK 1** for **BANK, bank number** in the above sequence.

Recalling Effects

To recall a register, press the following buttons:

BANK, bank number, register number

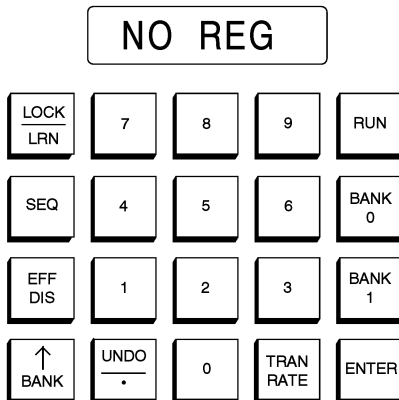
(The previous **NOTE** for learning applies also to recalling.)

When an E-MEM register is recalled, the key memory for any recalled crosspoint is updated.

Crosspoint Override

During an E-MEM recall, if you don't want the crosspoint to change, you can manually hold down the present crosspoint button while the E-MEM register is recalled. If key memory is off at this time, the video and key crosspoint are held. If key memory is on, the video and key crosspoint and the current keyer memory state are held.

Mix/Effects E-MEM Keypad



In addition to learning and recalling effects, the E-MEM keypad is used as a numerical entry pad for the following buttons: **TRAN RATE**, **LRN**, **LRN SEQ**, **LOCK**, and **BANK**.

Pushing a numerical button at any time other than when preceded by one of the above buttons recalls the corresponding register within the current bank. To recall a register in a different bank, enter the recall sequence described on the previous page.

Mix/Effects E-MEM Readout

L BO REG O4

The alphanumeric readout at the top of the E-MEM keypad provides status information about E-MEM operations and registers.

During normal learn and recall operations, the display informs you what the current Bank (“B...”) and Register (“R...”) are. If the register is locked, there is an “L” shown at the left end of the display. Other messages on the E-MEM readout include “NO REG” at startup, and “NO EMPTY” if no register is available for a **LRN •** operation.



↑/**BANK** is a two-function key that can be used for bank selection or for accessing “second” functions, for example, **LOCK** and **UNDO**. Pressing the ↑/**BANK** button enables single-digit bank selection (0 through 9) on the keypad, and delegates buttons with second functions to the second function. The button lights when pressed, and stays lit until the delegation is completed. Pressing ↑/**BANK** a second time terminates the delegation.

Refer to the “Learn and Recall Operations” description earlier in this section for use of the **BANK** button, and to the **LOCK** and **UNDO** headings for use of the ↑ (second) function button.



LRN is used for storing or “learning” the current panel setup into a register or for learning a register sequence.

Refer to the “Learn and Recall Operations” description earlier in this section for learning effects into E-MEM registers. Also refer to the **SEQ** button description for learning a register sequence.



The **LOCK** function locks a single register. Locking a register prevents the contents of that register from being changed. To lock the current register whose number is displayed, press the following buttons:

↑, **LOCK**

When locked, an “L” is displayed at the left end of the E-MEM readout. To unlock the register, press the buttons again:

↑, **LOCK**

NOTE: You cannot lock an entire E-MEM bank from the subpanel; a menu selection is provided for this action.



Pressing the **BANK 0** button makes bank 0 the current bank, and causes buttons 0 through 9 on the keypad to become one-button recall registers for registers 00 through 09. This button is lit whenever bank 0 is the current bank.



Pressing **BANK 1** makes bank 1 the current bank, and causes buttons 0 through 9 on the keypad to become one-button recall registers for registers 10 through 19. This button is lit whenever bank 1 is the current bank.



ENTER confirms a numerical entry on the keypad, such as for **TRAN RATE**. The **ENTER** button lights only when pressed.



SEQ is used for creating automated register-recall sequences.

Sequences are *created* by pressing the following buttons (parameters in parentheses are optional):

SEQ, LRN,
register, TRAN RATE, delay,
register, TRAN RATE, delay,
LRN

NOTE: **SEQ** and **LRN** may be pressed in either order to start the command sequence; **TRAN RATE** and **delay**, in parentheses, are optional. **TRAN RATE** enables a user-defined delay to be introduced between register recalls; **delay** is a 1- to 3-digit number entered on the keypad that specifies an amount of delay in TV frames. (If the number entered is a 1- or 2-digit number, the entry must be terminated by pressing **ENTER**; **register** is any desired register number, as described previously (e.g., **BANK**, **bank number**, **register number**). Use either **SEQ** or **LRN** to terminate the sequence.

A sequence loop may be created by again pressing the *first* register button as the *last* register in the sequence.

Sequences are *initiated* by pressing the following buttons:

SEQ, register

The sequence starts at the register indicated, and proceeds through the linked sequence to the last register. If a loop has been programmed, the sequence loop continues until the **SEQ** button is pressed again to terminate the sequence.

A sequence loop can be broken by double-pressing a register button. This clears the sequence link that existed in that register and makes that the last register in the sequence.

Different sequence delays may be learned into the different mix/effects E-MEM registers. With software version 3.1 and later, these sequence delays are completely independent; thus the sequencing may be occurring at different times on the different M/Es.

EFF
DIS

EFF DIS causes an S-linear transition from the current state to the next recalled register. The current state may be a setup you have just done on the mix/effects panel or the state of the panel resulting from a register recall.

An effects dissolve may be learned into a register, so that recalling that register will initiate a dissolve to another specified register.

The following button sequence is used to learn a dissolve (parameters in parentheses are optional):

LRN, EFF DIS, (TRAN RATE, eff dissolve rate), register

NOTE: *LRN and EFF DIS may be pressed in either order to start the command sequence;*

TRAN RATE enables a user-defined effects dissolve rate to be introduced in the dissolve;

*eff dissolve rate is a 1- to 3-digit number entered on the keypad that specifies the effects dissolve rate in number of TV frames. (If the number entered is a 1- or 2-digit number, the entry must be terminated by pressing **ENTER**);*

*register is any desired register number, as described previously (e.g., **BANK, bank number, register number**).*

The effects dissolve rate is the same as the auto transition rate indicated in the readout on the Transition subpanel of that M/E.

When the register with the learned effects dissolve is recalled, the **EFF DIS** button high tallies, turning off when the dissolve ends.

Different sequence delays may be learned into the different mix/ effects E-MEMs. With software version 3.1 and later, these sequence delays are completely independent; thus the sequencing may be occurring at different times on the different M/Es.

As with sequence delays, the effects dissolve rates on different mix/ effects are completely independent. Different effects dissolve rates may be learned separately into different mix/ effects E-MEMs; thus the dissolves may be running at different rates on the different M/Es.



The • (dot) button is used to represent the next empty register when used with the **LRN** operation. (At register 99, the search for an empty register will wrap around to 0).

LRN • learns the current switcher state into the next empty register, and that register becomes the current register.

NOTE: *If there are no empty registers, the operation will not be done, an error beep will sound, and the keypad readout will show “NO EMPTY.”*



UNDO is used to back out of a recall, learn, or another **UNDO** register operation. The **UNDO** button lights when pressed, confirming that it has been pressed. An **UNDO** must be done immediately after an undesired operation, otherwise it may not be able to undo the operation.

For these register functions, pressing ↑, **UNDO** repeatedly allows you to toggle back and forth between the two last states. (For toggling **UNDO**, you have to press ↑/**BANK** then **UNDO** each time.)



TRAN RATE is used with the keypad to set the transition/mix rates used by the **AUTO TRAN** (auto transition) and **KEY MIX** buttons on the Transition subpanels, and by the **EFF DIS** button on the M/E E-MEM keypad.

When **TRAN RATE** is pressed, the E-MEM readout displays the currently set auto transition rate, for example:

AUTO:030

To change the auto transition rate for that M/E, enter the desired rate using the number buttons on the M/E E-MEM keypad. Pressing three number buttons on the keypad automatically enters the rate. If only one or two number buttons are pressed, the entry must be completed by pressing **ENTER**. Rates from zero through 999 frames may be entered. (If one or two incorrect number keys have been pressed, the entry may be aborted and the previous rate restored by pressing **TRAN RATE** again.)

As soon as the new rate is confirmed, it is displayed in the auto transition rate display on the Transition subpanel and the E-MEM readout will then display the Key 1 mix rate, for example:

KEY1:060

This display refers to the mix rate of the **KEY 1 MIX** button at the right edge of the Transition panel. To change the Key 1 mix rate, follow the same procedure as described above for the auto transition rate.

As soon as the new rate is confirmed, it is entered into memory for that M/E, but is not displayed. The readout then displays the third transition/mix rate:

KEY2:060

Repeat the procedure again to set the mix rate for the **KEY 2 MIX** button.

NOTE: The mix rate for either key is displayed on the auto transition readout when the **KEY 1 MIX** or **KEY 2 MIX** button is pressed (initiating a mix) or when the **SHOW KEY** button is pressed and the desired key is enabled (**KEY 1** or **KEY 2** button on Keyer panel lit).

Any of the three transition/mix rates can be skipped simply by pressing the **ENTER** button when the display appears.

When the sequence of transition/mix rates has been completed, the **TRAN RATE** button turns off and the keypad display returns to its previous state.

RUN

Pressing the **RUN** button causes an effect to begin running from its current position. The **RUN** button is also used to stop and resume an effect during the run by acting as a run toggle button. The **RUN** button lights during a run, then turns off when the run is complete.

Keyer Subpanels

One Keyer Subpanel is provided for each M/E, and one Keyer Subpanel serves the two downstream Keyers (see Figure 2-6 and Figure 2-7).

The Keyer subpanels provide control over the following features for a specified M/E or DSK:

- Key masking
- Video key type selection — preset pattern, chroma key, luminance key, or linear key. (The DSK has only luminance and linear keys.)
- Key fill: matte or video fill
- Key source: video key or auto-selection of key signals based on personality programming
- Show key
- Key invert
- Key priority
- Key transition

The Keyer Subpanel can be delegated between **KEY 1**, **KEY 2**, **BKGD A/PGM**, and **BKGD B/PST**.

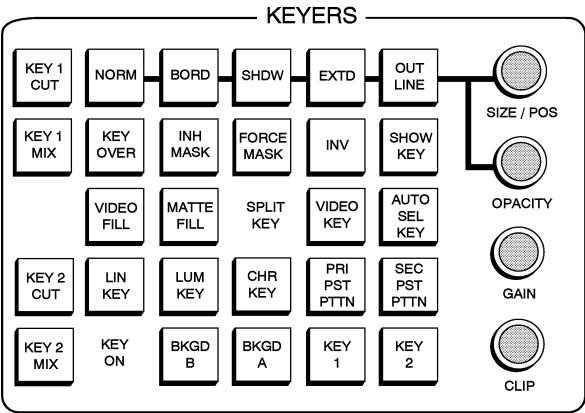


Figure 2-6. Mix/Effects Keyers Subpanel

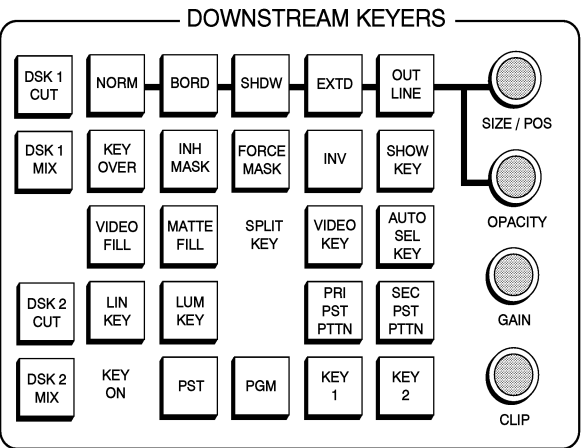
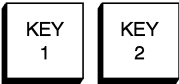


Figure 2-7. Downstream Keyers Subpanel

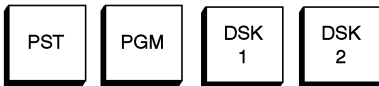
Keyer Delegation Buttons



In standard mode, the Keyer Subpanel located in each M/E row can be delegated between Key 1 and Key 2.



In layered mode, four keyers are available – Key 1, Key 2, Background B, and Background A.



The Downstream Keyer Subpanel can be delegated to PGM, PST, DSK 1, or DSK 2.

Key Transition

Each KEYER Subpanel has four key transition buttons. Pressing the KEY 1 or KEY 2 CUT buttons in the M/E KEYERS Subpanel cuts the Key 1 or Key 2 key into the mix/effects output. Pressing the KEY 1 or KEY 2 MIX button mixes the Key 1 or Key 2 into the M/E output.

Pressing the DSK 1 or DSK 2 CUT in the DOWNSTREAM KEYERS Subpanel cuts the DSK 1 or DSK 2 key into the DSK output. Pressing the DSK 1 or DSK 2 MIX button mixes DSK 1 or DSK 2 into the DSK output.

Setting Key Mix Rates

The mix rates used by the **KEY 1 MIX** and **KEY 2 MIX** buttons on the M/E Keyer panels are independently programmable, as detailed under the E-MEM panel **TRAN RATE** button description. After the M/E keyer mix rate has been programmed for each button, the rate is shown in the Transition panel readout *only* while the mix is in progress or while the **SHOW KEY** button on the Keyer or DSK panel is being pressed.

The mix rates used by the **DSK 1 MIX** and **DSK 2 MIX** buttons at the right edge of the PGM-PST/DSK Transition panel are similarly independently programmable, but those rates may also be used as auto transition rates when DSK 1 or DSK 2 are delegated as next transitions on the PGM-PST/DSK Transition panel.

KEY ON Indicator

KEY ON
The **KEY ON** indicator lamp lights when the delegated keyer is in use.

Key Type Buttons



The second row of buttons from the bottom of each Keyer Subpanel selects one of five keyer modes.

The Chroma Key button is not available in the DSKs.



Pressing the **LIN KEY** button selects a linear key with a gain fixed at unity, clip fixed at 50%, and no S-shaping. The **LIN KEY** lamp (only) is illuminated when this button is selected.



If a linear key is desired, but the key signal is not at the correct level, adjustments can be made with the **(CLIP)** and **(GAIN)** knobs. **(CLIP)** adjusts the offset of the key signal (over a small range) in linear key mode. **(GAIN)** adjusts the amplitude of the key signal (over a small range).



If either knob is adjusted away from unity, the **LUM KEY** button lights in addition to the **LIN KEY** button lamp. Both buttons illuminated indicates to the operator that a linear key is being performed with non-unity gain and/or clip. If the key memory feature is enabled in a software menu, the non-unity setting is recalled whenever the input associated with this setting is selected. When gain and clip are returned to unity, the **LUM KEY** button lamp goes off. Since it is difficult to adjust the knobs back to exact unity, the unity values can be forced by pressing the **LIN KEY** button a second time while it is lit. This action restores unity and turns off the **LUM KEY** button lamp.



The **LUM KEY** button selects a luminance key that has variable clip and gain adjustment and S-shaping of the key signal. Key (**CLIP**) (offset) and (**GAIN**) (amplitude) settings are remembered for each source. Six Clip and Gain values are saved: three for the video key and three for the Auto Select button (LUM, CHROMA KEY, and LINEAR).

A menu selection is available that switches a chroma trap into the key path to remove unwanted chroma from video used for keying.



Pressing the **CHR KEY** button delegates the Chroma Keyer Subpanel to that M/E. (The **CHR KEY** button is functional only when the chroma keyer option is installed.) Refer to the Chroma Keyer Subpanel description later in this section for details on chroma keyer operation. **CHR KEY** does not function with background keyers (layered mode), and is not available on the DSKs.



Pressing the Primary Preset Pattern **PRI PST PTTN** button selects the output of the primary (transition) wipe generator as the key source. Pattern adjustment is provided by the Wipe Subpanel (see the Wipe Subpanel description later in this section for details). The key (**CLIP**) and (**GAIN**) knobs are non-functional when this mode is selected. In the signal path through the Model 4000 switcher, keys, including preset patterns, occur before the effect send crosspoints. This allows any key, including a preset pattern, to be sent to an external digital video effects device via an effects send. Transition wipes, however, occur after the effects send crosspoints.

After pressing the **PRI PST PTTN** function the **SPLIT KEY** indicator is turned off.

NOTE: Double-pressing the **PRI PST PTTN** or **SEC PST PTTN** button in the Keyer Subpanel opens up a menu that allows you to set the preset pattern wipe direction. A single press of either the **PRI PST PTTN** or the **SEC PST PTTN** button auto delegates the Wipe Subpanel.



Pressing the **SEC PST PTTN** (Secondary Preset Pattern) button selects the optional secondary wipe generator as the key source. Operation of the keyer while **SEC PST PTTN** is selected is similar to that when **PRI PST PTTN** is selected.

The secondary wipe generator option provides wipe pattern selection independent of the primary wipe generator (no interaction occurs between them). Without the secondary wipe option, only secondary preset pattern edge attributes are independent (preset size, softness, soft symmetry, border width, border matte, border opacity, and normal/reverse).

All pattern controls are present on the Wipe Subpanel and Wipe menus. Refer to the Wipe Subpanel description, later in this section, for a discussion of these controls.

Primary and Secondary Preset Patterns can be used with all keyers in layered mode.



The **VIDEO FILL** and **MATTE FILL** buttons determine whether the key is filled with key bus video or a locally generated matte. These buttons are mutually exclusive; pressing one button de-selects the other. One of the two buttons is always active and illuminated.

VIDEO FILL and **MATTE FILL** operate independently from the key source buttons. All keyer modes except the A and B keyers operate with either video or matte fill.

When the key bus is contributing to the switcher Program output, pressing **MATTE FILL** does not low tally the key bus, even though the key fill *video* is not visible.

Video fill mode operates with background keyers in layered mode. When the keyer is delegated to a background layer, the **VIDEO FILL** button is turned on automatically (**MATTE FILL** is turned off).

Key Source Buttons



The **VIDEO KEY** and **AUTO SELECT KEY** buttons determine the source of the key.

Pressing the **VIDEO KEY** button forces derivation of the key from a video source. The “video source” is the video selected on the key bus (for keyers 1 and 2) or on the background bus (for background keyers in layered mode only).

If **VIDEO KEY** and **VIDEO FILL** are both selected, the result is a self-key.

Pressing **VIDEO KEY** while in Chroma Key mode causes an encoded chroma key, using the fill video as the source for the encoded chroma keyer.



Pressing the **AUTO SEL KEY** button forces the key to be derived from a user-defined source.

User preferences selected in the Configuration/User Preferences menu determine whether a luminance or linear key is a self-key or an external key (and determine which external key is used). They also specify whether chroma keys are encoded or analog component (YUV, BETA, MII, or RGB).

Split Key Operation

A Split Key uses any key source other than a key derived from the key fill (self key), or a key source pre-selected in user preferences, or a preset pattern. All other key sources can be used in a Split Key. A Split Key can be used in all keyers, and in either standard or layered mode.

A Split Key is set up by first selecting the key fill source on the Key bus, then holding down the **VIDEO KEY** button or the **AUTO SELECT** button while pressing a second button on the key bus. The second source provides the key signal. For **AUTO SELECT** that key is the external key signal mapped to that column of crosspoint buttons; for **VIDEO KEY** the key is the video signal mapped to that column of crosspoints.

SPLIT
KEY

When a split key is operational with an auto select key or a video key, the **SPLIT KEY** indicator is lit.

Other Key Modifier Buttons



Pressing **KEY OVER** swaps the priority of the two keyers, **KEY 1** and **KEY 2**, whether the subpanel is delegated to Key 1 or Key 2. The **KEY OVER** button lights when the Keyer Subpanel is delegated to the key that is over the other. It may be pressed whether or not either keyer is on-air.

In Layered mode, the **KEY OVER** button does not light if the Keyer Subpanel is delegated to either background keyer, but the button still controls the priority of Keyers 1 and 2. It does not affect the priority of the background keyers, which have a fixed priority.

OVER

One of the two key **OVER** indicators on the associated Transition Subpanel is always on, indicating the priority of the Keyers 1 and 2. The indicator is on regardless of the on-air status of either keyer.



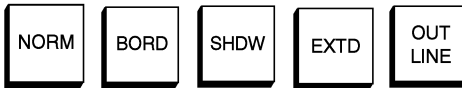
The **INV** toggle button inverts the polarity of the key source. Inversion is applied to the incoming key source before key processing is applied. **INV** operates in all keyers in layered mode.



The **SHOW KEY** button is used for viewing the key signal on a particular keyer. This button does not affect the on-air video. When held down, the switched preview bus output shows the key signal from the keyer currently delegated to the Keyer Subpanel. The key signal displayed is the key after clipping, masking, and chroma trapping have taken place.

The **SHOW KEY** button does not affect the program output of the M/E or DSK, and operates in all keyers in layered mode.

Borderline Controls



The buttons at the top of the Keyer Subpanel control the Borderline option. The **NORM**, **BORD**, **SHDW**, **EXTD**, and **OUTLINE** buttons are

interlocked; only one button can be active at a time. Pressing a button de-selects any other button.

NOTE: *The background keyers (layered mode) do not have Borderline capability.*

Border, Shadow, and Extrude modes operate with video or matte filled keys. The Borderline matte is separate from the fill matte and has its own delegate button in the Matte Subpanel.

The Borderline matte is adjusted on the Matte Subpanel after selecting **K1 BORD** or **K2 BORD**, as appropriate, with the **MATTE SEL** delegation button.



The **NORM** button turns Borderline off.



The **BORD** button turns on symmetrical Borderline mode. The border width may be one, two, or three video lines wide, as adjusted by the **SIZE/POS** control. (This adjustment is shared with Outline mode.)



The **SHDW** button turns on Shadow mode. The **SIZE/POS** knob is used to adjust the shadow width and position from one-to-six lines down and to the right or left.



The **EXTD** (extrude) button operates like **SHDW** except for the aesthetic appearance of the shadow effect on the screen. The shadow width and position adjustments are shared with Shadow mode.



Pressing the **OUTLINE** button produces an outline of the key signal. The border width is adjustable to one, two, or three lines. In Outline mode, there is no fill video or fill matte; only the background video and outline border matte are output. As a result, the **VIDEO FILL** and **MATTE FILL** buttons have no effect when **OUTLINE** is active.



SIZE/POS

The Borderline (**SIZE/POS**) knob adjusts the width of all Borderline borders. The control also moves the shadow or extruded shadow either down to the left or down to the right.



OPACITY

The Borderline (**OPACITY**) knob adjusts the transparency of the Borderline borders.

Preview Mode Operation

In normal operation, the switched preview output of the system may be set to monitor any of the M/E preview outputs, DSK preview output, or preview primary bus.

The Preview Mode feature is activated by pressing one of the keyer delegate buttons (**KEY 1**, **KEY 2**, **BKGD B**, or **BKGD A**) for 1/2 second or longer. When Preview Lookahead Mode is active, the next transition of the selected M/E is always shown. You can also select Key Preview Mode for the PGM/PST bus. This will preview DSK 1 and DSK 2 keys over the PGM/PST transition on the Preview Monitor. (See Section 3, "Preview Preferences," for more information.)

Mask Control



The **INH MASK** and **FORCE MASK** toggle buttons are illuminated when turned on, and can be turned on individually or together.

When either button is pressed, the Masks Subpanel is automatically delegated for adjusting the mask (unless auto delegation is disabled).

In layered mode all four keyers (M/E 1, Key 1 & 2; M/E 2, Key 1 & 2) and the DSK (A PGM, B PST) can be masked.

Pressing **INH MASK** inhibits the key from being displayed wherever the mask is present.

Pressing **FORCE MASK** causes the key to be fully turned on where the mask is present, rather than suppressing the key. (Normally, the mask generator is used to define areas of the screen where the key is inhibited.) **FORCE MASK** is not intended for use with shaped video.

The **INH MASK** and **FORCE MASK** buttons are inoperative for preset pattern keys.

Chroma Keyer Subpanel

The basic Chroma Keyer option consists of a dual Chroma Key Carrier Module for each M/E which provides two chroma keyers per M/E. With this option installed, a chroma key may be done using any 4:2:2 crosspoint signal on the M/E key bus as a source. For external component video sources, up to three optional dual Chroma Key Input Modules can be added each providing two component video sources for up to six inputs.

With a Chroma Keyer option installed in one or both M/Es, the Model 4000 switcher can generate key signals on the basis of color information contained in a video picture. User control of chroma keying is provided by the Chroma Keyers Subpanel (Figure 2-8) and the **(CLIP)** and **(GAIN)** controls on the Keyer Subpanel.

In addition to the controls provided on the Chroma Keyers Subpanel, several Chroma Keyer controls are provided via the Menu Display. These are described here and in Section 3, Menu Descriptions.

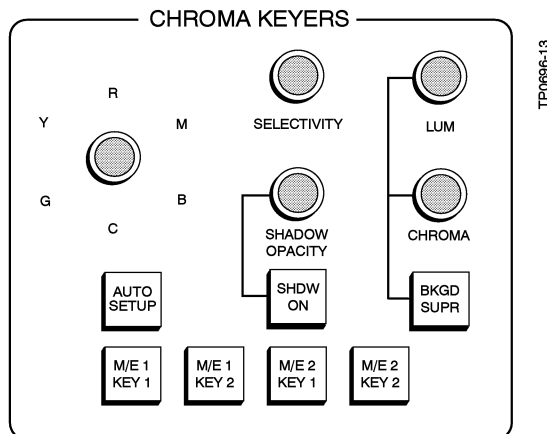


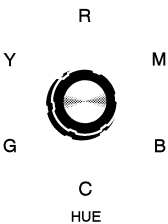
Figure 2-8. Chroma Keyers Subpanel

Chroma Keyer Delegation



The Chroma Keyers Subpanel may be delegated between any of the chroma keyers (two per M/E) using the four buttons located at the bottom of the subpanel.

Chroma Keyer Controls



The **HUE** control sets the color in the chroma key scene from which the key signal will be derived. The foreground and background suppress mattes also use this color unless otherwise set in the menu. The six indicators near the **HUE** knob indicate the color the knob is currently set to (R=red; M=magenta; B=blue; C=cyan; G=green; Y=yellow).



SELECTIVITY sets the acceptance angle of hues used to make the key signal.



The **SHDW ON** button turns the chroma key shadow on or off.



The **SHADOW OPACITY** control sets the opacity of the chroma key shadow.



The **BKGD SUPR** button turns background suppression on or off. When suppression is turned on, the associated control knobs are used to define the amount of suppression.



The **BKGD SUPR LUM** control adjusts the amount of luminance subtracted from the background region of the foreground video.



The **BKGD SUPR CHROMA** control adjusts the amount of chrominance subtracted from the background region of the foreground video. This knob will beep when the chroma has been suppressed to zero (at a linear chroma key location).

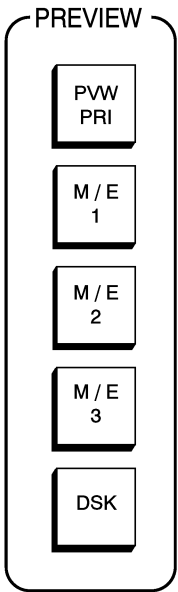
The **CLIP** knob in the Keyers Subpanel also will indicate when the chroma key has reached a linear level. In terms of the chroma key this indicates that the foreground part of the scene is just opaque. Only readjust this setting when parts of the foreground are transparent where they are picking up background color.



The **AUTO SETUP** button is used to enter Auto Setup mode. In this mode, the Positioner joystick is used to move a cursor to select a color to suppress. The selected color is used to automatically configure a basic linear chroma key.

NOTE: The **CHR KEY** button of the delegated keyer must be selected **before** pressing the **AUTO SETUP** button.

Preview Subpanel (4000-3 only)



The Preview subpanel allows you to select the preview output to be viewed on the switched preview monitor.

Choices available on the switched preview output are Preview Primary (current selection on PVW / AUX bus), M/ E 1 Preview, M/ E 2 Preview, M/ E 3 Preview, and DSK (switcher) Preview.

The buttons on the Preview panel are mutually exclusive, such that pressing one button de-selects any other button that was active.



PVW PRI selects the currently active input on the PVW / AUX bus. This selection can be any primary or secondary input.



M/E 1 through **M/E 3** select the corresponding M/E preview output.



DSK selects the preview output of the Program /Preset and Downstream Keyers.

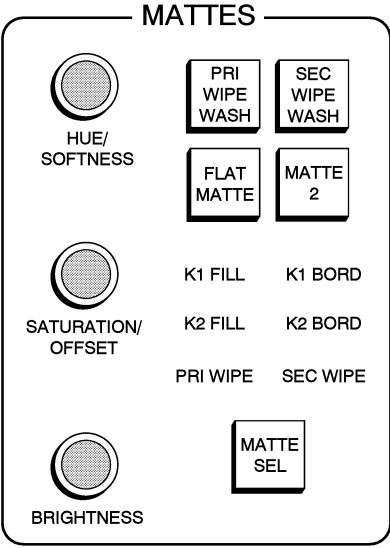
Matte Background

Matte background Subpanels are provided for delegation in each M/E and the DSK. Controls are provided in the Matte Subpanels for creating and modifying mattes and for assigning the delegation of the subpanels.

-2A

-2B

-3



TP0348-13

Figure 2-9. M/E and DSK Matte Subpanels

NOTE: The M/E Matte Subpanels are identical for the -2A, -2B, and -3 panels.

Matte Subpanel Delegation



Each Matte Subpanel has a **MATTE SEL** button used to select which of the six matte generators that particular subpanel will control. Above the **MATTE SEL** button are six indicators, which illuminate to show the current delegation at any given time. Pressing the **MATTE SEL** button repeatedly cycles the selection through all six matte generators. Holding the button down causes it to cycle through the selections automatically until the button is released. If the Borderline option is not installed in Key 1 or Key 2, the **K1 BORD** and/or **K2 BORD** selections will be skipped.

MATTE SEL Indicators

The six indicator LEDs indicate delegation as follows:

K1 FILL	K1 BORD
K2 FILL	K2 BORD
PRI WIPE	SEC WIPE

K1 FILL and **K2 FILL** LEDs – Indicate that the Matte Subpanel is delegated to one of the matte generators for an area determined by the key hole cutter. However, when the keyer is in Video Fill mode, the matte is not visible. All key types (LIN, LUM, CHR, PST PTTN) are operational with matte fill.

K1 BORD and **K2 BORD** LEDs – Indicate that the Matte Subpanel is delegated to a matte generator for adjusting the characteristics of the key border matte in all Borderline modes. (See the Keyer Subpanel description for related keyer buttons **BORD**, **SHDW**, **EXTRUDE**, and **OUTLINE**.)

PRI WIPE LEDs – Indicate delegation of the matte generator for controlling the transition wipe border matte. The **PRI WIPE** LED also indicates that the M/E Matte Subpanel is delegated to create the primary preset pattern border in preset pattern mode. (See the **PRI PST PTTN** button description under the Keyer Subpanel topic.)

SEC WIPE LEDs – Indicates that the Matte Subpanel is delegated to create the secondary preset pattern border in preset pattern mode (see the **SEC PST PTTN** button description under the Keyer Subpanel topic).

Matte Modifier Controls

The following buttons and control knobs on each Matte Subpanel control the characteristics of the delegated background matte.



The **FLAT MATTE** button selects a non-wash matte for the delegated matte generator. Pressing this button deselects all other matte mode buttons (**MATTE 2**, **PRI WIPE WASH**, and **SEC WIPE WASH** on the M/E Matte and the DSK Matte Subpanel).



The **MATTE 2** button delegates the matte controls to the second matte generator when a matte wash is selected. To select a matte wash, press either **PRI WIPE WASH** or **SEC WIPE WASH** on the M/E Matte Subpanel or the DSK Matte Subpanel. On the -2B, select either **USER DEF WASH** or **SEC WIPE WASH** on the DSK Matte Subpanel.



PRI WIPE WASH selects the primary (Transition) wipe generator to modulate between the two mattes during a wash. Pressing and holding this button allows you to change the transition softness with the **HUE/SOFTNESS** knob and the offset (position) with the **SATURATION/OFFSET** knob.



SEC WIPE WASH causes the secondary (optional) wipe generator to be used to modulate between the two mattes in a wash. Holding down this button performs the same function as with **PRI WIPE WASH**.

-2B



USER DEF WASH on the -2B DSK Matte subpanel selects the user wash generator to modulate between the two mattes during a wash. The **USER DEF WASH** pattern is a straight line that can be rotated via the **USER DEF WASH ANGLE** soft knob located in the Matte menu. (This menu may be opened by double-pressing the **USER DEF WASH** button.)

When **USER DEF WASH** is held down, the **HUE/SOFTNESS** knob adjusts the transition softness, the **SATURATION/OFFSET** knob adjusts the transition offset (position), and the **BRIGHT/TEX** knob adjusts the texture.

The texture consists of a random-like pattern (the same as the texture wipe pattern) that is mixed with the **USER DEF WASH** pattern. To control the texture, you make adjustments in the same manner as the wipe texture control, except that the buttons are in the Matte Texture menu.



HUE/
SOFTNESS

(HUE/SOFTNESS) knob – Adjusts the hue of the matte. The knob also adjusts the softness (gain) of the transition between the two matte generators when you hold down the **PRI WIPE WASH**, or **SEC WIPE WASH** button. Softness is not adjustable while **FLAT MATTE** is active.



SATURATION/
OFFSET

(SATURATION/OFFSET) knob – Adjusts the color saturation of the matte. The knob adjusts the offset (position) of the wash modulation when you hold down the **PRI WIPE WASH**, or **SEC WIPE WASH** button. Offset is not adjustable while **FLAT MATTE** is active.



BRIGHTNESS

(BRIGHTNESS), (BRIGHT/TEX) knob – Adjusts the color brightness of the matte.

When a Matte Subpanel is delegated away from a matte generator and then returned, the status of the knobs and buttons is remembered.

Master Effects Memory Subpanel

The Effects Memory (4000-2A/2B) or Master Effects Memory (4000-3) subpanel shown in Figure 2-10 allows you to define, store, and recall effects setups for the entire switcher. (See the following page for definitions of effects and keyframes.)

The (Master) E-MEM subpanel contains enable buttons, a keypad with readout, effect editing buttons, effect run buttons, and a run lever arm.

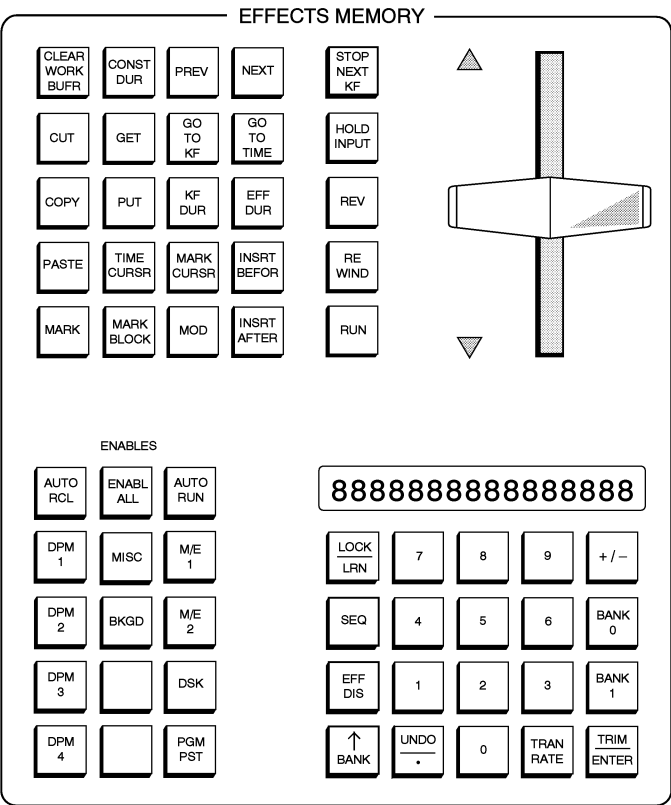


Figure 2-10. Effects Memory Subpanel

E-MEM Registers

Effect setups are stored in E-MEM registers. There is a total of 100 registers, grouped in ten banks of ten registers. Each register belongs to a specific bank (0 through 9) and has a unique number (0 through 9) within that bank. For example, register 46 means bank 4, register 6.

When the system is powered up, the keypad readout comes up with a “NO CURRENT REG” message.

Effects and Keyframes

An E-MEM “effect” has generally been considered to be whatever was stored in an E-MEM register. This consisted of the status of enabled levels of the switcher as set up on the control panel and in the menus, at the time the E-MEM effect was stored (“learned”).

However, the Model 4000 Switcher is now able to store more than one switcher state (“a keyframe”) on each enabled level in a single E-MEM register, and to transition, or “run,” between keyframes. Therefore, a keyframe effect is considered to be a sequence of keyframes stored in a single E-MEM register.

You may think of a E-MEM effect as being the same as a keyframe effect, but consisting of a single keyframe on each enabled level. This mode of operation (single-keyframe effects) may still be used, and may be preferable to multiple-keyframe effects in many instances.

Learning Effects

To learn an effect setup into a register, press the following button sequence on the E-MEM Subpanel:

LRN, BANK, bank number, register number

If the next desired register is in the current bank, you may press just the desired **register number**.

If the desired bank is 0 or 1, you may substitute **BANK 0** or **BANK 1** for **BANK, bank number** in the above sequences.

Recalling Effects

To recall a register, press the following button(s):

BANK, bank number, register number

NOTE: Only enabled “levels” are learned and/or recalled (see “Enable Buttons, later in this section).

When an E-MEM register is recalled, the key memory for any recalled crosspoint is updated.

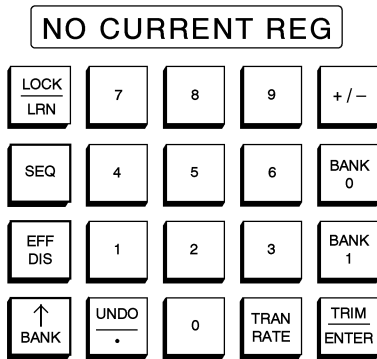
During an E-MEM recall, if you don’t want the crosspoint to change, you can manually hold down the present crosspoint button while the E-MEM register is recalled. This is referred to as “crosspoint override,” and If key memory is off at this time, the video and key crosspoint are held. If key memory is on, the video and key crosspoint and the current keyer memory state are held.

Crosspoint Override

During an E-MEM recall, if you don’t want the crosspoint on an individual bus to change, you can manually hold down the present crosspoint buttons while the E-MEM register is recalled. This is referred to as “crosspoint override.” When this is done, the video and key crosspoints are held, and if key memory is on at this time, the current keyer memory state is also held.

See the **HOLD INPUT** button description, later in this section, for a method of holding *all* sources while E-MEM registers are recalled.

Keypad with Readout



The E-MEM keypad is used for effect recalls, and serves as a numerical entry pad for the following buttons: **TRAN RATE, LRN, LRN SEQ, LOCK, BANK, GET, and PUT.** (The last two of these buttons are located in the E-MEM effect editing group of buttons.)

Pushing a number button at any time other than when preceded by one of the above buttons recalls the corresponding register within the current bank.

To recall a register in a different bank, enter the recall sequence described on the previous page.

Readout



The alphanumeric readout at the top of the E-MEM keypad provides status information about E-MEM operations and registers.

During normal learn and recall operations the current Bank (“B...”) and Register (“REG...”) are displayed. If the register is locked, there is an “L” shown at the left end of the display. Other messages on the E-MEM readout include “NO CURRENT REG” at bootup, “NO EMPTY REGS” if no register is available for a LRN• or PUT• operation, and “REG IS LOCKED” if you attempt to put an effect into a locked register. During Gets and Puts prompts ask you for the source or destination register.

One condition that can exist under certain circumstances is having two different enabled levels that were recalled by two different registers. In this case there are actually two current registers, but only one can be shown in the display. The existence of this condition is indicated by a “Δ” between the apparent current bank number and the apparent current register number (for example, “B0ΔREG 04”).

This condition would occur if (with **AUTO RCL** off) you enabled one level, recalled a register, turned off that enable, turned on another enable, recalled another register and re-enabled the first level. The locations of the contributing registers can be determined by turning on one enable at a time.



↑/**BANK** is a two-function key that can be used for bank selection or for accessing “second” functions, e.g., **LOCK** and **UNDO**. Pressing the ↑/**BANK** button delegates the numeric keypad to single-digit bank selection, and delegates buttons with second functions to the second function. The button lights when pressed, and stays lit until the delegation is completed. Pressing ↑/**BANK** a second time will also terminate the delegation.

