



Installation and Operation

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MINI MASTER CONTROL PANEL
M-2100 DIGITAL MASTER CONTROL SYSTEM

Contacting Grass Valley Group

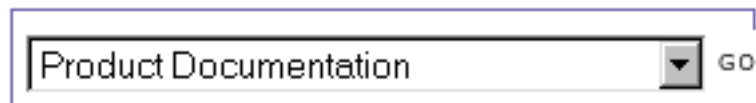
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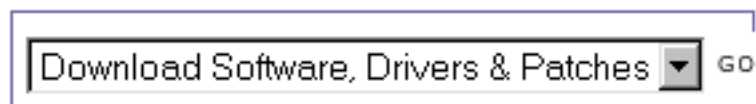
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Preface

About This Manual

This manual provides control panel installation and operating information for the Grass Valley Group M-2100 Mini Master Control Panel (MMCP) for use with the M-2100 Digital Master Control system. This manual is designed for personnel responsible for installing or operating MMCP systems.

Documentation Set

The standard M-2100 user documentation set consists of a:

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

The *User Manual* contains background information about the M-2100, and describes operating procedures. This manual can be used while learning about the M-2100, and for enhancing your basic knowledge of the system.

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

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

Other Documentation

A separate *Automation Interface Protocol Technical Reference Manual* is also available for installation and operation of an external device to control the M-2100.

Installation

Introduction

This section gives installation and configuration instructions for the Grass Valley Group M-2100 Mini Master Control Panel (MMCP).

The MMCP (Figure 1-1) is a compact panel for controlling the M-2100 Digital Master Control system. It offers control of up to eight channels from the panel, plus transition, key and audio functionality.

Note The M-2100 must be running v5.0 or later software for MMCP functionality.

Figure 1-1. Mini Master Control Panel

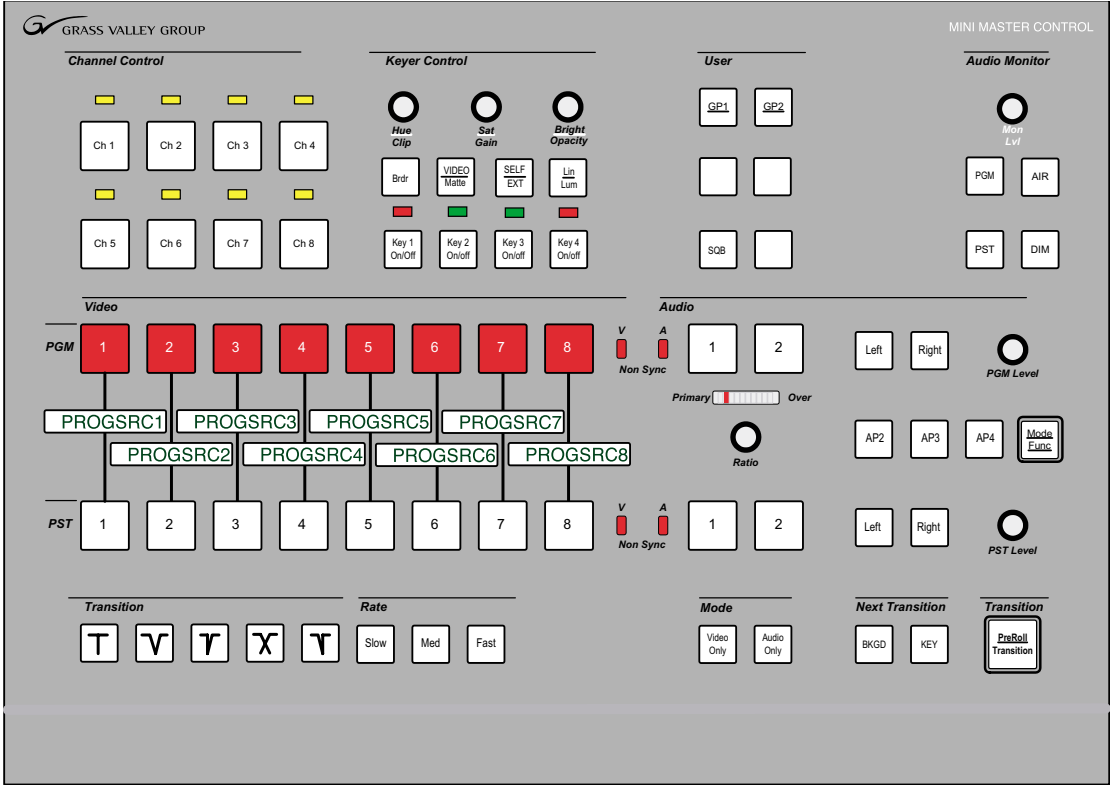
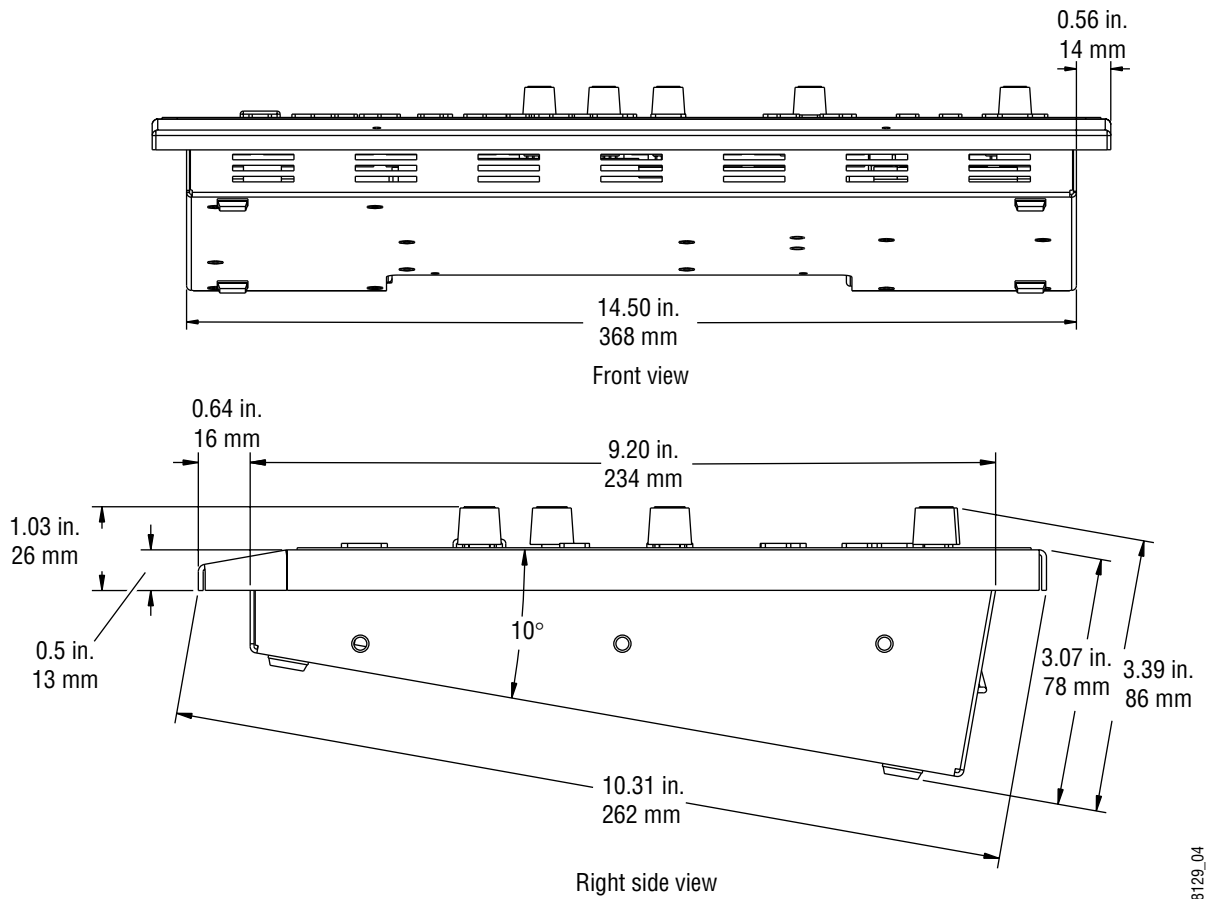