Refer to the “E-MEM Registers” description for use of the **BANK** button, and to the **LOCK** and **UNDO** headings for use of the ↑ (second) function button.



LRN is used for storing or “learning” the current panel setup in a register or for learning a register sequence.

To store a panel setup into a specific register, press the following keypad buttons:

LRN, register number,

or LRN, BANK, bank number, register number,

or LRN, BANK 0, register number,

or LRN, BANK 1, register number.

Refer to the **SEQ** button description for learning a register sequence.



The **LOCK** function locks a single register. Locking a register prevents the contents of that register from being changed. To lock the current register whose number is displayed, press the following buttons:

↑, LOCK

When locked, an “L” is displayed at the left end of the E-MEM readout, next to the register number. To unlock the register, press the buttons again:

↑, LOCK

NOTE: You cannot lock an entire E-MEM bank from the subpanel; a menu selection is provided for this action.



Pressing the **BANK 0** button makes bank 0 the current bank, and causes buttons 0 through 9 on the keypad to become one-button recall registers for registers 00 through 09. This button is lit whenever bank 0 is the current bank.



Pressing **BANK 1** makes bank 1 the current bank, and causes buttons 0 through 9 on the keypad to become one-button recall registers for registers 10 through 19. This button is lit whenever bank 1 is the current bank.



ENTER confirms a numerical entry on the keypad, such as for the following functions: **GET**, **PUT**, **KF DUR**, **GOTO TIME**, **GOTO KF**, and **TRAN RATE**. The **ENTER** button lights when pressed. (The **TRIM** function is not implemented at this time.)



SEQ is used for creating automated register-recall sequences.

Sequences are *created* by pressing the following buttons (parameters in parentheses are optional):

SEQ, LRN,
register, (TRAN RATE), (delay),
register, (TRAN RATE), (delay),
...
...
LRN

NOTE: **SEQ** and **LRN** may be pressed in either order to start the command sequence; **LRN** must be pressed again at the end in order to complete the command sequence.

TRAN RATE and **delay**, in parentheses, are optional.

TRAN RATE enables a user-defined delay to be introduced between register recalls;

delay is a 1- to 3-digit number entered on the keypad that specifies an amount of delay in TV frames. (If the number entered is a 1- or 2-digit number, the entry must be terminated by pressing **ENTER**; **register** is any desired register number, as described previously (e.g., **BANK**, **bank number**, **register number**).

A sequence loop may be created by again pressing the first register button as the last register in the sequence.

Sequences are *initiated* by pressing the following buttons:

SEQ, register

The sequence starts at the register indicated, and proceeds through the linked sequence to the last register. If a loop has been programmed, the sequence loop continues until the **SEQ** button is pressed to terminate the sequence.

A sequence loop can be broken by double-pressing a register button, clearing the sequence link that existed in that register, and making that the last register in the sequence.

During a sequence of registers with multiple levels, the **SEQ** button will high tally if *any* of the enabled levels was learned with a sequence. However, this does not necessarily mean that *all* enabled levels are sequencing.

Different sequence delays may be learned separately into different enabled levels. Sequence delays on different levels are completely independent, and therefore sequencing may be occurring at different times on different levels.

If an E-MEM level is disabled while it is actively sequencing, the sequence will continue. Turning off the **SEQ** button will not halt the sequence, because the sequencing level is not delegated. To ensure halting all actively running sequences, all E-MEM levels must be enabled (**ENABL ALL**) and then **SEQ** turned off.

EFF
DIS

EFF DIS causes an S-linear transition from the current state to the next recalled register. The current state may be a setup you have just done on the control panel or the state resulting from a register recall.

An effects dissolve may be learned into a register, so that recalling that register will initiate a dissolve to another specified register. Note that only the levels that are enabled on the Enables buttons subpanel area will be learned as effects dissolves.

The following button sequence is used to learn a dissolve (parameters in parentheses are optional):

LRN, EFF DIS, (TRAN RATE, eff dissolve rate), register

The command syntax is defined below.

LRN and **EFF DIS** may be pressed in either order to start the command sequence.

TRAN RATE enables a user-defined effects dissolve rate to be introduced in the dissolve.

<eff dissolve rate> is a 1- to 3-digit number entered on the keypad that specifies the effects dissolve rate in number of TV frames. (If the number entered is a 1- or 2-digit number, the entry must be terminated by pressing **ENTER**).

register is any desired register number, as described previously (e.g., **BANK, bank number, register number**).

The effects dissolve rate is the same as the auto transition rate indicated in the readout on the corresponding Transition Subpanel.

When the register with the learned effects dissolve is recalled, the **EFF DIS** button will high tally until the dissolve is completed, then will turn off.

During a recall of a register with multiple levels, the **EFF DIS** button will high tally if *any* of the enabled levels contains an effects dissolve. This does not necessarily mean that *all* enabled levels are dissolving.

Different effects dissolve rates may be learned separately into different enabled levels. The effects dissolve rates on different levels are completely independent, and thus the dissolves may be running at different rates on different levels.



The • (DOT) button is used to represent the next empty register when used with **LRN** and **PUT**. The next empty register is defined as the next register that is empty on all levels, not just enabled levels, starting with the current register. (At register 99, the search for an empty register will wrap around to 0).

LRN • learns the current switcher state into the next empty register, and that register becomes the current register.

PUT • ENTER copies the current register into the next empty register. The current switcher state is unaffected and the current register number is unaffected.

GET • ENTER clears out all levels of the current register. The current switcher state is unaffected and the current register number is unaffected.

NOTE: *If there are no empty registers, the operation will not be done, an error beep will sound, and the keypad readout will show "NO EMPTY REGS"*



UNDO is used to back out of a recall, **LRN**, **PUT**, **GET**, or another **UNDO** register operation. The **UNDO** button lights when pressed, confirming that it has been pressed. An **UNDO** must be done immediately after an undesired operation, otherwise it may not be able to undo the operation.

For these register functions, pressing $\neq$, **UNDO** repeatedly allows you to toggle back and forth between the two last states.

(For toggling **UNDO**, you have to press $\neq$ /**BANK** then **UNDO** each time.)



TRAN RATE is used with the keypad to set the transition/mix rates used by the **AUTO TRAN** (auto transition), **KEY MIX**, and **DSK MIX** buttons on the Keyer Subpanels, and by the **EFF DIS** button on the E-MEM keypad.

When **TRAN RATE** is pressed, the E-MEM display queries:

SET WHICH RATE?

and any Enable buttons that are on turn off.

The transition rate is then delegated to the desired Transition Subpanel by pressing **M/E 1**, **M/E 2**, **M/E 3**, **PGM PST**, or **DSK**. All of these functions may be enabled simultaneously by pressing **ENABL ALL**.

NOTE: *When **TRAN RATE** has been selected, **ENABL ALL** enables only those levels that have programmable transition rates (**M/E 1**, **M/E 2**, **M/E 3**, **BKGD**, **DSK**, and **PGM PST**).*

After the desired levels are enabled, the display queries:

AUTO RATE = ?

(This is the first of 3 rates that the display will ask for.)

To set the auto transition rate for all enabled levels, enter the desired rate using the number buttons on the keypad. Pressing three number buttons on the keypad automatically enters the rate. If only one or two number buttons are pressed, the entry must be completed by pressing **ENTER**. Rates from zero through 999 frames may be entered. (If one or two incorrect numbers have been entered, the entry may be cleared and the previous rate restored by pressing **TRAN RATE** again.)

As soon as the new rate is confirmed, it is displayed in the auto transition rate display on the Transition Subpanel of each enabled level.

The E-MEM display then queries:

KEY 1 RATE = ?

This refers to the mix rate of the **KEY 1 MIX** buttons or **DSK 1 MIX** button at the right edge of each Transition panel. To set the Key 1 and/or DSK 1 mix rate for all enabled levels, follow the same procedure as described above for the auto transition rate. (If you want to set each key mix rate separately, enable each level separately.)

As soon as the new rate is confirmed, it is entered into memory for each enabled level, but is not displayed. The display then asks for the third rate to be set:

KEY 2 RATE = ?

Repeat the procedure again to set the mix rate for the **KEY 2 MIX** buttons and **DSK 2** button.

NOTE: *The mix rate for either key is displayed on the auto transition readout when the **KEY 1 MIX/DSK 1 MIX** or **KEY 2 MIX/DSK 2 MIX** button is pressed (initiating a mix) or when the **SHOW KEY** button is pressed on the appropriate panel and the desired key is enabled (**KEY 1/DSK 1** or **KEY 2/DSK 2** button on Keyer panel lit).*

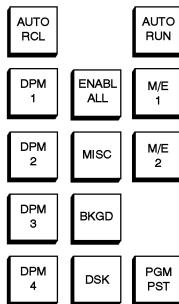
Any of the three transition/mix rates can be skipped simply by pressing the **ENTER** button when the query appears.

If there are no enabled levels that require one of the above-mentioned rates, that query will be skipped. For example, **PGM PST** does not require a key rate, and **DSK** does not require an auto transition rate.

When the sequence of transition/mix rates has been completed, the **TRAN RATE** button turns off and the Enable buttons return to their previous state, as does the keypad readout display.

Enable Buttons

-2A

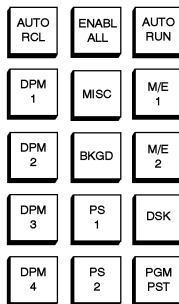


The Enable buttons are located to the left of the keypad on the E-MEM Subpanel and are used for enabling register levels. Each register is partitioned into sections (or “levels”) corresponding to the Enable buttons.

When you learn a switcher state (or insert a keyframe) into an E-MEM register, the only switcher parameters that are learned are those that are enabled by the Enable buttons on the E-MEM Subpanel.

Each E-MEM register is partitioned into sections (or “levels”) corresponding to the Enable buttons and representing functional areas of the control panel and associated menu selections.

-2B

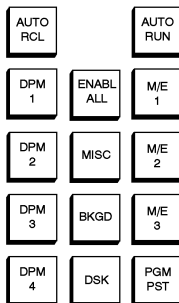


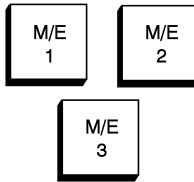
All register manipulation, including learn and recall operations, affect only the enabled levels. This allows you to build independent effects on each level and to recall the levels independently.

For example, an effect using both M/E 1 and M/E 2 could be built with both being enabled, and either the M/E 1 or M/E 2 part of the effect could be recalled separately by enabling only one and recalling the register. Conversely, separate effects built at different times, in different levels of the same register, can be recalled together by enabling both M/E 1 and M/E 2.

The **M/E 1**, **M/E 2**, **M/E 3**, **PGM PST**, and **DSK** buttons are also used when setting transition rates in the effects systems, as previously described (see **TRAN RATE**).

-3





M/E 1, M/E 2, and M/E 3 enable the following areas for learn and recall operations on a specific M/E: standard or layered mode operation, crosspoint settings, transition settings, keyer settings, masks and mattes, chroma key settings, wipes, positioner settings and full additive mix (FAM) settings.



PGM PST enables the crosspoint settings and transition settings for learn and recall operations on the Program and Preset buses.



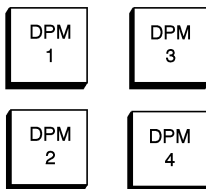
DSK enables the following areas for learn and recall operations on the two downstream keyers: DSK crosspoints DSK keyer settings, DSK masks, and four mattes (**K1 FILL**, **K1 BORD**, **K2 FILL** and **K2 BORD** on the DSK Mattes Subpanel), excluding matte wash.



BKGD enables the two background matte generator settings (**BKGD 1** and **BKGD 2** on the Mattes Subpanel) for learn and recall operations, excluding matte wash.



MISC enables the following user-defined areas for learn and recall operations: frame store settings, peripheral settings, GPI settings, aux bus settings, mask bus settings, preview bus settings, and matte wash settings for Backgrounds 1 and 2 and the DSK. All aux buses default to the **MISC** level unless assigned to a DPM level using the Config/DPM Map Ports and Config/DPM Map Aux Buses menus.



DPM 1, DPM 2, DPM 3, and DPM 4 enable parameters of the associated with DPMs (Digital Picture Manipulators) for learn and recall operations. The specific functions to be learned and/or recalled are determined by the type of DPM, its capabilities, and the configuration of the DPM port.

Pressing **ENABL ALL** lights all Enable buttons if any or all of them are not presently lit, or turns all Enable buttons off if all are already lit. This action allows all enables to be turned off or on with a maximum of two button presses. **ENABL ALL** may also be used to enable all levels simultaneously when setting transition rates (see the **TRAN RATE** button description).

A square button with a black border and the text "AUTO RCL" in black, centered.

AUTO RCL allows the state of the Enable buttons to be learned or recalled as part of an effect.

If **AUTO RCL** is on while an effect is learned, the state of the Enable buttons is learned as part of the effect. If **AUTO RCL** is off while an effect is learned, the enables are not learned, and any subsequent recall (even if **AUTO RCL** is on during the recall) does not change the state of the enables.

If **AUTO RCL** is on during a recall, the enables (as learned) are first recalled, then the resulting enabled portions of the switcher are recalled. If **AUTO RCL** is off during a recall, the enables remain as set on the Enable panel, and those parts of the effect are recalled.

A square button with a black border and the text "AUTO RUN" in black, centered.

AUTO RUN enables effect Recall-and-Run operations. When **AUTO RUN** is active, a register recall causes a recall of the register, sets the Time Cursor at Time 0, and causes an immediate run if the effect contains more than one keyframe.

Effect Editing Controls

The effect editing controls are located at the upper left corner of the Effects Memory Subpanel



The **CLEAR WORK BUFR**, **GET**, and **PUT** buttons on the effect editing panel are at low tally whenever they are enabled to perform their respective functions.

All other buttons on the effect editing panel must be enabled by a menu selection in the main Keyframe Menu. (Select **ENABLE** with the **KEYFRAME EDITING** soft button.)

When enabled, the effect editing buttons are at low tally; when disabled, the effect editing buttons are off. (Some of the buttons may also be off under certain conditions, as described under the individual button descriptions.)

CLEAR WORK BUFR is used to clear out stored values from the following switcher memory areas.



1. To Clear Current Working Buffer— *except* Keyers:

Single press of the **CLEAR WORK BUFR** button: (E-MEM Subpanel)

Clears Current Working Buffer (CWB) to user-defined defaults. The key memory portion of the CWB is unaffected (for example, video processing or clip and gain). All non-key memory parameters are cleared for enabled levels.

2. To Clear Current Working Buffer — *including* Keyers:

Double press of the **CLEAR WORK BUFR** button:

Same as above, with addition of key memory parameters being cleared. Crosspoints are unaffected.

3. To Clear a Single Crosspoint Key Memory:

Hold a key bus crosspoint, *single* press **CLEAR WORK BUFR** button:

Clears only the key memory portion of the Current Working Buffer for switcher key crosspoints held down. Clears any split keys for that key crosspoint.

4. To Clear Current Working Buffer for a selected E-MEM level and clear any split keys for that key crosspoint—including Keys for E-MEM level owning Crosspoint Keyer:

Hold a key bus crosspoint, *double* press the **CLEAR WORK BUFR** button.

CLEAR WORK BUFR is always functional, even when the other effects editing buttons are not enabled (**KEYFRAME EDITING** set to **DISABLE** in the Keyframe Menu).

The **CLEAR WORK BUFR** button is normally off, but lights for one-half second when pressed.

NOTE: The “Current Register” is defined as the active register on each E-MEM level. If all enabled levels are in the same register, the Current Register is the same as that shown in the E-MEM keypad display. However, if the enabled levels have different Current Registers, as indicated by a “Δ” between the bank number and the register number, the Get and Put operations will operate on different registers. For example, if enabled level M/E 1 is in Register 1, and enabled level M/E 2 is in Register 2, a “PUT CUR INTO 03” operation will copy M/E 1 Register 1 into M/E 1 Register 3, and M/E 2 Register 2 into M/E 2 Register 3.

GET

GET provides a method of copying or “getting” the contents of a specified register into the *current register*.

The current switcher state and the current register number are not affected by the Get operation.

The **GET** button is at low tally whenever a Get operation is permissible and off when the operation is not permissible (when there is no Current Register or the Current Register is locked).

When pressed, the **GET** button high-tallies and the E-MEM readout provides a prompt. For example, if Bank 0 and register 7 are currently selected, the display prompts:

GET 0x INTO CUR

(If the bank were 1 and the current register 7, the display would show: GET 1x INTO CUR)

To get the effect from a specific bank and register, change the bank number if the correct bank is not already selected, then enter the register number of the effect to be copied. Press **ENTER** to complete the **GET** operation.

The **GET** operation does not copy sequence link information (sequence link register or sequence delay) to the current register.

An **UNDO** of the **GET** operation will restore the previous contents to the current register, without affecting the current switcher state or current register number.

Also, as mentioned previously under the • button description, the **GET** button may be used for clearing out the current register by pressing **GET • ENTER**.

PUT

The **PUT** button provides a method of copying or “putting” the contents of the currently selected register into another E-MEM register. If multiple keyframes are contained in the enabled levels of the Current Register, they are copied into the new register.

The **PUT** button is at low tally whenever a **PUT** operation is permissible and off when the operation is not permissible (no current register).

When pressed, the **PUT** button high-tallies and the E-MEM readout provides a prompt. For example, if Bank 0 and register 7 are currently selected, the display prompts:

PUT CUR INTO 0 x?

To put the current effect into a specific bank and register, change the bank number if the correct bank is not already selected, then enter the (destination) register number. Press **ENTER** to confirm the **PUT** operation.

The **PUT** operation does not copy sequence link information (sequence link register or sequence delay) to the destination register.

If the destination register is locked, the **PUT** operation will not be performed, an error beep will sound, and the keypad readout will show “REG IS LOCKED”.

An **UNDO** of the **PUT** operation will restore the previous contents to the destination register, without affecting the current switcher state or current register number.

Also, as mentioned previously, the **PUT** button may be used to copy the current register contents into the next empty register by pressing **PUT • ENTER**.

NOTE: *The remainder of the Effect Editing controls deal primarily with effect keyframes and effect timelines.*

Refer to “Effects and Keyframes” near the beginning of this section for general definitions of *effects* and *keyframes*.

In the Model 4000, a *Timeline* is a graphical representation (in the Timeline menu) of the keyframes and their time relationships on a given enabled level in the current E-MEM register. Each enabled register has its own timeline.

The *Master Timeline* (the top timeline in the Timeline menu) is a composite representation of the timelines of all enabled levels in

the current E-MEM register. All time positions of the effect are referenced to the Master Timeline.

A *Master Timeline Keyframe* is a point on the Master Timeline that has a keyframe on one or more levels at that point in time.

The *Current Time* is the time position of the Time Cursor on the Master Timeline of the effect.

The *Current Keyframe* is the keyframe and its duration on which the Time Cursor is positioned.



Pressing the **TIME CURSR** button once brings up the Timeline menu of the current E-MEM register. If there is more than one keyframe in the effect, the position of the Time Cursor may be positioned on the timeline by the **RUN TIME** soft knob in the menu, the Run lever arm on the E-MEM panel, or any of the effects positioning buttons (**GO TO KF**, **GO TO TIME**, **NEXT**, **PREV**, or **REWIND**).



The **MARK CURSR** button is provided for future editing operations; however, pressing **MARK CURSR** once brings up the Timeline menu.

Modes of Insertion/Deletion

The editing mode selected determines the way keyframes are added to or removed from an effect. The editing mode is selected by the **CONST DUR** button (on/off) on the E-MEM Effects Editing panel and by the **DELEGATES/ENABLES** selection in the Main Keyframe Menu or the Timeline Menu.

The four editing functions that add keyframes or delete keyframes from an effect (**Cut**, **Paste**, **Insert Before**, and **Insert After**) are affected by the selected editing mode and by the position of the Time Cursor on the Master Timeline.

NOTE: *Cuts, Inserts, and Pastes cannot be performed on any locked level of an E-MEM register.*

Only those levels that are *delegated* are affected by timeline editing. When **ENABLES** is selected in the Timeline menu or the main Keyframe menu, *all* enabled levels are also delegated; thus all levels are affected. When **DELEGATES** is selected in the menu, only specified enabled levels are delegated; all other enabled levels are *enabled but not delegated*.

NOTE: *The **DELEGATES** selection in the Timeline menu and main Keyframe menu is discussed in the Effects Editing section of this manual.*

With previous software versions

- If the Master Timeline cursor was on a keyframe, an Insert operation (**Insert Before** or **Insert After**) used the “on a keyframe” rule; that is, a new keyframe was added before or after the current keyframe on each delegated level, and that added keyframe lengthened the overall duration of those timelines.
- If the Master Timeline cursor was not on a keyframe, the Insert operation used the “on the path” rule; that is, a new keyframe was added at that point-in-time on each delegated level, subtracting the added keyframe’s duration from the current keyframe’s duration. Therefore, the added keyframe did not add to the overall duration of that timeline.

With software version 5.2, the system makes decisions as to whether to use the “on a keyframe” or “on the path” rules based on whether keyframes are present on the *delegated* levels, not whether they are present on the Master Timeline.

The new rules are as follows:

- If *any* delegated level has no keyframe at the current time (location of cursor), an Insert operation does an insert “on the path” on each delegated level. As before, an insert “on the path” does not increase the overall length of the timelines.
- If *any* delegated level has a keyframe at the current time, an Insert operation does an insert “on a keyframe” on each delegated level. An insert “on a keyframe” increases the length of the timeline of each delegated level(s) by the duration of the inserted keyframe (equal to the duration of the current keyframe on the Master Timeline).

Note that in Constant Duration mode, inserting “on a keyframe” is inhibited because that would add to the duration of the delegated timeline.

These new rules apply to all corresponding Insert, Paste, and Mod operations.

Constant Duration Off

The following pages describe the operation of the keyframe insertion/deletion functions when Constant Duration mode is *not* selected (**CONST DUR** button at low tally) and **ENABLES** is selected in the Timeline menu or main Keyframe menu.

NOTE: Refer to the **CONST DUR** button description for the operation of keyframe insertions and deletions in Constant Duration mode.

When **CONST DUR** is *off*, the overall duration of the effect is the sum of the durations of the individual keyframes (on any delegated level’s Timeline). Adding or deleting keyframes or changing the duration of one or more keyframes may change the overall duration of the effect.

INSRT
BEFOR

On a Keyframe. When the Time Cursor is positioned on a keyframe of any delegated level, **INSRT BEFOR** inserts a keyframe and its duration into each delegated level just *prior* to the current keyframe. All subsequent keyframes are “rippled” (pushed out) in time by an amount equal to the newly inserted keyframe duration. This increases the overall duration of the effect by the duration of the current keyframe on the Master Timeline.

The data entered into the keyframe on each delegated level is the data in the Current Working Buffer, which is the same as the Current Switcher State for that level.

Unless otherwise specified (see **KF DUR**), the duration of the inserted keyframe is the same as that of the current keyframe.

Any delegated level that does not have a keyframe at that point in time will have a keyframe inserted just *before* the current keyframe.

On the Path. When the Time Cursor is “on-the-path” (not on a delegated level’s keyframe), the **INSRT BEFOR** button is tallied off and the Insert operation is not allowed.

INSRT
AFTER

On a Keyframe. When the Time Cursor is positioned on a keyframe of any delegated level, **INSRT AFTER** inserts a keyframe and its duration into each delegated level immediately *following* the duration of the current keyframe (in other words, just before the *next* keyframe). All subsequent keyframes are “rippled” (pushed out) in time by an amount equal to the newly inserted keyframe duration. This increases the overall duration of the effect by the duration of the current keyframe on the Master Timeline.

The data entered into the keyframe on each delegated level is the data in the Current Working Buffer, which is the same as the Current Switcher State for that level.

Unless otherwise specified (see **KF DUR**), the duration of the inserted keyframe is the same as that of the current keyframe.

Any delegated level that does not have a keyframe at that point in time will have a keyframe and its duration inserted just *after* the current keyframe. The current time position moves to the timepoint of the newly-inserted keyframe.

On the Path. When the Time Cursor is located “on-the-path” (not on *any* delegated level’s keyframe), **INSRT AFTER** inserts a keyframe on each delegated level but does not add time to the overall effect.

The data entered into the keyframe on each delegated level is the data in the Current Working Buffer, which is the same as the Current Switcher State for that level. This includes the values of all parameters at that point, interpolated on-the-path between the two keyframes, plus any changes that may have been made on the control panel and in the menus since stopping at that point on the timeline.

The duration of the inserted keyframe is the difference between the point of insertion and the position of the *next* keyframe. The duration of the previous keyframe (what had been the current keyframe) is decreased by the same amount. The current time position remains at the point of the newly-inserted keyframe.

CUT

Previous to software version 5.2 when the Time Cursor is positioned on a Master Timeline keyframe, the **CUT** operation deleted the keyframe from any delegated level that had a keyframe, and deleted the duration of the Master Timeline keyframe from all delegated levels, even those that do not have a keyframe at that point. Then all subsequent keyframes ripple backward in time.

Currently with software version 5.2 and later, if the Time Cursor on *any* delegated level is not on a keyframe, the **CUT** button is tallied off and the Cut operation is disabled.



COPY makes a copy of the data in the Current Working Buffer, for all delegated levels, and places it in the Clipboard Buffer. No changes are made to the effect.

If the Time Cursor is on a keyframe on the Master Timeline when the Copy is done, the duration of the copied keyframe is the duration of the Master Timeline keyframe. If the current time position is on-the-path on the Master Timeline, the keyframe duration is the difference between the current time position and the position of the next keyframe.

The keyframe can then be pasted into another effect (same levels) or into another point in the same effect (same levels).



The **PASTE** button inserts a keyframe (on all delegated levels) into an effect. This operation is essentially the same as doing an Insert After, with the following exceptions: For a Paste, the data to be inserted comes from the Clipboard Buffer, rather than from the Current Working Buffer, and the keyframe duration also comes from the Clipboard if the Paste is done on a keyframe. If the Paste is done on-the-path, the keyframe duration is handled the same as that of an Insert After, adding no time to the effect.

Constant Duration Mode

The following paragraphs describe the operation of keyframe insertion/deletion in Constant Duration mode. Refer to the previous portion of this section for operation with Constant Duration turned *off*.

CONST
DUR

CONST DUR forces the overall duration of an effect to be constant during editing, except as noted here. The length of the existing effect is unchanged by keyframe deletions (cuts) or additions (inserts or pastes). When **CONST DUR** is on, the button is high-tallied; when off, it is low-tallied if edit mode is enabled, or tallied off if edit mode is off.

Also, in Constant Duration mode, the **KF DUR** button is tallied off, indicating that keyframe duration modifications are not allowed.

All Inserts and Pastes in Constant Duration mode must be made *on-the-path*—they are not allowed *on keyframes*—except as follows:

An Insert Before may be done on the first keyframe of an effect, or an Insert After or Paste may be done on the last keyframe of an effect. The duration and timing of the *original* effect are not affected, but the inserted keyframe is appended to the effect, increasing its overall duration.

When an Insert or Paste is done *on-the-path* in Constant Duration mode, the duration of the inserted keyframe is subtracted from that of the previous keyframe.

A Paste operation in Constant Duration mode is similar to an Insert After, except that the data to be pasted comes from the Clipboard Buffer, rather than the Current Working Buffer.

A Cut must be made *on* a keyframe, whether **CONST DUR** is on or off. If a Cut is done in Constant Duration mode, the keyframe state is deleted and the duration of the cut keyframe is added to the duration of the previous keyframe. The Time Cursor remains positioned at the point of deletion.

NOTE: *The following operations are the same whether **CONST DUR** is on or off.*

Modify Keyframes



When the Time Cursor is positioned on a delegated level's keyframe, pressing the **MOD** button *once* enters any modification that has been made on any delegated level. When **MOD** is pressed, the button high-tallies for one-half second to confirm the Mod operation.

If an individual delegated level does not have a keyframe at the time location where a Mod is being done, the Mod operation inserts a keyframe on-the-path if any changes have been made on that level. The duration of the inserted keyframe is taken from that of the previous keyframe. No change is made to the overall effect duration.

Modify All Keyframes (Relative)

When the Time Cursor is positioned on a Master Timeline keyframe, pressing the **MOD** button *twice* applies any modification that has been made on any delegated level to all keyframes *on that level*. For instance, if you want to change the background color by 180° in all keyframes on the M/E 1 level, place the cursor on any keyframe, change the background color, and press **MOD** twice (generally referred to as Mod All Relative operation).

It is also possible to modify all keyframes on a given level to a single value (for example, changing the background to Blue in all keyframes on that level) by doing a Mod All Absolute operation. This function is accessed through the Keyframe menu, as described in the Section 3, Menu Descriptions.



KF DUR allows you to change the duration of the current keyframe or to set the duration of a keyframe to be inserted. If not all delegated levels are on a keyframe, or if different delegated levels have differing keyframe durations, pressing **KF DUR** will add an appropriate change to the current keyframe duration on all levels.

When pressed, **KF DUR** high-tallies and the E-MEM display shows the current keyframe duration:

KF DUR SSS:FF.f

where SSS=Seconds, FF=Frames, and f=field(s) of the desired keyframe duration.

A new duration may be entered as follows on the E-MEM keypad:

S S S • F F • f ENTER¹

The keyframe duration is then applied to all delegated levels by pressing **MOD** once.



The **EFF DUR** button is provided for future editing operations.



PREV and **NEXT** are used to step the effect forward or backward to the next keyframe on the Master Timeline.

When the **PREV** or **NEXT** button is pressed, it high-tallies for one-half second to confirm the operation.

1. Not all digits are required for defining the time. The system will recognize the • button presses to determine which digits are seconds, which are frames, and which are fields. For instance, to enter 2 seconds and 5 frames (65 frames or 130 fields), you would need only to enter:

2 • 5 ENTER
or • **6 5 ENTER**
or • • **1 3 0 ENTER**

In all of these cases, the display shows:

KF DUR 002:05.0

The **PREV** button is off at the *beginning* of an effect or if the effect has zero or one keyframe. The **NEXT** button is off at the *end* of an effect or when the effect has zero or one keyframe.



GO TO TIME enables positioning of the effect to a specific position on the Master Timeline. When **GO TO TIME** is active, the desired time is entered as follows on the E-MEM keypad:

SSS•FF•f ENTER

where SSS=Seconds, FF=Frames, and f=field(s) of the desired point in time or as abbreviated above under **KF DUR**.



GO TO KF moves the Time Cursor to the specified keyframe on the Master Timeline.

To move to the desired keyframe, press the **GO TO KF** button, enter the number on the keypad, then press the **ENTER** button.

(A 3-digit number is entered automatically without pressing **ENTER**).



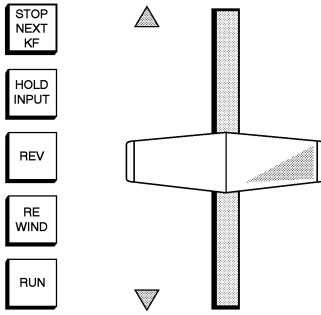
The **MARK** button is provided for future clipboard operations.



The **MARK BLOCK** button is provided for future clipboard operations.

NOTE: *Refer to the Keyframe Operations section of the User Guide for additional information on use of the Effect Editing controls.*

Run Controls



The Run controls in the upper right corner of the E-MEM Subpanel determine the manner in which the selected E-MEM effect will run.



Pressing **STOP NEXT KF** causes an effect to be stepped through, one Master Timeline keyframe at a time. When on, **STOP NEXT KF** causes run commands to last the duration of one keyframe, and each **lever arm** transition to advance the run only one keyframe at a time.

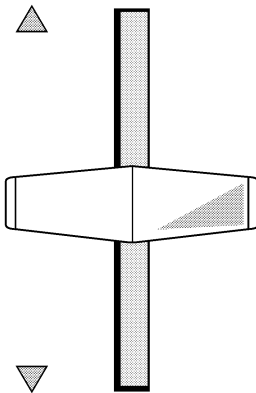
The button is at high tally when the function is selected, at low tally when enabled but not selected.



When **HOLD INPUT** is enabled (high tally), all crosspoints (video and key) on all buses of the switcher are held. That is, the state of the crosspoints do not change when an E-MEM recall is done. If key memory is on at this time, the current keyer memory state is also held. (See “Crosspoint Override” earlier in this section for holding crosspoints on individual buses.)



Pressing the **RUN** button causes an effect to begin running from its current position. The **RUN** button is also used to stop and resume an effect during the run by acting as a run toggle button. The **RUN** button lights during a run, then turns off when the run is complete.



The **Run lever arm** can be used to manually run an effect . Moving the **lever arm** causes the current effect to run.

Normally, the position of the **lever arm** directly corresponds to the relative percentage of run completion; however, if the **lever arm** and the effect get out of sync (for example, the **lever arm** is not at an endpoint when a register is recalled), the remaining **lever arm** movement is scaled to the remaining effect duration. (Forward direction is scaled to the end of the effect; reverse direction is scaled to the start of the effect.)

The **Run lever arm** may also be used for positioning the Time Cursor in the Timeline Menu when building an effect.



REV causes an effect to run backwards. The button may be pressed before or during the effect run (on-the-fly). The button lights and stays lit when pressed, then toggles off when pressed again.

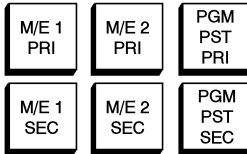


REWIND positions the current effect at Time 0. If an effect is already running when this button is pressed, the effect run stops and the effect returns to Time 0. The **REV** button inverts the **REWIND** function. In other words, it positions the effect at the last keyframe of the effect. The **REWIND** button lights for one-half second any time it is pressed.

NOTE: Refer to the *Keyframe Operations* section of the User Guide for additional information on use of the Effect Editing controls.

Positioner Subpanel

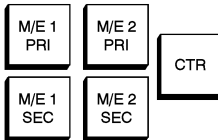
-2A



The Positioner joystick allows wipes to be moved from their current position to another position on the screen.

The delegation buttons located below the joystick (Figure 2-11, Figure 2-13, and Figure 2-13) enable control of the primary and (optional) secondary wipe patterns to be delegated to either or both M/Es and the PGM/PST (-2A), or all three M/Es (4000-3).

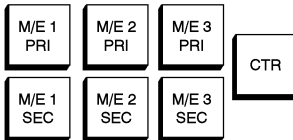
-2B



If all of the delegation buttons are turned off, the joystick is disabled.

NOTE: *The position of a wipe pattern cannot be changed if both **POS NORM** and **POS AUTO** are off for that wipe generator, even if the joystick is delegated via its delegation button.*

-3



Pattern movement (direction and speed) is determined by the direction and distance the joystick is moved. The farther it is moved from the center position, the faster the pattern moves. When released, the joystick returns to its center position, leaving the pattern where it is currently positioned.

-2B



Pressing the **POS CTR** button causes the assigned patterns to automatically center on the screen.

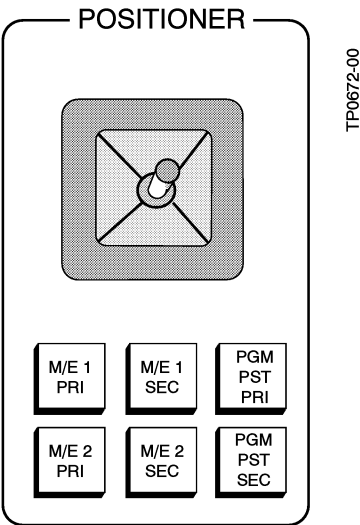


Figure 2-11. -2A Positioner Subpanel

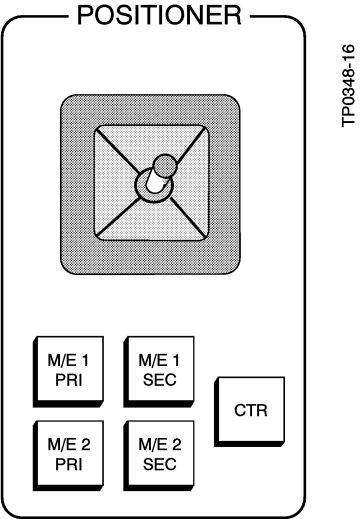


Figure 2-12. -2B Positioner Subpanel

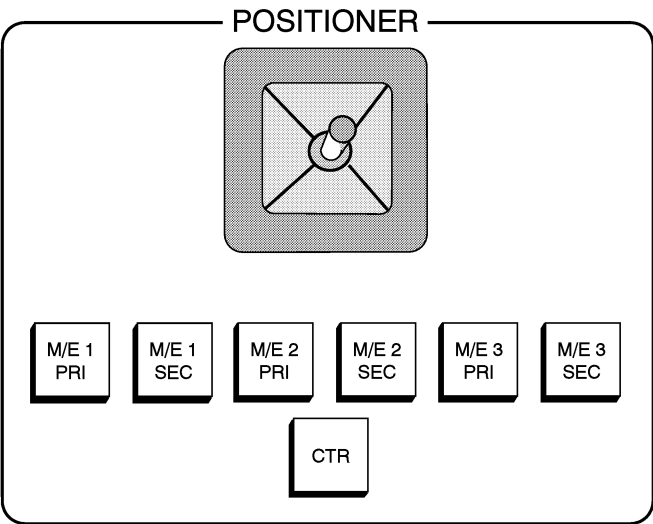


Figure 2-13. -3 Positioner Subpanel

Wipe Subpanel

The Wipe system (Figure 2-14) consists of wipe delegate buttons, wipe pattern selection buttons, wipe controls, wipe rotation types, wipe pattern mix, wipe direction, wipe pattern modifiers, and wipe positioner buttons.

Each M/E and PGM/PST has a primary wipe generator. (PGM/PST applies to the -2A only.) Optional secondary wipe pattern generators (one for each M/E and PGM/PST) may also be installed. The primary and secondary wipe pattern generators operate independently. The primary wipe generator creates the wipe solid for the wipe. The secondary wipe generator creates the wipe solid for the preset pattern. (Refer to your *Installation and Service Manual*, in Section 3, Functional Description, for more information on the Mix/Wipe Modules and the Wipe Mezzanine Boards.)

Limited secondary wipe functionality is available even if secondary wipe pattern generators are not installed. The secondary wipes are available, but only the edge attributes of the secondary wipe are independent. (Edge attributes include preset size, softness, soft symmetry, border width, border matte, border opacity and normal/reverse.) If only the primary wipe generators are installed, secondary wipe generator pattern select, rotation modes, positioner modes, and pattern modifiers are the same values as those of the primary wipe generator on the same M/E.

The transition **WIPE** button on the Transition Subpanel always uses the primary wipe generator. Preset wipes, masks, and matte wash can also use a secondary wipe generator.

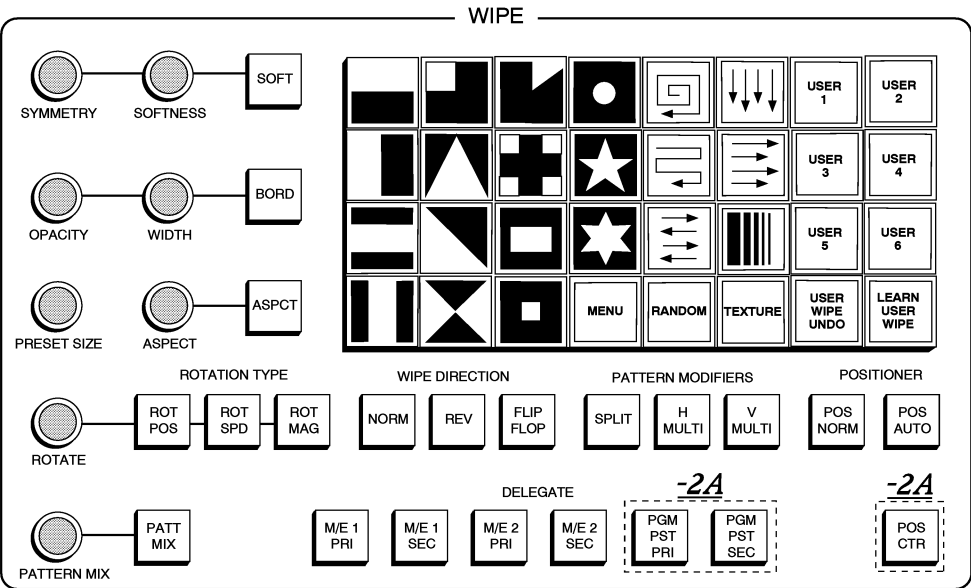
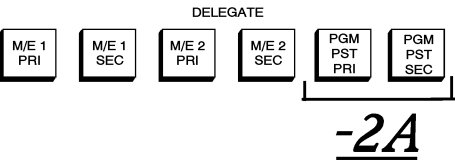


Figure 2-14. Wipe Subpanel

Wipe Delegation



Pressing any one of the Wipe delegation buttons at the bottom of the Wipe Subpanel delegates the entire Wipe Subpanel to the Primary/Secondary wipe generator selected.

Pattern Select Buttons



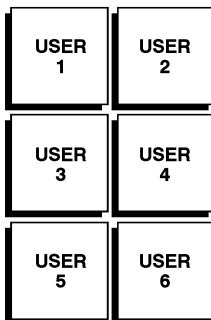
Pressing any of the Wipe pattern buttons selects that wipe pattern and lights the button. These buttons are mutually exclusive (including **MENU**); pressing one selects a pattern and de-selects the previously active pattern. Pressing the **MENU** pattern button selects a pattern that was previously chosen in the pattern menu. Double-pressing the **MENU** button opens the wipe pattern menu. Wipe patterns not available on the pattern select panel may be selected through the Wipe menu, described later in Section 3, Menu Descriptions.



RANDOM selects one of the available random patterns.



TEXTURE selects a user-adjusted texture pattern, selected in the Wipe Texture menu.



LEARN USER WIPE – The six **USER** wipe buttons let you learn a wipe effect into memory and then recall it all at once. Everything on the Wipe Subpanel is learned except the delegate buttons. Upon recall, the stored wipe parameters are transferred to the delegated wipe generator. This shared system allows you to transfer wipe effects from one wipe generator to another.

To store a wipe setup, press the **LEARN USER WIPE** button, followed by any one of the six **USER** buttons. The current wipe pattern selection and all modifiers will be memorized into the **USER** register. To recall the wipe effect later, press that **USER** button. After a **USER** button is pressed, either for a learn or recall operation, the button remains lit as a reminder that it was the last one used.



USER WIPE UNDO allows an accidental **USER** wipe recall or learn to be “un-done.” When undoing a recall, pressing this button restores the panel to the state that existed before the last learn; when undoing a learn, it restores the user register to its previous state (the control panel is not affected).

Wipe Control



Pressing the **SOFT** button toggles the wipe edge softness on and off. When the button is illuminated, wipe edge softness can be adjusted with the **SOFTNESS** knob.



SOFTNESS

The **SOFTNESS** knob controls the amount of wipe edge softness when **SOFT** is on. A setting of full counter-clockwise rotation causes zero softness, while full clockwise rotation causes maximum softness.



SYMMETRY

Turning the **SYMMETRY** knob controls the relative softness between the inside and outside wipe border edges, when the **SOFT** and **BORD** buttons are turned on. The last value of **SYMMETRY** is remembered when either **BORD** or **SOFT** is turned off.



BORD toggles control of the wipe border on and off. When **BORD** is on, the adjacent **WIDTH** and **OPACITY** knobs become active for modifying the wipe border. The wipe border is functional on transition and preset wipes only.



WIDTH

The **WIDTH** knob sets the width of the wipe border when **BORD** is on. When **BORD** is turned off, the last value of **WIDTH** is remembered and is recalled when **BORD** is turned on again.



OPACITY

The **OPACITY** knob controls the opacity or translucence of the wipe border when **BORD** is on. The **OPACITY** value is remembered when **BORD** is turned off.



PRESET SIZE

PRESET SIZE adjusts the wipe pattern size for preset patterns used in non-transitional wipe patterns. It is also used to adjust the size of masks that use the wipe generator.



The **ASPCT** button toggles control of the **ASPECT** knob (horizontal to vertical ratio) of the wipe pattern on and off.



ASPECT

Turning the **ASPECT** knob clockwise from mid-position stretches the horizontal axis of the wipe pattern. Similarly, turning the knob counter-clockwise from mid-position stretches the vertical axis.

Rotation Type



The 3 rotation type buttons, **ROT POS**, **ROT SPD**, and **ROT MAG** are mutually exclusive and toggle on and off. Only one of these buttons can be on at a time.



ROTATE

The **ROTATE** knob, located adjacent to the three rotation type buttons, controls whichever mode is enabled. The knob setting for each of the three rotation modes is remembered even when the modes are de-selected.



ROT POS (rotate position) allows rotation of the wipe pattern to a fixed angle. With this mode on, turning the **ROTATE** knob from its mid-position rotates the entire wipe pattern up to four complete rotations, either clockwise or counterclockwise.



ROT SPD (rotate speed) allows constant rotation of the wipe pattern at a rate adjusted by the **ROTATE** knob. Turning the knob clockwise or counterclockwise from mid-position causes the wipe pattern to rotate up to a maximum of four rotations per second.



ROT MAG (rotate magnitude) causes the wipe pattern to rotate as a function of the transition position (lever arm or auto transition). The amount and direction of rotation is adjusted by the **ROTATE** knob. Turning the knob clockwise or counterclockwise causes the wipe pattern to rotate up to a maximum of four rotations during the course of the wipe transition. The starting angle (or position) of the pattern is determined by the **ROT POS** value.

Pattern Mix



PATT MIX toggles the pattern mix mode on or off. When **PTN MIX SOURCE** is set to **NORMAL** in the menu, the pattern mix mode causes the delegated wipe generator to mix its pattern with the other wipe generator pattern on a given M/E. (The “other wipe generator” is the secondary generator if delegated to the primary, or the primary generator if delegated to the secondary.) When **PTN MIX SOURCE** is set to **TEXTURE**, the pattern mix mode causes the delegated wipe generator to mix its pattern with the texture pattern.



PATTERN MIX

The adjacent **PATTERN MIX** knob controls the mix ratio between the two pattern generators. If the **PTN MIX TYPE** is **NAM+** or **NAM-** (as selected in the Wipe Modifier menu),

the pattern mix knob controls the relative size of the two patterns. The knob value (shared by mix and NAM modes) is remembered when the **PATT MIX** button is turned off.

Wipe Direction



NORM and **REV** select the wipe direction (normal or reverse). One of these buttons is always on.



FLIP FLOP toggles flip-flop mode on and off. When flip-flop mode is on, the wipe direction changes at the end of each wipe transition. (The **NORM** and **REV** lights alternate on and off during a wipe, every time the transition reaches the opposite limit.)

NOTE: The **NORM**, **REV**, and **FLIP FLOP** buttons on the Wipe Subpanel do not affect the primary preset pattern key. Instead, a menu selection provides a choice of either **NORM** or **REV**.

Pattern Modifiers



The **SPLIT** button toggles split mode on and off. When split mode is on, the selected wipe pattern is split into two. Split operation is affected by the **SPLIT OFFSET** button and knob in the Wipe Modifier menu.



H MULTI and **V MULTI** allow multiple copies of the same wipe pattern to appear.

Pressing **H MULTI** results in an additional copy of the wipe pattern being arranged horizontally (in a row). One additional copy of the pattern is supplied for each push of the button, up to a maximum of eight rows.

Similarly, **V MULTI** produces multiple patterns arranged vertically in a column. Pressing both **V MULTI** and **H MULTI** at the same time results in a grid alignment of multiple patterns. You can hold down either button for 1/2 second to return a multiple wipe pattern to a single wipe pattern. Additional modifiers are available through submenus available under the Wipe menu. These menus are described later in this section under Section 3, Menu Descriptions.

Positioner Buttons



The **POS NORM** and **POS AUTO** buttons are mutually exclusive; only one can be on, although both can be off. If both are off, delegating the joystick has no effect on the pattern.

Pressing **POS NORM** allows you to move the center of the wipe solid with the delegated joystick on the Positioner Subpanel. When used for a wipe transition, the **POS NORM** button may cause the wipe edge to pop if the pattern is too far off center when a transition is performed.

The **POS AUTO** button invokes an auto positioner mode allowing you to place a wipe pattern anywhere on the screen. You can then make a transition between the wipe pattern and a second video source without the second video “popping” at the end of the lever arm travel.

When auto position is selected, the size of the wipe pattern is scaled according to the distance it is positioned off-center. That is, the wipe pattern gets smaller as it moves away from screen center. You can also move the wipe pattern completely off-screen and bring it back again.

Auto positioning may be used with primary, secondary, and program/preset wipes.

Auto positioning has no effect with matrix (non-solid type) wipe patterns.

NOTE: *Since the joystick positioner can be ganged to several M/E channels, the **POS NORM** and the **POS AUTO** buttons on the Wipe Subpanel do not delegate the joystick.*

-2A



Pressing the **POS CTR** button causes the assigned patterns to automatically center on the screen.

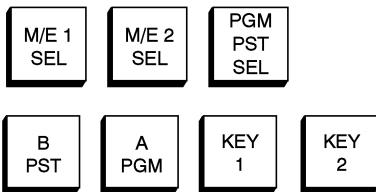
Masks Subpanel

The Masks Subpanel (Figures 2-15, 2-17, and 2-17) services and controls all video key masks in the switcher. A mask is a control signal used to modify a key signal. Delegation of the subpanel allows it to control any of the masks. Buttons and knobs are provided for controlling mask position and aesthetic features.

NOTE: The differences between the -2A and -2B Mask Subpanels are in the Mask Delegation buttons (see below). All other descriptions for this subpanel are for both models.

Mask Delegation

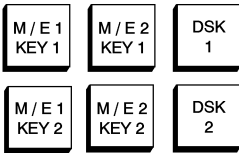
-2A



Pressing one of the three selection buttons delegates one of the mask generators to an M/E or the PGM/PST bus. The mask may then be assigned to a key layer by pressing the select button to cycle through the key layer selections, **KEY 1**, **KEY 2**, **A/PGM**, and **B/PST**.

Only one button can be on (high tally) at a time; pressing a button de-selects the previous button (lamp is turned off).

-2B



Pressing one of the six selections buttons delegates one of the mask generators to an M/E or the DSK bus. Only one button can be on (high tally) at a time; pressing a button de-selects the previous button (lamp is turned off).



INH MASK delegates the Mask Subpanel controls for adjusting the inhibit mask. The actual selection of mask inhibit is performed on the Keyer Subpanel (see the **MASK INH** discussion under the Keyer panel description).



FORCE MASK delegates the Mask Subpanel controls for making adjustments to a forced mask. The actual selection of force mask is performed on the Keyer Subpanel (see the **FORCE MASK** discussion under the Keyer panel description). The DSK cannot perform a forced mask.

Auto delegation of the Mask Subpanel may occur when other buttons on the control panel are pressed. (Refer to the Auto Delegation discussion earlier in this section.)

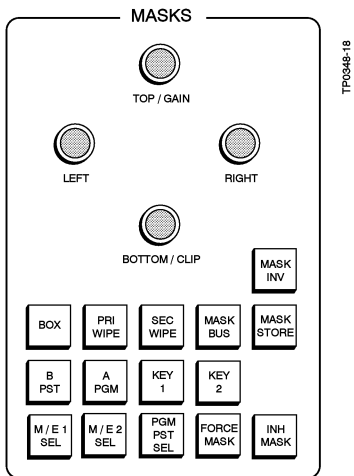


Figure 2-15. -2A Masks Subpanel

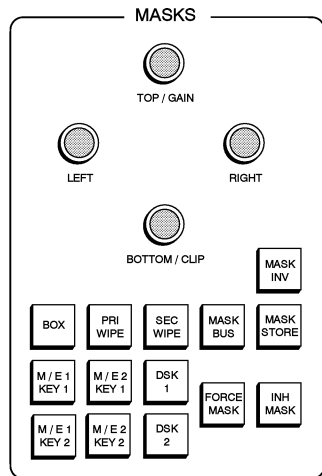


Figure 2-16. -2B Masks Subpanel

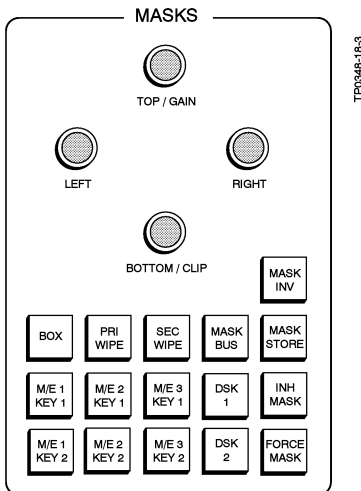


Figure 2-17. -3 Masks Subpanel

Mask Source Selection

The top row of buttons (excluding **MASK INV**) select sources that determine the shape of the mask. These buttons are mutually exclusive and one is always active.



BOX uses a rectangular box generator for the mask. The box is completely independent of the wipe systems. The four knobs at the top of Masks Subpanel determine the position of the four sides of the box. The box mask has hard edges. Each keyer has its own box, so it is possible to have up to six differently sized box masks in use at a time.

NOTE: *A box mask is the only type of mask available on the DSKs.*



PRI WIPE selects the primary (transition) wipe generator to produce the mask. The primary wipe generator in the same M/E provides the mask signal. Wipe Subpanel controls select the pattern, size, position and edge softness. This is not available on the DSKs.



SEC WIPE selects the secondary (optional) wipe generator to produce the mask. The secondary wipe generator in the same M/E provides the mask signal. If the secondary wipe option is not installed, the pattern shape and position are the same as the primary wipe generator. Pattern size and edge softness are still independent of the primary wipe mask source. This is not available on the DSKs.



MASK BUS selects a video source to generate the mask. The mask bus is a dedicated video bus in the primary matrix accessed with a bus delegate button in the Aux Bus area of the panel. The mask bus permits any primary or re-entered input to be used as a mask source. A clip and gain circuit in the mask generator processes the selected video input for display in the mask. When **MASK BUS** is selected, the **(TOP/GAIN)** knob becomes a gain control and the **(BOTTOM/CLIP)** knob becomes a clip control. This is not available on the DSKs.



The **MASK STORE** feature has not been implemented for the Model 4000.

Mask Controls

Several knobs and one button on the Masks Subpanel control the size and edge characteristics of the mask.

An edge of the mask cannot be moved past the edge of the raster or past the opposite mask edge. On a box mask, as one edge is adjusted to reach the opposite mask edge or the edge of the raster, the control function stops and the knob beeps. Turning the knob in the other direction then shows the mask edge.

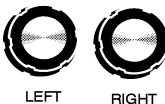
The Mask **(TOP/GAIN)** and **(BOTTOM/CLIP)** knobs function only as gain and clip controls when the mask source is delegated to the Mask bus. The clip and gain-adjusted Mask bus can be frozen in the mask frame store (or mask store).



(TOP/GAIN) is a two-purpose knob whose operation is dependent on whether the **BOX** button or the **MASK BUS** or **MASK STORE** button is pressed. If **BOX** is active, the **(TOP/GAIN)** knob controls the top side of the box-style mask (see **BOX** button description). If **MASK BUS** is active, the **(TOP/GAIN)** knob controls the gain of the Mask bus clipper.



(BOTTOM/CLIP) is a two-purpose knob whose operation is dependent on whether the **BOX** button or the **MASK BUS** or **MASK STORE** button is pressed, just as with the **(TOP/GAIN)** knob. If **BOX** is active, the **(BOTTOM)** knob controls the bottom of the box-style mask (see **BOX** button description). If **MASK BUS** or **MASK STORE** is active, this knob controls the Mask bus clipper.



The **(LEFT)** and **(RIGHT)** knobs control the left and right sides of the box-style mask. They are inactive if **BOX** is not selected.



The **MASK INV** button inverts the polarity of the signal used to create the mask. A mask, that normally allows a key inside of a box, will allow a key outside the box when **MASK INV** is on. Mask Invert functions with all mask sources.

Frame Store Subpanel

The primary functions of the Frame Store option are storage of still video and key images and creation of dropshadows behind keys. Controls for manipulation of these functions are found on the Frame Store Subpanel and menus.

The Frame Store option allows storage and retrieval of images at a 10-bit resolution. Up to four 2-field pages can be stored in both the video store and the key store. Video and Key inputs may be frozen together or independently. The images can later be read with either one- or two-field mode. Either replication or interpolation may be used if one field readout is selected.

Frame Store is controlled from a dedicated group of controls on the upper Control Panel. Frame Store is source oriented in that its inputs are fed with an AUX/effects send bus (Aux 4) and the outputs are available as primary inputs to the crosspoint matrix.

You can assemble complex graphics by layering multiple picture elements into a final composite image. Adding dropshadows is made easier by the provision of a Frame Store real-time dropshadow mode. Using this feature, variable-density full-resolution shadows can be created from the key signal and positioned anywhere within the raster.

The Frame Store module is installed in the Signal Frame Processor B bay, Slot 15.

Frame Store Features:

- Freeze video and key
- Mosaic, Pseudo-color Bit-map Effects, Blur, Repositioning, Strobe, Rectangular Cropping, and Hue Rotate.
- Write after read capability allowing layering of stills in a recursive manner. (i.e., frame store could receive output from an M/E that is using the frame store as one of its inputs).

- Ability to provide a real-time drop shadow on a key that can be positioned anywhere in the raster. Shadow can be blurred independent of Video and Key.
- Frame Store Video and Key may be composited on top of a background.
- Four two-field images may be captured.
- 1 or 2 fields read when frozen with replicate or interpolation on readout.

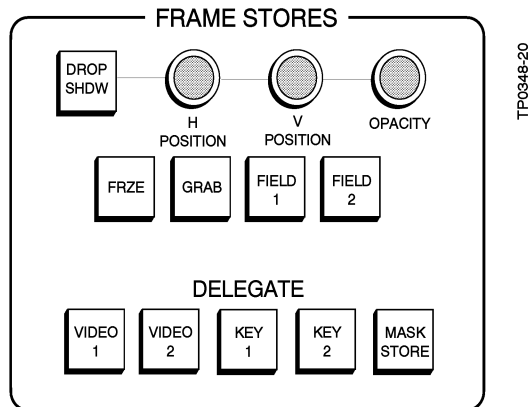


Figure 2-18. Frame Store Subpanel

Input Selection

Aux bus pair 4A/4B can be used to supply inputs to the frame store video and key channels.

Output Routing

Video and key outputs from the frame store are routed to the switcher crosspoint matrix and may be used as primary switcher inputs. The video and key outputs are also routed to an output module for use by external devices.

If the frame store is not in Freeze mode, its output is delayed by 2 fields from its input.

Still Image Storage

Video and key can be frozen either separately or simultaneously through the use of panel controls. In addition, the system has read-before-write capability, so stills can be layered in a recursive manner. The system accomplishes this by sending the output of the frame store to the input of an M/E for combination with another image. A composite is generated that can be fed back to the input of the frame store and re-frozen.

NOTE: *The Video 2 and Key 2 buttons are not used.*



The **VIDEO 1** and **KEY 1** buttons select whether the Frame Store Subpanel is assigned to the video channel or key channel. One of these buttons is always lit. **VIDEO 1** and **KEY 1** may be selected simultaneously.

Operations that can be independently set for video and key channels are as follows:

- Freeze
- Grab
- Field 1 and Field 2

When **VIDEO 1** and **KEY 1** are delegated simultaneously, the key channel settings are automatically aligned with the video channel settings.



The **FRZE** button provides a freeze / unfreeze function that toggles between states. Press once to freeze, press a second time to unfreeze. When enabled, this button stops data from being written to the frame store, resulting in a frozen image.



Pressing the **GRAB** button updates the frame store with new input data and freezes the new data. If freeze is off (moving video is coming out of the frame store), pressing **GRAB** turns on freeze. Freeze can be turned off again by pressing the **FRZE** button. If freeze is on and **GRAB** is pressed, the frame store is unfrozen for two fields and then frozen again. The **FRZE** button remains lit to indicate that freeze is still on. Since the **GRAB** button initiates a single one-time action, it lights only while the button is pressed and for a short instant afterward.



FIELD 1 and **FIELD 2** determine the field, or fields, that are read out while the image is frozen. Either field may be selected, or both may be selected at the same time. (When unfrozen, the Field buttons have no effect.)

A full frame is always frozen, regardless of the state of these buttons. This method of storage allows the operator to decide between fields and frames after the image is frozen.

When an image is read from the frame store in field mode, the "other" field is replicated from the selected field (indicated by the illuminated **FIELD 1** button), if **REPLICATE** mode is selected in the Video Store menu. If **INTERPOLATE** mode is selected in the menu, the "other" field is interpolated from the selected field.

Dropshadows



The **DROP SHDW** button turns shadow mode on and off.



H
POSITION



V
POSITION



OPACITY

When shadow mode is on, the **H POSITION** and **V POSITION** knobs adjust the horizontal and vertical offset of the shadow from the main key signal. A third knob, **OPACITY**, adjusts the opacity of the shadow.

DROP SHDW mode is functional only with primary video inputs that have an associated linear key signal or an M/E in layered mode. No clip and gain adjustments are available to the user. Dropshadow mode does not reduce the bandwidth of the key channel.

Drop Shadow is added to the key signal; the video output is unaffected. Therefore the Frame Store video and key must be composited on top of another layer in order to see the dropshadow.

External Interface Subpanel

The External Interface Subpanel, located at the left end of the upper control panel, provides selection of the type of interface to be used to communicate with external devices.

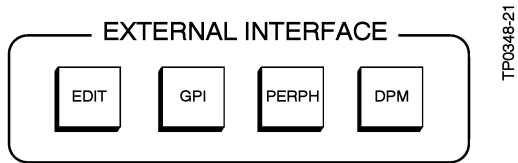


Figure 2-19. External Interface Subpanel

The buttons on the subpanel perform the following functions:



The **EDIT** button enables or disables editor access to the switcher. Initially pressing the button illuminates it and allows external control of the switcher through the Editor port. Pressing the button a second time turns off the button lamp and disables editor control of the switcher. With **EDIT** off, editor protocol messages that affect the switcher are still acknowledged by the switcher, although it does not act under Editor control. For example, the switcher will still send status information to the editor.

NOTE: An editor cannot control the **EDIT** button via software protocol. In addition, the **EDIT** button does not affect communication through the other serial ports.



The **GPI** button enables and disables GPI outputs and control of the switcher from GPI inputs. When **GPI** is on, control inputs from GPI relay contacts are read by the switcher, and GPI outputs from the switcher are also active for external use. When the button is off, all GPI inputs and outputs are disabled.



The **PERPH** button functions in a manner similar to that of the **EDIT** button, except that it controls peripheral access to the switcher via any peripheral-configured serial port. It does not acknowledge protocol messages while it is turned off.



The **DPM** (Digital Picture Manipulator) button turns communication with a digital effects device on or off. The device being controlled is defined through the Configuration menu.

Floppy Disk Drive

The floppy disk drive (Figure 2-20) is located in the left end of the Upper Control Panel.

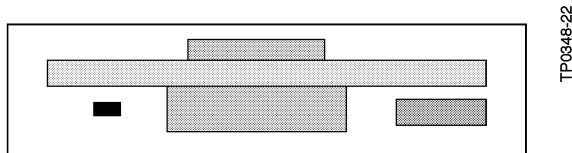


Figure 2-20. Floppy Disk Drive

Operations available by way of the disk drive are

- Formatting disks
- Saving and loading system configurations
- Saving and loading E-MEM register data

Refer to the Disk Menu portion of this section for disk operating instructions. Refer to your *User Guide* for specific, step-by-step, instructions on loading/recalling files from disk.

Preview/Aux Bus Source Select and Delegate Subpanel

The PVW AUX buttons are used to select sources for the preview, mask, and aux bus facilities. This row of buttons is located along the top of the lower section of the Control Panel (see Figure 2-21 and Figure 2-22). The Model 4000-3 is not shown. The functions are identical to the -2A/-2B with the addition of the third M/E buttons.

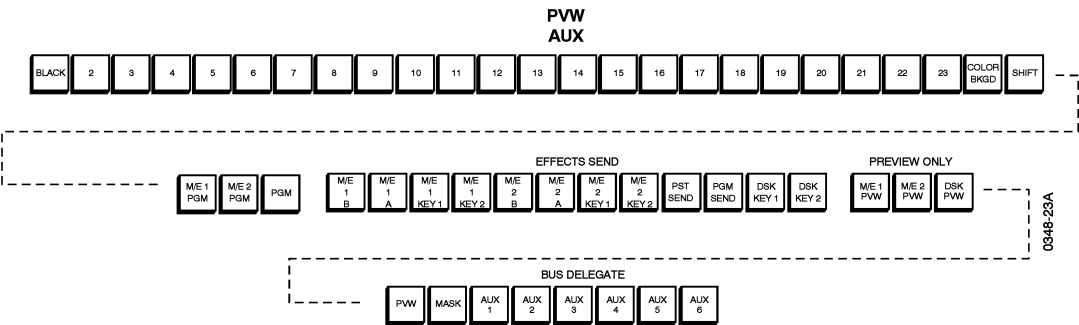


Figure 2-21. -2A PVW AUX Source Select and Delegate Buttons

-2A

The PVW AUX crosspoints consist of five groups of buttons:

- Primary Source Select (**BLACK ... SHIFT**)
- Secondary (Re-entry) Source Select (**M/E 1 PGM ... PGM**)
- Aux 1-4 Effects Send Only (**M/E 1 B ... DSK 2**)
- Preview Only Select (**M/E 1 PVW ... DSK PVW**)
- Bus Delegate Select (**PVW ... AUX 6**)

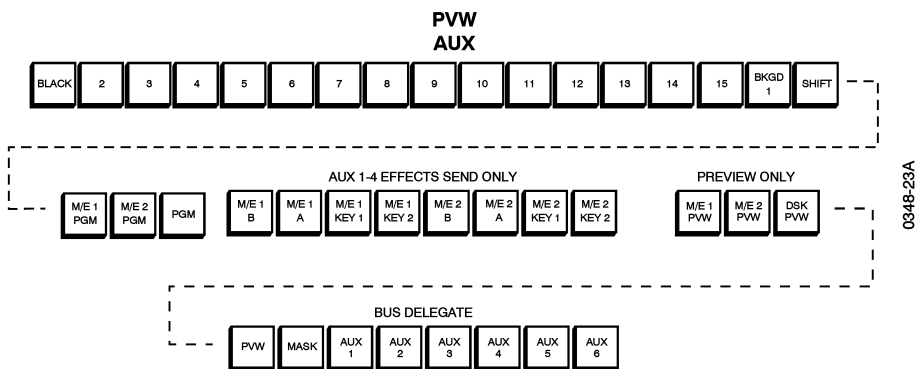


Figure 2-22. -2B PVW AUX Source Select and Delegate Buttons

-2B

The PVW AUX crosspoints consist of five groups of buttons:

- Primary Source Select (**BLACK ... SHIFT**)
- Secondary (Re-entry) Source Select (**M/E 1 PGM ... PGM**)
- Aux 1-4 Effects Send Only (**M/E 1 B ... M/E 2 KEY 2**)
- Preview Only Select (**M/E 1 PVW ... DSK PVW**)
- Bus Delegate Select (**PVW ... AUX 6**)

Source Selection



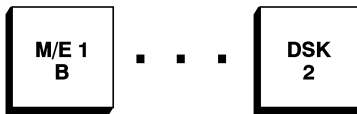
The first *two* groups of buttons select primary and secondary (re-entry) video/key sources for PVW, MASK, and AUX 1-6 output buses.

The re-entry sources are:

- M/E 1 and M/E 2 program outputs
- Switcher (PGM) program output

The selected source button is either bright or dim, depending upon its on-air status. All other buttons in the row are unlit.

Effects Send Buttons



The Effects Send buttons select output of both video and key sources. Key outputs must be associated with selected video sources.

NOTE: *The AUX 1-4 EFFECTS SEND ONLY buttons are functional only when the Effects Send option is installed. (For Effects Send operation, the system automatically configures the aux bus pair (A/B) as a video/key pair. It is not necessary to do this in the Aux Bus Format menu.)*

Preview Only Select Buttons



The Preview Only buttons select the desired preview output to be viewed on the switched preview monitor. When one of the Preview Only buttons is pressed, the **PVW** bus delegate button is automatically selected if it isn't already on.

Choices available on the switched preview output are M/E 1 Preview output, M/E 2 Preview output, and DSK (switcher) Preview output.

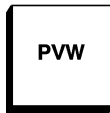
Bus Delegate Buttons

The following delegation sources are available:

- Any of the panel-selectable Aux buses (press one of the **AUX 1** ... **AUX 6** buttons)
- The mask bus (press **MASK**)
- The preview bus (press **PVW**)

One of the Bus Delegate buttons is always lit.

Preview Bus Selection



The **PVW** button enables the selection of the source to be viewed on the switched preview monitor. The selection can be any primary or secondary input, or any of the PVW ONLY crosspoint sources (**M/E1 PVW**, **M/E 2 PVW**, or **DSK PVW**. or any of the crosspoint sources selected on the Preview Subpanel (**PVW PRI**, **M/E 1**, **M/E 2**, **M/E 3**, or **DSK**) on the 4000-3.

Mask Bus Selection



Pressing the **MASK** button in the Bus Delegate group delegates the source select buttons to select a source for the mask generators. The **MASK** button high tallies when the mask bus is contributing to the switcher Program output.

Aux Bus Selection



Aux buses 1 through 6 can be used as simple video routing aux buses or for sending video and key to an external digital device (DPM).

Each bus consists of an “A” bus and a “B” bus under E-MEM control. The “A” buses are for video only; the “B” buses may be configured for either video or key.

To use the Aux bus as a simple routing bus:

For an “A” bus, press the appropriate Bus Delegate button to select the desired Aux bus, then select any primary or re-entry source on the PVW AUX row. To select a “B” bus, hold down the Bus Delegate button while selecting the primary or re-entry source.

To use an Aux bus for “effects looping” operation:

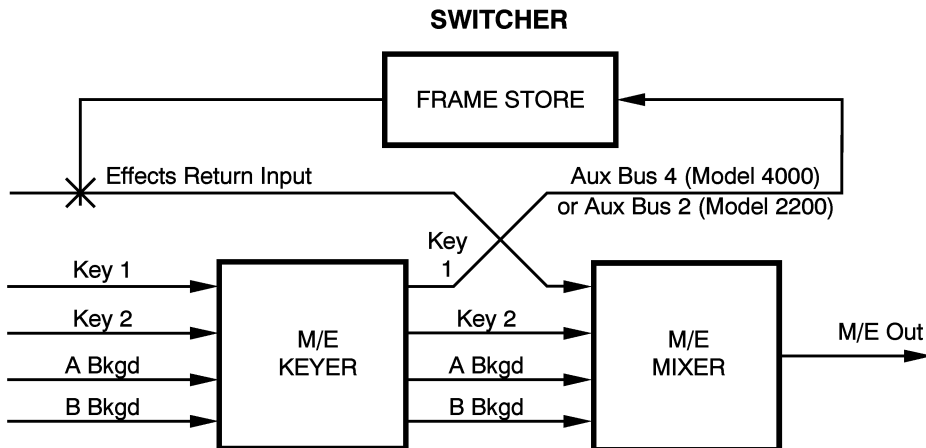
Select the layer of the desired M/E on the Effects Send group of buttons. This causes the selected M/E output to be sent out the Aux bus output. Concurrently, a primary switcher input (that has previously been chosen to receive the return video from the DPM or other external device) is automatically routed to the chosen mixer layer for insertion of the processed video. The primary input to be used for the return path is set up in the Configuration menu.

Effects Send – Looping Mode with Frame Store

With Software Release 5.2 and later, the Frame Store may now be used with the effects send loop to capture the output from a keyer and return the frozen image to the mixer of the same M/E. This is similar to using the effects send loop with an external DPM (Digital Picture Manipulator).

NOTE: You must have the Frame Store option and the Effects Send option installed in order for this feature to operate.

Frame Store Looping Mode takes the output of an M/E Keyer, sends it to the Frame Store module, then returns the output of the Frame Store to the Mix/Wipe circuit of the same M/E in the switcher. This provides the effect of inserting the Frame Store right into the M/E, between the Keyer and the Mix/Wipe system.



0844-01

1. To select Frame Store looping mode, first press the **Aux Bus** button on the main menu panel, then press the **BUS SELECT** soft button in the Aux Bus Menu to select the Aux Bus to be looped (**AUX 4** for the Model 4000 or **AUX 2** for the Model 2200).

2. With the **EFF LOOP MODE** button, select **FRAMESTORE**. This sends the output of the selected Keyer to the Frame Store option module and connects the output of the Frame Store to the Mix/Wipe system of the same M/E.
3. On the Switcher's **Pvw Aux** bus, select the Keyer output to be sent to the Frame Store by pressing **Aux 4 Effects Send Only** button on the Model 4000 or **Aux 2 Effects Send Only** button on the Model 2200.

NOTE: The Keyer **B** and **A** selections apply only when in layered mode.

Open the Aux Bus Shaping menu by pressing **Config** on the top menu panel, then select **AUX BUS FORMAT>** and **AUX BUS SHAPING>** in the submenus.

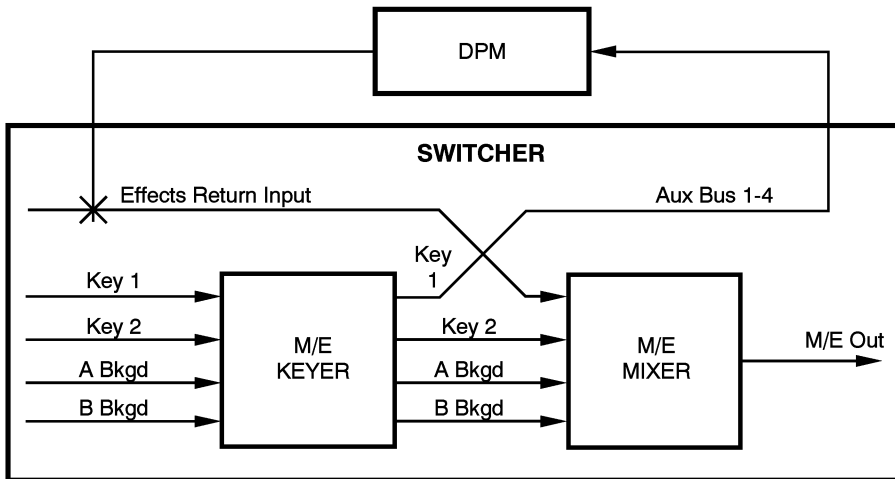
Set the shaping of the effects send video to **SHAPED** by selecting **AUX BUS 4** for the Model 4000 or **AUX BUS 2** for the Model 2200, then selecting **SHAPED** with the **VIDEO/KEY FMT** button.

In Frame Store loop mode, operation of the Effects Send loop is the same as for external looping mode (described in the User Guide), except that manipulation of the Keyer output is done on the Frame Stores panel, rather than by an external Digital Picture Manipulator.

NOTE: The Video Store and Key Store need to be unfrozen.

Effects Send – Looping Mode with DPM

Looping mode takes the output of an M/E Keyer, sends it to an external DPM, then returns the output of the DPM to the Mix/Wipe circuit of the same M/E in the switcher. This provides the effect of inserting a DPM right into the M/E, between the Keyer and the Mix/Wipe system, as illustrated below.



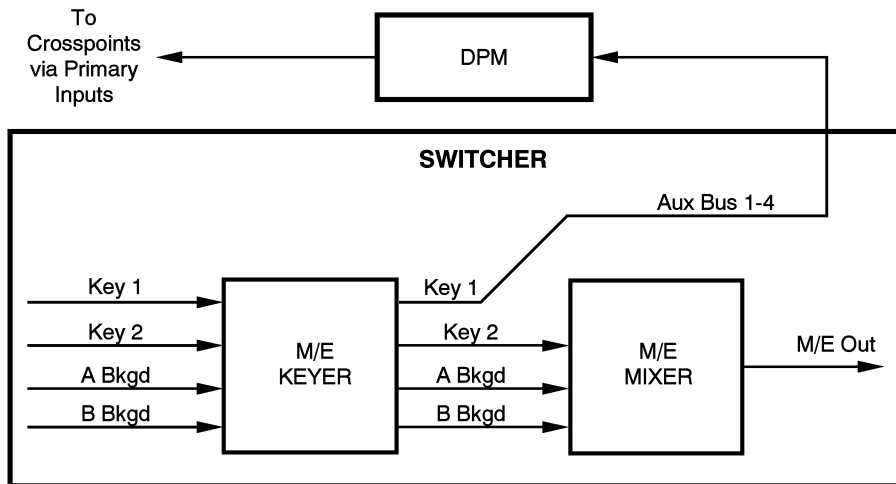
1. To select Effects Send looping mode, first press the **AUX BUS** button on the main menu panel, then press the **BUS SELECT** soft button to select the Aux Bus to be looped. With the **EFF LOOP MODE** button select **EXT LOOP**.
2. With one of the **BUS DELEGATE** buttons, select the (physical) **AUX BUS (1-4)** that you want to use. With the switcher set up as described previously for looping, the DPM output will automatically be routed to the Mix/Wipe system of the M/E whose Keyer output you sent to the DPM.

NOTE: The *A* and *B* bus selections apply only when in layered mode.

3. Select the Keyer output to be sent to the DPM by pressing one of the **EFFECTS SEND** buttons on the PVW/ AUX row of buttons (**M/E 1 B** through **DSK 2**).

Effects Send – Non-Looping Mode with DPM

Non-Looping mode takes the output of an M/E Keyer and sends it to an external DPM. The output of the DPM may then be used as an input to the switcher and may be selected on any bus on the control panel. This allows the output of one Keyer to be manipulated by the DPM, then used as a video or key input by the other M/E or the Program/ Preset system. See the illustration that follows.



1. To select Effects Send non-looping mode, first press the **AUX BUS** button on the main menu panel, and then press the **BUS SELECT** soft button to select the Aux Bus to be looped. With the **EFF LOOP MODE** button select **NO LOOP**.
2. Select the Keyer output to be sent to the DPM by pressing one of the **EFFECTS SEND** buttons on the PVW / AUX row of buttons (M/E 1 A through DSK 2).

NOTE: *The A and B bus selections apply only when in layered mode.*

3. With one of the **BUS DELEGATE** buttons, select the (physical) **AUX BUS (1-4)** that you want to use. With the switcher set up as described previously for non-looping, the DPM output will be routed to the previously-mapped crosspoint column on the Source Select panel.
4. If the DPM output has been connected to a primary input and mapped to one of the crosspoints, it may then be selected as a source on any output bus on the Source Select panel.

Backgrounds Subpanel

-2A

NOTE: This description is relevant for the Model 4000-2A only. The Model 4000-2B and 4000-3 do not have this subpanel.

The Backgrounds Subpanel, located in the upper panel to the left of the Menu Display Subpanel, services and controls the two independent background generators in the switcher. It has the ability to wash from any of three secondary wipe options (M/E 1, M/E 2, and DSK). The buttons and knobs control background wash and other background matte features. See Figure 2-23.

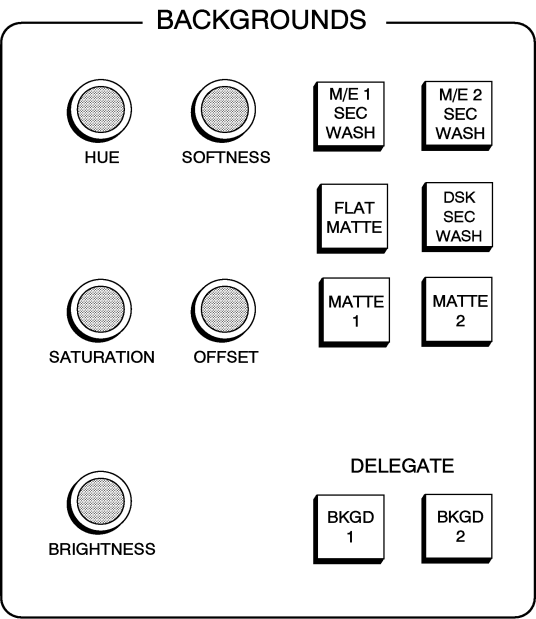


Figure 2-23. Background Subpanel

Background Delegate Selections

-2A



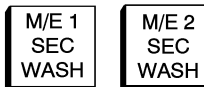
Pressing **BKGD 1** or **BKGD 2** one of the two independent solid color background generators — Background Generator 1 or Background Generator 2.

Background Modifier Control Buttons

There are six background modifier control buttons in the Background Subpanel. The operation of each is described below:



The **FLAT MATTE** button selects standard flat matte mode. Use the soft knobs to set the hue, saturation, and brightness for the currently selected background when selected. **FLAT MATTE** enabled is the default background modifier setting. Pressing this button deselects any of the other three matte wash selection buttons.