Figure 1-3. Front and Right Side Panel Dimensions

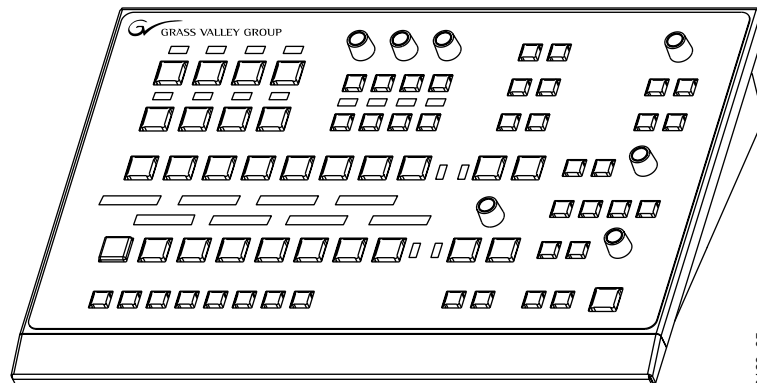


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Tabletop Mounting

The MMCP panel can stand alone on a tabletop surface (Figure 1-4). Rubber feet are installed on the bottom of the panel.

Figure 1-4. MMCP Tabletop Mounting



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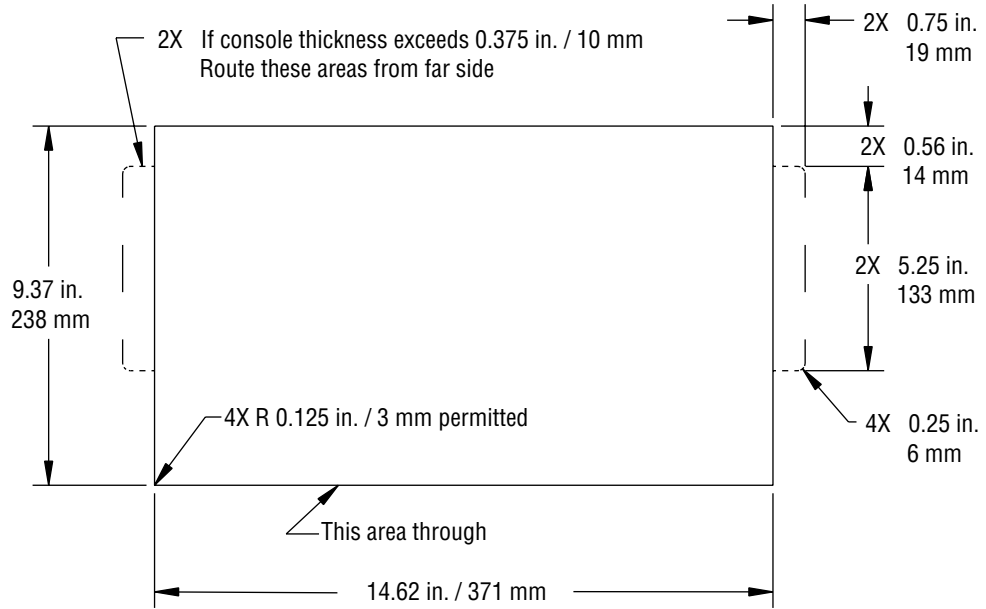
Console Mounting

A mounting bracket option kit provides a console mounting bracket to mount the control panel into a console cutout or rack ears to mount the panel in a standard 19 in. rack.

To install the panel in a console cutout, perform the following steps:

1. Prepare the console cutout according to the dimensions in [Figure 1-5](#).

Figure 1-5. MMCP Console Cutout Dimensions



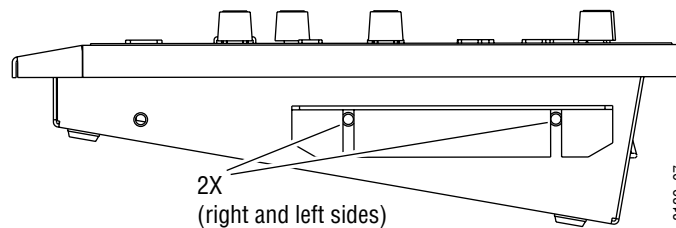
Console preparation as viewed from console top surface

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2. Install the optional console mounting brackets to the right and left sides of the panel using four of the #8 screws provided ([Figure 1-6](#)).

Adjust the mounting bracket to position the panel in the console at the desired height. Maximum console thickness is 0.375 in (10 mm). For a console wider than this, route the areas from the far side as shown above.

Figure 1-6. Attaching Console Mounting Brackets



Right side view

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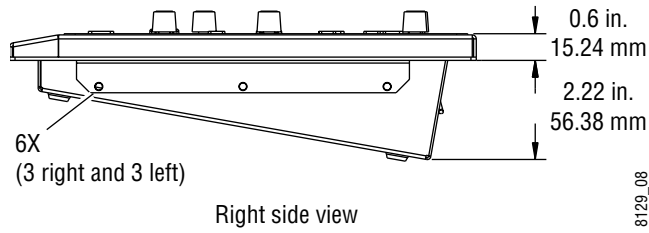
Rack Mounting

To mount the control panel in a standard 19 in. (483 mm) rack, use the rack ears provided with the mounting option.

To rack mount the panel, perform the following steps:

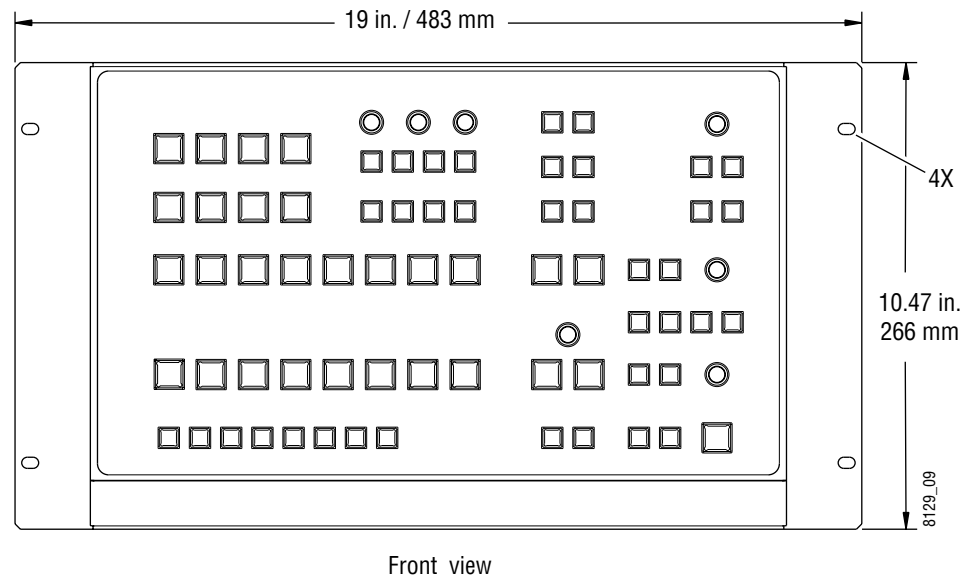
1. Install the rack ears to the right and left sides of the panel using the six #8 screws provided as illustrated in Figure 1-7.