The **M/E 1/SEC WASH** or **M/E 2/SEC WASH** (optional) buttons enable a wash between the currently delegated background and a second internal matte. Pressing either of these buttons allows you to change the characteristics of the wash with the adjacent five soft knob controls.



The **DSK SEC WASH** button enables a wash between the currently delegated DSK background and a second internal matte. Pressing this button activates the same modifier controls as the M/E 1 and M/E 2 SEC WASH buttons.



The **MATTE1** and **MATTE 2** buttons delegate the background matte modifier controls (**HUE**), (**SATURATION**), and (**BRIGHTNESS**) to the internal matte when any of the wash buttons are selected. The **MATTE** buttons can be either ON or OFF when any of the wash modifier buttons are selected; however, they are turned off when **FLAT MATTE** is on.

Background Control Knobs

-2A



The **HUE** knob adjusts the hue of the currently selected background when **FLAT MATTE** is selected or the internal matte when a wash pushbutton and **MATTE 2** are selected.



The **SATURATION** knob adjusts the color saturation of the currently selected background when **FLAT MATTE** is selected or the internal matte when a wash pushbutton and **MATTE 2** are selected.



The **BRIGHTNESS** knob adjusts the color brightness of the currently selected background when **FLAT MATTE** is selected or the internal matte when a wash pushbutton and **MATTE 2** are selected.



The **SOFTNESS** knob adjusts the softness (gain) of the transition (wash) between the two matte generators when either the **M/E 1 SEC WASH**, **M/E 2 SEC WASH**, or **DSK** button is selected. Softness is not adjustable while **FLAT MATTE** is active.



The **OFFSET** knob adjusts the offset position of the wash modulation when either the **M/E1 SEC WASH**, **M/E 2 SEC WASH**, or **DSK SEC WASH** button is selected. Offset is not adjustable while **FLAT MATTE** is active.

Remote Aux Bus Panels

The Remote Aux Control Panels allow you to control the switcher aux buses from a remote location. There are three models of the Remote Aux Panels, each identified by the number of rack units (RUs) it occupies in the equipment rack.

- 1-RU panel (Option Part Number 088901-00)
- 2-RU panel (Option Part Number 088902-00)
- 3-RU panel (Option Part Number 088903-00)

The 1-RU and 2-RU panels (Figure 2-24) are functionally identical. The 1-RU panel is designed for areas with very restricted space, and has small crosspoint buttons containing LED tally lamps. The 2-RU panel has large crosspoint buttons with internal tally lamps. Each of these panels must be set up to control a specific aux bus and must have the setup changed to control another bus.

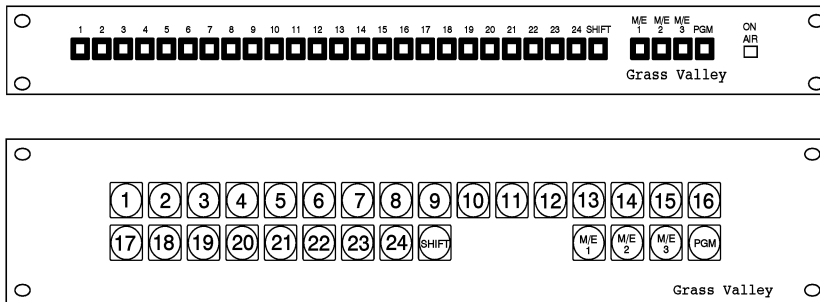


Figure 2-24. 1-RU and 2-RU Remote Aux Control Panels

The 3-RU panel (Figure 2-25) has large buttons and is designed for locations where it is desirable to operate more than one bus. This panel will normally control all aux buses but can be set up to lock out specific buses.

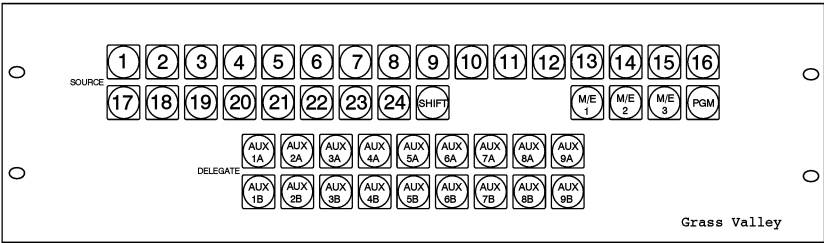


Figure 2-25. 3-RU Remote Aux Control Panel

As many as 32 Remote Aux Panels can be attached to one switcher.

Source Selection



The Remote Aux Panels are designed to control 48 inputs (24 unshifted and 24 shifted). When used with the -2B, inputs 1 through 16 and **SHIFT 1** through **SHIFT 16** will be the active crosspoints. Input buttons 17 through 24 are disabled, as will the **M/E 3** button.

Each crosspoint lamp on the 2-RU or 3-RU panel will high tally when that input is on air. There is an **ON AIR** lamp on the one RU panel which will illuminate to indicate that the selected input is on air. The on-air tally can be permanently enabled on all panels.

Rear Panel Switches

The rear panel includes a number of switches that control operating modes, such as address, bus enable, delegate enable, and test mode. These switches are set up during installation, as described in the Installation section of the Model 4000 *Installation and Service Manual*.

Remote Aux Operation

Operation of the Remote Aux Panel is identical to operation of the local aux panel installed in the switcher control panel.

If the switcher setup identifies a bus pair (e.g. 2A and 2B) as video and key, selecting a source on bus 2A will also change 2B. To split the key selection will require use of the 3-RU panel or two of the 1-RU or 2-RU panels (one set up for each bus).

More than one Remote Aux Control Panel can attempt to control a single aux bus. When two or more panels controlling the same bus have source buttons pressed, the panel with the highest address will control the source.

Model 4000

Menu Descriptions

3

Menu Display Subpanel

Many Model 4000 features are accessed via the Menu Display on the upper control panel. Top-level menus are displayed by pressing the appropriate buttons on the Menu Display Panel at the left of the Menu Display (Figure 3-1).

You make menu choices by pressing the “soft buttons” below the display, and sometimes by making parameter adjustments with the “soft knobs” at the right end of the display. These controls are called “soft” because their functions change with different menus.

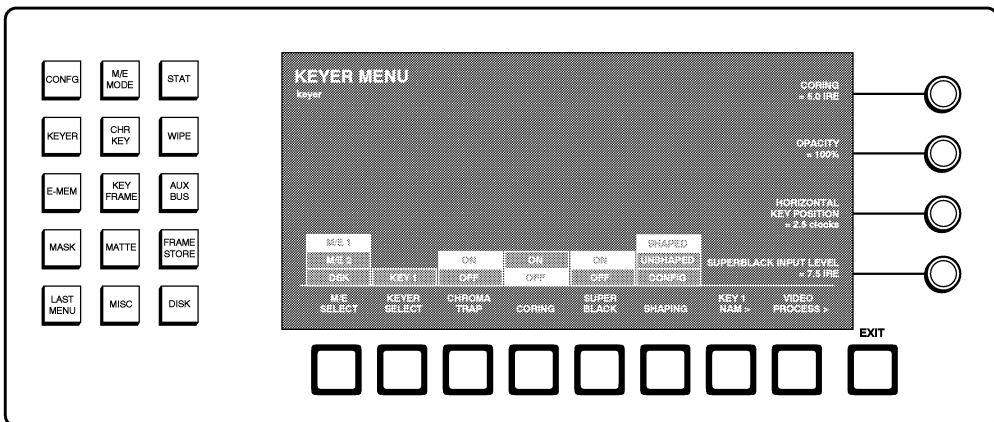
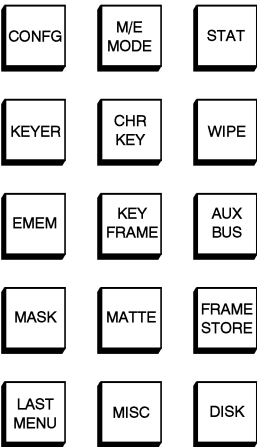


Figure 3-1. Menu Display Subpanel

Top-Level Menu Buttons



The menu system is divided into groups of related menus. Any particular group can be accessed by pressing one of the top-level buttons on the Main Menu subpanel. This action brings up the corresponding top-level menu, which assigns specific functions to the soft buttons and knobs. The **LAST MENU** button recalls the last previously chosen menu.

Illustrations and descriptions of the menus are provided on the following pages.

Soft (Function) Buttons and Soft Knobs

The eight function buttons below the menu display implement the menu-selected functions or access lower -level menus. A dedicated **EXIT** button allows you to return to the menu one level higher on the menu tree.

The four knobs at the right end of the menu display are available for adjusting various parameters. These knobs are active only when labels appear adjacent to them in the menu display. Many menus do not require the use of the soft knobs.

Menu Display and Graphics

In addition to specifying functions for the soft buttons and soft knobs, the high -resolution menu display is sometimes used for showing bit -mapped graphics. For example, menu -selectable wipe patterns are shown pictorially on the display when the **WIPE** top-level menu button is pressed.

The intensity of the display makes it highly legible in both low -light and bright -light environments.

Menu Descriptions

Many control panel functions are enhanced by “soft” controls available through the use of the Menu Display.

This portion of the Menus section illustrates the top-level menus and their submenus, and describes the functions of the soft buttons and soft knobs accessed by each.

The menus presented here are arranged in hierarchical order; that is, after each top-level menu, the submenus under that top-level menu are described before going on to the next top-level menu. (All menus and submenus are listed in the local Table of Contents at the beginning of this section.)

NOTE: *The Configuration Menu and submenus are also discussed in the Startup section of the 4000 User Guide.*

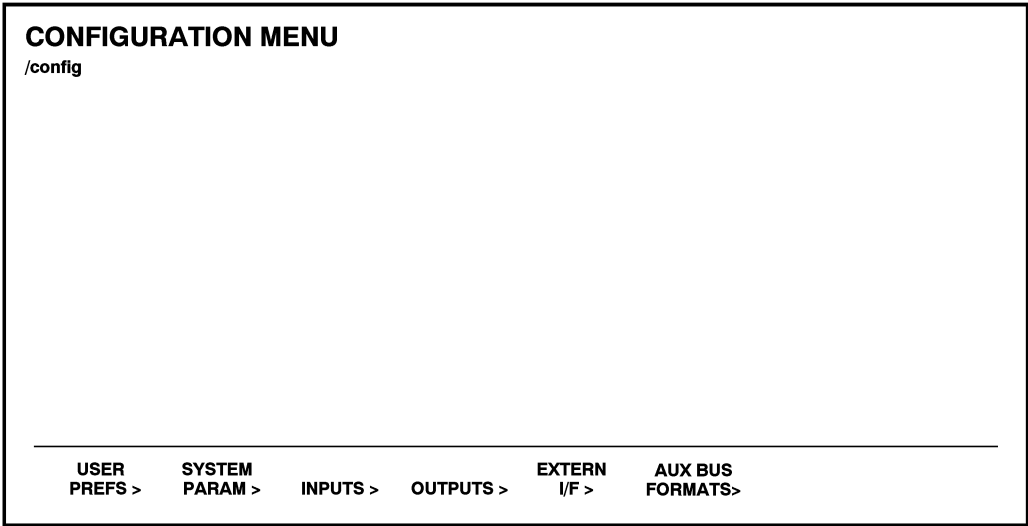
Top-level menus may be displayed by pressing the buttons at the left of the Menu Display. Submenus are then brought up by pressing the soft buttons at the bottom of the display. Each menu function that will call up a submenu is indicated by a “>” symbol at the end of the function name in the display.

Some menus or submenus may also be brought up by automatic menu delegation which is activated by double -pressing certain buttons on the control panel. Auto delegation is discussed near the beginning of Section1, Control Panel Descriptions.

NOTE: *The menus in this section show the PGM/PST bus as a selectable bus. If you have a -2B switcher, substitute DSK for PGM/PST.*

The Configuration Menu

The Configuration Menu is a top-level menu which provides access to the User Preferences, System Parameters, Inputs, Outputs, External Interface, and Aux Bus Formats sub-menus.



To begin the setup process, press the **CONFIG** button on the Menu Display Subpanel to display the Configuration Menu and the sub-menu choices.

1. **USER PREFS >** — Sets up operating parameters, such as Keyer and Preview preferences and default switcher states.
2. **SYSTEM PARAMS >** — Sets aspect ratio, the matte generator limiter and the system clock.
3. **INPUTS >** — Defines your inputs and name crosspoint buttons.
4. **OUTPUTS >** — Adjusts the luminance and chroma limiter settings on the switcher outputs.

5. **EXTERN I/F >** — Selects or changes settings for the Editor, DPM, and Peripherals Interfaces connected to the Model 4000.
6. **AUX BUS FORMAT>** — Sets the “B” Aux Bus on Aux buses 5B–9B to be either a separate video or key bus to accompany the corresponding “A” Aux Bus. Set Aux Buses 1 through 4 (physical/logical) for shaped or unshaped video output.

Configuration Sub-Menus

USER PREFERENCES

- Keyer Prefs
- Preview Prefs
- Beeper Prefs
- Define Defaults
- E-MEM Prefs

SYSTEM PARAMETERS

- Aspect Ratio
- Matte Gen Lim
- Set Clock Menus (Date / Time)

INPUTS MENU

- Analog Video Inputs
- Analog Key Inputs
- Analog Input Timing
- Map Inputs and Name Crosspoint Button
- Chroma Key Inputs
- GPI Inputs

OUTPUTS MENU

- Output Digital Resolution Menu

EXTERNAL INTERFACE MENUS

- Editor I/F
- DPM I/F
- Peripheral I/F
- GPI Outputs

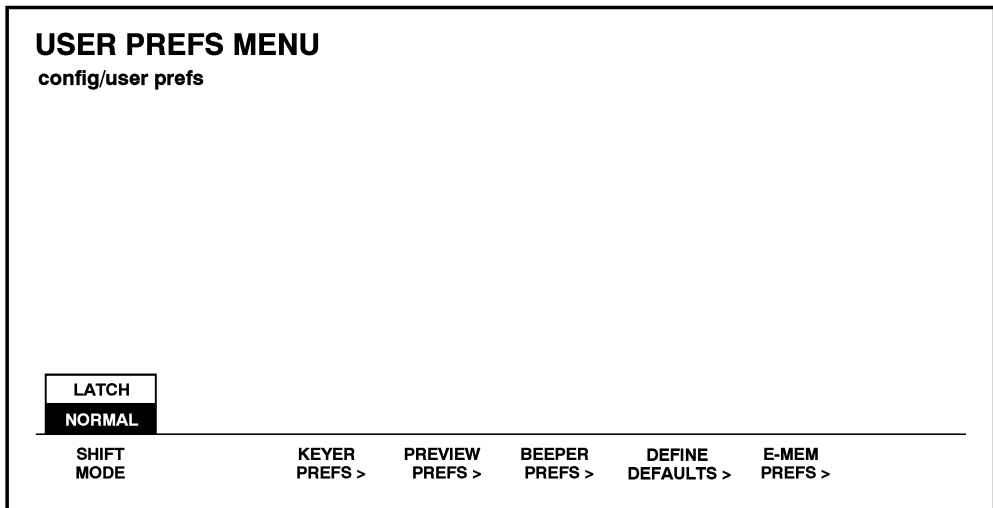
AUX BUS FORMAT MENU

- Aux Bus Shaping

User Preferences Menu

Use the User Preferences Menus to gain access to keyer, preview, beeper, and switcher defaults submenus.

1. From the Configuration Menu, press the **USER PREFS >** button to access the User Preferences Menu.



2. Select either **LATCH** or **NORMAL** with the **SHIFT MODE** soft button.

The **LATCH** selection allows you to lock any switcher crosspoint bus into a shifted (UPPERCASE) state. This allows ready access to those input sources mapped to shifted crosspoints. (See “Configuring Switcher Inputs” in the *User Guide*.)

With **LATCH** enabled on the User Preferences Menu, press and hold the **SHIFT** button while selecting a crosspoint. The bus containing that crosspoint is now locked into a shifted state. Any crosspoint selected on this bus will now be a shifted crosspoint. The **SHIFT** button light will remain ON while the bus is in this state.

To unshift a bus, press and hold the **SHIFT** button. Select a crosspoint button. The bus is now unshifted, and the **SHIFT** button lamp is OFF.

Keyer Preferences Menu

From the User Preferences Menu, press the **KEYER PREFS>** button to display the Keyer Preferences Menu:

KEYER PREFS MENU
config/user prefs/keyer prefs

ON	ON
OFF	OFF

DSK DROP

KEY MEMORY

CLEAR KEY MEM>

1. The **DSK DROP** button allows you to enable or disable DSK Drop mode. DSK Drop mode ON drops any DSK when a program bus crosspoint is pressed. (This is usually left OFF.)
2. The **KEY MEMORY** Button allows you to turn on or off the key memory feature. ON enables crosspoints to remember all key settings. (This is usually left ON.)

Clear Key Memory Menu

1. Press **CLEAR KEY MEMORY** to invoke the Clear Key Memory Menu.

CLEAR KEY MEMORY MENU

config / user prefs / keyer prefs / clear key mem

CURRENT XPT

7

M/E 1	
M/E 2	A
DSK	B
AUX	KEY 1
MASK	KEY 2

SECTION SELECT

BUS SELECT

CLEAR XPT

CLEAR BUS

CLEAR SECTION

CLEAR SWITCHER

Press a button below to clear key memory for –

CLEAR XPT: the current xpt on the selected bus
CLEAR BUS: all xpts on the selected bus
CLEAR SECTION: all xpts on all buses in the selected section
CLEAR SWITCHER: all xpts in the switcher

This menu allows you to clear the key memory settings for various areas of the switcher.

2. With the **SECTION SELECT** and **BUS SELECT** buttons, select the area of the switcher whose key memory you wish to clear.

To select a specific crosspoint on a bus: After selecting the section and bus, press the specific crosspoint on the selected bus. (The number of that crosspoint will appear in the **CURRENT XPT** box in the menu.)

3. Use the **CLEAR XPT**, **CLEAR BUS**, **CLEAR SECTION**, or **CLEAR SWITCHER** button to clear the desired memory area.

Preview Preferences Menu

From the User Preferences Menu, press the **PREVIEW PREFS>** button to display the Preview Preferences Menu.

NOTE: Please note that these menu setups affect only the PVW output connectors and the PVW Monitor(s).

PREVIEW PREFS MENU

config/user prefs/preview prefs

PUSH TO PREVIEW TIMEOUT
= 3 secs

M/E 1	PGM	ALL KEYERS
M/E 2	LOOKAHEAD	OFF
PGM/PST	PGM	OFF

	AUTO	ALL KEYERS
	LOOKAHEAD	DELEG KEYS
M/E 2	PGM	OFF

PVW
SELECT

	PGM	OFF

PVW
MODE

	ALL KEYERS
	DELEG KEYS
	OFF

DIM
PVW

ON
OFF

PUSH TO
PVW

1. Use the **PVW SELECT** button to select the switcher subsystem; M/E 1, M/E 2, or PGM PST, that you wish to set preview options for.
2. Use the **PVW MODE** button to select the preview mode desired for the selected switcher subsystem:

NOTE: The optional M/E Preview Mezzanine must be installed for each M/E in order to select **AUTO** and **LOOKAHEAD** Preview Modes. **These selections** will not be displayed in the **menu** if the mezzanine board is not installed.

The Preview Mode choice depends on how many monitors you have per M/E, and how you wish to use them (see Figure 3-2).

AUTO – Use this mode to automatically toggle between PGM and PVW (next transition) when a single M/E monitor is used. A high tally on the M/E displays PVW output. A low tally on the M/E displays PGM output.

LOOKAHEAD – Use to review what is going on-air next. Always shows the next transition of the selected M/E.

PGM – Use this selection to have the PGM output of the M/E or PGM/DSK displayed on the Preview monitor. (Useful if your PGM monitor goes down — signal is feed from the switched PVW output.

KEY PVW – (Displayed when **PGM/PST** is selected.)
Previews **DSK 1** and **DSK 2** keys over the **PGM/PST** transition on the Preview Monitor.

3. Use the **DIM PVW** button to dim the preview of all keyers using a mask in that M/E or PGM/DSK, or to turn off the preview dim function so that the preview never dims regardless of masking.
4. Assign a Dim Preview mode to one of the following:

ALL KEYERS – all keyer previews using a mask in that M/E or DSK will dim the Preview monitor.

DELEG KEYR – the keyer which is currently delegated and inserting a mask in that M/E or DSK will dim the Preview monitor.

OFF – preview never dims, regardless of masking.

5. Press the **PUSH TO PVW** button to enable/disable the push-to-preview mode for the entire switcher. Hold down the key delegate button (for example **KEY 1** or **KEY 2** on the Keyer panel) of the appropriate keyer for 1/2 second or more to display the M/E look-ahead preview along with the selected keyer output on the switched preview monitor.

When the key delegate button is released, the preview display remains on for a programmed time-out period, as set by the **(PUSH TO PREVIEW TIMEOUT)** soft knob, before reverting to its original state.

(PUSH TO PREVIEW TIMEOUT)—Sets how long the preview will remain on after you have released the key delegate button. The default value for the auto preview timeout is 3 seconds. Any adjustments to clip or gain resets the time-out, thus maintaining the auto preview mode while making clip and gain adjustments.

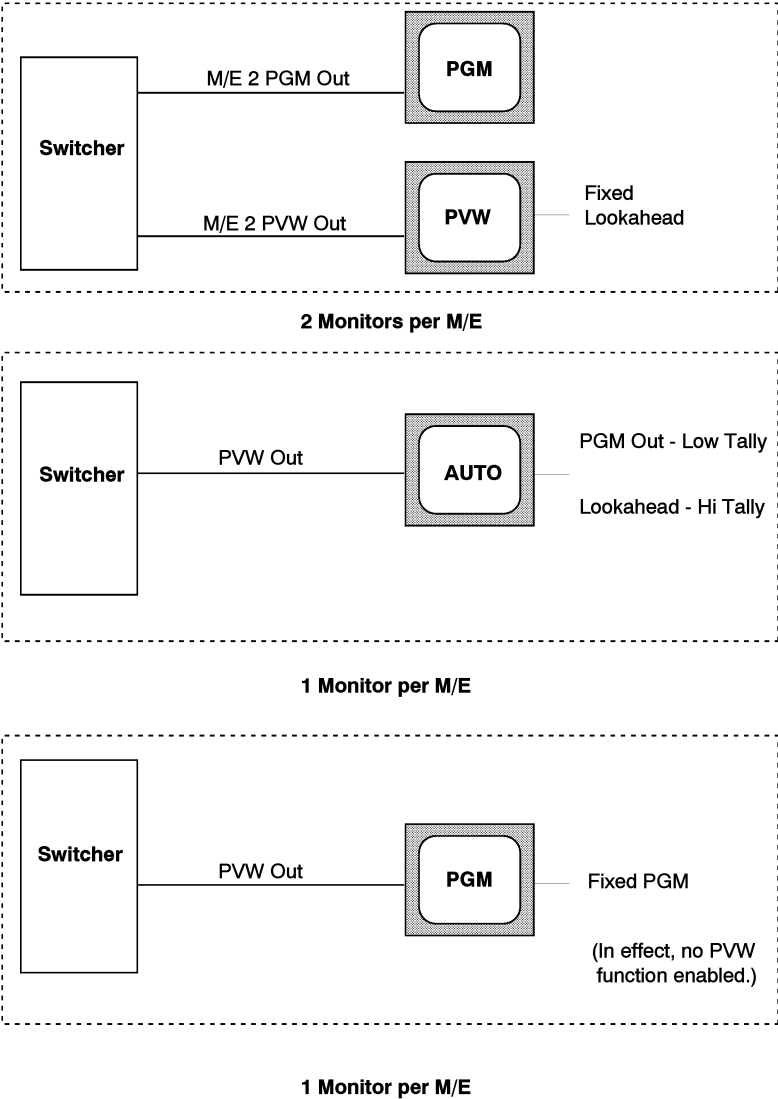
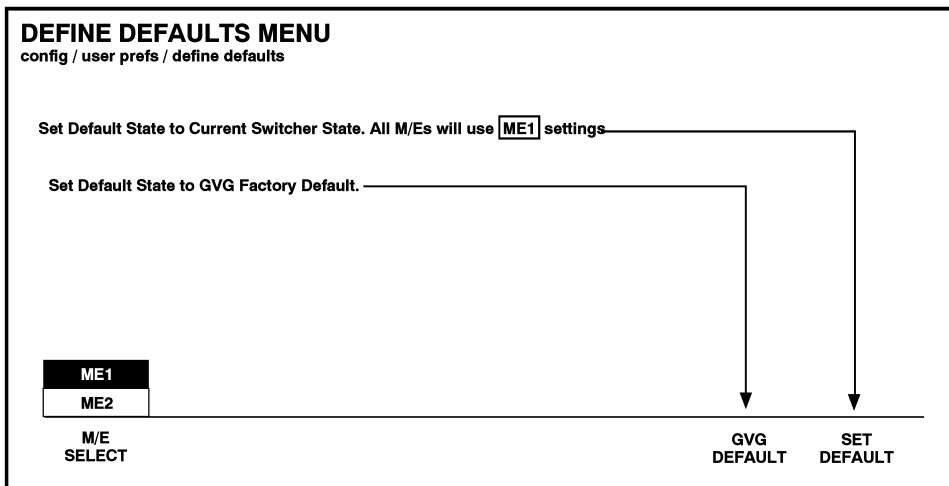


Figure 3-2. Preview Mode Configurations

Define Defaults Menu

Use the Define Defaults Menu to change the default values that are stored in memory and used when the switcher is turned on. (You may also use the **CLEAR WORK BUFR** button). The values stored in the User-Defined Default Buffer (battery-backed RAM) are loaded into the Working Buffer when power is applied to the switcher. This sets the initial state of the switcher parameters. With the **M/E SELECT** button, select the M/E whose settings you want to be used during power-up. (Only one set of values is stored for the M/Es, therefore both M/Es will use the same values at boot-up.)

1. On the switcher panel (including the selected M/E), set up the switcher state that you want the switcher to assume when it is turned on.
2. Press **SET DEFAULT** to enter the new default values.
3. Pressing the **GVG DEFAULT** button will restore the factory-set default values to the switcher. These are stored in non-volatile memory (ROM).



E-MEM User Preferences

You may wish to customize the E-MEM system. E-MEM preferences are selected on the Configuration/User Preferences Menu/E-MEM User Preferences Menu shown below.

RUN LEVER— Use to enable or disable the E-MEM run lever.

KEYFRAME EDITING — Use to enable or disable keyframe editing.

MASTER E-MEM — Use to enable Normal mode or enable 300-Style E-MEM control.

E-MEM USER PREFS MENU
config/user prefs/E-MEM prefs

ENABLE	ENABLE	
DISABLE	DISABLE	300 STYLE
		NORMAL

RUN
LEVER

KEYFRAME
EDITING

MASTER
E-MEM

Normal Mode

In Normal mode on a 2 M/E Switcher, when you do a Learn or Recall, individual M/Es are simply levels in the Master E-MEM register.

In Normal mode on a 3 M/E Switcher, when you do a Learn or Recall, the Master E-MEM forces all individual enabled M/Es to align with the same register that the Master E-MEM is pointing to and causes the individual M/Es to learn the current Switcher setup into those aligned registers.

Learn A Register

We will look at how the Learn operation works with Auto Run, Auto Recall, and Effects Dissolve in the Normal mode.

Auto Recall

- Auto Recall ON — Switcher learns the current Switcher enables into the Master E-MEM register
- Auto Recall OFF — Switcher does not learn Switcher enables into the Master E-MEM register

Auto Run

- Auto Run ON — Operation does two things:
 - Enables the Auto Run function
 - Turns on Independent Timeline runs
- Auto Run OFF — Operation does two things:
 - Disables the Auto Run function
 - Turns on Master Timeline runs

NOTE: *In a later Switcher software release, Independent and Master Timeline runs will be controlled by a menu selection.*

Effects Dissolve

- Effects Dissolve ON — Switcher learns that Effects Dissolve is on into the Master E-MEM register
- Effects Dissolve OFF — Dissolve is not learned into Master E-MEM register

Recall A Register

We will look at how the Recall operation works with Auto Run, Auto Recall, and Effects Dissolve in the Normal mode.

Auto Recall

- Auto Recall ON — Switcher recalls learned enables before recalling the effect
- Auto Recall OFF — Switcher does not recall the learned enables. The Switcher recalls only what is currently enabled on the Control Panel

Auto Run

- Auto Run ON — After the effect is recalled it runs (if the effect has multiple keyframes stored)
- Auto Run OFF — After the effect is recalled it waits at the first keyframe

Effects Dissolve

- Effects Dissolve ON (or ON when Learned) — Switcher applies a dissolve from the Switcher's current state (or register) to the register being recalled
- Effects Dissolve OFF (and OFF when Learned) — Switcher does nothing

300 Style Mode (3-M/E Switchers Only)

In 300 Style mode, when you do a Learn or Recall, the Master E-MEM allows individual M/Es to “skew registers” (that is, allows M/Es to point to different registers) than the Master E-MEM is pointing and allows the Master E-MEM to learn the individual M/E’s skewed register numbers. This operation does not change the content of those skewed M/E registers, because the operation does not write the current M/E settings into those registers. You must independently learn the M/E settings into the individual M/E E-MEMs.

Registers that are Learned using the Model 300 Style mode have an “M” in the Master E-MEM display as a mode identifier.

The Learn and Recall operation, described in the previous Normal mode text, is identical in the 300 Style mode. Therefore, that text is not repeated here.

Operational Defaults in Either Mode

- If *Auto Run* is ON when the register is Recalled, the keyframe effect runs.
- If *Auto Run* is OFF when the register is Recalled, the keyframe effect does not run when Recalled.
- If *Auto Recall* is ON when the register is Learned and ON when the register is Recalled, the Switcher enables are learned with the effect and re-established before the effect is recalled.
- If *Auto Recall* is ON when the register is Learned and OFF when the register is Recalled, the Switcher enables do not change from the current settings.
- If *Auto Recall* is OFF when the register is Learned and ON when the register is Recalled, all Switcher enables go off.
- If *Effects Dissolve* is ON when the register is Learned, the Switcher runs the dissolve when the register is recalled whether the Effects Dissolve button is currently ON or OFF.

Beeper Preferences

You may wish to customize the beeper alert system. Beeper preferences are selected on the Configuration/User Preferences Menu/Beeper Preferences Menu shown below.

BEEPER ON/OFF — Use to enable or disable the beeper alert system.

WARNING — Use to enable or disable beeper warnings. (For example: On the Keyer Copy Menu, if you try to copy M/E 1 Key 1 to M/E 1 Key 1 (copy a key onto itself) you will get a beep with Beeper Prefs selection: WARNING ON.)

END OF KNOB — Enable or disable the beeper alert that sounds when the knob is turned to either end of its' range.

KNOB CENTER — Enable or disable the beeper alert that sounds when the knob is turned to the center of its' range.

INACTIVE KNOB — Enable or disable the beeper alert for knobs "turned off" during the current switcher state.

BEEPER PREFS MENU
config/user prefs/beeper prefs

ON	ON	ON	ON	ON
OFF	OFF	OFF	OFF	OFF
BEEPER ON/OFF	WARNING	END OF KNOB	KNOB CENTER	INACTIVE KNOB

System Parameters Menu

Use the System Parameters Menu to set the aspect ratio (ratio of television picture width to height), to select the matte generator chroma limiting algorithm, and to set the system clock.

Press the **SYSTEM PARAMS >** soft button from the Configuration Menu to bring up the System Parameters Menu:

SYSTEM PARAMETERS MENU

config/system param

		XMITABLE
	FIELD 1	VALID RGB
4 X 3	FIELD 2	BOTH
16 X 9	NONE	NONE

ASPECT RATIO

FIELD DOMINANCE

MATTE GEN LIM

SET CLOCK >

ASPECT RATIO — Soft button may be set to either the **4 x 3** or **16 x 9** setting, depending on your installation requirements.

FIELD DOMINANCE — (**FIELD DOMINANCE** set to **NONE**), selection changes become effective at the beginning of the next field (immediately after the functions have been changed).

Using Field Dominance

If the Model 4000 output is going to be recorded onto tape that will later be edited along with other tape, it is important that changes take place consistently on the *same* field. They can occur on either Field 1 or Field 2 of the frame, but need to be on the same field every time. If this is not done, there will be a “flash” at the edit in the resulting taped video.

With **FIELD 1** selected as the dominant field, if a change takes place just prior to Field 1, the change will become effective at the beginning of Field 1. But if the change takes place prior to Field 2, the change will be delayed by one field so that it also becomes effective at the beginning of the next Field 1. This way, all changes will be synchronized to take place at the beginning of Field 1.

Similarly, if **FIELD 2** were selected as the dominant field, those changes that take place prior to Field 1 would be delayed until Field 2.

If you are recording the switcher output on video tape and will be doing post-production editing of the tape, it is recommended that you set Field Dominance for a specific field (either **FIELD 1** or **FIELD 2**), and leave it at that setting. This will ensure that all changes will take effect consistently on the same field.

If an Editor or a GPI trigger initiates one of these functions, it will produce the same effect as a control panel change. That is, the initiation of any of these functions will be delayed until the beginning of the selected dominant field.

The **MATTE GEN LIM** button is used to choose the matte generator chroma limiting algorithm. The selections are:

XMITABL — Prevents the total signal (luminance and chrominance) from exceeding the NTSC transmission standard.

VALID RGB — Limits colors to those which generate red, green, and blue values within the 0 to 100% range.

BOTH — Selects a valid RGB color limiter which also prevents the encoded signal envelope from exceeding NTSC transmission level. This is the system default mode.

NONE — Turns off all algorithm methods for matte generator limiting.

SET CLOCK> opens the Set Clock Menu which allows you to set the system time and date.

Set Clock Menu

Use the Set Clock Menu to set the system date and time.

1. From the System Parameters Menu, press the **SET CLOCK >** soft button to display the Set Clock Menu.

The screenshot displays the 'SET CLOCK MENU' interface. At the top left, the title 'SET CLOCK MENU' is followed by the path 'config/system param/set clock'. On the right side, the current settings are listed: 'YEAR = 1994', 'MONTH = March', and 'DAY = 4'. In the center, a box shows the current 'CLOCK' as 'April 1, 1994 8:31 AM'. Below this, a larger box instructs the user to 'Press "CONFIRM" button to update the clock setting.' with a downward arrow pointing to the 'CONFIRM' button at the bottom. On the left, there is a toggle switch for 'DATE' and 'TIME', with 'DATE' currently selected. At the bottom left is the 'SELECT' button.

If the date and/or time are incorrect, they may be reset as follows:

2. Set the date by selecting **DATE** with the **SELECT** button and turning the soft knobs to select the appropriate **(YEAR)**, **(MONTH)**, and **(DAY)**.
3. Press the **CONFIRM** button to enter the new date.
4. Set the time by selecting **TIME** with the **SELECT** button and using the soft knobs to select the **(HOUR)**, **(MINUTE)**, and **(SECOND)**. Press the **CONFIRM** button to enter the new time.

Inputs Menu

Use the Inputs Menu to enter or change the various configuration settings for your inputs. Set up your top and bottom test signal parameters directly from this menu.

INPUTS MENU

/config/inputs

100% COLOR BARS

75% COLOR BARS

HORIZ TIMING

MULTIPULSE

PULSE & BAR

CHR KEY TEST

H RAMP

WALKING BITS

TOP

TEST SIGNAL

100% COLOR BARS

75% COLOR BARS

HORIZ TIMING

MULTIPULSE

PULSE & BAR

CHR KEY TEST

H RAMP

WALKING BITS

BOTTOM

TEST SIGNAL

ANLG VIDEO

ANLG KEY

ANLG INPUT

MAP

CHR KEY

GPI

INPUTS >

INPUTS >

TIMING >

INPUTS >

INPUTS >

INPUTS >

Analog Video Inputs Menu

Use the Analog Video Inputs Menu to select the component format with setup or no setup for each analog video input.

1. From the Inputs Menu, press the **ANLG VIDEO INPUTS>** button to select the Analog Video Inputs Menu as shown below.

ANALOG VIDEO INPUTS MENU					
/config/inputs/anlg_vid_inp					
INPUTS					
CARD 1	33-36	BETA	OFF	BETA	OFF
CARD 2	37-40	BETA	OFF	BETA	OFF
CARD 3	41-44	BETA	OFF	BETA	OFF
CARD 4	45-48	BETA	OFF	BETA	OFF
CARD 5	49-52	BETA	OFF	BETA	OFF
CARD 6	53-56	BETA	OFF	BETA	OFF
CARD 7	57-60	BETA	OFF	BETA	OFF
CARD 8	61-64	BETA	OFF	BETA	OFF
		RGB		RGB	
		BETA		BETA	
		YUV	OFF	YUV	OFF
		MII	ON	MII	ON
CARD 2		INP 37	INP 37	INP 39	INP 39
CARD SELECT		FORMAT	SETUP	FORMAT	SETUP

2. Increment the **CARD SELECT** button until you reach the video input you want to assign. There are 2 video inputs per card. In the menu above a format is assigned to the video inputs on Card 2 for inputs 37 and 39.
3. After formatting the input, you must determine whether the video input requires **SETUP** or **NO SETUP**. Do this by selecting **ON** or **OFF** for each input. The **SETUP** selection sets all outputs for a black level 7.5 IRE above blanking. The **NO SETUP** selection puts black at blanking level.

Analog Key Inputs Menu

Use the Analog Key Inputs Menu to select the component format for each analog key input.

1. From the Inputs Menu, press the **ANLG KEY INPUTS>** button to select the Analog Key Inputs Menu as shown below.

ANALOG KEY INPUTS MENU

/config/inputs/anlg_key_inp

INPUTS

CARD 1	33-36	NO SETUP	NO SETUP
CARD 2	37-40	NO SETUP	NO SETUP
CARD 3	41-44	NO SETUP	NO SETUP
CARD 4	45-48	NO SETUP	NO SETUP
CARD 5	49-52	NO SETUP	NO SETUP
CARD 6	53-56	NO SETUP	NO SETUP
CARD 7	57-60	NO SETUP	NO SETUP
CARD 8	61-64	NO SETUP	NO SETUP

CARD 2

CARD SELECT

NO SETUP

KEY SETUP

NO SETUP

KEY SETUP

INP 38

INP 40

2. Increment the **CARD SELECT** button until you reach the key input you want to assign. There are 2 key inputs per card. Here you are assigning a format to the key inputs on Card 2 which handles key inputs 38 and 40.
3. After formatting the input, determine whether the key input requires **SETUP** or **NO SETUP**. Do this by selecting **KEY SETUP** or **NO SETUP** for each key input. The **SETUP** selection sets all outputs for a black level 7.5 IRE above blanking. The **NO SETUP** selection puts black at blanking level.

Analog Input Timing Menu

Use the Analog Input Timing Menu to match the timing of each analog/key input to the key bus. From the Inputs Menu, press the **ANLG INPUT TIMING>** button to select the Analog Input Timing Menu.

ANALOG INPUT TIMING MENU

/config/inputs/anlg_inp_timing

INPUTS			
CARD 1	33-36	1	1
CARD 2	37-40	1	1
CARD 3	41-44	1	1
CARD 4	45-48	1	1
CARD 5	49-52	1	1
CARD 6	53-56	1	1
CARD 7	57-60	1	1
CARD 8	61-64	1	1

CARD 2

CARD SELECT

1	1
2	2
3	3
4	4

INP 37-38

INP 39-40

TIMINGTIMING

1. Increment the **CARD SELECT** button until you reach the analog/key inputs you want to time to the key bus. Here you are timing all four inputs to the reference.
2. Use the **INP “NN-NN”TIMING** buttons to step the inputs in 1/4 clock increments (where 1 = the shortest delay, and 4 the largest delay).

Map Inputs Menu

Use the Map Inputs Menu to define the format for each video or key input.

NOTE: This function is applied to only a key input if the external key is being used with video or superblack.

From the Inputs Menu, press the **MAP INPUTS>** button to select the Map Inputs Menu.

MAP INPUTS MENU

config/inputs/map inputs

VIDEO INPUT

= 4

(DIG SER/RGB/SETUP)

KEY INPUT

= 1

(DIG SER/8 BIT/SETUP/SYNC)

CHROMA KEY INPUT

= NONE

(INTERNAL)

XPT BUTTON NUMBER

XPT BUTTON NAME

38

(SHIFT-14)

UNSHAPED VIDEO

SHAPED VIDEO

VIDEO/
KEY FMT

LOG CHANNEL

PHYS CHANNEL

LOG/PHYS ASSIGNMENT

NAME XPT BUTTON >

Use the Preset Bus to select button number.

1. With the **VIDEO/KEY FMT**, button, select **UNSHAPED VIDEO** or **SHAPED VIDEO**. Inputs should be set for **UNSHAPED VIDEO** unless otherwise required.
2. With the **LOG/PHYS ASSIGNMENT** button, select **PHYS INPUTS**.

3. Press the crosspoint button on the PST bus that you want to map . (All crosspoints in that vertical column will have the same inputs.)
4. Use the appropriate soft knob to select the desired type of input. Note that input formats are displayed when selecting input type.

NOTE: *Undefined buttons default to black.*

5. If mapping a chroma key input, use the **CHROMA KEY INPUT** soft knob to assign the chroma key type for the currently selected crosspoint button.

Refer to “DPM Map Aux Bus Menu” under “DPM Configurations,” in this section, for use of the **LOG CHANNEL** function of the **LOG/PHYS ASSIGNMENT** button.

Name Crosspoint Button Menu

After mapping the input, you may name the crosspoint by pressing **NAME XPT BUTTON >**. The Name Xpt Button Menu appears as shown below.

NAME XPT BUTTON MENU

config/inputs/map inputs/name xpt button

space ' () - / * : .

String Register

Camera

Save
String
↑

Get
String
↓

Button Name

Cam 2

Character = G

a b c d e f g h i j k l m n o p q r s t u v w x y z

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

XPT BUTTON NUMBER

38
(SHIFT- 14)

Use the Preset Bus to select button number.

1 2 3 4 5 6 7 8 9 0

CURSOR
BACK

ACCEPT
CHAR

CURSOR
FORWRD

DELETE
CHAR

SAVE
STRING

GET
STRING

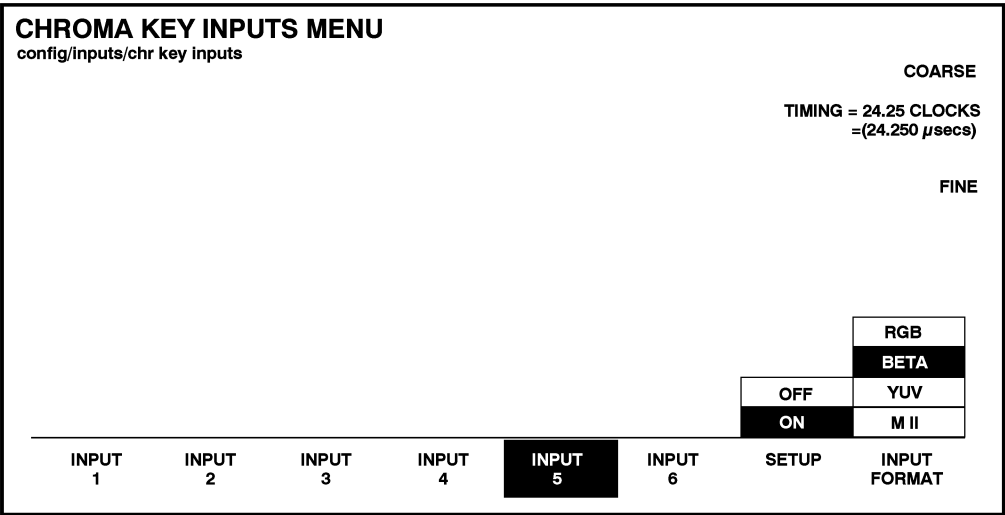
ACCEPT
NAME

1. Select each character by turning the soft knobs located to the right of the menu display.
2. Enter the selected character by pressing the **ACCEPT CHAR** button. The new character will be displayed in the menu.
3. Continue selecting characters in this manner until the name is spelled out in the menu. You may enter up to 9 characters for the input name.
4. Press **ACCEPT NAME** to store the name. The system automatically returns to the Map Inputs Menu.
5. Repeat the steps in Map Inputs Menu and Name Crosspoint Button Menu until all inputs have been mapped and named.

Chroma Key Inputs Menu

If you have installed the optional Chroma Key Inputs, you need to assign input formats. Use the Chroma Key Inputs Menu to select and adjust chroma key parameters.

- 1. From the Chroma Key Inputs Menu, select the appropriate input to change. As each button is pressed, the input format will change to the default setting for that input.



- 2. As required, either accept the default input format, or change it to match the chroma key input signal format. Adjust the coarse and fine timing for each chroma key input. The range of the **COARSE** soft knob is -256 clocks to +256 clocks. Use the **FINE** soft knob to adjust the fractional value from .000 to .999 clocks.
- 3. Choose **SETUP** either **ON** or **OFF** for the selected Chroma Key Input (1 through 6).
- 4. Press **EXIT** to return to the Inputs Menu.

GPI Inputs Menu

Use the GPI Inputs Menu to set GPI assignments for signals that can be used to trigger Model 4000 functions. These assignments must correspond to the physical GPI connections described earlier in this section.

Eight GPI inputs are provided. All of these accept pulse-type GPI inputs except Aux Tally Back, which is level-sensitive.

1. From the Inputs Menu, press the **GPI IN>** button to select the GPI Inputs Menu. (The first time you do this no functions will appear in the second column of the menu table.)

GPI INPUTS MENU

config/inputs/gpi in

FUNCTION SELECT (MISC)

AUX TALLY

DISABLE GPI

GPI 1	MISC: AUX TALLY - 1
GPI 2	AT: FF
GPI 3	CUT: ME 1
GPI 4	E-MEM: ME 1 - 12
GPI 5	E-MEM: MSTR - 26
GPI 6	DISABLE GPI
GPI 7	FRM STOR: VIDEO GRAB
GPI 8	E-MEM: RCL SEQ

When the desired function is selected, press **PROGRAM GPI** button to set the selected GPI input to the selected function.

AUX BUS = 1

Choose from these 6 buttons to select various categories of GPI functions. Then use the FUNCTION SELECT knob to select a function.

GPI 1

GPI SELECT

MISC

KF EFFECT

AUTO TRANS

CUT

E-MEM

FRAME STORE

PROGRAM GPI

MISC: AUX TALLY - 1?

The types of GPI assignments currently available are Miscellaneous (Aux Tallies), Keyframe Effects, Auto Transitions, Cuts, E-MEM registers, and Frame Stores, as indicated by the button labels at the bottom of the display window.

One of these functions is always selected. The selected function is indicated in parentheses under the **FUNCTION SELECT** knob label.

2. To assign the GPI inputs, first press **GPI SELECT** to select the desired input.
3. Select the type of category to be assigned (Misc, Auto Trans, etc.) by pressing the appropriate soft button.
4. Turn the **FUNCTION SELECT** knob to assign a specific function (Aux Tally, etc.).
5. After the desired function has been selected for each GPI, press **PROGRAM GPI** to enter the selection, which is indicated in the display table.

The following categories are available for assignment:

MISC — Enables selection of the Aux Tally Back function, or allows the selected GPI input to be disabled.

AUXTALLY — Allows an external device to control the aux bus tally level (high or low). The (AUX BUS) soft knob selects the appropriate aux bus.

DISABLE GPI — Causes any signal applied to the selected GPI input to be ignored.

KF EFFECT — Enables selection of the Keyframe GPI function. The following functions may be triggered with GPI pulses:

RUN, REWIND, AUTO RUN, and REVERSE

AUTO TRANS — Enables selection of the Auto Transition GPI function. The following transitions may be triggered with GPI pulses:

M/E 1, M/E 2, F-F, and F-F PST BLK

CUT — Enables selection of the Cut GPI function. The following cuts may be triggered by the GPI:

M/E 1, M/E 2, and F-F

E-MEM — Enables selection of the E-MEM GPI function. The following E-MEM functions may be triggered by the GPI:

RECALL ME 1, RECALL ME 2, RECALL MSTR, AUTO RECALL, EFX DISSOLV, and SEQUENCE. The **REGISTER** soft knob selects the register for E-MEM recalls.

FRAME STORE — Enables selection of the Frame Store GPI function. The functions that may be triggered are:

VIDEO GRAB, KEY GRAB, and MASK GRAB

Outputs Menu

Select **OUTPUTS** from the Configuration Menu. The **OUTPUTS** Menu shown below displays:

OUTPUTS MENU

config/outputs

```

graph TD
    PGM[PGM] --> M_E1[M/E1 PGM]
    PGM --> M_E2[M/E2 PGM]
    M_E1 --> OFF_WHITE[OFF]
    M_E1 --> PEAK_WHITE[PEAK]
    M_E2 --> BOTH_WHITE[BOTH]
    M_E2 --> PEAK_BLACK[PEAK]
    LUM_LIMITER[LUM LIMITER] --> OFF_LUM[OFF]
    LUM_LIMITER --> PEAK_WHITE_LUM[PEAK WHITE]
    LUM_LIMITER --> PEAK_BLACK_LUM[PEAK BLACK]
    CHROM_LIMITER[CHROM LIMITER] --> OFF_CHROM[OFF]
    CHROM_LIMITER --> PEAK_CHROM[PEAK]
  
```

The diagram illustrates the OUTPUTS MENU structure. It starts with a main menu 'OUTPUTS MENU' with a sub-label 'config/outputs'. Below this, there are three main categories: 'PGM', 'LUM LIMITER', and 'CHROM LIMITER'. Each category has a list of options: 'PGM' has 'M/E1 PGM' and 'M/E2 PGM'; 'LUM LIMITER' has 'OFF', 'PEAK WHITE', and 'PEAK BLACK'; 'CHROM LIMITER' has 'OFF' and 'PEAK'. The 'M/E1 PGM' and 'M/E2 PGM' options further branch into 'OFF' and 'PEAK' or 'BOTH' and 'PEAK' respectively.

1. Select the desired output from PGM, M/E 1 PGM or M/E 2 PGM with the **OUTPUT SELECT** button.
2. With the **LUM LIMITER** button choose between the following luminance limiting condition for the delegated PGM video output (does not apply to reentries):

PEAK WHITE — The luminance level is not allowed to go above peak white luminance

PEAK BLACK — The luminance level is not allowed to go below standard black luminance

BOTH — Keeps the luminance levels between standard black and peak white

OFF — Allows the luminance levels to vary between the full legal D1 limits

3. Use the **CHROM LIMITER** button to set the chrominance to the following conditions:

PEAK — Keeps the chrominance between 100% chroma saturation levels

OFF — Allows chrominance levels to vary between the full legal D1 limits

External Interface Menu

The External Interface menus set the operating parameters for the Editor Interface, DPM Interface, and the GPI Interface. The External Interface Menu is shown below:

EXTERNAL INTERFACE MENU
config/extern if

EDITOR
I/F>

DPM
I/F>

PERIPHERAL
I/F>

GPI
OUTPUTS>

Editor Interface Menu

The Editor Interface Menu shown below allows you to set the Baud, Parity and Switcher Address for the switcher editor port, J3, on the Com I/O Module in Slot C1.

EDITOR INTERFACE MENU

config/extern if editor if

2400	
4800	
9600	ODD
19200	EVEN
38400	NONE

BAUD

PARITY

1. Select the desired switcher editor port BAUD rate with the **BAUD** button. The choices are listed below:
 - 2400
 - 4800
 - 19200
 - 38400 (Typical setting for Grass Valley editors.)
2. Select the desired parity for the switcher editor port with the **PARITY** button. The choices are listed below:
 - ODD (Typical setting for Grass Valley editors.)
 - EVEN
 - NONE

DPM Setup Menu

From the External Interface Menu, press **DPM IF>** to bring up the DPM Setup Menu. Settings for Krystal, Kaleidoscope, and the DPM-700 are listed below.

DPM SETUP MENU

config / extern if / dpm setup

EFF SEND DELAY

= 2 fields

			EFF SEND DELAY	CONTROL DELAY	E-MEM LEVELS
DEVICE 1	DEVOUS	PORT A1	2	7	DPM 1
DEVICE 2	OTHER FIXED	NONE	–	0	DPM 2
DEVICE 3	NONE	NONE	–	0	DPM 3
DEVICE 4	NONE	NONE	–	0	DPM 4

KSCOPE

KRYSTAL

DVEOUS

OTHER FIXED

DPM1

NONE

CONTROL DELAY

= 7 fields

DEVICE
SELECT

DPM
TYPE

CHANNEL
ROUTING

DPM MAP
AUX BUSES >

DPM MAP
INPUTS >

3/4000 v5.3

For Kaleidoscope:

- 1. Set the **DPM TYPE** to **KSCOPE**. The values denoted in Steps 2-4 are set automatically.
- 2. Turn the **VIDEO DELAY** soft knob to select **2 fields**. It is important to set this delay correctly.
- 3. Turn the **CONTROL DELAY** soft knob to select **6 fields**.
- 4. Press the **PORT ASSIGN** button to assign **PORT A1** to the DPM. The baud rate for Port A1 is fixed at 307 K baud.

5. Set **CHANNEL ROUTING** for **BOTH** or **SWR IN**, depending upon your system configuration. (Described in the *4000 User Guide* under “DPM Configurations.”)
6. Reset the Control Processor in the Model 4000 Signal Processor frame. This is done by opening the front door of the Processor and pressing the **RESET** button located near the top of the Control Processor module.

Communication should now be established between the Model 4000 and Kaleidoscope.

For Krystal:

1. Set the **DPM TYPE** to **KRYSTAL**. The values denoted in Steps 2–4 are set automatically.
2. Turn the **VIDEO DELAY** soft knob to select **2 fields**. It is important to set this delay correctly.
3. Turn the **CONTROL DELAY** soft knob to select **6 fields**.
4. Press the **PORT ASSIGN** button to assign PORT A1 to the DPM. The baud rate for Port A1 is fixed at 307 K baud.
5. Set **CHANNEL ROUTING** for **BOTH** or **SWR IN**, depending upon your system configuration, as described previously under “DPM Configurations.”
6. Reset the Control Processor in the Model 4000 Signal Processor frame. This is done by opening the front door of the Processor and pressing the **RESET** button located near the top of the Control Processor module.

Communication should now be established between the Model 4000 and the Krystal.

For a DPM-700:

1. Set the **DPM TYPE**, to **OTHER FIXED**.
2. Set **AUX BUS CONTROL** to **SWITCHER**. (The DPM-700 cannot control the aux bus.)
3. Turn the **VIDEO DELAY** soft knob to select 2 fields. It is important that this be set correctly.

The **CONTROL DELAY** soft knob has no effect with the DPM-700.

4. Set **PORT ASSIGN** to **NONE**.
5. Set **CHANNEL ROUTING** to **OFF**.

For DVEous:

1. Set the **DPM TYPE** to **DVEOUS**.
2. Turn the **VIDEO DELAY** soft knob to select **2 FIELDS**. It is important to set this delay correctly.
3. Turn the **CONTROL DELAY** soft knob to select **7 FIELDS**.
4. Press the **PORT ASSIGN** button to assign **PORT A1** to the DPM. The baud rate for Port A1 is fixed at 307 K baud.
5. Set **CHANNEL ROUTING** for **BOTH** or **SWR IN**, depending upon your system configuration, as described previously under "DPM Configurations."
6. Reset the Control Processor in the Model 4000 Signal Processor frame. This is done by opening the front door of the Processor and pressing the **RESET** button located near the top of the Control Processor module.

DPM K'SCOPE Sources Menu

The DPM K'Scope Sources Menu, shown below, allows you to map Kaleidoscope video source crosspoints to your switcher video source crosspoints. The first time you use this menu you must set user defaults. After setting defaults you can map crosspoints as required.

Map Kaleidoscope video source crosspoints as follows:

1. From the DPM Setup Menu, press **DPM K'SCOPE SOURCES>** to access the DPM K'Scope Sources Menu.
2. Push **SET DEFAULTS** to set user defaults.
3. Scroll the menu table selection fields with the **K'SCOPE BUTTON** soft knob. Highlight the K'Scope button number you want to map.
4. Use the **SWITCHER BUTTON** soft knob to set the desired switcher video source crosspoint to the Kaleidoscope video source crosspoint

DPM K'SCOPE SOURCES MENU

config/extern if/dpm setup/dpm k'scope sources

K'SCOPE BTN	SWR BTN	K'SCOPE BTN	SWR BTN	K'SCOPE BTN	SWR BTN
0	1	11	12	22	23
1	2	12	13	23	24
2	3	13	14	24	S/1
3	4	14	15	25	S/2
4	5	15	16	26	S/3
5	6	16	17	27	S/4
6	7	17	18	28	S/5
7	8	18	19	29	ME/1
8	9	19	20	30	ME/2
9	10	20	21	31	PGM
10	11	21	22		

DIAL IN SWITCHER
XPT BUTTON FOR
K'SCOPE SOURCE
BUTTON

K'SCOPE BUTTON
=

SWITCHER BUTTON
=

SET
DEFAULTS

DPM Map Aux Buses Menu

Aux bus-to-device assignments are made from the DPM Map Aux Buses Menu.

1. From the DPM Setup Menu, press **DPM MAP AUX BUSES>** to access the DPM Map Aux Buses Menu.
2. Select the desired device (1 through 4) by pressing the **DEVICE SELECT** button
3. For Kaleidoscope, rotate the **NUMBER OF CHANNELS** knob, assigning aux buses 1 through 'n' to this device number. Note that a Kaleidoscope device (or other poolable DPM) does not allow you to select a starting aux bus number other than Aux Bus 1.

NOTE: All aux buses assigned to a DPM must be in consecutive order.

4. For DPM 100 or 700 set the **NUMBER OF CHANNELS** and **CHANNEL 1=** soft knobs as appropriate for your installation.

NOTE: Assigning an Aux Bus to a DPM level saves the parameters under the DPM level, rather than the MISC level for E-MEM operations.

DPM MAP AUX BUSES MENU

config/extern if/dpm setup/dpm map aux buses

NUMBER OF CHANNELS
= 2

Connection of physical AUX buses
to physical channels

CHANNEL 1
= AUX 6

MISC	AUX 4	AUX 5	AUX 8	-	-	-	-	-
	CHAN 1	CHAN 2	CHAN 3	CHAN 4	CHAN 5	CHAN 6	CHAN 7	CHAN 8
DPM 1	AUX 1	AUX 2	AUX 3	-	-	-	-	-
DPM 2	AUX 6	AUX 7	-	-	-	-	-	-
DPM 3	-	-	-	-	-	-	-	-
DPM 4	-	-	-	-	-	-	-	-

DPM 2

DEVICE
SELECT

DPM Map Inputs Menu

Use the DPM Map Inputs Menu to set up the Kaleidoscope video and key return input numbers.

- 1. From the DPM Setup Menu, press **DPM MAP INPUTS>** to bring up the DPM Map Inputs Menu.

DPM MAP INPUTS MENU

config/extern if/dpm setup/dpm map inputs

	PHYSICAL	LOGICAL	VIDEO INPUT	KEY INPUT
DEVICE 1 (DEVOUS)	CHAN 1		—	—
	CHAN 2		19	42
	CHAN 3		29	63
	CHAN 4		—	—
	CHAN 5		—	—
	CHAN 6		—	—
	CHAN 7		—	—
	SECONDARY		—	—

DEVICE 1

DEVICE 2

DEVICE 3

DEVICE 4

DPM
SELECT

CHANNEL
SELECT

VIDEO INPUT
= 19

KEY INPUT
= 42

V5.3

- 2. Select the desired device (1 through 4) by pressing the **DPM SELECT** button.
- 3. Select the desired DPM channel by pressing the **CHANNEL SELECT** button.

3-45

4. Use the **VIDEO INPUT** knob to assign an input (1 - 64) to the Model 4000 physical channel to which the Kaleidoscope physical channel video return is connected.
5. Use the **KEY INPUT** knob to assign an input (1 - 64) to the Model 4000 physical channel to which the Kaleidoscope physical channel video return is connected.
6. Set up the aux bus format as described under the Aux Bus Format Menu heading later in this section. Make sure that any aux buses assigned to Kaleidoscope are configured for **KEY** operation of their B aux buses.
7. See “Mapping DPM Returns” in the *Model 4000 User Guide* for information on assigning the DPM channel returns to Model 4000 crosspoints

NOTE: *It is not necessary to set the format for aux buses that are to be used for Effects Send. When Effects Send is selected, the B bus of each selected aux bus is automatically configured as a key.*

Peripheral Interface Menu

Use the Peripheral I/F Menu to set the Baud, Parity and Peripheral Trigger parameters for the switcher peripheral port, PORT A3, on the Expanded Communication Module.

PERIPHERAL INTERFACE MENU
config/extern if/peripheral if

NOTE:
The Peripheral Bus port is labelled
"Port A3" on the rear of the frame
electronics.

2400	
4800	
9600	ODD
19200	EVEN
38400	NONE

BAUD

PARITY

PERIPHERAL TRIGGERS>

Select the desired switcher peripheral port BAUD rate and parity parameters. These should be set the same for the switcher and the peripheral device. For a DPM-700 set the baud rate to 38400 and parity to NONE.

Peripheral Trigger Menu

Use this menu to delegate any of the eight peripheral triggers for the switcher (designated A through H) to an E-MEM level of **MISC**, or **DPM 1–DPM 4**. Use the **LEVEL** soft knob to select which E-MEM level will activate the selected trigger. Each trigger is sent to a particular address (Device Number) on the Peripheral Bus.

Once configured, these triggers can be learned into E-MEM effects (on the **MISC** level) or fired directly from this menu. Refer to the Attach Peripheral Trigger Menu description in this section for attaching peripheral triggers to E-MEM registers.

From the Peripheral Interface Menu, press **PERIPHERAL TRIGGERS>** to open the Peripheral Triggers Menu.

- 1. Increment **TRIGGER SELECT** to select the designator to be assigned (A through H).
- 2. Turn the **DEVICE NUMBER** soft knob to select the peripheral device to which that trigger will be sent.
- 3. Turn the **FUNCTION NUMBER** to select the device function that will be triggered by a trigger message on the Peripheral II Bus.

PERIPHERAL TRIGGERS MENU

config/extern if/peripheral if/peripheral triggers

DEVICE NO. FUNCTN NO. LEVEL

A	1	1	-
B	1	4	DPM 1
C	1	0	0
D	15	1	-
E	-	-	-
F	0	2	-
G	17	1	-
H	3	15	-

B

TRIGGER SELECT

DEVICE NUMBER
= 1

FUNCTION NUMBER
= 4

<>LEVEL
= DPM 1

FIRE
B

GPI Outputs Menu

Use the GPI Outputs Menu to set E-MEM levels for each assigned GPI. You can also set up GPI outputs which trigger each time there is a cut on the PGM Bus, and set the length of the GPI trigger signal.

GPI OUTPUTS MENU

config / external if / gpi outputs

LENGTH
= 1 Field

OFF
GPI 1
GPI 2
GPI 3
GPI 4
GPI 5
GPI 6
GPI 7
GPI 8

PGM CUT TRIGGER

	LEVEL	LENGTH
1	MISC	1
2	MISC	1
3	MISC	1
4	MISC	1
5	MISC	1
6	MISC	1
7	MISC	1
8	MISC	1

MISC
DPM 1
DPM 2
DPM 3
DPM 4

E-MEM LEVEL

7

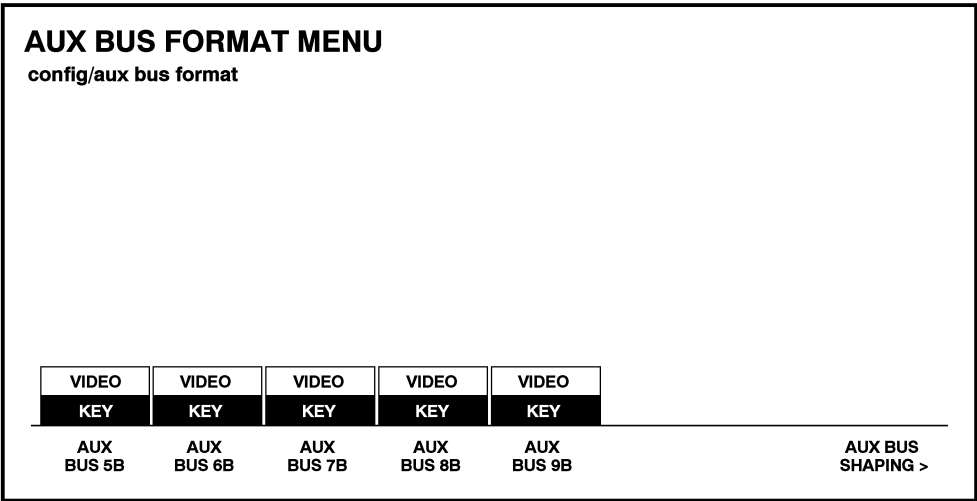
SELECT GPI

1. Use the **PGM CUT TRIGGER** button to select a GPI number which will trigger each time there is a cut on the PGM Bus. This GPI is typically connected to an external device such as a clock/timer which is reset by each trigger. Such a clock would then indicate how long the current source has been on air.
2. Use the **SELECT GPI** button to select the desired GPI number.
3. Press the **E-MEM LEVEL** button to select the desired E-MEM level for the selected GPI number.
4. Use the **LENGTH** soft knob to select (in number of fields) the required GPI duration. Use this to set the duration of GPI output triggers.
5. Repeat Steps 1 through 3 for other GPIs.

Aux Bus Format Menu

There are nine pairs of Aux buses on the Model 4000, designated A1 through A9, and B1 through B9. Aux pairs one through four are not configurable (video/key only). Aux buses pairs five through nine can be configured as video/video or video/key signals. In addition, Aux buses 1-4 (A and B) may be configured for either shaped or unshaped video output.

1. From the Configuration Menu, press **AUX BUS FORMAT>** to select the Aux Bus Format Menu.



2. For each “B” bus to be configured, select either **VIDEO** or **KEY** with the appropriate soft button.
3. Press the **AUX BUS SHAPING>** Menu button to invoke the Aux Bus Shaping Menu.

Aux Bus Shaping Menu

The Aux Bus Shaping Menu allows you to select the output configuration to be *always shaped* or *always unshaped* on aux buses 1-4. Thus the configuration should be set according to the input needs of the external device connected to the aux bus. The switcher then internally decides whether to turn on shaping or unshaping circuitry according to the nature of the video/key pair feeding the aux bus.

NOTE: *The output shaped/unshaped selections for the Aux Buses apply only to the Aux 1 through Aux 4 outputs and only if the Effects Send option is present. Without the circuitry on the Effects Send module, the aux bus outputs simply pass whatever signal is present—either shaped or unshaped.*

1. Press the **PHYS AUX SELECT** button to select the physical aux bus to be used in the effects send loop.
2. Set the **VIDEO/KEY FMT** selections for Aux Buses 1 through 4 to match the characteristic **SHAPED** or **UNSHAPED** expected by the external devices connected to those outputs. These settings control the states of the shapers and unshapers on the Aux Bus outputs.

The **LOGICAL** column indicates the logical aux bus being used. This may be different from the physical aux bus when the Model 4000 is connected to a Kaleidoscope or other DPM that is able to control the aux buses. (This column is informational only. You can not change it from this menu.)

AUX BUS SHAPING MENU

config/aux bus format/aux bus shaping

PHYSICAL

AUX BUS 1

AUX BUS 2

AUX BUS 3

AUX BUS 4

LOGICAL

AUX BUS 1

AUX BUS 2

AUX BUS 3

AUX BUS 4

SHAPED

UNSHAPED

UNSHAPED

UNSHAPED

UNSHAPED

AUX 1

PHYS AUX
SELECT

SHAPED

UNSHAPED

VIDEO/
KEY FMT

NOTE: Since the process of unshaping the video signal results in dividing the video signal by its key, level errors, especially around black, may produce extreme signal levels where the key is at or near zero. Kaleidoscope ignores these extraneous signals, but they may cause problems with external sync separators or clamps. Therefore, it is recommended that connections to Kaleidoscope inputs be made directly from the 4000 Aux Bus outputs.

When the Effects Send option is not present, the **VIDEO/KEY FMT** selections are not visible in the menu.

M/E Mode Menu

Use the M/E Mode menu to select Standard or Layered mode, and to turn Full Additive Mix mode on or off on an M/E -by -M/E basis.

M/E MODE MENU

me mode

M/E 1	LAYERED	OFF
M/E 2	LAYERED	ON
PGM PST	STANDARD	OFF

	LAYERED	ON
M/E 2	STANDARD	OFF

M/E SELECT

M/E MODE

FULL ADD MIX

M/E COPY>

KEY 1 OPACITY
= 100.00%

KEY 2 OPACITY
= 100.00%

KEY A OPACITY
= 100.00%

KEY B OPACITY
= 100.00%

The following menu selections are accessible through the M/E Mode menu:

- M/E SELECT

— Selects the M/E system to which subsequent menu selections apply.
- M/E MODE

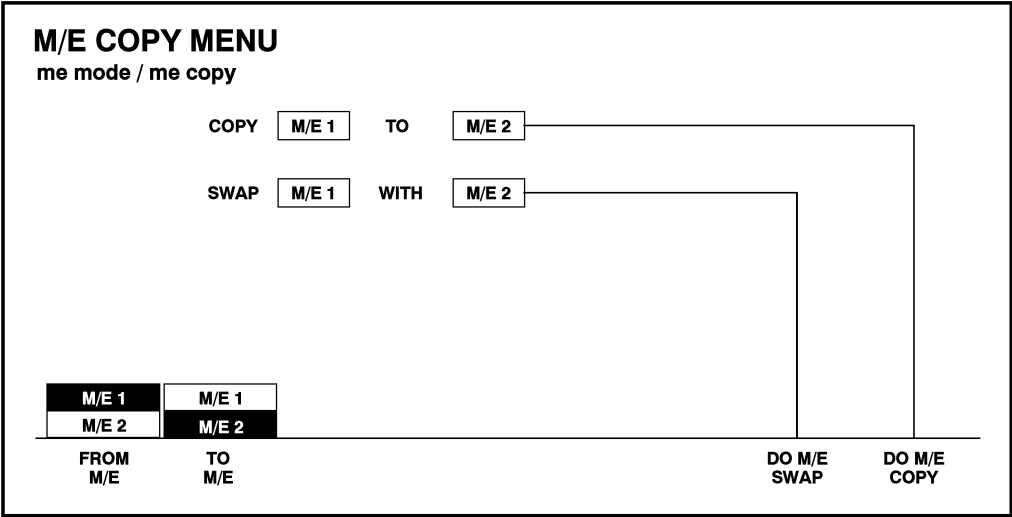
— Sets the selected M/E to either Layered mode or Standard mode. In Layered mode, the A and B buses function as keyers rather than background buses. In Standard mode, the A and B buses function as background buses.
- FULL ADD MIX

— Enables or disables the FAM mode when in Layered mode. When FAM is on, the opacity of each layer is adjustable with a soft knob.
- M/E COPY

— Opens the M/E Copy submenu. Use to copy or swap all M/E settings between M/Es.

M/E Copy Menu

Use the **M/E Copy** Menu to copy or swap all M/E settings between M/Es. A swap operation, for example, means you can simultaneously copy all of M/E 1s settings to M/E 2, and M/E 2s settings to M/E 1.



The M/E Copy Menu selections are:

FROM M/E — Selects the M/E system to copy / swap from.

TO M/E — Selects the M/E system to copy / swap to.

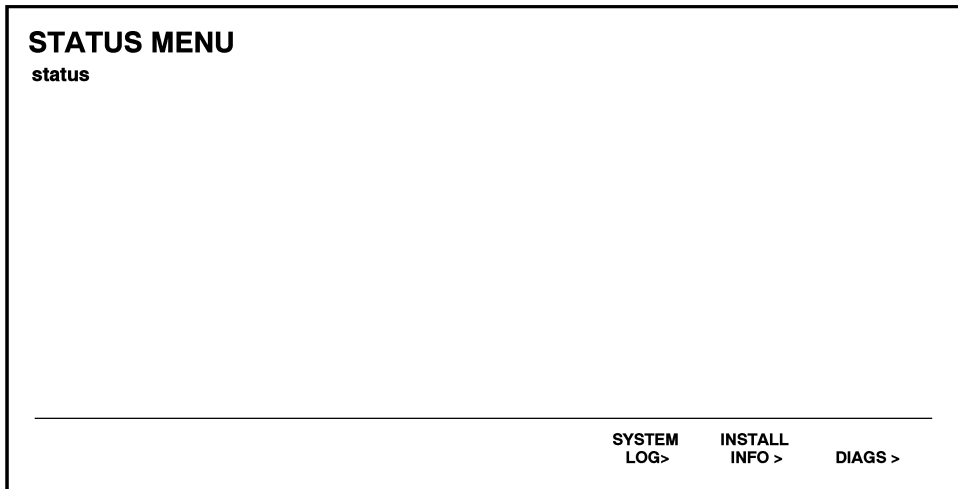
DO M/E SWAP — Initiates the M/E swap currently selected.

DO M/E COPY — Initiates the M/E copy currently selected.

NOTE: An Undo function is available on button F6 after a DO SWAP or DO COPY operation. Undo must be performed before exiting the menu in order to take effect.

Status Menu

Use the Status menu to get information about the current version number of the switcher software and hardware.



The Status menu selections are:

SYSTEM LOG> — Opens the System Log menu to display any current switcher error messages.

INSTALL INFO > — Opens the Install Info Status menu, which displays the version of the software installed.

DIAGS > — Opens the Diagnostics menu. This menu is not installed at this time.

Press the Install Info Status Menu to view the system software version number.

System Log Menu

The system log is intended mainly for use by GVG personnel for fault identification. GVG may ask customers to search the log for a specific message, or ask customers to read back the last few messages. This information can help in isolating a fault or discovering a software bug.

The contents of the system log *do not* necessarily indicate a problem with the switcher. Routine information and warning messages normally appear in the log. Normally, switcher operation is not affected by events that generate log messages.

The log can contain messages from before a system reset or power up. This may allow GVG personnel to debug a problem if an error was logged prior to the system locking up.

Each time the system is reset, a special message is entered in the log indicating the time of the reset. These messages tend to separate sections of the log.

SYSTEM LOG MENU

----- MESSAGE LOG CLEARED BY USER AT 15:57:24 ON JAN 5 1995

PAGE
UP

PAGE
DOWN

FIRST
PAGE

LAST
PAGE

LAST
RESET

CLEAR
LOG

SCROLL

The System Log menu selections are:

The **PAGE UP** and **PAGE DOWN** buttons allow you to scroll up and down the log on page at a time.

PAGE UP, PAGE DOWN, FIRST PAGE, LAST PAGE — Use these page scrolling buttons as required to view the desired messages.

If you press the **FIRST PAGE** button, the beginning of the log displays.

If you press the **LAST PAGE** button, the most recently logged messages will display. This is often the most useful button to press for fault determination. (This button is not available when you are already displaying the last page.)

The **SCROLL** soft knob now allows you to scroll up or down the screen one line at a time.

CLEAR LOG — Erase all current error messages.

The **LAST RESET** button (System Log Menu) brings the first message after the last system power up or reset to the top of the display.

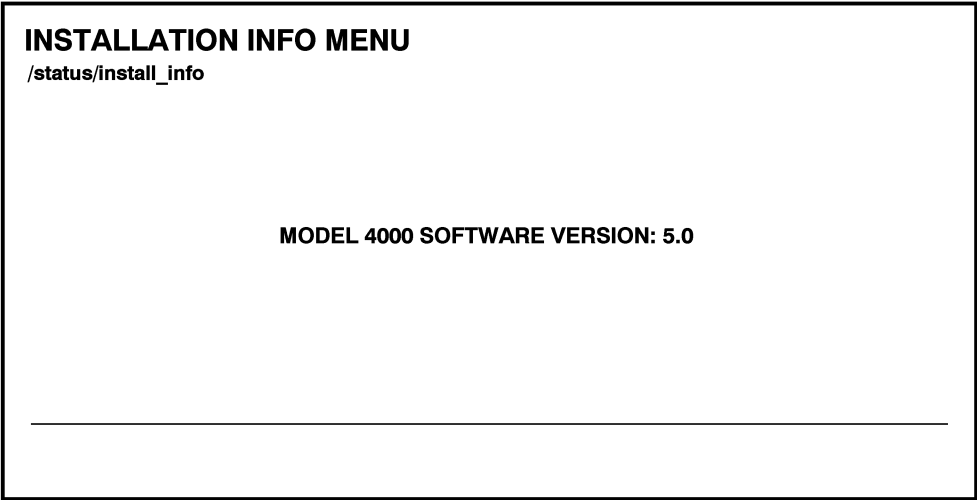
There may be no SYSTEM RESET message in the log because:

Someone cleared the log (**CLEAR LOG** button). In this case, a "MESSAGE LOG CLEARED BY USER AT..." message will be the first entry in the log.

The message log overflowed. Only the most recent messages are retained if an overflow occurs, so the SYSTEM RESET message may not be present.

Installation Information Menu

Invoke this menu to see the currently installed switcher software.



Keyer Menu

Use the Keyer menu to make key characteristic adjustments not available on the control panel. The statuses of these characteristics are displayed on each key bus of the selected M/E. (Only Key 1 and Key 2 are shown when in Standard mode.)

KEYER MENU

keyer

OPACITY
= 100.00%

M/E 1	KEY 1	OFF
	KEY 2	AUTO
	KEY A	AUTO
	KEY B	AUTO

HORIZ KEY POSITION
= 0.00 clocks

M/E 1
M/E 2
DSK

ON
OFF
AUTO

M/E
SELECT

KEYER
SELECT

SHAPING

KEYER
COPY >

CALIBRATE

VIDEO
PROCESS >

KEY 1
NAM >

The following selections are accessible through the Keyer menu:

M/E SELECT — Selects the effects system to which subsequent menu selections apply.

KEYER SELECT — Selects the keyer to which the subsequent menu selections apply.

SHAPING — Forces shaped **ON** or unshaped **OFF** video for the selected key bus, regardless of the current Configuration menu setting, or allows the current Configuration setting to apply **AUTO**.

OPACITY — Adjusts the opacity of the selected key.

HORIZ KEY POSITION — Adjusts the horizontal position of the selected key.

KEYER COPY> — Opens the Keyer Copy menu to allow keyer parameters to be copied from one keyer to another.

CALIBRATE — Resets all functions that turn on the Source Select **UNCAL** lamp to their default values (includes **CORING** and **OPACITY**).

VIDEO PROCESS> — Opens the Video Process menu, which allows adjustment of the luminance gain, chroma gain, and DC offset for the individual key bus selected.

KEY 1 NAM> — Opens the Key 1 NAM menu, which allows non-additive mixing (NAMing) of Key 2 into Key 1 on an M/E -by -M/E basis.

Keyer Copy Menu

Use the Keyer Copy menu to copy or swap keyer parameters from any keyer to another. A swap operation, for example, means you can simultaneously copy all of M/E 1 key settings to M/E 2, and M/E 2 key settings to M/E 1.

KEYER COPY MENU

keyer / keyer copy

COPY

M/E 1 KEY 2

TO

M/E 2 KEY 2

SWAP

M/E 1 KEY 2

WITH

M/E 2 KEY 2

M/E 1

M/E 2

DSK

KEY 1

KEY 2

KEY A

KEY B

EXCLUDE

INCLUDE

M/E 1

M/E 2

DSK

KEY 1

KEY 2

KEY A

KEY B

FROM GROUP

FROM KEYER

WIPES

TO GROUP

TO KEYER

DO KEYER SWAP

DO KEYER COPY

FROM GROUP and **FROM KEYER** — Selects the Keyer whose setup parameters are to be copied.

WIPES — Includes or excludes Wipe settings that may be associated with the selected keyers.

TO GROUP and **TO KEYER** — Selects the destination Keyer that is to receive the copied keyer setup.

DO KEYER SWAP — Initiates the keyer swap currently selected.

DO KEYER COPY — Initiates the keyer copy currently selected.

NOTE: *If the destination Keyer has parameters that the source Keyer does not, the destination Keyer parameters are set to default values.*

NOTE: *An Undo function is available on button F6 after a DO KEYER SWAP or DO KEYER COPY operation. Undo must be performed before exiting the menu in order to take effect.*

Video Process Menu

Use the Video Processing menu to adjust luminance gain, chroma gain, and D.C. Offset for the selected bus.