Figure 1-7. Install Rack Ears To Panel



2. Mount the assembly to a standard rack using four standard rack screws and washers (not provided).

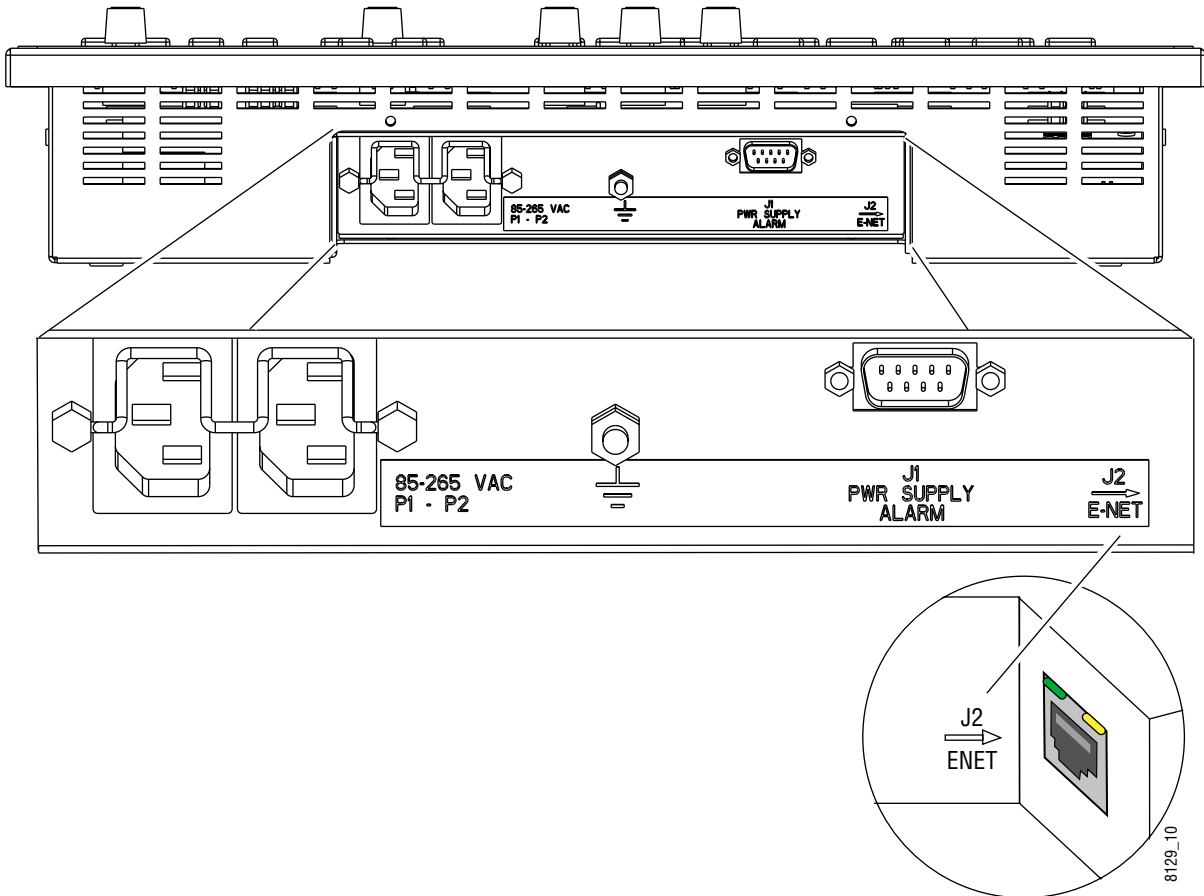
Figure 1-8. MMCP Rack Mounting



Control Panel Cabling

The connections to the MMCP panel are made at the rear of the panel in the recessed area shown in [Figure 1-9](#).

Figure 1-9. Control Panel Connections



Powering On

The MMCP has dual power supplies as standard features. The power supplies are installed inside the panel and are not accessible. There is no on/off switch for either supply. To power on, connect the AC line cords to the PS 1 and PS 2 AC connectors.

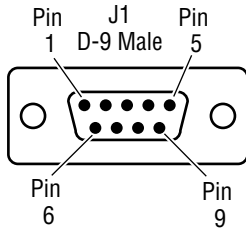
A chassis ground lug is provided at the rear of the panel.

Power Supply Alarms

A 9-pin male connector at J1 provides a power supply status reporting port. An external device can be wired to this connector to indicate when one or both of the power supplies fail.

A pinout diagram for J1 is given in [Table 1-1](#).

Table 1-1. Power Supply Alarm Connector Pinout

9-pin D Male Connector	Pin	Alarm Port (J1)
	1	Normally Closed_1
	2	Common
	3	Normally Open
	4	No Connection
	5	No Connection
	6	Normally Closed_2
	7	No Connection
	8	No Connection
	9	No Connection

When both power supplies are working properly, Pin 3 (Normally Open) is open with respect to Pin 2 (Common). If there is a power supply failure on either AC circuit or power supply, Pin 2 and Pin 3 will close.

An external alarm may be attached to the connector to operate in one of the following ways:

- Connect an alarm between Pin 2 and Pin 3 to switch on when the AC input or either power circuit fails or when either power supply fails.
- Connect an alarm between either Pin 1 or Pin 6 and Pin 2 to open when the AC input on either circuit fails or when either power supply fails.
- Connect an alarm between Pin 1 and Pin 6 to open when the AC input on either circuit fails or when either power supply fails.

Note Connecting between Pin 1 and Pin 6 is recommended only when the alarm relay is used to switch open an inductive load such as an AC-powered relay that cannot otherwise be protected with an external shunt diode.

The alarm relay contacts should be rated for 100 mV to 28 V AC or DC at 100 to 500 mA.

Network Configuration

The MMCP communicates with the M-2100 frames over a separate MCP Net Ethernet network. The M-2100 frames communicate with other external devices over the Facility LAN. The IP address of each panel must be set to put it on the specific MCP Net where the frames it will control reside. This must be done before you connect panels to the network.

Setting MCP Net IP Address

If this is a new installation, you may use the default MCP Net IP addresses of the panel and frame set at the factory. They should be on the same MCP Net. If more than one panel or frame is present, you will need to change the last octet of the MCP Net IP address of each of the additional devices. Each device must have a unique IP address (first three octets are the same, the last one different). The default IP address set at the factory for the MMCP is 192.168.0.250.

If you are installing a panel into an existing network, you will need to change the IP address of each panel so it is on the same MCP Net as the frames it will be controlling (first three octets are the same, the last one different).

If you don't know the MCP Net IP address of the existing network, you will need to query your frame through Console Port J4 on the rear of the frame to determine what MCP Net IP address has been assigned. Your network administrator may also be able to tell you what IP addresses are used at your facility.

There are two methods for setting the IP Address,

- Using the Netburner PC Tool, or
- Connecting a PC directly to the MMCP.

Netburner IPSetup PC Tool

The Ethernet card in the MMCP runs on the Netburner operating system. You may use the Netburner IPSetup.exe PC tool included on the floppy disk that accompanies the panel to set the IP address of the panel.

Note This utility can also be downloaded free of charge from the Netburner.com web site.