VIDEO PROCESS MENU				LUM GAIN = 1.00
keyer/video process				
ME 2	KEY 1	OFF	OFF	CHROMA GAIN = 1.00
	KEY 2	ON	ON	
	A	ON	OFF	
	B	OFF	ON	
				DC OFFSET = 0.00 IRE
M/E 1		ON	ON	CORING = 7.50 IRE
M/E 2				
DSK	KEY 2	OFF	OFF	
M/E SELECT	BUS SELECT	VIDEO PROCESS	CORING	RESTORE DEFAULTS

The Video Process menu selections are:

M/E SELECT — Selects the M/E to be adjusted.

BUS SELECT — Selects the bus to be adjusted.

VIDEO PROCESS — Enables or disables the Video Processing adjustments listed below for the selected bus.

LUM GAIN — Sets luminance gain of the selected bus.

CHROMA GAIN — Sets chroma gain of the selected bus.

DC OFFSET — Sets D.C. Offset of the selected bus.

CORING — Enables or disables the coring function for linear keys on the selected key bus (applies only to Key 1 and Key 2 buses in Standard mode and A and B buses in Layered mode).

CORING —Adjusts M/E background video in key area to ensure that video is fully removed.

RESTORE DEFAULTS — Restores default adjustments of the selected soft knob functions.

Key 1 NAM Menu

The Key 1 NAM menu allows NAMing Key 2 into Key 1 on an M/E-by-M/E or DSK basis.

KEY 1 NAM MENU

/keyer/key_1_nam

M/E 1	KEY1	ON
M/E 2	KEY1	OFF
DSK	KEY1	OFF

M/E 1

M/E 2

DSK

ON

OFF

M/E SELECT

NAM K2 INTO K1

RESTORE DEFAULTS

NAM SOFTNESS
= 50%

NAM OFFSET
= 75 %

Selections in the Key 1 NAM menu are as follows:

M/E SELECT — Selects the M/E or DSK to be set.

NAM K2 INTO K1 — Enables or disables NAMing Key 2 into Key 1.

NOTE: *When NAMing Key 2 into Key 1, Key 2 will be on the M/E output but not indicated by a key ON indicator. (The crosspoint button tally will be correct.)*

RESTORE DEFAULTS — Restores default adjustments of the selected soft knob functions.

NAM SOFTNESS — Adjusts the video signal transition area between two video signals for the selected M/E.

NAM OFFSET — Sets the transition level in the case where two or more video signals are present, the signal with the largest instantaneous amplitude is passed.

Chroma Key Menu

Use the Chroma Key menu to select and adjust a variety of chroma key parameters.

CHROMA KEY MENU

/chrKey

ME 1 KEY 1	ON	ON	OFF
ME 1 KEY 2	ON	ON	FIXED
ME 2 KEY 1	ON	ON	VARIABLE
ME 2 KEY 2	ON	ON	OFF

FOREGROUND CORING
= 7.50 IRE

SHADOW GAIN
= 50%

SHADOW CLIP
= 50%

ME 2 KEY 1

ON

ON

VARIABLE

OFF

OFF

FIXED

CHR KEY SELECT

FOREGROUND VIDEO

BACKGROUND VIDEO

FOREGROUND CORING

SECONDARY COLOR >

HUE MODS >

KEY ADJUST >

SETUP>

The Chroma Key Main menu button selections are:

CHR KEY SELECT — Selects the M/E Keyer to which the menu selections apply.

FOREGROUND VIDEO — Turns the foreground on and off. When off, the foreground image is replaced with black.

BACKGROUND VIDEO — Turns the background on and off. When on, the foreground image is a full raster image.

FOREGROUND CORING — Turns foreground coring on and off. Coring replaces the key area of the background with black to ensure a clean key when background and fill are additively keyed together.

VARIABLE — Provides a **FOREGROUND CORING** adjustment knob.

FIXED — Provides a factory default foreground coring level.

OFF must be selected to enable the Chroma Key panel **BKGD SUPR LUM** and **CHROMA** knobs to operate.

SHADOW GAIN — May be used to adjust the clip level of the Chroma Key shadow after the function has been turned on by the **SHDW ON** button on the Chroma Keyers subpanel.

SHADOW CLIP — May be used to adjust the clip level of the Chroma Key shadow after the function has been turned on by the **SHDW ON** button on the Chroma Keyers subpanel.

SECONDARY COLOR > — Opens the Secondary Color menu, to adjust the secondary color suppression angle, secondary color selectivity, and secondary chroma suppression level.

HUE MODS > — Opens the Hue Modifications menu, to adjust the secondary hue angle, separate hue suppression, flare suppression, and flare suppression offset.

KEY ADJUST > — Opens the CK Adjust menu, to adjust the chroma key position, width, and key softness.

SETUP > — Opens the CK Setup Menu. Chroma Key Auto Setup allows you to use the Positioner joystick to select the color to be suppressed.

Chroma Key Secondary Color Menu

Use the Chroma Key Secondary Color menu to select and adjust secondary color suppression angle, selectivity, chroma and luminance suppression level and fringe control.

CK SECONDARY COLOR MENU

chr key/secondary color

ME1 KEY 1

OFF

ME1 KEY2

ON

ME2 KEY1

ON

ME2 KEY 2

OFF

ME2 KEY1

OFF

ON

OFF

CHROMA

LUMA

CHR KEY
SELECT

SEC COLOR
SUPPRESS

SUPPRESS
MODE

SEC COLOR SUPPRESS ANGLE

= 370.0 degrees

(0.0 degrees CW from Primary)

SEC COLOR SUPPRESS SELECTIVITY

= 50%

SEC CHROMA/LUM SUPPRESS LEVEL

= 30%

FRINGE CONTROL

= 30%

The CK Secondary Color menu selections are:

CHR KEY SELECT — Delegates the chroma keyer to be adjusted.

SECONDARY COLOR SUPPRESS — Enables or disables the following soft knobs:

SEC COLOR SUPPRESS ANGLE — Provides an offset adjustment to the primary chroma key hue setting.

SEC COLOR SUPPRESS SELECTIVITY — Adjusts selectivity of the chroma key hue control.

SEC CHROMA/LUMA SUPPRESS LEVEL — CHROMA: Changes a second color in the foreground that may have been affected by the primary color suppression. For example, if the video set is a person with blond hair standing in front of a blue background, individual strands of the blond hair may appear bluish after suppressing the blue background. By adjusting the secondary chroma suppression level, you can adjust the hair color back to its normal blond. **LUMA:** Control the luma contribution of the background to the foreground part of the scene.

(FRINGE CONTROL) — Use to restore color to the gray portions of the foreground color resulting from adjustments to the **SEC CHROMA SUPPRESS LEVEL**.

SUPPRESS MODE — Suppresses either chroma or luma modes for the selected chroma key.

Chroma Key Hue Modifiers Menu

Use the Chroma Key Hue Modifiers menu to select and adjust hue selectivity and flare suppression.

CK HUE MODIFIERS MENU

/chr_key/hue_mods

ME1 KEY 1	ON	ON	OFF
ME1 KEY2	OFF	ON	OFF
ME2 KEY1	ON	ON	HIGH
ME2 KEY 2	ON	ON	OFF

SEPARATE HUE SUPPRESS ANGLE
= 127 degrees
(150.5 degrees CCW from Primary)

FOREGROUND FLARE SUPPRESS
= 75%

			HIGH
			MEDIUM
	ON	ON	LOW
ME2 KEY1	OFF	OFF	OFF

CHR KEY SELECT
SEP HUE SUPPRESS
FLARE SUPPRESS
FGD NOISE SUPPRESS

The CK Hue Modifiers menu selections are:

CHR KEY SELECT — Delegates the chroma keyer to be adjusted.

SEP HUE SUPPRESS — Enables or disables suppression of the selected hue from background and foreground. Also enables or disables the **SEPARATE HUE SUPPRESS** soft knob.

SEPARATE HUE SUPPRESS — Adjusts hue suppression applied to background and foreground.

FLARE SUPPRESS — Enables or disables suppression of the selected hue from the foreground. Also enables or disables the **FOREGROUND FLARE SUPPRESS** soft knob.

FOREGROUND FLARE SUPPRESS — Used to adjust the amount of foreground glare caused by a camera lens.

FGD NOISE SUPPRESS — Corrects for color impurities in video tape. For example, if you are keying out blue in your source tape and the white on the tape is blue - shifted, you will also key out the white. The offset suppression adjustment allows you to change the origin of the suppression space, so that the blue -shifted white is not included in the suppression.

Chroma Key Adjust Menu

Use the Chroma Key Adjust Menu to adjust the chroma key horizontal position, key width, and softness.

CK ADJUST MENU

/chr_key/key_adjust

ME1 KEY1	ON	ON	ON	ON	ON
ME1 KEY2	ON	OFF	OFF	ON	OFF
ME2 KEY1	ON	ON	ON	ON	ON
ME2 KEY2	ON	ON	ON	ON	ON

KEY WIDTH
= 1.0 CLOCKS
(69.8 nsecs)

KEY SOFTNESS
= 50%

HORIZ KEY POSITION
= -2.0 CLOCKS
(-139.6 nsec)

	ON	ON	ON	ON	ON
ME2 KEY1	OFF	OFF	OFF	OFF	OFF

CHR KEY
SELECT

KEY
WIDTH

KEY
SOFTNESS

KEY
POSITION

FGD
RESHAPE

KEY
S-SHAPING

The Chroma Key Adjust menu selections are:

CHR KEY SELECT — Delegates the chroma keyer to be adjusted.

KEY WIDTH — Enables or disables the **KEY WIDTH** soft knob.

KEY WIDTH — Adjusts width of the chroma key.

KEY SOFTNESS — Enables or disables the **KEY SOFTNESS** soft knob.

KEY SOFTNESS — Use to adjust the foreground edges to the key cut into the background. When off, horizontal and vertical softness are forced to zero.

3-72

KEY POSITION — Enables or disables the **HORIZ KEY POSITION** soft knob.

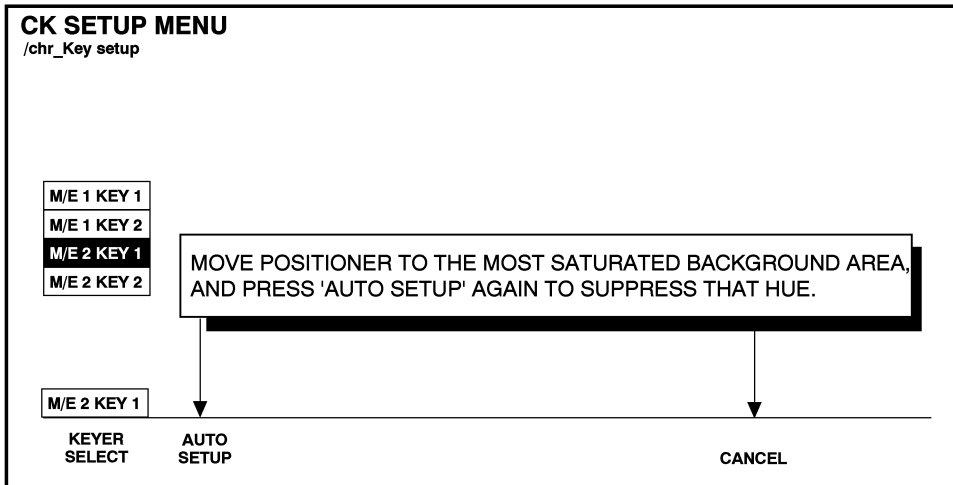
HORIZ KEY POSITION — Adjusts the horizontal position of the chroma key.

FGD RESHAPING — When **ON**, causes the shaped fill out of the chroma keyer to be multiplied by the key signal out of the chroma keyer. Depending upon the picture(s), **FGD RESHAPING** may improve the appearance of the chroma key.

KEY S -SHAPING — Enables an S-shape chroma compression function. Chroma compression helps remove slight transparencies in the foreground, and low -level noise in the background.

Chroma Key Setup Menu

Use the Chroma Key Setup Menu to select a chroma key suppress color from a chroma key signal. Use the Positioner joystick to position the cursor on the color to be suppressed.



The Chroma Key Setup menu selections are:

KEYER SELECT — Delegates the chroma keyer to setup.

AUTO SETUP — Use to begin or complete an Auto Setup session. Auto Setup mode is entered after you press the Auto Setup button. In this mode, use the Positioner to move the cursor displayed on the Preview monitor. Place the cursor on the color to be suppressed, then press the **AUTO SETUP** button again to complete; or press **CANCEL** to abort. Auto Setup mode is aborted if you exit the menu.

(The **AUTO SETUP** button on the Chroma Keyer subpanel performs the same function as this menu selection.)

NOTE: *The **CHR KEY** button of the delegated keyer must be selected before pressing the **AUTO SETUP** button.*

Auto Setup mode is aborted if the delegated keyer is not of the type CHROMA KEY.

CANCEL — Use to abort an Auto Setup in progress.

Wipe Menu

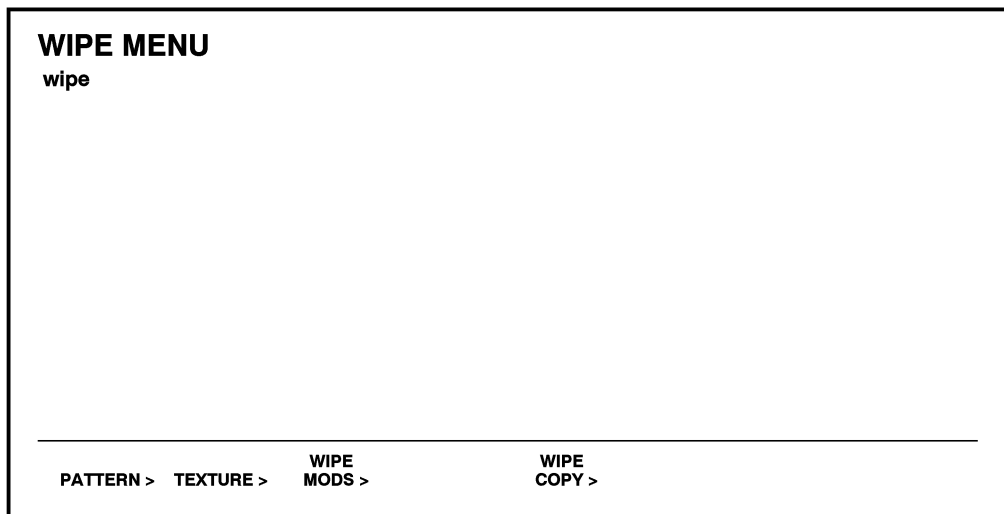
Use the “top” Wipe menu as a means to access the Wipe submenus listed below:

PATTERN > — Opens the Wipe Pattern menu.

TEXTURE > — Opens the Wipe Texture menu.

WIPE MODS > — Opens the Wipe Modifiers menu.

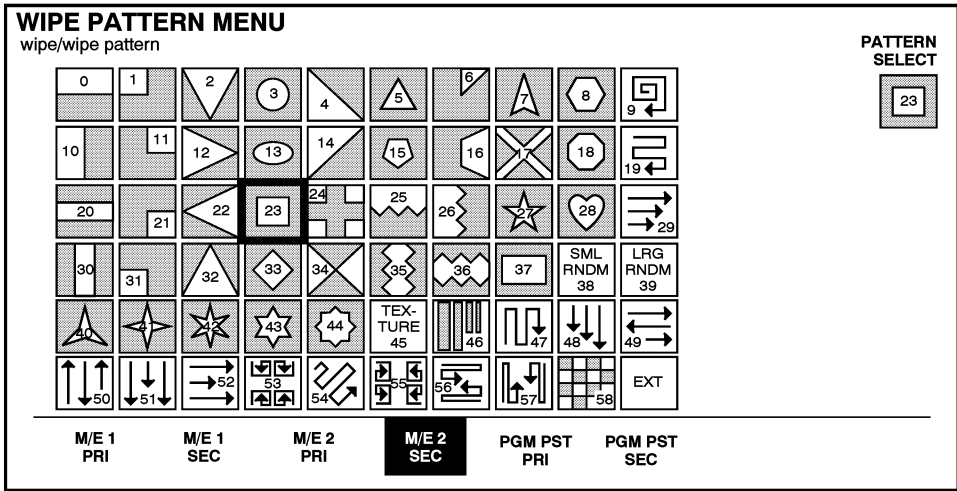
WIPE COPY > — Opens the Wipe Copy menu.



NOTE: Wipe Generator Select choices or buttons labeled “PGM PST PRI” and “PGM PST SEC” apply to only -2A switchers.

Wipe Pattern Menu

Use the Wipe menu to assign a wipe generator to which you can apply wipe menu selections.



The following menu selections are accessible through the Wipe menu:

M/E 1 PRI — Assigns the **PATTERN SELECT** soft knob to the M/E 1 Primary Wipe Generator.

M/E 1 SEC — Assigns the **PATTERN SELECT** soft knob to the M/E 1 Secondary Wipe Generator.

M/E 2 PRI — Assigns the **PATTERN SELECT** soft knob to the M/E 2 Primary Wipe Generator.

M/E 2 SEC — Assigns the **PATTERN SELECT** soft knob to the M/E 2 Secondary Wipe Generator.

PATTERN SELECT — Selects a wipe pattern from the pattern menu for use by the currently delegated wipe generator.

Wipe Texture Menu

Use the Wipe Texture menu to adjust the appearance of the video texture.

WIPE TEXTURE MENU							
wipe/texture							
M/E 1 PRI		1:1	2:1	NONE	3	1	6
M/E 1 SEC		1:1	FREE RUN	NOTCH	6	1	6
M/E 2 PRI		6:1	2:1	NOTCH	5	2	1
M/E 2 SEC		2:1	1:1	SMOOTHING	2	4	3
PGM PST PRI		2:1	1:1	NONE	2	3	2
PGM PST SEC		3:1	8:1	SMOOTHING	4	3	5

	1:1	1:1		1		1
	2:1	2:1		2		2
	3:1	4:1		3	1	3
	4:1	6:1	SMOOTHING	4	2	4
	6:1	8:1	NOTCH	5	3	5
M/E 2 PRI	8:1	FREE RUN	NONE	6	4	6
WIPE GEN SELECT	HORIZ STRETCH	VERT MODE	FILTER MODE	LENGTH A	LENGTH B	SOURCE

The Wipe Texture menu selections are as follows for the selected wipe generator:

HORIZ STRETCH — Selects one of the horizontal stretch ratios listed in the menu.

VERT MODE — Selects one of the vertical stretch ratios listed in the menu.

FILTER MODE — Selects one of the filtering modes listed in the menu.

LENGTH A — Selects one of the lengths listed in the menu.

LENGTH B — Selects one of the lengths listed in the menu.

SOURCE — Selects one of the sources listed.

Wipe Modifiers

Use the Wipe Modifiers menu to assign several different wipe modifiers to each wipe generator.

WIPE MODIFIERS MENU

wipe/wipe mods

SPLIT OFFSET

= 0%

M/E 1 PRI	MIX	TEXTURE	ON	REVERSE
M/E 1 SEC	MIX	NORMAL	OFF	NORMAL
M/E 2 PRI	NAM -	NORMAL	ON	NORMAL
M/E 2 SEC	NAM+	TEXTURE	OFF	REVERSE
PGM PST PRI	MIX	NORMAL	ON	REVERSE
PGM PST SEC	MIX	TEXTURE	OFF	REVERSE

NAM -

NAM+

ME 2 PRI

MIX

TEXTURE	ON	REVERSE
NORMAL	OFF	NORMAL

WIPE GEN SELECT

PTN MIX TYPE

PTN MIX SOURCE

SPLIT OFFSET

PST PTN DIRECTION

The Wipe Modifiers menu selections are as follows for the selected wipe generator:

WIPE GEN SELECT — Selects the desired wipe generator.

PTN MIX TYPE — Selects the type of pattern mix.

PTN MIX SOURCE — Selects the pattern mix source.

NORMAL — Selects a mix between the primary and secondary wipe generators. This selection is prohibited if the secondary wipe option is not installed.

TEXTURE — Selects a mix between the texture pattern and the primary wipe generator.

SPLIT OFFSET button — Enables or disables the split wipe offset function.

SPLIT OFFSET soft knob — Adjusts the offset of split wipes.

PST PTN DIRECTION — Selects the direction of the preset pattern for the selected wipe generator.

Wipe Modulation

Use the Wipe Modulation menu to assign modulation characteristics to the wipe generators.

WIPE MODULATE MENU
 wipe/wipe mods/wipe modulate

MODULATION AMPLITUDE
 = 50%

M/E 1 PRI	OFF	SINE
M/E 1 SEC	OFF	SINE
M/E 2 PRI	VERT	SINE
M/E 2 SEC	OFF	TRIANGLE
PGM PST PRI	OFF	SINE
PGM PST SEC	OFF	SINE

MODULATION FREQUENCY
 =16 cycles/screen

LOCK	
HORIZ	
VERT	
TRIANGLE	

M/E 2 PRI	OFF	SINE

WIPE GEN
SELECT

MODULATE

MODULATE
WAVEFORM

The Wipe Modulation menu selections are as follows for the selected wipe generator:

WIPE GEN SELECT — Selects the desired wipe generator.

MODULATE — Turns wipe modulation **ON** or **OFF**. When **OFF**, no other buttons or knobs on this menu are available.

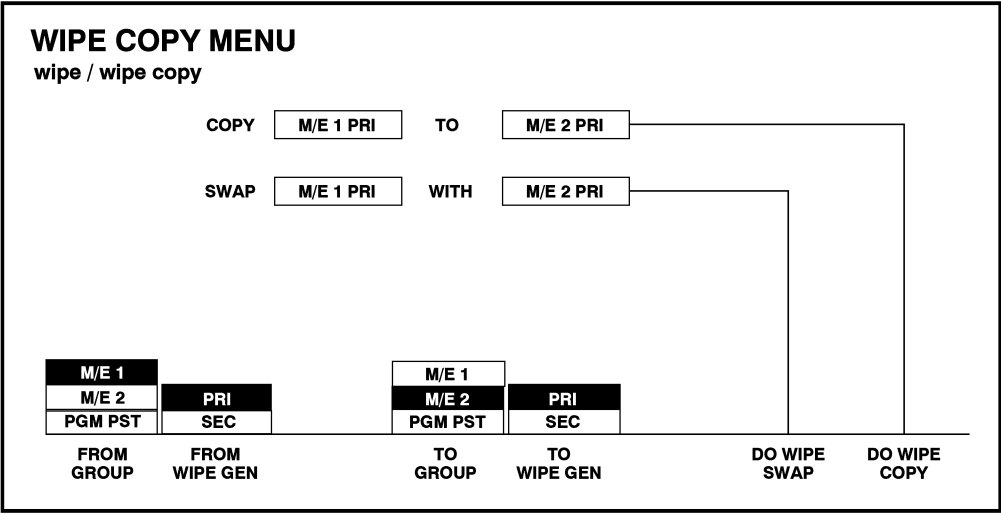
MODULATE WAVEFORM — Selects the modulation waveform, either **TRIANGLE** or **SINE**.

MODULATION AMPLITUDE — Adjusts the amplitude of the modulation signal.

MODULATION FREQUENCY — Adjusts the frequency of the modulation signal.

Wipe Copy

Use the Wipe Copy menu to copy or swap Primary (PRI) or Secondary (SEC) Wipe Generator settings between M/Es. A swap operation, for example, means you can simultaneously copy all of M/E 1 PRI settings to M/E 2 PRI, and M/E 2 PRI settings to M/E 1 PRI.



The Wipe Copy menu selections are as follows for the selected M/E:

FROM GROUP — Selects the M/E or PGM PST bus system to copy/swap from.

FROM WIPE GEN — Selects either the PRI or SEC Wipe Generator to copy/swap from.

TO GROUP — Selects the M/E or PGM PST bus system to copy/swap to.

TO WIPE GEN — Selects either the PRI or SEC Wipe Generator to copy/swap to.

DO WIPE SWAP — Initiates the wipe swap currently selected.

DO WIPE COPY — Initiates the wipe copy currently selected.

NOTE: *An Undo function is available on button F6 after a DO SWAP or DO COPY operation. Undo must be performed before exiting the menu in order to take effect.*

E-MEM Menu

The E-MEM menu displays the status of several parameters on all levels of the E-MEM register selected on the E-MEM panel, and sets up the switcher to inhibit crosspoint changes when E-MEM recalls are done.

E-MEM MENU							
E-MEM							
E-MEM LEVEL	REG	ENABLE STATUS	LOCK STATUS	SEQ LINK	SEQ DELAY	KEYFRAMES	AVAILABLE KEYFRAMES
M/E 1	07	ON	ON	08	000	000	000
M/E 2	07	-	-	08	-	-	-
PGM PST	07	-	-	08	-	-	-
DSK	07	-	-	08	-	-	-
BKGD	07	-	-	08	-	-	-
MISC	07	-	-	08	-	-	-
DPM 1	07	-	-	08	-	-	-
DPM 2	07	-	-	08	-	-	-
DPM 3	07	-	-	08	-	-	-
DPM 4	07	-	-	08	-	-	-

REGISTER >

SOURCE HOLD >

PERIPH DEVICES >

The following selections are available under the E-MEM menu:

REGISTER > — Opens the E-MEM Register menu.

SOURCE HOLD > — Opens the Source Hold menu.

PERIPH DEVICES > — Opens the Peripheral Devices menu.

E-MEM Register Menu

Use this menu to lock and unlock registers, and to clear effects sequences.

E-MEM REGISTER MENU

E-MEM/register

Current Bank: 5

Current Register: 52

CLEAR REG

LOCK REG

CLEAR SEQ

SELECT
LOCK ALL
LOCK BANK
LOCK REG

SELECT — Enables either locking/unlocking E-MEM registers, clearing registers, or clearing register sequences.

For **CLEAR REG**:

Clears only sequence information for the register whose number is displayed in the menu for all enabled levels. After **CLEAR REG** is pressed, a submenu displays with a **CONFIRM** or **CANCEL** choice.

For **LOCK REG**:

LOCK ALL, UNLOCK ALL – Locks or unlocks all 100 registers for all currently enabled “levels.” (Levels are enabled with the Enable buttons on the E-MEM panel; for a definition of levels, refer to Enable Buttons, Effects Memory Subpanel, this section.)

If any registers are unlocked, a **LOCK ALL** selection is displayed; if any or all registers are locked, an **UNLOCK ALL** selection is displayed.

LOCK BANK, UNLOCK BANK – Locks or unlocks all registers in the currently displayed bank and register for all currently enabled levels. Note that the current bank displayed may not be the same as the current bank for independent E-MEM levels. If that is the case, the current bank will not get locked on those levels, but the selected bank will.

If any currently -enabled E-MEM level has an unlocked register in the bank, a **LOCK BANK** instruction is displayed for the currently displayed bank number. When all registers in the bank are locked, an **UNLOCK BANK** instruction is displayed.

LOCK REG, UNLOCK REG – Locks the register whose number is displayed in the menu for all currently enabled levels. Note that this may not be the current register for some levels. If that is the case, the current register will not get locked on those levels, but the selected register will.

If any currently -enabled E-MEM register level is unlocked, a **LOCK REG** instruction is displayed for the currently displayed register number. When all of the enabled E-MEM register levels are locked, an **UNLOCK REG** instruction is displayed.

For **CLEAR SEQ**:

CLEAR ALL — Clears only sequence information for all 100 registers for all enabled levels. After **CLEAR ALL** is pressed, a submenu comes up to allow you to **CONFIRM** or **CANCEL** the operation.

CLEAR BANK — Clears only sequence information for all registers in the bank whose number is displayed in the menu for all enabled levels. After **CLEAR BANK** is pressed, a submenu displays with a **CONFIRM** or **CANCEL** choice.

Source Hold Menu

Use the Source Hold menu to inhibit crosspoint changes on individual buses during E-MEM recalls.

SOURCE HOLD MENU

E-MEM/source hold

BUS
= ME 1 A

BUS	HOLD	BUS	HOLD	BUS	HOLD	BUS	HOLD
ME 1 A	HOLD	ME 1 B	-	ME 1 K1	-	ME 1 K2	-
ME 2 A	-	ME 2 B	-	ME 2 K1	-	ME 2 K2	-
PGM	-	PST	-	DSK 1	-	DSK 2	-
PVW	-	MASK	-	AUX 1	-	AUX 2	-
AUX 3	-	AUX 4	-	AUX 5	-	AUX 6	-
AUX 7	-	AUX 8	-	AUX 9	-		-

Menu changes delegated E-MEMs only.

ON

OFF

CLEAR ALL
HOLDS

ALL
HOLD

SOURCE
HOLD

(**BUS** = ... **soft knob** — Selects the bus to which the source hold is to be applied.

CLEAR ALL HOLDS — Clears all Source Holds.

ALL HOLD — Sets all Source Holds.

SOURCE HOLD — Enables or disables the Source Hold feature on the selected bus. When **ON**, all crosspoints (video and key) on the bus are held; that is, the state of the crosspoints does not change when E-MEM recalls and runs are done.

Peripheral Devices Menu

Use this menu to select the peripheral devices you want included in E-MEM learns and recalls.

PERIPHERAL DEVICES MENU

E-MEM/periph devices

DEVICE NO.	STATE	DEVICE NO.	STATE	DEVICE NO.	STATE
0	OFF	8	OFF	16	OFF
1	ON	9	OFF	17	OFF
2	OFF	10	OFF	18	OFF
3	OFF	11	OFF	19	OFF
4	OFF	12	OFF	20	OFF
5	OFF	13	OFF	21	OFF
6	OFF	14	OFF	22	OFF
7	OFF	15	OFF	23	OFF

Set the peripheral devices which are to be affected by E-MEM Learn and Recall operations.

DEVICE NUMBER = 1

ON

OFF

DEVICE 1

CLEAR ALL OFF

SET ALL ON

CLEAR ALL OFF — Turns **OFF** learn and recall operations to all devices on the peripheral bus.

SET ALL ON — Turns **ON** learn and recall operations to all devices connected to the peripheral bus.

DEVICE = ... soft knob —Selects the Device Number to be turned **ON** or **OFF** with regard to E-MEM learn and recall operations.

DEVICE ... — Turns **ON** or **OFF** learn and recall operations to the selected device.

Keyframe – Timeline Menu

The Timeline menu provides a graphic display of the keyframe positions for all enabled levels in the current E-MEM register. This menu allows you to view changes to the effect in the selected register while you add, remove, and edit keyframes.

The Timeline menu can be accessed either by pressing the **KEYFRAME** button on the Menu Display panel, then selecting **TIMELINE>** in the Keyframe menu, or by pressing the **TIME CURSR** button on the E-MEM effects editing panel.

TIMELINE MENU		> ——— Run Cursor		1:00	KF	2	Time
keyframe / timeline	Register 8	2 Keyframes	Duration 1:00				
KF editing enabled	1					2	
Master Timeline	M/E 1 M/E 2 PGM PST DSK BKGD MISC DPM 1 DPM 2 DPM 3 DPM 4						
	DELEGATES ENABLES						
	TIME ALIGN LEVELS						
	SET START TIME						
	TIME KNOB SELECT						
							RUN RUN DEL MARK START KF EFF DUR
							ZOOM 1.0X

The appearance of this menu is determined by the state of the current E-MEM register. Parameters that affect the appearance of the menu include the following:

- The number of the current E-MEM register selected on the E-MEM keypad
- The levels of the register enabled with the E-MEM Enables buttons

- The number, location, and duration of keyframes stored in the register
- The position of the Time Cursor on the timeline
- The selection of Delegates or Enables mode

The menu illustrated above is for a 4000 switcher with all levels enabled, two keyframes in the effect, and keyframe editing enabled.

DELEGATES/ENABLES:

ENABLES — provides a timeline for each level that is enabled by the E-MEM **ENABLE** buttons. The **ENABLE** button of each enabled level is high -tallied and the name of each enabled level is highlighted in the menu.

DELEGATES — allows individual enabled levels to be delegated for modification while keeping the timelines of the other enabled levels in the display.

When **DELEGATES** is selected, the names of the enabled levels become un-highlighted in the menu and the buttons of the enabled levels go to low tally on the E-MEM Enable panel. Then, pressing one or more of the **ENABLE** buttons will delegate the selected levels for timeline editing. The buttons of the *delegated* levels will go to high tally and the names of the delegated levels will be highlighted in the menu. (The buttons of the undelegated *enabled* levels will remain at low tally.)

SET START TIME — Sets the start time (time of the first keyframe) of all delegated levels to the time of the cursor. The relative timing of all keyframes within a level remains unchanged; only the start times of delegated levels are changed.

ADJUST START TIME — Changes the delegation of the top menu knob from **RUN TIME** to **START TIME**. This allows you to adjust the start times of all delegated levels.

RUN TIME — Runs the effect just like the lever arm.

ZOOM — Expands the timeline display in order to examine adjacent keyframe details, and precisely positions the Time Cursor.

NOTE: Other soft button and soft knob functions that appear in the Timeline menu under specific conditions are discussed in the Effects Editing section of this manual.

Keyframe Path Menu

Use the Keyframe Path Menu to set the type of path for interpolating parameters between keyframes.

KEYFRAME PATH MENU

keyframe / kf path

M/E 1
M/E 2
PGM PST
DSK
MISC
BKGD
DPM 1
DPM 2
DPM 3
DPM 4

LEVEL SELECT

TRANSITION	CURVE
KEY 1	LINEAR
KEY 2	S-LINEAR
KEY A	HOLD
KEY B	HOLD
WIPES	S-LINEAR
WIPEXFORM	S-LINEAR
ALL	
FSTOREXFRM	

GROUP SELECT

CURVE
S-LINEAR
HOLD
LINEAR

PATH TYPE

Register: 52 Keyframe: 2

<TENSION>

<>CONTINUITY

<>BIAS

LEVEL SELECT and **GROUP SELECT** — Select the register level and the functional group to which the path type is to be applied. Each functional group of each keyframe can have its own path type.

PATH TYPE — Selects the algorithm to be used for interpolating between keyframes for the selected group. The available path types are Curve, Linear, S-Linear, and Hold.

CURVE — This path type may be used with both **WIPEXFORM** and **FSTOREXFRM** selections. The **TENSION**, **CONTINUITY**, and **BIAS** soft knobs are used with **CURVE**.

NOTE: Refer to Appendix A of this manual for a description of how the **TENSION**, **CONTINUITY**, and **BIAS** soft knobs may be used to control a keyframe path.

LINEAR — Causes a constant change in parameter values between keyframes, with no acceleration or deceleration.

S-LINEAR — Causes the change to each parameter to begin slowly as it leaves the starting keyframe, to move faster through the midrange of the keyframe duration, then to decelerate as it approaches the destination keyframe.

HOLD — Causes all parameters to hold at their starting values throughout the keyframe duration. All changes occur at the end of the keyframe duration, with no interpolation between keyframes.

Attach GPI Menu

Use the Attach GPI menu to attach GPI triggers to keyframes in E-MEM registers so that each attached trigger will fire when the register is recalled or the keyframe is reached in the effect run. The triggers may be tested after setting them up.

ATTACH GPI MENU
keyframe/attach gpi

Level: MISC
Effect: 4 Keyframe: 1

1	OFF
2	OFF
3	OFF
4	OFF
5	OFF
6	OFF
7	OFF
8	OFF

1

ON
OFF

SELECT
GPI

ATTACH

FIRE
GPI 1

FIRE
ATTACHED

The **Level: MISC** notation in the upper right -hand corner of the screen is a reminder that the Attach GPI function operates through the **MISC** level on the E-MEM Enables panel. The **Effect:** notation is the currently selected E-MEM register. **Keyframe:** shows the location of the Time Cursor on the timeline.

GPI SELECT — Selects the GPI Output (1 through 8) to which you may attach an E-MEM register or keyframe. The trigger numbers correspond to the physical connections made to the GPI Output connectors on the rear of the switcher frame.

ATTACH — Attaches the selected trigger to the indicated E-MEM register or keyframe (**ON**), or turns the trigger **OFF**.

FIRE GPI — Test fires the selected (highlighted) GPI.

FIRE ATTACHED — Test fires all attached GPIs (set to **ON**) simultaneously, regardless of what is currently selected.

Attach Peripheral Trigger Menu

Use this menu to attach peripheral triggers to keyframes in E-MEM registers so that each attached trigger will fire when the register is recalled or the keyframe is reached in the effect run. The triggers may be tested after setting them up.

ATTACH PERIPH TRIGGER MENU

keyframe/attach trigger

Level: MISC
Effect: 4 Keyframe: 1

		DEVICE NO. FUNCTN NO.	
A	OFF	1	6
B	OFF	-	-
C	OFF	-	-
D	OFF	-	-
E	OFF	-	-
F	OFF	-	-
G	OFF	-	-
H	OFF	-	-

A

ON

OFF

TRIGGER
SELECT

ATTACH

FIRE
A

FIRE
ATTACHED

As in the GPI Trigger menu, the **Level: MISC** notation in the upper right -hand corner of the screen reminds you that the Attach GPI function operates through the **MISC** level on the E-MEM Enables panel, **Effect:** is the currently selected E-MEM register, and **Keyframe:** is the location of the Time Cursor on the timeline.

TRIGGER SELECT — Selects the Peripheral trigger (A through H) which you may attach to an E-MEM register or keyframe. The triggers are defined in the Peripheral Triggers submenu under Configuration.

ATTACH — Attaches the selected trigger to the indicated E-MEM register or keyframe (**ON**), or turns the trigger **OFF**.

FIRE A — Fires the selected (highlighted) trigger (for testing purposes).

FIRE ATTACHED — Fires all attached triggers (set to **ON**) simultaneously, regardless of the current selection (for testing purposes).

Aux Menu

Use the Aux Bus menu to select looping mode on Aux Buses 1 through 4 (when used with the Effects Send feature), or to deselect looping mode. Press the Menu Display panel **AUX BUS** button to bring up the Aux menu.

AUX MENU

/aux bus

PVW BUS	PVW	—	1	—	
MASK BUS	MASK	—	2	—	
AUX BUS 1	AUX BUS 1	EXT LOOP	ME/ 1	3	
AUX BUS 2	AUX BUS 2	EXT LOOP	—	—	
AUX BUS 3	AUX BUS 3	EXT LOOP	—	—	
AUX BUS 4	AUX BUS 4	FRAMESTORE	16	S/16	
AUX BUS 5	AUX BUS 5	—	—	—	
AUX BUS 6	AUX BUS 6	—	—	—	
AUX BUS 7	AUX BUS 7	—	—	—	
AUX BUS 8	AUX BUS 8	—	—	—	
AUX BUS 9	AUX BUS 9	—	—	—	

LOGICAL

PHYSICAL

VIDEO XPT

KEY XPT

AUX BUS 4

NO LOOP

EXT LOOP

FRAMESTORE

LOG AUX SELECT

EFX LOOP MODE

VIDEO = 16

KEY = S/16

TAKE

The following selections are available from the Aux menu:

PHYS AUX SELECT — Selects the physical aux bus to be used in the effects send loop.

EFX LOOP MODE — Turns on (**EXT LOOP**) or off (**NO LOOP**) the effects send loop.

The **LOGICAL** column indicates the logical aux bus being used. This may be different from the physical aux bus when the Model 4000 is connected to a Kaleidoscope or other DPM that is able to control the aux buses.

EFX LOOP MODE — Turns the effects send loop on (**EXT LOOP**) or off (**NO LOOP**).

Mask Menu

Use the Mask menu to adjust the opacity of the inhibit mask and turn the chroma trap on or off.

MASK MENU
mask

INHIBIT MASK OPACITY
= 100 %

M/E1	KEY 1	ON	
	KEY 2	ON	
	A	OFF	
	B	ON	

M/E 1		ON	ON
M/E 2		ON	ON
DSK	KEY 2	OFF	OFF

M/E SELECT BUS SELECT INH MASK OPACITY BOX MASK SOFTNESS

The Mask menu selections are:

M/E SELECT — Delegates an M/E for the following selections.

BUS SELECT — Delegates a keyer.

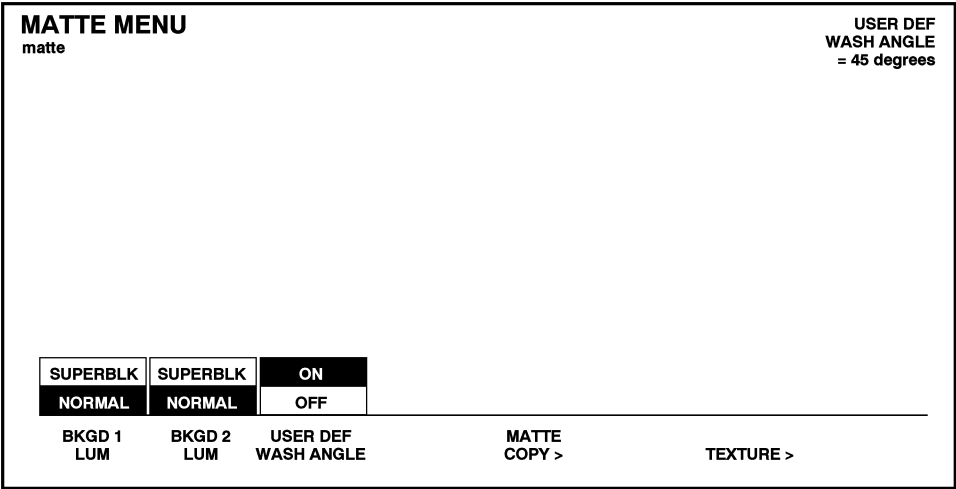
INH MASK OPACITY — Enables or disables the INHIBIT MASK OPACITY soft knob.

INHIBIT MASK OPACITY — Adjusts opacity of the inhibit mask. Available only for Key 1 and Key 2 in the M/Es.

BOX MASK SOFTNESS — Allows hard or soft edges on the Box Mask. Install Field Modification Note FM2509-00 for this functionality to be available.

Matte Menu

Use the Matte menu to adjust the luminance level of Backgrounds 1 and 2 down to superblack, and to adjust the user -definable wash angle.



The following menu selections are accessible through the Matte menu:

BKGD 1 LUM and **BKGD 2 LUM** — Enables or disables luminance adjustment down to superblack with the Background 1 and/or Background 2 **LUM** controls.

USER DEF WASH ANGLE — Enables the (**WASH ANGLE**) soft knob.

MATTE COPY > — Opens the Matte Copy menu.

TEXTURE > — Opens the Texture menu to select matte texture parameters.

Matte Copy Menu

Use the Matte Copy menu to copy or swap all Matte settings between M/Es. A swap operation, for example, means you can simultaneously copy all of Matte 2 settings to Matte 1, and Matte 1 settings to Matte 2.

MATTE COPY MENU
matte / matte copy

COPY OF TO OF

SWAP OF WITH OF

FROM GROUP		FROM MATTE GEN		SIDE SELECT		TO GROUP		TO MATTE GEN		DO MATTE SWAP		DO MATTE COPY	
M/E 1	KEY 1 BORD	2 TO 1	M/E 1	KEY 1 BORD									
M/E 2	KEY 2 FILL	1 TO 2	M/E 2	KEY 2 FILL									
DSK	KEY 2 BORD	MATTE 1	DSK	KEY 2 BORD									
BKGD	PRI WIPE	MATTE 2	BKGD	PRI WIPE									
PGM PST	SEC WIPE	BOTH	PGM PST	SEC WIPE									

The following menu selections are accessible through the Matte Copy menu:

FROM GROUP — Selects the M/E or PGM PST bus system to copy / swap from.

FROM MATTE GEN — Selects the Matte Generator to copy / swap from.

SIDE SELECT — Each Matte Generator has two mattes. This button selects the Matte Generator to copy / swap from.

TO GROUP — Selects the M/E or PGM PST bus system to copy / swap to.

TO MATTE GEN — Selects the Matte Generator to copy / swap to.

DO MATTE SWAP — Initiates the matte swap currently selected.

DO MATTE COPY — Initiates the matte copy currently selected.

NOTE: *An Undo function is available on button F6 after a DO SWAP or DO COPY operation. Undo must be performed before exiting the menu in order to take effect.*

Matte Texture Menu

Use the Matte Texture menu to adjust the appearance of the video texture.

MATTE TEXTURE MENU					
/matte/texture					
1:1	1:1		1		1
2:1	2:1		2		2
3:1	4:1		3	1	3
4:1	6:1	SMOOTHING	4	2	4
6:1	8:1	NOTCH	5	3	5
8:1	FREE RUN	NONE	6	4	6
HORIZ STRETCH	VERT MODE	FILTER MODE	LENGTH A	LENGTH B	SOURCE

The Matte Texture menu selections are:

HORIZ STRETCH — Selects one of the horizontal stretch ratios listed in the menu.

VERT MODE — Selects one of the vertical stretch ratios listed in the menu.

FILTER MODE — Selects one of the filtering modes listed in the menu.

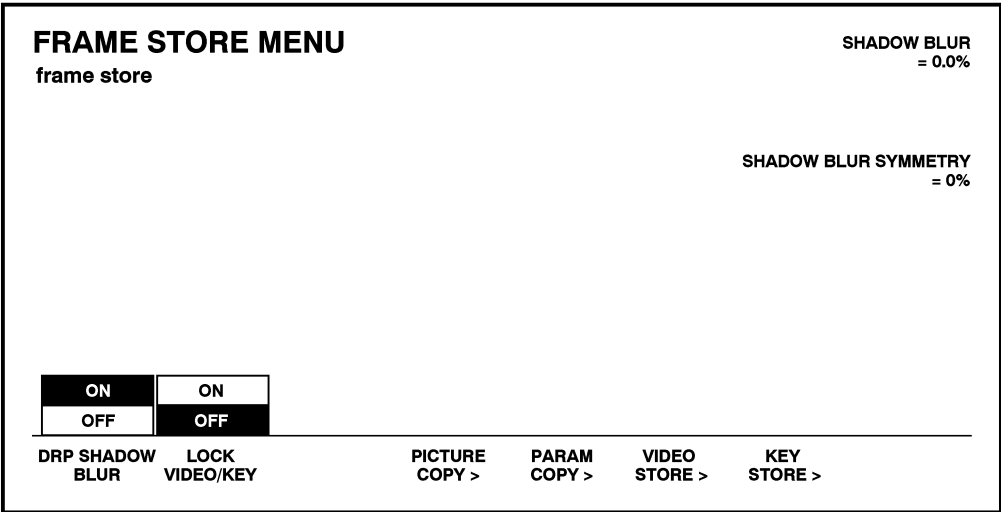
LENGTH A — Selects one of the lengths listed in the menu.

LENGTH B — Selects one of the lengths listed in the menu.

SOURCE — Selects one of the sources listed.

Frame Store Menu

The Frame Store menu and submenus include operational settings for the Frame Store Option.



DRP SHADOW BLUR — Turns on or off the Frame Store Drop Shadow blur and enables the shadow blur adjustment knobs.

SHADOW BLUR — Adjusts the amount of blur to be applied to the Drop Shadow.

SHADOW BLUR SYMMETRY — Adjusts the ratio of vertical to horizontal blur on the Drop Shadow. When set to 0.0, the vertical and horizontal blur are equal.

LOCK VIDEO/KEY — Causes the key store to follow any parameter change that you make in the associated video store.

PICTURE COPY> — Opens the Picture Copy menu. Use to copy or swap picture settings.

PARAM COPY > — Opens the Parameter Copy menu. Use to copy or swap parameter settings.

VIDEO STORE > — Opens the Video Store menu.

KEY STORE > — Opens the Key Store menu.

Mask Store Option

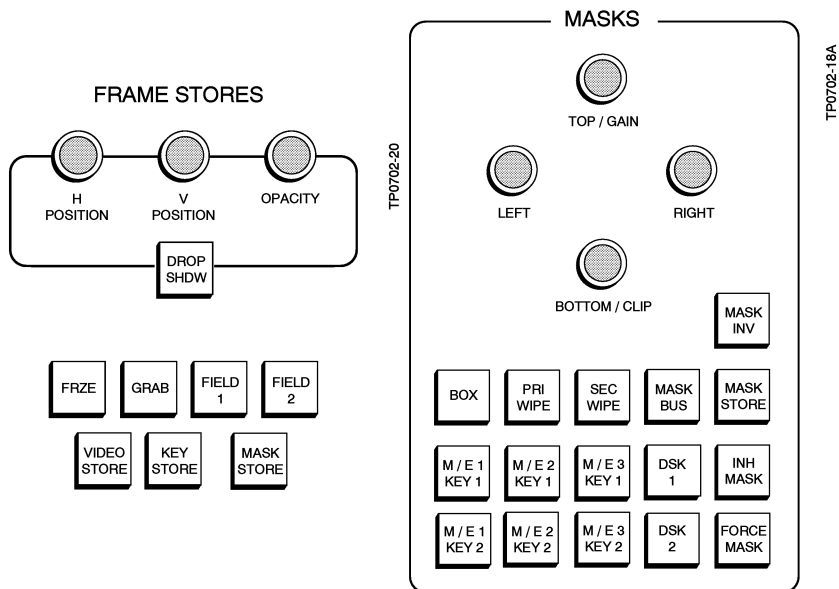
NOTE: *You must have the Mask Store option and Software Version 5.2 installed in order to operate this function.*

The primary function of the Mask Store option is storage of masks for masking keys. The option provides a two-field Mask Store, allowing mask-image storage and retrieval at a 10 bit resolution. Masks can be derived from any video source or can be drawn with a drawing tablet.

Any video source available on the Mask Bus can be converted to a mask via clip and gain, stored in the Mask Store, and used as a mask by any keyer. The mask is then routed to a keyer (selected on the Mask panel), to the Switcher crosspoint matrix for use as a primary input, and to an output module for use by external devices.

Mask Store Controls

Controls for manipulation of the Mask Store are found on the Frame Stores and Masks subpanels and in the Mask Store menu.



The Masks panel's **MASK STORE** button selects the output of the Mask Store for use as a mask. If the Mask Store hardware option is not installed, the **MASK STORE** button does not light.

When Masks panel's **MASK STORE** is selected, the **TOP/GAIN** and **BOTTOM/CLIP** knobs control the gain and clip levels of the signal on the Mask bus.

The Mask bus' clip and gain-adjusted mask can then be frozen in the Mask Store. Once the mask is frozen, the clip and gain controls have no effect.

The Frame Stores panel's **MASK STORE** button assigns the Freeze, Grab, Field 1 and Field 2 buttons to the Mask Store. If the Mask Store hardware option is not installed, the **MASK STORE** button does not light.

Pressing the **GRAB** button updates the Mask Store with new input data, and freezes the new data replacing the old.

Pressing **FIELD 1** and **FIELD 2** selects the video fields (1, 2, or both) and sends them to the Mask Store output. A full frame is always frozen, regardless of the state of these buttons. This allows the operator to decide later (after the image is frozen) whether to read out the image based on one-field or two-field mode.

If the Mask Store is not in Freeze mode, its output is delayed by 2 fields. (Mask Store has no 4-Field mode.)

Mask Store Menu

You may access the Mask Store menu two ways:

- Press **Frame Store** (top-level menu panel) then the **MASK STORE** soft button
- Or, double-press the **Mask Store** button on the Frame Stores panel

The Mask Store menu allows you to select the following functions: straight or freehand drawing, paint brush parameters, screen parameters, and a shape-filling utility.

DRAW — Use to enable/ disable the graphics tablet, the pen cursor, and the Mask Store Menu.

DRAW MODE — Selects between freehand and straight-line drawing tools.

SOFTEN — Softens the edges of the image.

FILL SHAPE — Fills either inside or outside the drawn image.

BLACK SCREEN — Fills the Mask Store screen with system black.

WHITE SCREEN — Fills the Mask Store screen with system white.

UNDO — Replaces all work with the contents of the save buffer.
Note: Any data not saved, frozen, or grabbed is lost, because

UNDO recalls the last saved mask buffer; therefore, you must do periodic **SAVES** to make the best use of the feature.

SAVE — Copies current screen data into the save buffer.

ON

OFF

STRAIGHT

FREEHAND

DRAW

DRAW MODE

SAVE

SOFTEN

FILL SHAPE

BLACK SCREEN

WHITE SCREEN

UNDO

MASK STORE MENU

frame store / mask store

BRUSH SOURCE

WHITEBLACK

BRUSH OPACITY

= 100%

BRUSH SIZE

= 15 (TV LINES)

BRUSH SOFTNESS

= 100%

Use the following controls to adjust brush parameters.

BRUSH SOURCE soft knob — Selects either Black or White brush color.

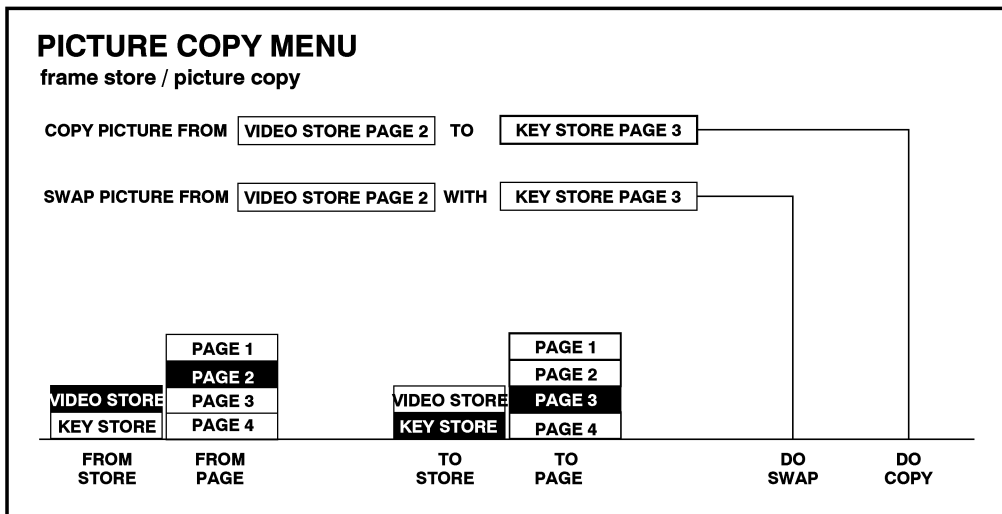
BRUSH OPACITY soft knob — Makes brush strokes more opaque or more transparent.

BRUSH SIZE soft knob — Selects brush size from 1 TV line to 31 TV lines diameter.

BRUSH SOFTNESS soft knob — Adjusts the softness of the brush edges.

Picture Copy Menu

Use the Picture Copy menu to copy or swap all picture information from video to video, key to key, or video to key.



The Picture Copy menu selections are:

FROM STORE — Selects the store to copy/swap from.

FROM PAGE — Selects the page to copy/swap from.

TO STORE — Selects the store to copy/swap to.

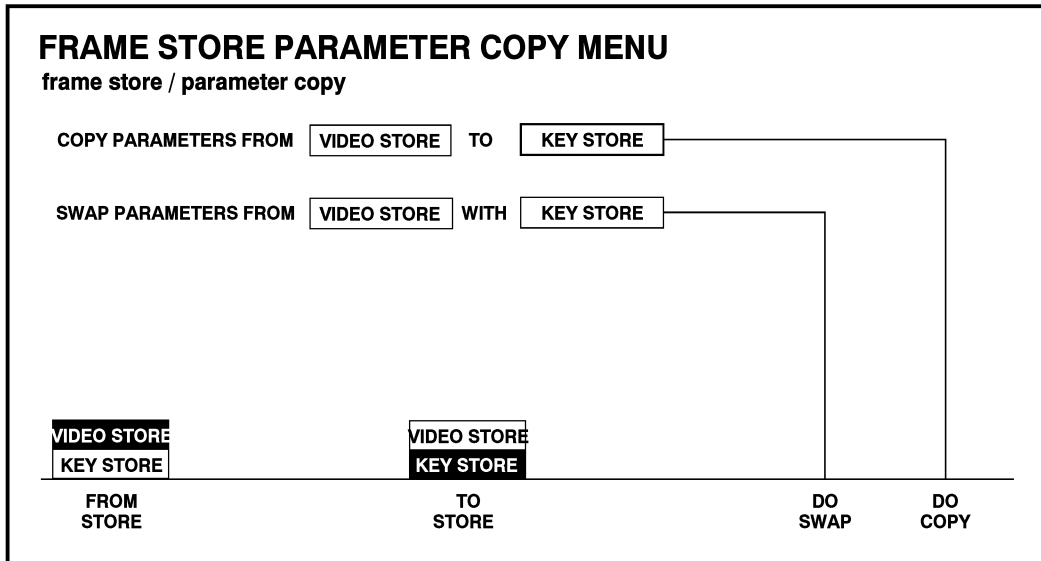
TO PAGE — Selects the page to copy/swap to.

DO SWAP — Initiates the Picture swap currently selected.

DO COPY — Initiates the Picture copy currently selected.

Parameter Copy Menu

Use the Parameter Copy menu to copy or swap all parameter settings from video to video, key to key, or video to key.



The Parameter Copy menu selections are:

FROM STORE — Selects the store to copy/swap from.

TO STORE — Selects the store to copy/swap to.

DO SWAP — Initiates the Parameter swap currently selected.

DO COPY — Initiates the Parameter copy currently selected.

Video Store Menu

The Video Store menu allows you to select a page of stored video, create a strobe effect by setting a strobe time period between a stored image and a delegated source image, and provides access to Video Store positioning and pseudo color controls.

VIDEO STORE MENU
frame store / video store

PAGE SELECT

PAGE 1

PAGE 2

PAGE 3

PAGE 4

STROBE TIME PERIOD
= 20

STROBE FREEZE PERIOD
= 10

ON

OFF

STROBE

MOSAIC >

PSEUDO
COLOR >

CROP >

REPOSITION >

FILTER >

STROBE — When **ON** is selected, strobe is activated. Strobe alternates between a frozen Frame Store image and a selected source image (M/E, PGM, etc. delegated to Aux Bus 4) with the frequency set by the soft knobs described below. The difference between the time settings is what varies the strobe effect.

STROBE TIME PERIOD — Sets the time (in fields) for the delegated video source to be displayed. Minimum time period is 4 fields.

STROBE FREEZE PERIOD — Sets the time (in fields) during which the frozen frame store image is displayed. Minimum time period is 8 fields.

PAGE SELECT — Selects one of four pages (frames) of the video image.

MOSAIC > — Opens the Video Store Mosaic Menu.

PSEUDOCOLOR > — Opens the Video Store Pseudo Color Menu.

CROP > — Opens the Video Store Crop Menu.

REPOSITION > — Opens the Video Store Reposition Menu.

FILTER > — Opens the Video Store Filter Menu.

Video Store Mosaic Menu

This menu allows you to apply and adjust a mosaic pattern to the video store video.

VIDEO STORE MOSAIC MENU
frame store / video store / mosaic

MOSAIC SIZE
= 50%

MOSAIC ASPECT
= 0.00

FIRST ACTIVE PIXEL
= 0

ON

OFF

MOSAIC

MOSAIC — Turns on the mosaic feature and enables the mosaic adjustment soft knobs.

MOSAIC SIZE — Adjusts the width of the mosaic area, up to 100% of the screen.

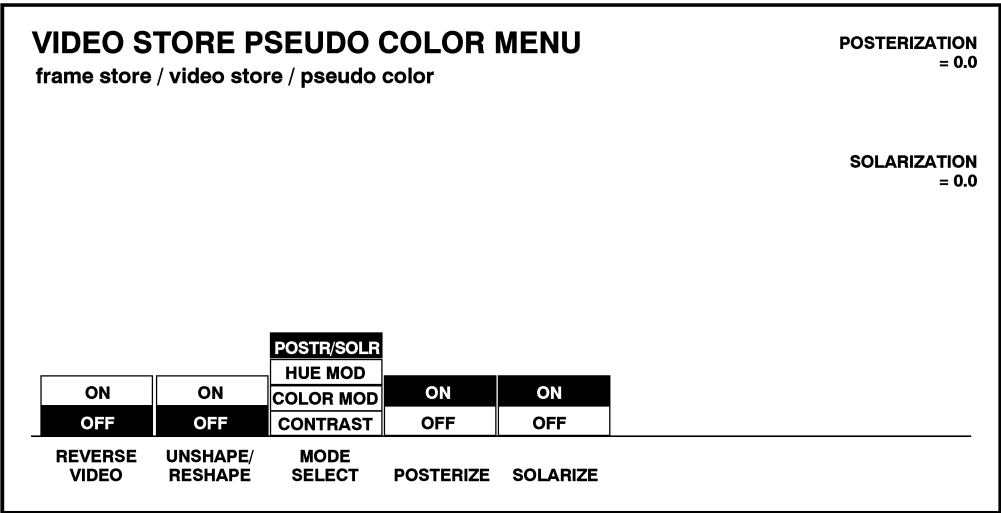
MOSAIC ASPECT — Adjusts the vertical-to-horizontal aspect of the mosaic area.

FIRST ACTIVE PIXEL — Adjusts the positioning of the left edge of the mosaic area.

Video Store Pseudo Color Menu

The Pseudo Color menu allows you to select normal or reversed video, and several pseudocolor modes. The mode selected determines the functions of the fourth and fifth soft buttons and the soft knobs.

The following illustration is the appearance of the Video Store Pseudo Color menu when **POSTR/SOLR** is selected.



REVERSE VIDEO — Turns reverse video on or off, which inverts the luminance (white and black are reversed) and places each hue 180° away from its original color.

UNSHAPE/RESHAPE — Allows shaped video (of a video/key pair) to be unshaped before being bitmapped, then reshaped after bitmapping. This button appears only if Key Store is configured as Key.

MODE SELECT — Selects one of four pseudocolor modes, as described on the following pages.

Posterization/Solarization

Selecting **POSTR/SOLR** mode provides adjustment of the posterization and solarization parameters.

POSTERIZE — Causes the luminance values of a frozen image to be changed from a continuous scale to a limited(adjutable) number of steps.

POSTERIZATION — Adjusts the number of steps of luminance.

SOLARIZE — Causes the chrominance values of a frozen image to be changed from a continuous scale to a limited(adjutable) number of steps.

SOLARIZATION — Adjusts the number of steps of chrominance.

Pseudo Color Hue Modification

The following illustration is the appearance of the Pseudo Color menu when **HUE MOD** is selected.

VIDEO STORE PSEUDO COLOR MENU
 frame store / video store / pseudo color

HUE MOD START PHASE
 = 0.0

HUE MOD END PHASE
 = 0.0

HUE MOD SATURATION
 = 0.0

ON	ON	POSTR/SOLR		
OFF	OFF	HUE MOD	ON	CW
		COLOR MOD	OFF	CCW
		CONTRAST		
REVERSE VIDEO	UNSHAPE/ RESHAPE	MODE SELECT	HUE MOD	HUE MOD PATH

HUE MOD — Enables the hue modification feature, which strips chroma from the stored image and substitutes a spectrum of colors for the resulting black and white. Also enables the soft knobs for adjustment of the colors to be substituted.

HUE MOD START PHASE and **HUE MOD END PHASE** — Adjust the starting color and ending color of the spectrum to be substituted for black and white.

HUE MOD SATURATION — Adjusts the saturation of the color spectrum to be substituted.

HUE MOD PATH — Sets the direction of the hue substitution from black to white, as viewed on a vectorscope.

Pseudo Color Modification

The following illustration is the appearance of the Pseudo Color menu when **COLOR MOD** is selected. This menu provides adjustment of the color modification parameters.

VIDEO STORE PSEUDO COLOR MENU

frame store / video store / pseudo color

BLACK HUE
= 0.0

BLACK SAT
= 0.0

BLACK BRIGHT
= 0.0

POSTR/SOLR

HUE MOD

COLOR MOD

CONTRAST

ON

OFF

ON

OFF

ON

OFF

ON

OFF

REVERSE
VIDEO

UNSHAPE/
RESHAPE

MODE
SELECT

COLOR
MOD

BLK/WHT
DELEGATE

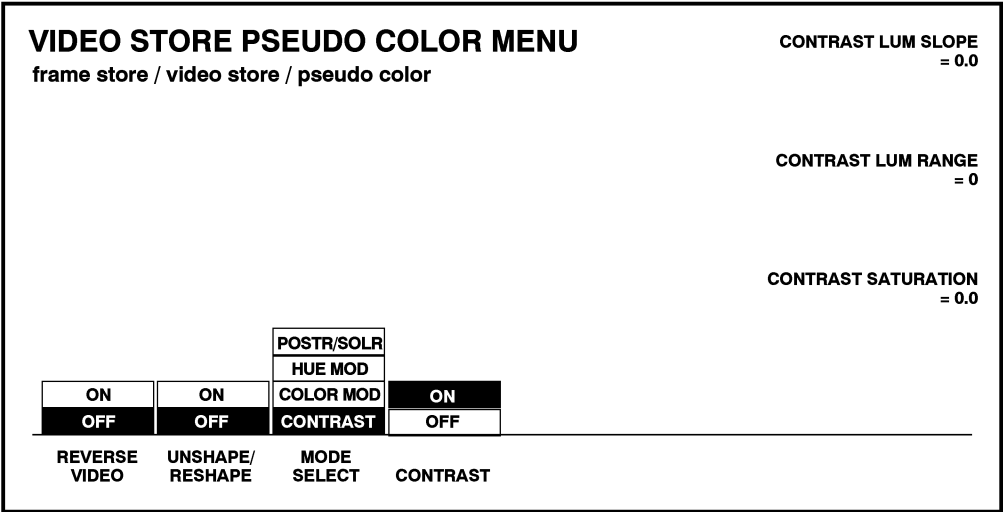
COLOR MOD — Enables the color modification feature, which strips chroma from the stored image, then substitutes two colors for the black and white limits of the resulting image.

BLK/WHT DELEGATE — Delegates the soft knobs for adjustment of the color to be substituted.

BLACK HUE, BLACK SAT, and BLACK BRIGHT or WHITE HUE, WHITE SAT, and WHITE BRIGHT — Adjust the color and luminance of the colors to be substituted for the black and white portions of the signal.

Pseudo Color Contrast

The following illustration is the appearance of the Pseudo Color menu when **CONTRAST** is selected.



CONTRAST—Turns on the contrast function and enables the contrast adjustment knobs. Adjustment of these controls is highly subjective and depends on the characteristics of the image and the desires of the operator.

CONTRAST LUM SLOPE — Adjusts the luminance contrast of the stored video.

CONTRAST LUM RANGE — Adjusts the luminance offset of the video.

CONTRAST SATURATION — Adjusts the saturation of the video chrominance.

Video Store Crop Menu

This menu allows you to crop (mask) portions of the stored video.

VIDEO STORE CROP MENU			
frame store / video store / crop	TOP = 0.00 screen units		
	BOTTOM = 0.00 screen units		
	LEFT = 0.00 screen units		
<table><tr><td>ON</td></tr><tr><td>OFF</td></tr></table>	ON	OFF	RIGHT = 0.00 screen units
ON			
OFF			
CROP			

CROP — Turns on the crop feature and enables the soft knob adjustments for positioning the crop.

TOP, BOTTOM, LEFT, and RIGHT — Adjust the limits of the crop for the stored video.

Video Store Reposition Menu

This menu allows positioning of the video store output image.

VIDEO STORE REPOSITION MENU

frame store / video store / reposition

Blur is currently ON.
Position values are limited to
4 Line, 1 Pixel boundaries

ON	ON	ON
OFF	OFF	OFF

HORIZONTAL POSITION

VERTICAL POSITION

PIXEL DETENT

Coarse Adjust Horizontal

= 0.0000 Screen Units
(0.00 Pixels)

Fine Adjust Horizontal

Coarse Adjust Vertical

= 0.0000 Screen Units
(0.00 Lines)

Fine Adjust Vertical

RESTORE
DEFAULTS

HORIZONTAL POSITION — Enables or disables horizontal positioning of the stored (frozen or unfrozen) image.

Coarse Adjust Horizontal and **Fine Adjust Horizontal** soft knobs — Adjust the horizontal position of the image.

VERTICAL POSITION — Enables or disables vertical positioning of the stored (frozen or unfrozen) image.

Coarse Adjust Vertical and **Fine Adjust Vertical** soft knobs — Adjust the vertical position of the image.

RESTORE DEFAULTS — Returns the image to the original position.

Video Store Filter Menu (Blur)

The Video Store Filter menu allows you to apply either a blur or hue rotate to the video store output image.

FILTER SELECT — Selects either **BLUR** or **HUE ROTATE** filter mode.

Following is the appearance of the menu when **BLUR** is selected.

VIDEO STORE FILTER MENU
frame store / video store / filter

LUM BLUR
0%

CHROMA BLUR
0%

BLUR SYMMETRY
0%

BLUR	ON	ON	ON	ON	ON
HUE ROTATE	OFF	OFF	OFF	OFF	OFF

FILTER SELECT

BLUR

SEPARATE LUM/CHROMA

LUM BLUR

CHROMA BLUR

BLUR SYMMETRY

BLUR — Turns on the blur filter mode.

SEPARATE LUM/CHROMA — Allows separate adjustment of luminance blur and chrominance blur applied to the video store image.

LUM BLUR — Enables the **LUM BLUR** adjustment.

LUM BLUR — Adjust the amount of luminance blur applied to the image.

CHROMA BLUR — Enables the **CHROMA BLUR** adjustment.

CHROMA BLUR — Adjusts the amount of chrominance blur applied to the video store image.

BLUR SYMMETRY — Enables the **BLUR SYMMETRY** horizontal adjustment.

BLUR SYMMETRY — Adjusts the vertical proportions of luminance and chrominance blur.

Video Store Filter Menu (Hue Rotate)

This is the appearance of the Video Store Filter Menu when **HUE ROTATE** is selected.

VIDEO STORE FILTER MENU
frame store / video store / filter

HUE ANGLE
0 deg

BLUR	ON
HUE ROTATE	OFF

FILTER
SELECT

HUE
ROTATE

HUE ROTATE — Turns on the hue rotate filter mode which rotates the chrominance as observed on a Vectorscope.

HUE ANGLE — Adjusts the angle of hue rotation.

Key Store Menu

The Key Store menu allows you to select the page, set the strobe period, and provides access to Key Store positioning.

KEY STORE MENU	
frame store / key store	
PAGE SELECT PAGE 1 PAGE 2 PAGE 3 PAGE 4	
STROBE TIME PERIOD = 20	
STROBE FREEZE PERIOD = 10	
ON OFF	
STROBE	CROP > REPOSITION > FILTER >

STROBE — When **ON** is selected, Strobe is activated.

STROBE TIME PERIOD — Sets the time for the Strobe.

STROBE FREEZE PERIOD — Sets the time for the Strobe to freeze.

PAGE SELECT — Selects one of four pages (frames) of the key image.

REPOSITION > — Opens the Key Store Reposition menu.

FILTER> — Opens the Key Store Filter menu.

Key Store Crop Menu

This menu allows you to crop (mask) portions of the stored key.

KEY STORE CROP MENU	TOP
frame store / key store / crop	= 0.00 screen units
	BOTTOM
	= 0.00 screen units
	LEFT
	= 0.00 screen units
ON OFF	RIGHT
	= 0.00 screen units
CROP	

CROP— Turns on the crop feature and enables the soft knob adjustments for positioning the crop.

TOP, BOTTOM, LEFT, and RIGHT — Adjust the limits of the crop for the stored key.

Key Store Reposition Menu

This menu allows positioning of the key store output image.

KEY STORE REPOSITION MENU

frame store / key store / reposition

Blur is currently ON.
Position values are limited to
4 Line, 1 Pixel boundaries

ON

OFF

ON

OFF

ON

OFF

HORIZONTAL
POSITION

VERTICAL
POSITION

PIXEL
DETENT

Coarse Adjust Horizontal

= 0.0000 Screen Units
0 Pixels)

Fine Adjust Horizontal

Coarse Adjust Vertical

= 0.0000 Screen Units
(0 Lines)

Fine Adjust Vertical

RESTORE
DEFAULTS

HORIZONTAL POSITION — Enables or disables horizontal positioning of the stored key.

Coarse Adjust Horizontal and **Fine Adjust Horizontal** soft knobs — Adjust the horizontal position of the key.

VERTICAL POSITION — Enables or disables vertical positioning of the stored (frozen or unfrozen) key.

Coarse Adjust Vertical and **Fine Adjust Vertical** soft knobs — Adjust the vertical position of the key.

RESTORE DEFAULTS — Returns the key to the original position.

Key Store Filter Menu (Blur–Video Mode)

The Key Store Filter menu allows you to apply a blur to the key store output.

Following is the appearance of the menu when **BLUR** is selected.

KEY STORE FILTER MENU		BLUR 0%					
frame store / key store / filter							
		BLUR SYMMETRY 0%					
<table><tr><td>BLUR</td><td>ON</td></tr><tr><td>HUE ROTATE</td><td>OFF</td></tr></table>	BLUR	ON	HUE ROTATE	OFF	<table><tr><td>ON</td></tr><tr><td>OFF</td></tr></table>	ON	OFF
BLUR	ON						
HUE ROTATE	OFF						
ON							
OFF							
FILTER SELECT	BLUR	BLUR SYMMETRY					

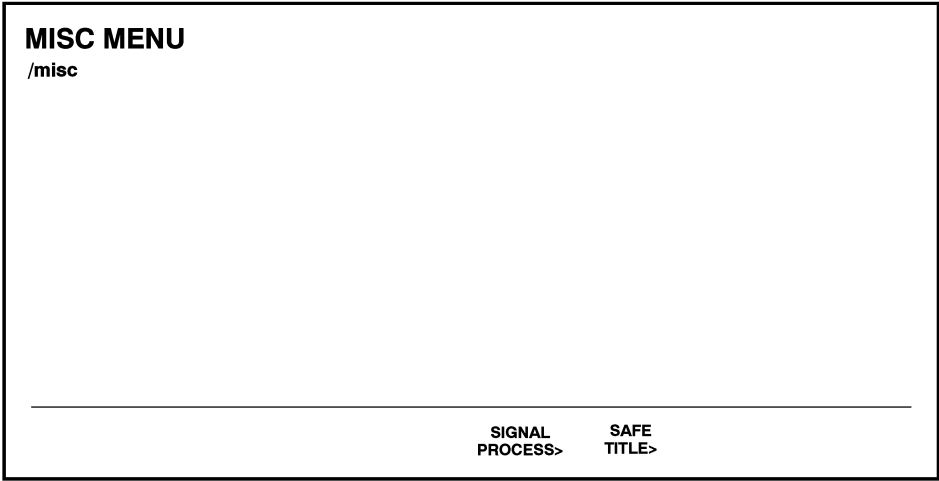
BLUR — Turns on the blur filter mode.

BLUR SYMMETRY — Enables the **BLUR SYMMETRY** adjustment.

BLUR SYMMETRY — Adjusts the proportions of horizontal and vertical blur.

Miscellaneous Menu

The **MISC** button on the Menu Display subpanel brings up the Misc menu.



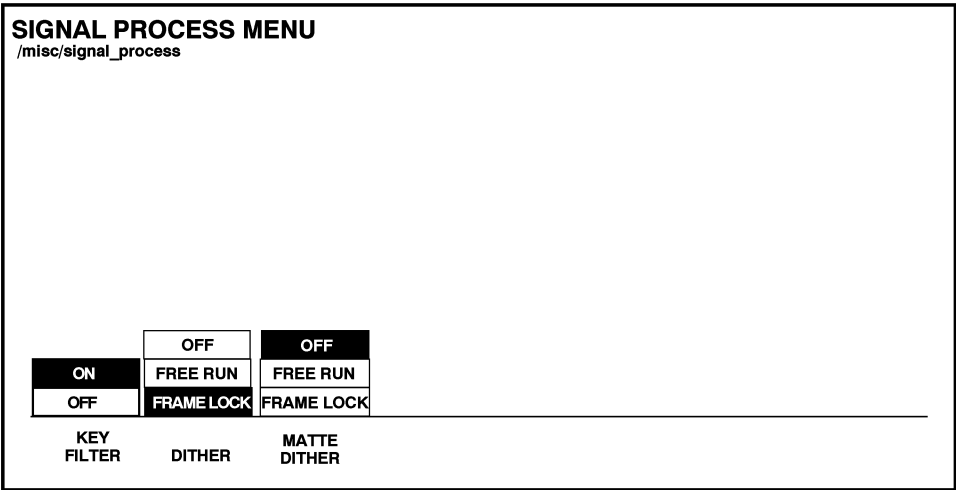
The following menu selections are accessible through the Miscellaneous menu:

SIGNAL PROCESS > — Opens the Signal Process menu, which allows you to select Key Filter and Dither modes.

SAFE TITLE > — Opens the Safe Title menu, which allows you to turn on or off safe title and select a safe title pattern.

Signal Processing Menu

Use the Signal Processing menu to turn Key Filter, Dither and Matte Dither modes on or off.



The Signal Processing menu selections are as follows:

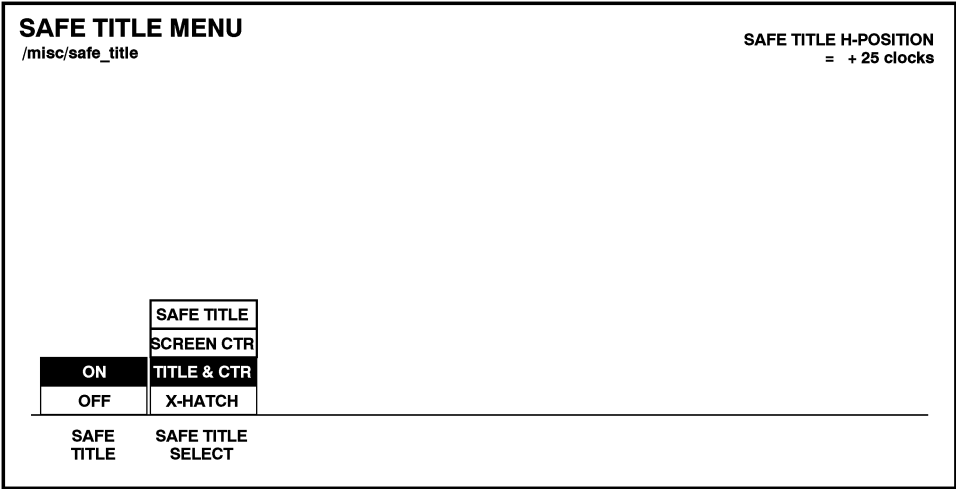
KEY FILTER — Enables/ disables Key Filter mode.

DITHER — Selects Frame Lock, Free Run, or Off for 8 -bit digital outputs.

MATTE DITHER — Selects Frame Lock, Free Run, or Off for 8 -bit digital outputs for the matte signals.

Safe Title Menu

Use the Safe Title menu to turn the Safe Title mode on or off, select a safe title pattern, and adjust safe title horizontal position. The functions of this menu appear only if the Safe Title option is installed.



The Safe Title menu selections are:

SAFETITLE — Turns the Safe Title Generator preview monitor display on or off.

SAFETITLE SELECT — Selects a safe title pattern. This soft button appears only when **SAFE TITLE** is on.

SAFE TITLE H-POSITION — Positions safe title horizontally. This soft knob appears only when **SAFE TITLE** is on.

Disk Menu

Use the Disk menu for disk and file management functions such as creating directories, and loading and saving files.

The initial **DISK** menu appears as shown below when there is no disk in the drive.

DISK MENU

/disk

MARKED FILES	
# FILES	# BYTES
0	0

CURRENT DIRECTORY	TOTAL BYTES
/FLOPPY	0

FILENAME	EXT	BYTES	DATE	TIME
FLOPPY		<DEV>		

FILE
SELECT

CHILD
DIRECTORY

UTILS >

CHILD DIRECTORY — Causes the system to read a diskette in the disk drive and to list the parent directory of the diskette.

Pressing **CHILD DIRECTORY** re-displays the menu to enable other functions, such as in the sample menu below:

DISK MENU

/disk

MARKED FILES	
# FILES	# BYTES
0	0

CURRENT DIRECTORY	TOTAL BYTES
/FLOPPY	0

FILENAME	EXT	BYTES	DATE	TIME
/FLOPPY		<DEV>		

FILE
SELECT

VIEW BY
NAME

LIST
DIRECTORY

PARENT
DIRECTORY

LOAD
FILE >

SAVE
FILE >

MARK FILE
FOR DELETE

DELETE >

UTILS >

LIST DIRECTORY — Causes the system to re-read the directory of the diskette in the disk drive.

PARENT DIRECTORY — Backs out from a subdirectory to the parent directory.

LOAD FILE > — Invoke the Load File menu. If a subdirectory is selected (see **FILE SELECT** below), the **CHILD DIRECTORY** label appears instead of **LOAD FILE>**.

SAVE FILE > — Invokes the Save File menu.

MARK FILE FOR DELETE — Marks files so that they may be deleted simultaneously. (Does not enable simultaneous loading or saving of files.)