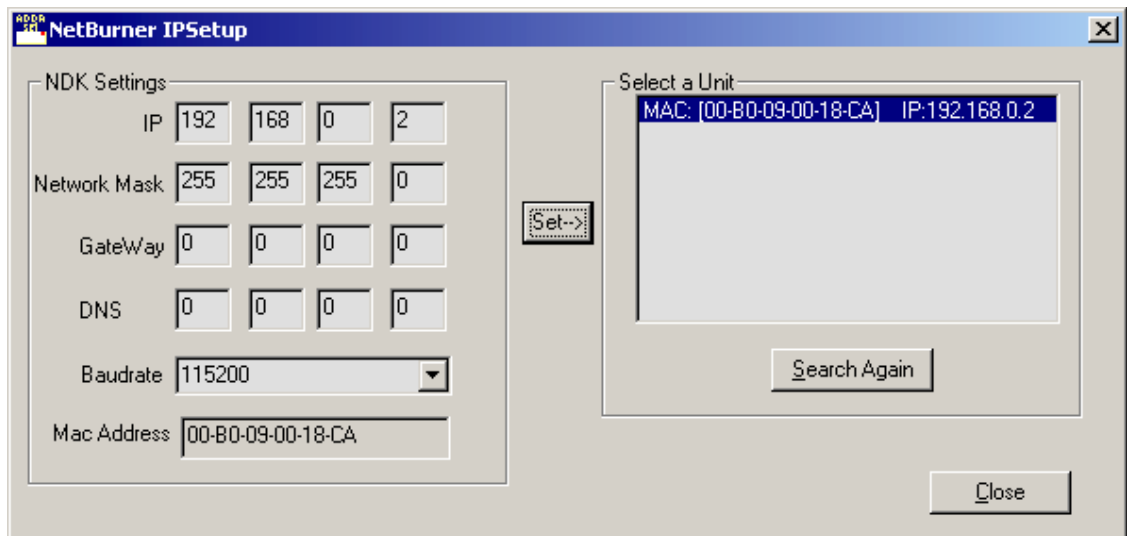
Use the following procedure to set the IP address using the Netburner PC tool.

1. Connect a PC and one MMCP to the same 10 BaseT Ethernet network.

Note Only one panel at a time should be connected to the PC to allow positive identification of the panel to be programmed.

2. Open the Netburner IPSetup.exe application and locate the panel on the network as shown in [Figure 1-10](#). The application will find Netburner devices on the network and identify them by their MAC addresses.
3. Type in the desired IP address in the **IP** boxes.
4. Set the Subnet Mask in the **Network Mask** boxes to 255.255.255.0.
5. Set the **GateWay** IP address to 0.0.0.0.
6. Set the **DNS** IP address to 0.0.0.0.
7. When finished, click on the **Close** button.
8. The panel must be rebooted for the new IP address to take effect. Remove power momentarily to reboot.

Figure 1-10. Netburner IPSetup PC Tool



Direct PC Connection

You may use a PC equipped with an Ethernet interface and a web browser to change the panel IP address as follows.

1. Connect the PC's Ethernet port directly to the MMCP panel ENET RJ45 connector J2 (Figure 1-9 on page 1-6).

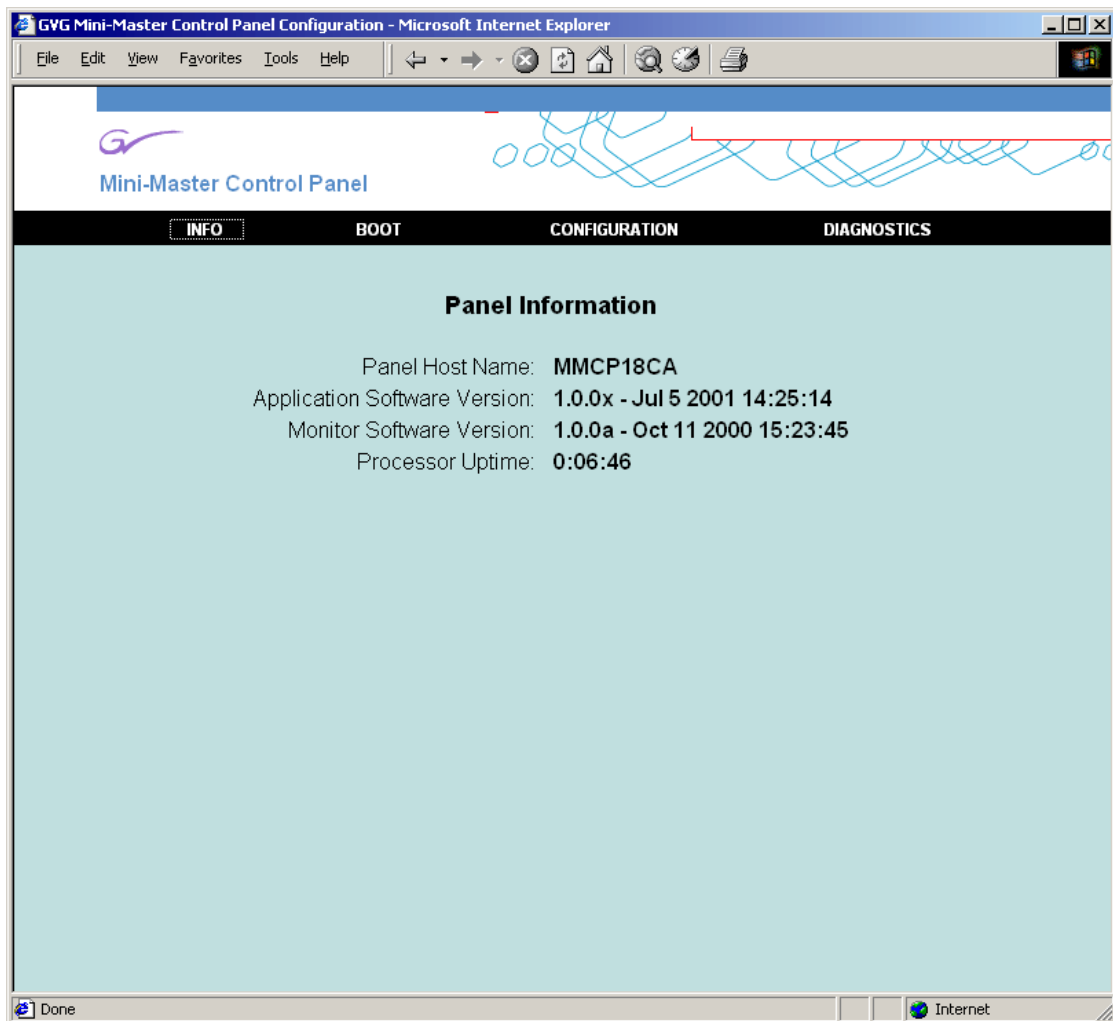
Note A crossover Ethernet cable (Tx/Rx pair crossed) is needed when connecting a PC directly to the panel without a hub intermediary.

2. Run the web browser and type in the default IP address of the MMCP panel as `http://192.168.0.250`. The PC IP address must have a network value (first three octets) that matches the default IP address.

If the address is found, a **Panel Information** screen similar to Figure 1-11 will appear.

3. Click on the **BOOT** link to go to the Boot Configuration screen.

Figure 1-11. Panel Information Screen

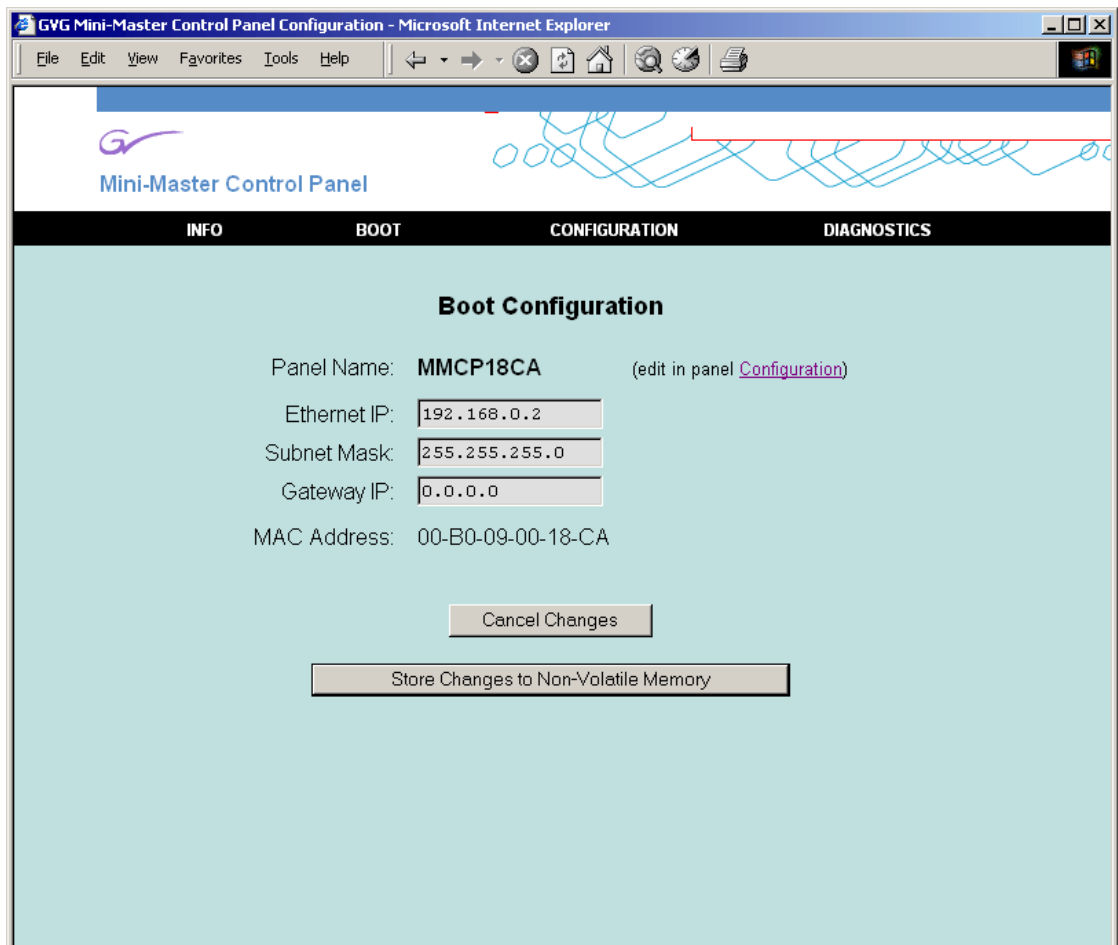


4. In the Boot Configuration screen (Figure 1-12 on page 1-11), enter the **Ethernet IP** address for this panel to put it on the MCP Net with the frames it will be controlling.
5. The **Subnet Mask** should be 255.255.255.0 (the subnet mask for the M-2100 network).
6. The **Gateway IP** should be set to 0.0.0.0.
7. Select **Store Changes to Non-Volatile Memory** to store these values or **Cancel** to make no changes.

Note The MAC address of the Ethernet card inside the panel is also given in read-only format.

8. Disconnect the panel from the PC and install it onto the MCP Net Ethernet network.
9. Repeat this procedure on all the MMCP panels to be used with your M-2100 system, entering unique MCP Net IP addresses (last octet different) for each MMCP panel.

Figure 1-12. Boot Configuration Screen



Control Panel Configuration

After installing the panel in the MCP Net and in its operating location you may wish to adjust some of the operating parameters such as display and low tally intensity and LED blink period. This can be done in the **Panel Configuration** menu also accessible through the web browser.

Return to the panel IP address location with the web browser by entering the new IP address of the panel. From the **Panel Information** screen, click on **CONFIGURATION**.

The **Panel Configuration** screen will appear as shown in [Figure 1-13 on page 1-13](#).

You may set the following parameters from this screen:

- **Panel Name** — Enter a panel name of up to eight characters.
- **LED Blink Period** — Enter a number from 1–25 for a blink rate.
- **LED Low-Tally Intensity** — Enter a value from 1–9 (1=minimum to 9=maximum).
- **Display Intensity** — Enter a value from 1–7 (1=minimum to 7=maximum).

You may make channel assignments for each of the eight channel controls on the panel from this menu. Enter the name of the channel (from the FCM name assigned in M–2100 configuration). The name must be a valid FCM name on the network. The preferred method of making channel assignments is by using the **Channel Control** buttons on the panel as described in [Assigning Channels to Channel Control Buttons on page 2-4](#).

When you have finished, click the **Use Changes Now** button to preview any of the intensity or blink rate parameters. Click the **Store Changes to Non-Volatile Memory** to store these values or **Cancel Changes** to make no changes.

Figure 1-13. MMCP Configuration

The screenshot displays the 'GVG Mini-Master Control Panel Configuration' web application running in Microsoft Internet Explorer. The browser's address bar and menu bar are visible at the top. The application has a blue header with the GVG logo and the text 'Mini-Master Control Panel'. Below the header is a navigation bar with four tabs: 'INFO', 'BOOT', 'CONFIGURATION', and 'DIAGNOSTICS'. The 'CONFIGURATION' tab is currently active.

The main content area is titled 'Panel Configuration' and contains the following settings:

- Panel Name: (max 8 chars, alphanumeric or - only)
- LED Blink Period: x 0.2 seconds (1-25)
- LED Low-Tally Intensity: (1=min to 9=max)
- Display Intensity: (1=min to 7=max)
- Channel 1 Assignment:
- Channel 2 Assignment:
- Channel 3 Assignment:
- Channel 4 Assignment:
- Channel 5 Assignment:
- Channel 6 Assignment:
- Channel 7 Assignment:
- Channel 8 Assignment:

At the bottom of the configuration area, there are three buttons: 'Use changes Now', 'Cancel Changes', and 'Store Changes to Non-Volatile Memory'.

The browser's status bar at the bottom shows 'Done' on the left and 'Internet' on the right.

Control Panel Diagnostics

Some control panel diagnostics are available through the **Diagnostics Mode** menu and from button presses on the panel pushbuttons.

Note Diagnostics may only be run when the system is off-air and no FCMs are communicating. Release all connected FCMs or clear all FCM assignments from **Channel Control** buttons.

To perform diagnostics from the web browser, click on **DIAGNOSTICS** from the **Panel Information** screen.

The **Diagnostics Mode** screen will appear as shown in [Figure 1-14 on page 1-15](#).

You may perform the following diagnostic tests from this screen:

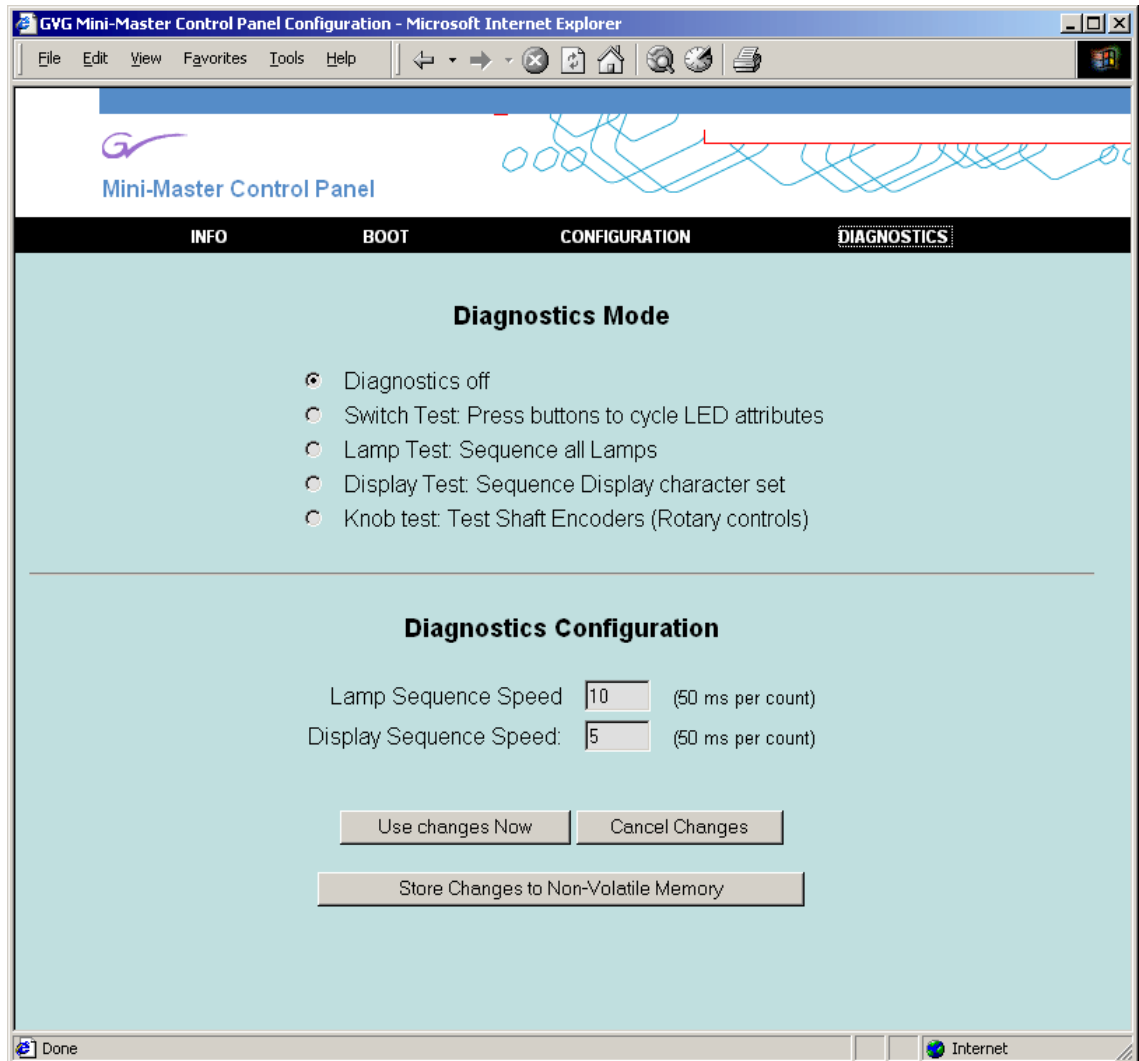
- **Switch Test** — The LED display behind each switch will be cycled through bright, dim and off states. For switches with two LEDs, both LEDs will be cycled through all combinations.
- **Lamp Test** — All LEDs will be turned on in sequence. The current LED number will be displayed.
- **Display Test** — All displays are identified by number while the intensity is cycled through all states. All possible ASCII characters are also cycled.
- **Knob Test** — An absolute signed value will be shown for each shaft encoder. Turn knobs to send delta values to the frame. Press any button to clear and reset the displayed values.

Click the **Use Changes Now** button to preview any of the intensity or blink rate parameters. Click the **Store Changes to Non-Volatile Memory** to store these values or **Cancel Changes** to make no changes.

The panel diagnostics may also be initiated directly from the panel push-buttons as follows:

1. Press and hold the unlabeled white button below the **GPI 2** button in the User control section of the panel.
2. Press one of the top four Channel Control buttons to run the diagnostics. The four buttons correspond to the diagnostic tests above (Channel 1=Switch Test, Channel 2=Lamp Test, Channel 3=Display Test and Channel 4=Knob Test).
3. To turn diagnostics off, press and hold the unlabeled button and select any one of the bottom four **Channel Control** buttons.

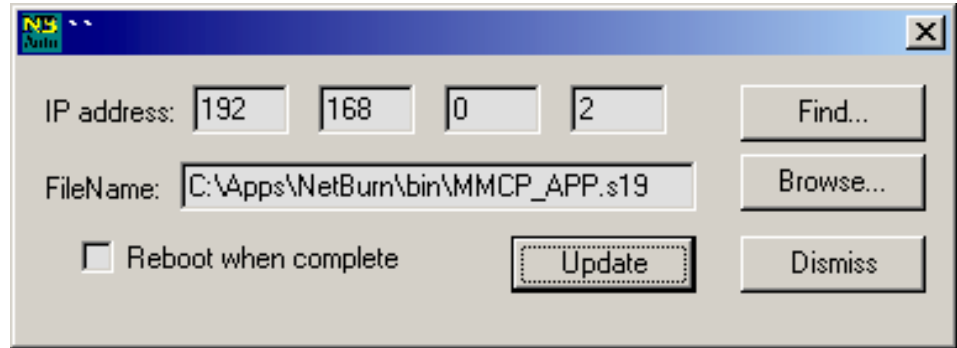
Figure 1-14. MMCP Diagnostics Screen



Software Installation

The MMCP requires that the M-2100 is running v5.0 or later software. When new system software is released, installation is done with the Netburner AutoUpdate PC Tool shown in [Figure 1-15](#). Instructions for using the tool are given in the Release Notes that accompany the upgrade. The Release Notes will also cover new operating and configuration information.

Figure 1-15. Netburner AutoUpdate PC Tool



System Configuration

After installing new software, you will need to configure the system with Configuration Manager. The **MCP** form in this application is used to set the panel parameters. Refer to your M-2100 Installation and Service Manual for complete instructions.

System Operations

About this Section

This section of the Mini Master Control Panel Installation and Operation manual describes the basic operation of the MMCP. The operations are described using step-by-step procedures.

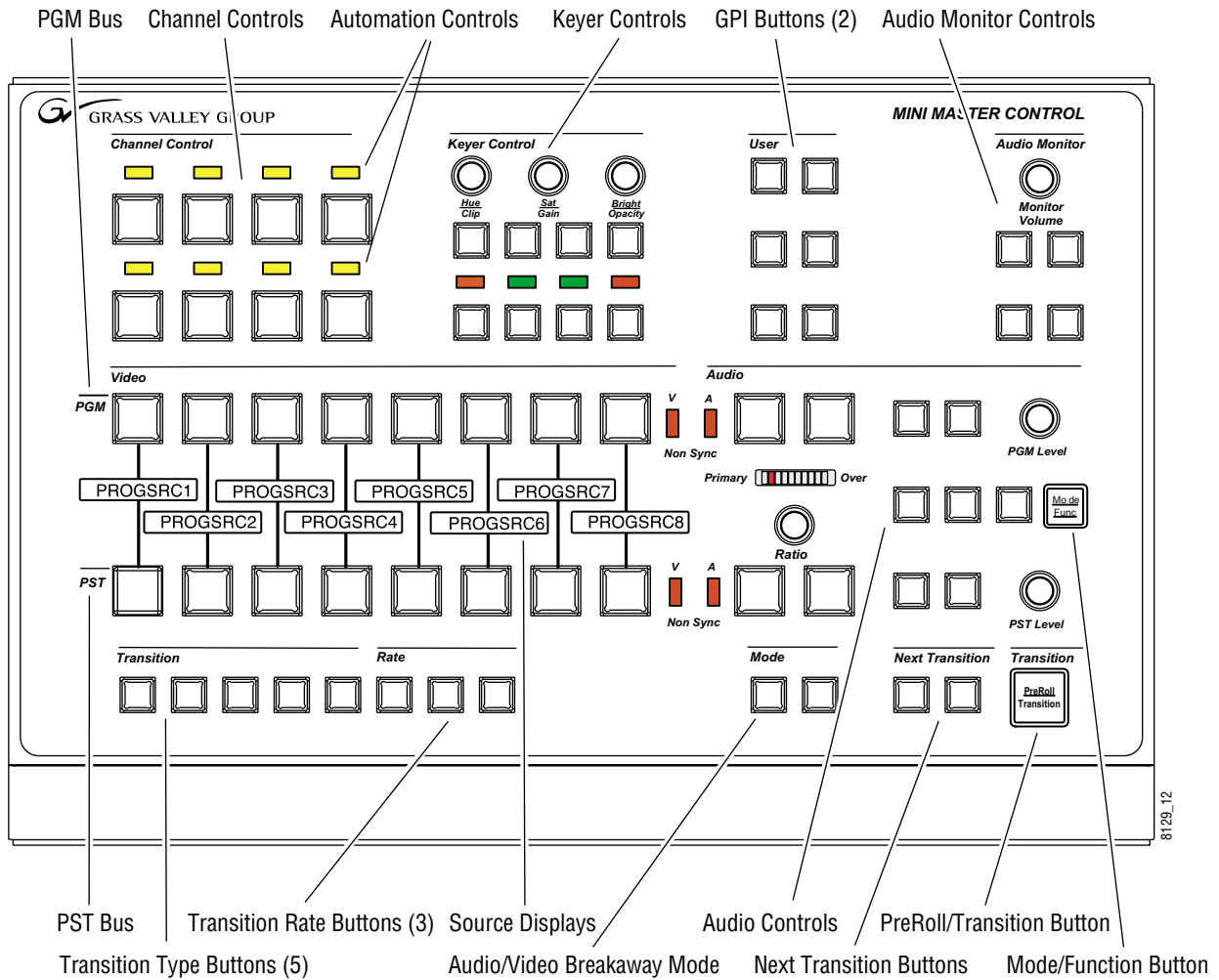
The topics covered in this section are:

- Multichannel operations,
- Program/Preset bus operations,
- Transition controls and operation including **Transition Type** and **Rate**, **Breakaway Mode**, **Next Transition**, and **PreRoll/Transition** button groups,
- **GPI** button operations,
- **Mode/Function** button operations,
- Keying controls and operations including keys and key modifiers, Chroma keying, SqueezeBack and Crop, and
- Audio Controls and operations including audio monitoring.

Introduction

The Mini Manual Control Panel shown in [Figure 2-1](#), provides an alternative to automated control of the M-2100 Serial Digital Master Control System. A single MMCP can control up to sixteen channels (frames), eight channels selectable at any given time. Automation can be disabled at the MMCP for each of the Audio/Video/Control Processors.

Figure 2-1. Mini Master Control Panel



Using Multichannel Control

A powerful feature of the M-2100 is the ability to control more than one processing channel (FCM). A Channel Control subpanel ([Figure 2-1 on page 2-2](#)) located in the top left corner of the panel, allows you to:

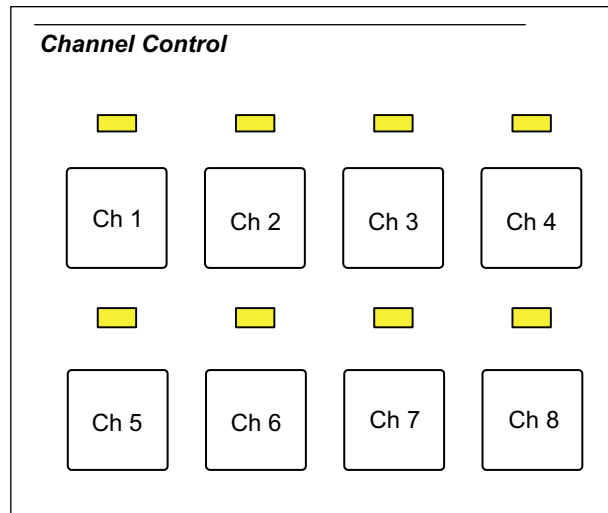
- Enable/disable automation for each channel,
- Assign **Channel Control** buttons to specific channel (Frame Controller Modules or FCMs),
- Control chosen FCMs using MMCP controls, and
- Monitor channel status.

Channel Control Overview

The Channel Control subpanel ([Figure 2-2](#)) allows control of up to eight channels from the panel. The panel will respond to the lamps and tallies for only one panel at a time. This is the Primary channel. Up to seven Secondary channels can be assigned; one of which can be chosen to replace the Primary fails for some reason. Assigned and connected channels do not have to be selected as Primaries or Secondaries. The color and state (bright or dim) of the **Channel Control** buttons will indicate the status of each connected channel (see [Table 2-1 on page 2-4](#)).

The **Channel Control** buttons also enable and disable automation of any associated assigned channel and show automation status with the yellow LED above each button.

Figure 2-2. Channel Control Subpanel



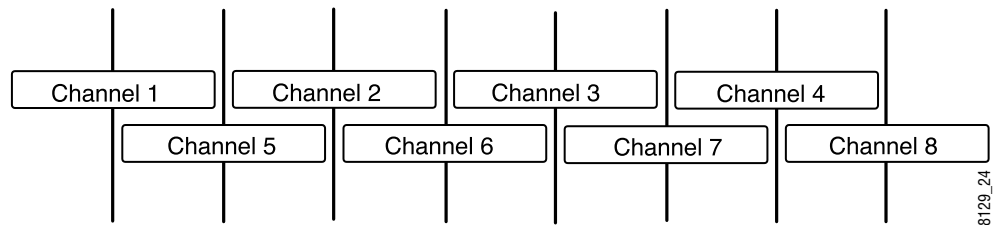
The **Channel Control** button color, tally states and their meanings are summarized in Table 2-1.

Table 2-1. Channel Control Button Color and Tally States

Color/State	Meaning
Off	Not assigned
Dim Red	Assigned but not available (Busy or No Comm)
Dim Red (blinking)	Assigned pending connection
Dim Green	Assigned and connected
Bright Yellow	Primary channel
Dim Yellow	Secondary channel
Alternating Red	Non-sync

When assigning a channel, you may scroll through the available channels with the **Take** and **Fade/Fade** Transition Type buttons in the lower left of the panel (Figure 2-1 on page 2-2). The scrolling channel names will appear in a Source Name display (Figure 2-3) corresponding to the **Channel Control** button being pressed. Once channels are assigned to a button, the channel names will be displayed in the Source Name displays corresponding to the **Channel Control** buttons. Channel names will only display during the channel assignment process.

Figure 2-3. Channel Names in Source Name Displays



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Assigning Channels to Channel Control Buttons

Each frame (channel) must be currently configured as a valid Equipment Type in Configuration Manager before it can be assigned to a **Channel Control** button.

Channel Control buttons can only be assigned when the panel is in a quiescent state (no Primary active and all panel lights off).

To assign channels, do the following:

1. Press and hold down the **Mode/Function** button on the far right of the panel between the PGM and PST Level audio controls (Figure 2-1 on page 2-2).

2. Press and hold down one unassigned **Channel Control** button whose button state is off.
3. Release the **Mode/Function** button. Continue to hold down the **Channel Control** button.
4. Use the first two buttons, **Take** and **Fade/Fade**, in the Transition Type subpanel to scroll through the list of available valid channel names displayed in the Source Name display corresponding to the selected **Channel Control** button (Figure 2-3 on page 2-4).

Note Frame names already assigned will not appear in the list.

5. When the desired FCM name is found, and while continuing to hold the **Channel Control** button, press and release the **Mode/Function** button.
6. Release the **Channel Control** button. The FCM name is assigned to the associated **Channel Control** button and the button will light dim green to indicate it is assigned and connected or dim red if it is assigned but not available. Refer to Table 2-1 on page 2-4 for a summary of other status states.
7. To delete an assignment, scroll through the list and assign **None** to the button.

In addition to the above functionality, an assigned and connected (dim green status) channel may be released to allow another control panel to acquire it without changing the assigned FCM name stored in non-volatile memory.