DELETE > — Invokes the Confirm Delete menu which allows you to **DO DELETE** or **CANCEL**. Either a single selected file or a number of marked files can be deleted.

UTILS > — Invokes the Utilities menu.

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FILE SELECT — Moves the selection box through the list of files in the directory to select the file or directory to be acted upon by subsequent operations.

VIEW BY NAME/EXT/DIR — Allows the directory to be listed in alphabetical order by file name or by extension, or to just list subdirectories. The display changes automatically as the new selection is made.

After the diskette directory has been read, the display may look something like the following example:

MARKED FILES		CURRENT DIRECTORY		TOTAL BYTES		FILE SELECT
# FILES	# BYTES	/FLOPPY		8004		
0	0	FILENAME	EXT	BYTES	DATE	TIME
		BOOT	ABS	45548	FEB 10 1994	09:20
		COMM1	CMP	52665	FEB 10, 1994	08:31
		COMM2	CMP	55817	FEB 10, 1994	22:27
		.	.	.	.	.
		.	.	.	.	.
		.	.	.	.	.

LIST DIRECTORY	PARENT DIRECTORY	LOAD FILE >	SAVE FILE >	MARK FILE FOR DELETE	DELETE >	UTILS >

Load File Menu

The following menu displays when you press **LOAD FILE** if the selected file is an E-MEM register.

LOAD FILE MENU

/disk/load_file

Load file:/FLOPPY/ABLE.R01

E-MEM REGISTER

E-MEM BANK

E-MEM ALL

E-MEM LOAD SELECT

NO LOAD

LOAD

NO LOAD

LOAD

NO LOAD

LOAD

NO LOAD

LOAD

NO LOAD

LOAD

NO LOAD

LOAD

ME 1

ME 2

PGM-PST DSK

MISC

BKGD

DPMS 1-4

DO LOAD

M/E 1 through DPMS 1–4 — Include or omit portions of the selected file before loading it from disk into the switcher.

E-MEM LOAD SELECT — Enables loading of the selected **E-MEM REGISTER**, the **E-MEM BANK** containing the selected register, or **E-MEM ALL** (all 100 E-MEM registers).

NOTE: It takes approximately 6 minutes to load all 100 registers, even if most of them are empty. You may prefer to load only specific banks.

DO LOAD — Brings up the Confirm File Load menu, which allows you to **DO LOAD** or **CANCEL**.

If the selected file is a Configuration file instead of an E-MEM file, the Load File Menu displays as follows:

LOAD FILE MENU
disk/load file

Load file:/FLOPPY/NEWS.CFG

NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD
LOAD	LOAD	LOAD	LOAD	LOAD	LOAD
USER PREFS	SYSTEM PARAMS	INPUTS	OUTPUTS	EXTERNAL INTERFACE	CLR WK BUF

DO
LOAD

USER PREFS through **CLR WK BUF** — Include or omit portions of the selected file or buffer before loading it into the switcher.

DO LOAD — Invokes the Confirm File Load menu, which allows you to **DO LOAD** or **CANCEL**.

Save File Menu

Use the Save File menu to save selected portions of E-MEM register data, Configuration data, or editor decision List (EDL) data, to disk. All of these data types may be saved on one diskette if desired. You can also choose the type of save, the number of registers to be saved, and invoke the Name File submenu.

SAVE FILE MENU

/disk/save_file

CURRENT DIRECTORY	TOTAL BYTES
/FLOPPY	8004

REGISTER = 24

SYSTEM	E-MEM REGISTER	E-MEM BANK	E-MEM ALL

SAVE SELECT

NO SAVE	NO SAVE	NO SAVE	NO SAVE
SAVE	SAVE	SAVE	SAVE

ME 1ME 2

PGM-PST DSKMISCBKGD

DPMs 1-4NAME FILE >

M/E 1 through DPMs 1 -4 — Select portions of the E-MEM register data or switcher Configuration data to be included or omitted when saving it to disk.

NOTE: The switcher’s serial protocol supports the transfer of E-MEM registers to and from an Editor. This allows an Editor to save its decision list (EDL) together with the switcher E-MEMs on one diskette. Refer to your Editors Operations Manual to see if this feature is supported by your Editor.

SAVE SELECT — Selects the type of save to be done.

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NAME FILE > — Invokes the Name File menu in order to name the file(s) that you wish to create on the disk. For an E-MEM file, an automatic extension is added to the file name on the disk (for example, .R24 for register 24). If an E-MEM bank of all E-MEM registers is saved, a separate file is created on the disk for each E-MEM register.

SAVE FILE MENU

disk/save file

CURRENT DIRECTORY	TOTAL BYTES
/FLOPPY	8004

CONFIG

E-MEM REGISTER

E-MEM BANK

E-MEM ALL

NO SAVE	NO SAVE	NO SAVE	NO SAVE	NO SAVE	NO SAVE
SAVE	SAVE	SAVE	SAVE	SAVE	SAVE

USER PREFS

SYSTEM PARAMS

INPUTS

OUTPUTS

EXTERNAL INTERFACE

CLR WK BUF

NAME FILE >

NAME FILE > — Invokes the Name File menu to name the file you wish to create on the disk. For a Configuration file, an automatic extension of CFG is added to the file name on the disk.

Name File Menu

Use this menu to name files to be saved. This menu uses the same format as the Name Inputs menu described earlier in this section.

NAME FILE MENU

/disk/save_file/name_file

() -

String Register:

USER

Save String

Get String

a b c d e f g h i j k l m n o p q r s t u v w x y z

A B C D E F **G** H I J K L M N O P Q R S T U V W X Y Z

File Name:

WORKIN_

Character =

G

1 2 3 4 5 6 7 8 9 0

CURSOR BACK

ACCEPT CHAR

CURSOR FORWARD

DELETE CHAR

SAVE STRING

GET STRING

ACCEPT NAME

When **ACCEPT NAME** is pressed, the Confirm File Save menu displays, allowing you to **DO SAVE** or **CANCEL**. If a file with the same name already exists in the directory, you will be warned of that fact and given a third alternative, **OVER WRITE**, which will write the new file over the existing file on the disk (the existing file will be erased).

Utilities Menu

Use the Utilities menu to format disks and create subdirectories in order to organize your saved files.

UTILITIES MENU
/disk/utls

CURRENT DIRECTORY		TOTAL BYTES	
/		0	

DISK USAGE			
KBYTES USED	% USED	KBYTES AVAIL	% AVAIL

CREATE
DIR >

FORMAT
720K >

FORMAT
1.44M >

FORMAT 720K and **FORMAT 1.44M** — Format a blank or previously used disk in the appropriate format. (A 720K disk has one write-protect tab; a 1.44M disk has two write-protect tabs.)

NOTE: Be sure to have the write-protect tab(s) set to off (closed) to allow writing to the disk.

Press **FORMAT 720K** or **FORMAT 1.44M** to invoke the Confirm Format Disk menu in order to **DO FORMAT** or **CANCEL**.

CREATE DIR > — Invokes the Name Directory Menu, which allows you to create subdirectories on the disk. This menu uses the same format as the Name File Menu.

Press **CREATE DIR>** to open the Name Directory menu. Press **ACCEPT NAME** to either **DO CREATE** or **CANCEL**. If a duplicate directory name already exists in the parent directory a warning is issued and the Confirm Create Directory menu allows you to **RENAME** or **CANCEL**.

To save files to a subdirectory, first create the subdirectory, then have it open while you save the desired files.

Model 4000

D I G I T A L

Menu Trees

4

Introduction

Access many switcher features via software menus that are displayed on the Menu Display. This display shows both alphanumeric text and graphics.

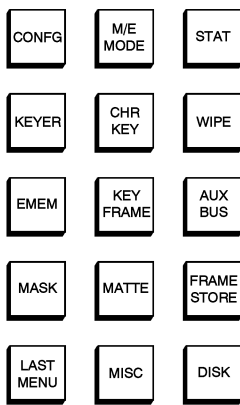
NOTE: This section has been updated to software *version 5.3*.

Top Level Menu Buttons

The menu system is divided into groups of related menus. Any particular group of menus can be accessed by pressing one of the top level menu buttons located at the left of the menu display.

Each main menu button (except **LAST MENU**) brings up a main menu, under which there may be sub-menus that allow selection of less-frequently used options. (Some top level menus have no sub-menus, or contain only one or two levels of sub-menus.)

Pressing a top level menu button causes the soft button assignments in the display to change specifically for that menu.



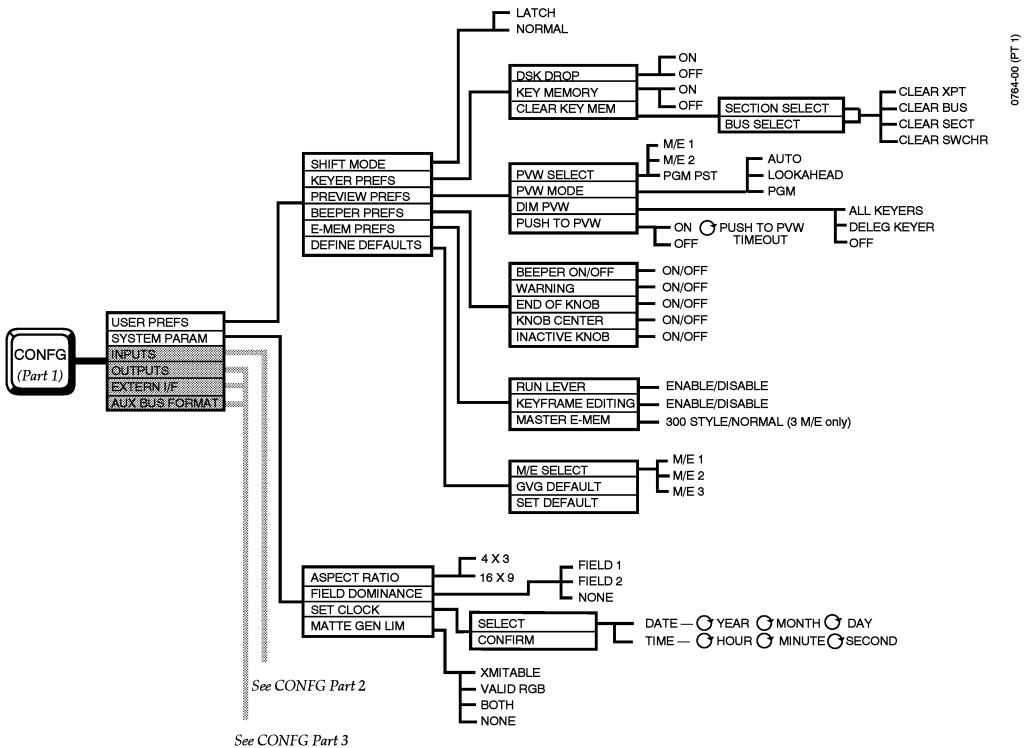
Soft Buttons

The eight “soft” buttons located below the menu display allow you to make function and sub-menu selections from menus displayed on the screen. The symbol “>” following the name of a soft button indicates that pressing that button will bring up a lower-level menu.

A ninth button in the row is a dedicated **EXIT** button that allows you to leave the menu you are in and return to the next higher menu on the tree.

Menu Tree Structures

Tree-structure diagrams are presented on the following pages for the top level menu buttons

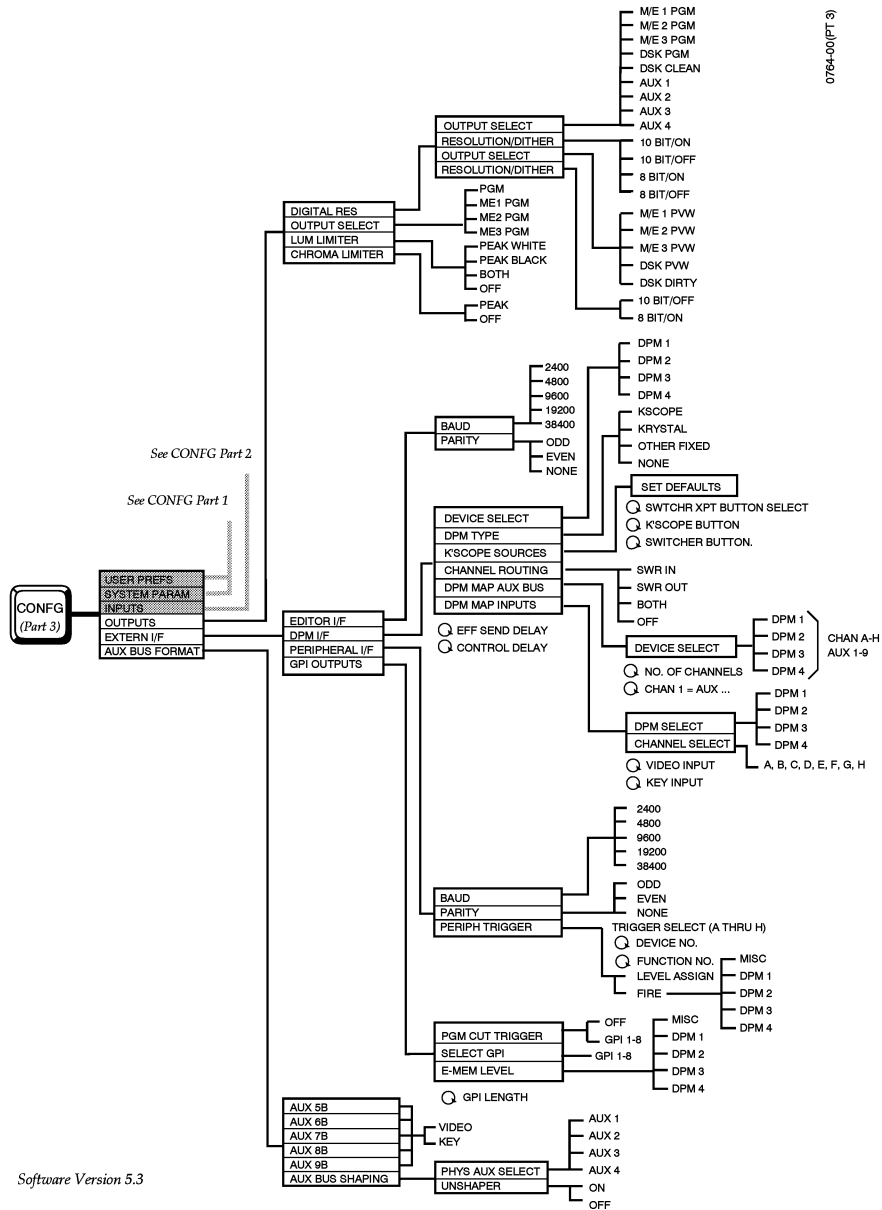


Software Version 5.3

Figure 4-1. CONFIG Menu Tree (Part 1)



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Software Version 5.3

Figure 4-3. CONFIG Menu Tree (Part 3)

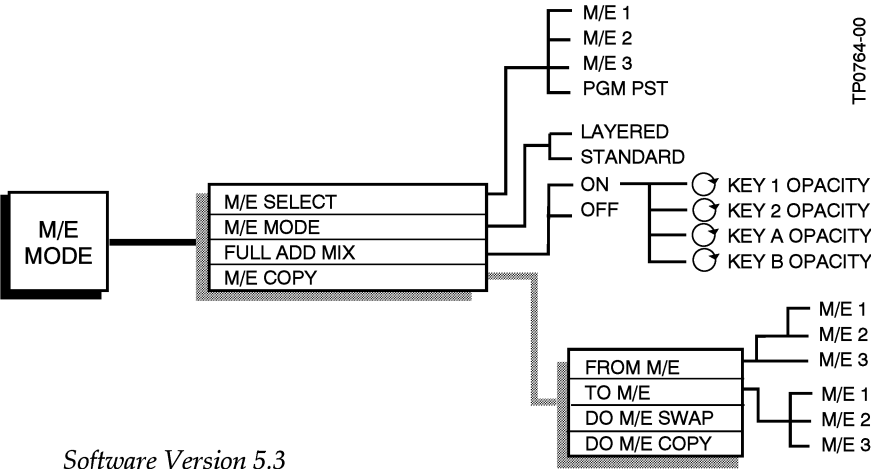
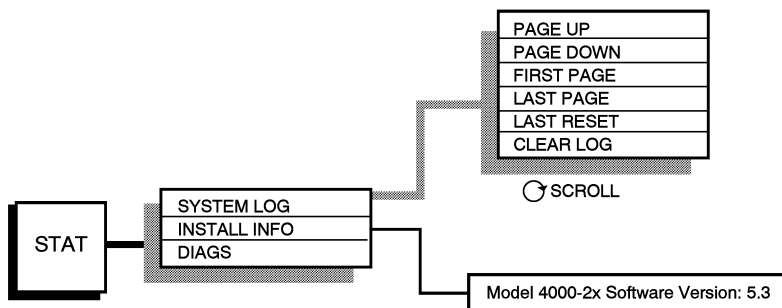
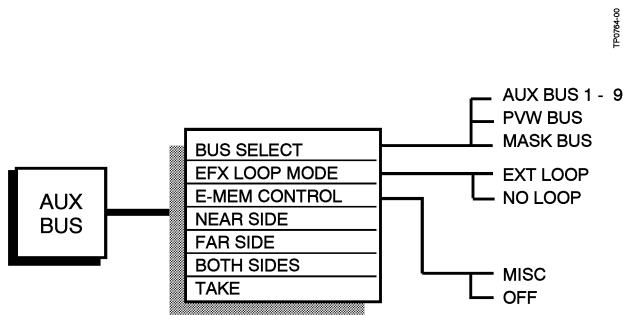


Figure 4-4. M/E MODE Menu Tree



Software Version 5.3

Figure 4-5. STAT Menu Tree



Software Version 5.3

Figure 4-6. AUX BUS Menu Tree

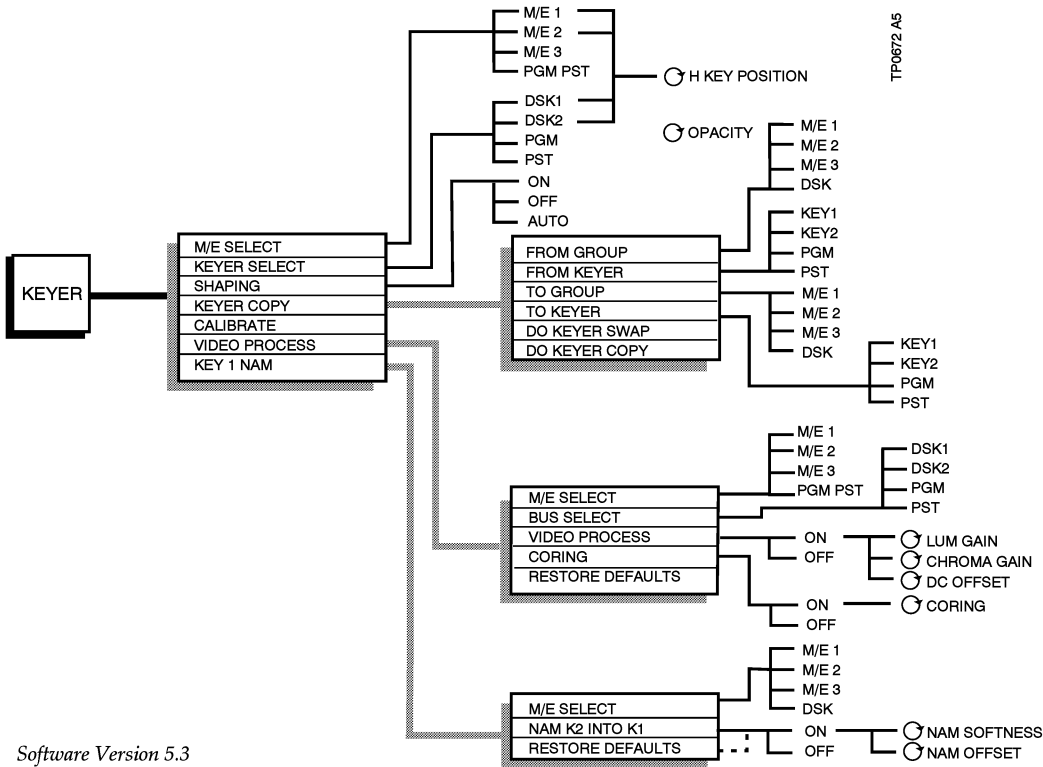
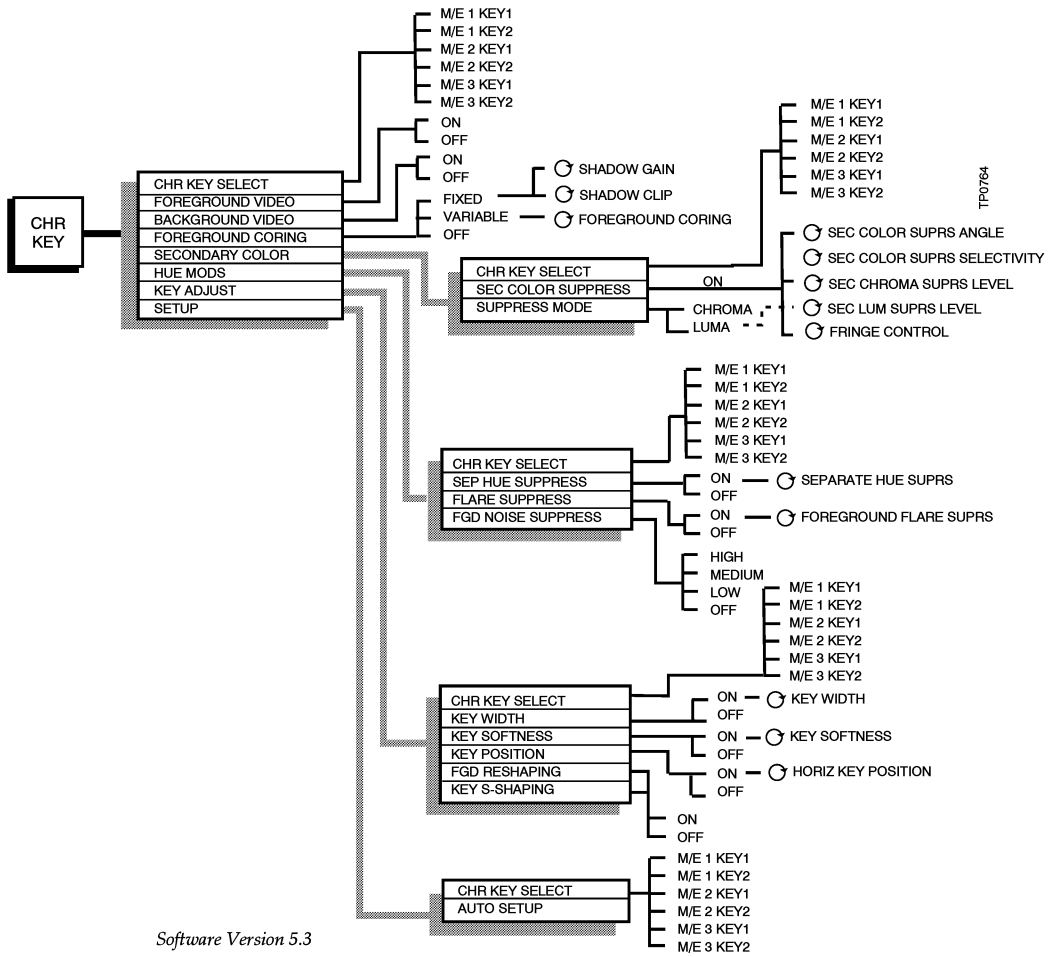
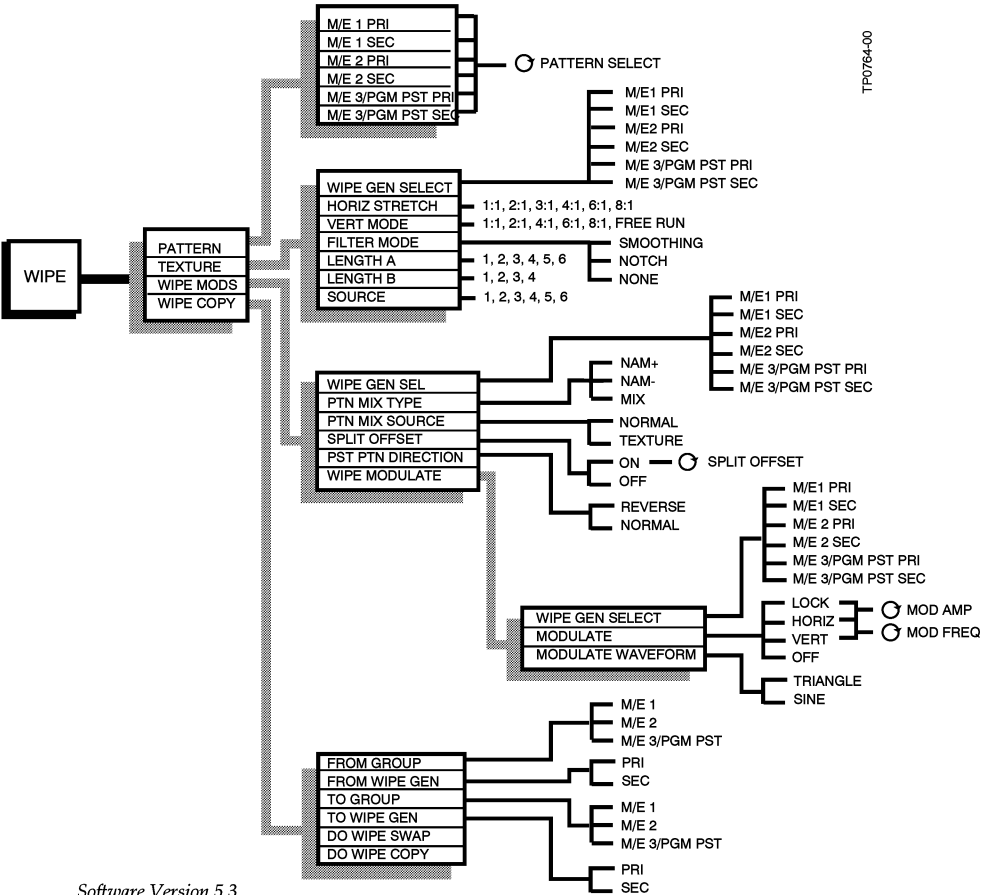


Figure 4-7. KEYER Menu Tree



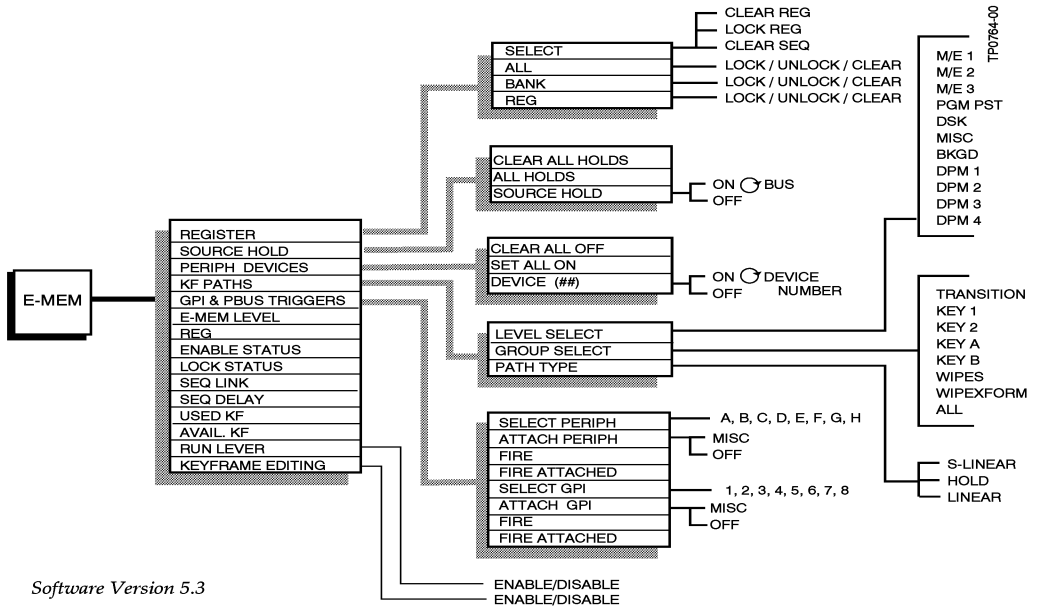
Software Version 5.3

Figure 4-8. CHROMA KEY Menu Tree



Software Version 5.3

Figure 4-9. WIPE Menu Tree



Software Version 5.3

Figure 4-10. E-MEM Menu Tree

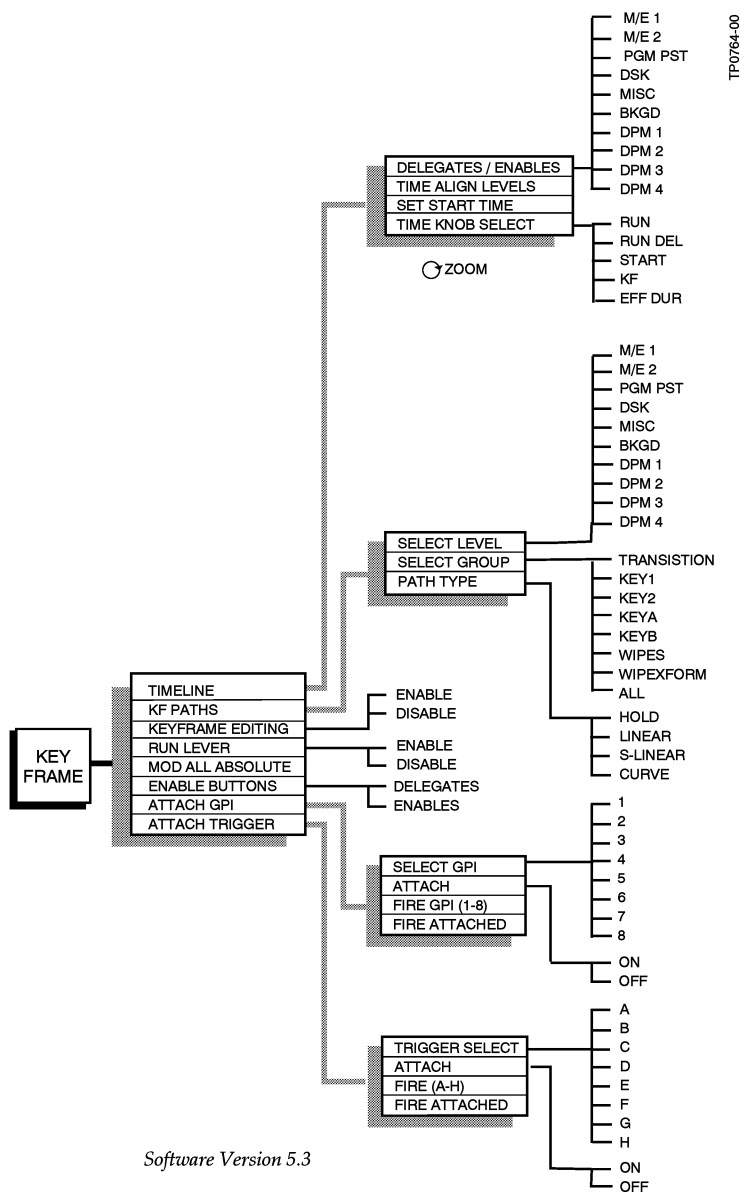


Figure 4-11. KEY FRAME Menu Tree

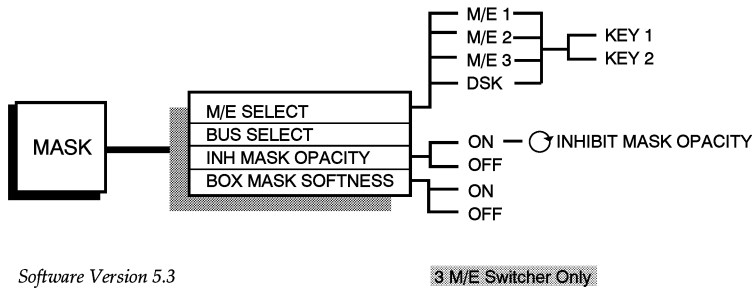


Figure 4-12. MASK Menu Tree

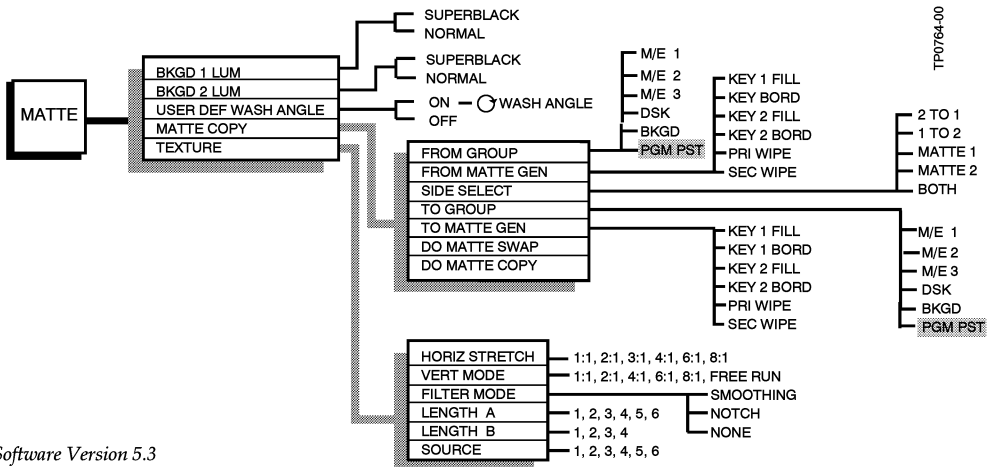
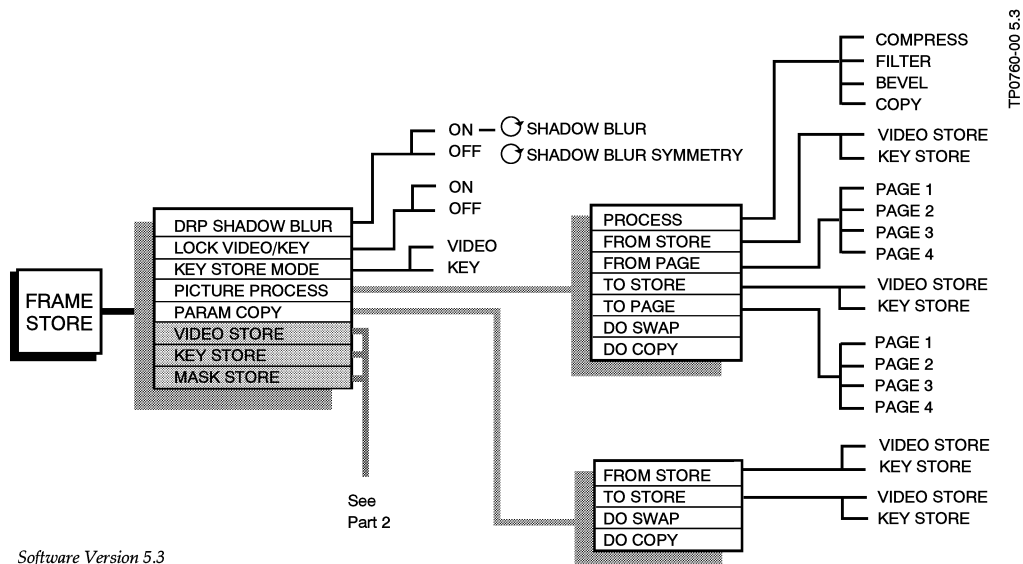


Figure 4-13. MATTE Menu Tree



Software Version 5.3

Figure 4-14. FRAME STORE Menu Tree (Part 1)

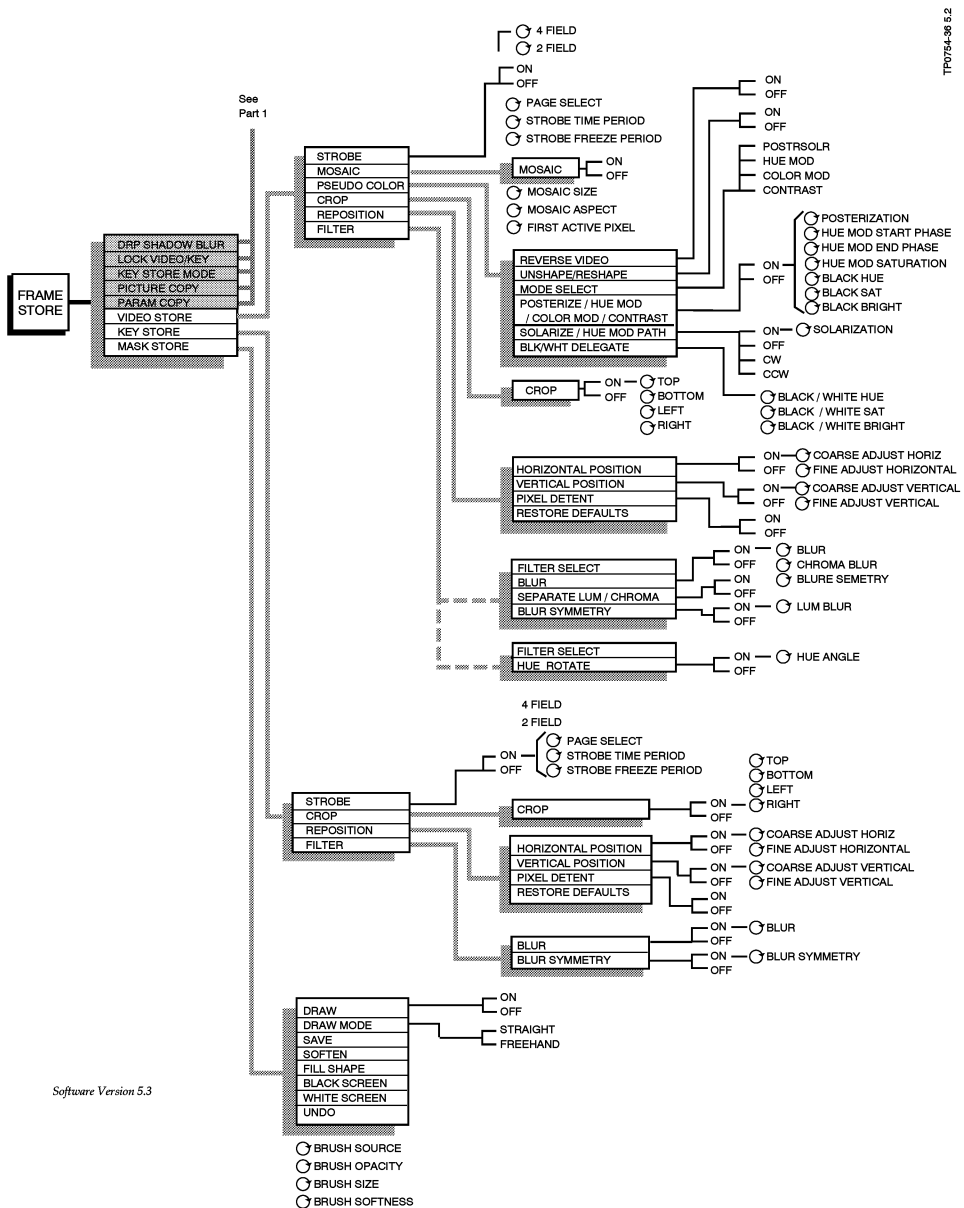
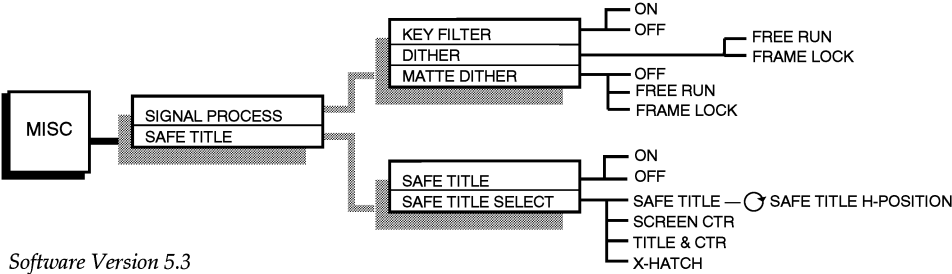


Figure 4-15. FRAME STORE Menu Tree (Part 2)



Software Version 5.3

Figure 4-16. MISC Menu Tree

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