To release a channel for use by another MCP, do the following:

1. Press and hold the **Mode/Function** button.
2. Press and hold the appropriate **Channel Control** button.
3. Release the **Mode/Function** button and momentarily press it again.

Assigning Primaries and Secondaries

Any button that is displaying dim green status may now be selected as a Primary or Secondary channel.

A Primary channel is active and on-air. Any changes made on the panel controls will affect this channel. Its status is indicated by the corresponding **Channel Control** button tallying bright yellow. Only one Primary channel may be selected at a time.

A Secondary channel can be selected but is not on-air. Its corresponding **Channel Control** button will light dim yellow. If the Primary channel fails, the operator can select the Secondary and it will be in the same panel state as the Primary. Up to seven Secondaries can be selected.

Selecting a Primary or Secondary Channel

To select a Primary channel, press a **Channel Control** button with dim green status. The button will now tally bright yellow indicating it is the active Primary channel.

The following behavior applies to a selected Primary:

- Pressing the button again will deselect it as the Primary.
- Pressing and holding the Primary button and selecting and releasing another button with dim green status will assign that button as a Secondary (dim yellow). The Primary button will not lose its status.
- If no Secondary is selected, releasing the Primary button will result in its de-selection as Primary. It will return to a dim green status. Select it again to return it to the Primary channel.
- Pressing another dim green or dim yellow (Secondary) tallied **Channel Control** button will select the associated channel as the Primary. All other previously selected channels (Primary and Secondary) will be deselected (return to dim green status).

Pressing an already selected Primary when there are Secondaries will have the following affects:

- While held down, Secondaries can be de-selected by pressing and releasing their button. The Primary remains unaffected.
- While held down, new Secondaries can be selected by pressing and releasing their associated button. The Primary remains the Primary.
- When the Primary button is released, and if no Secondaries have been selected or de-selected, all Secondaries are de-selected. The Primary remains selected.

Automation Enable

The **Channel Control** buttons are also used to enable/disable automation control for the corresponding channel.

Automation Control can be enabled/disabled for all eight channels independently of the **Channel Control** buttons status. That is, a channel does not have to be chosen as a primary or secondary in order to enable/disable automation.

To enable/disable automation on a channel, do the following:

1. Press and hold the **Mode/Function** button.
2. Press and release the **Channel Control** button corresponding to the automation control you wish to enable or disable.
3. The corresponding yellow LED above the **Channel Control** button (Figure 2-2 on page 2-3) will light when automation control of the channel is enabled and go off when control is disabled.

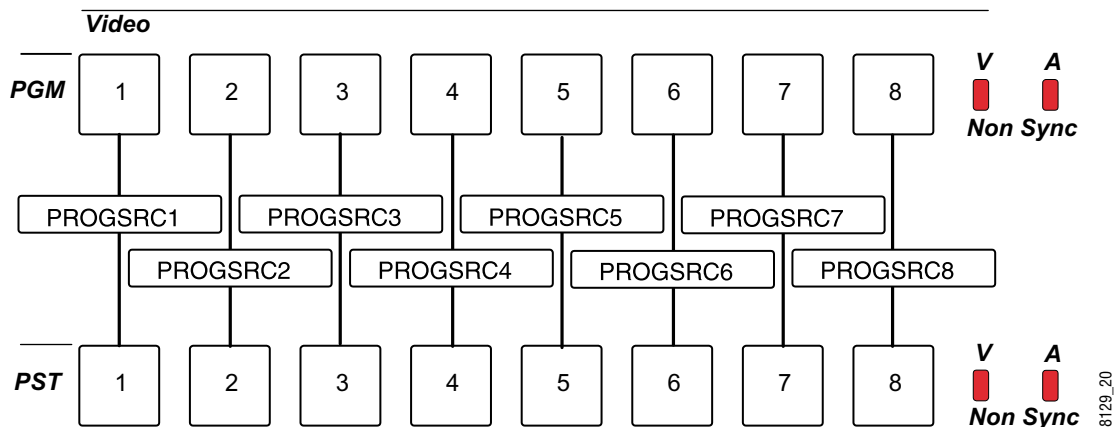
Program and Preset Bus Operations

Preset Bus

The Preset bus (PST) (Figure 2-4) is a row of eight source select crosspoint buttons. Each crosspoint button may be mapped to an input source from the rear of the Processor frame. The crosspoint buttons are initially configured at the factory so that the sources are associated in ascending numeric order from left to right. The left-most button corresponds to Source 1; the right-most button corresponds to Source 8. This order may be changed in the **Main Sources** form, under **PGM/PST/Aux Sources** tab in Configuration Manager.

The crosspoint buttons can be mapped to any input source desired. It is not necessary to map Crosspoint 1 to Source 1, for example, it may be assigned to any of the sources. Each source consists of video and like-numbered audio inputs. For instance, video at input 1, and all audio connections to input 1 (from one to four channels), are all part of the same source, Source 1.

Figure 2-4. Program (PGM) and Preset (PST) Buses



Selecting Preset Sources

PST buttons can select main audio/video (married) sources and/or sources for Audio Processor Modules 1–4. To select a Preset source, do the following:

1. Press the **PST** button corresponding to the desired source.

The selected **PST** button lights at high tally, indicating that it is the source of both video and audio signals. All other **PST** buttons go dark.

2. If **Next transition Bkgd** tallies high, the selected Preset source will be output on the Look Ahead Preview (LAP) output.

If video and audio monitors have been connected, you can view, hear, and adjust the Preset source prior to taking it to the Program bus.

The audio level and trim settings that existed on the selected source when last placed on the Program bus are recalled.

Backup Preset Sources

The M-2100 has the ability to maintain a backup source. A backup source can be taken to air on the Program bus if the primary source fails.

You may enable another Preset source to act as a backup if you have checked the **Enable Backup Input Select** check box in the **MCP** form in Configuration Manager. If backup capability has not been enabled, simultaneous pressing of more than one **PST** button results in only the leftmost having any effect.

If a backup source has been enabled in Configuration Manager, enable a backup source as follows:

1. Press and hold a **PST** button (which will tally high) to select the primary source.
2. Press and release a second **PST** button to select a backup source (which will tally high/blinking). If this was the incorrect backup selection, change the backup crosspoint by holding down the Primary **PST** button, and pressing and releasing another **PST** button. The first selection will be replaced by the second.

Pressing and releasing the **PST** button of a backup source will cause it to be swapped with the primary married source — the backup source becomes the primary married source and the previous primary married source becomes the backup source.

Pressing and releasing the **PST** button of the primary married source will cause the backup source to be dropped.

When the Preset source is transitioned to the Program bus (on-air), the backup source will follow and may be selected manually as a backup if the original source fails. This is normally done with two identical sources rolling the same tape or clip.

Program Bus

The Program bus (PGM) is a row of eight source select crosspoint buttons (Figure 2-4 on page 2-8). Crosspoints assignments are made as described in *Preset Bus on page 2-8* and follow the Preset bus.

Sources active on the Program bus are sent to the Program output. This is typically the output being supplied to the station transmitter. In routine operation, sources are preset on the Preset bus, then transitioned to the Program bus.

When a transition is made with the **PreRoll/Transition** button, or automation, sources selected on the Preset bus are transitioned to the Program bus, and **PGM** button tally changes accordingly. For fade-type transitions, **PGM** button tally changes in the frame during which new video first appears on the Program output bus. For mixes, **PGM** button tally changes when the transition is complete.

If more than one **PGM** button is pressed, only the left-most has an effect.

PGM buttons can select main audio/video (married) sources and/or sources for Audio Processor Modules 1–4.

Backup sources cannot be chosen on the Program bus, only the Preset bus, as explained above.

Backups can be transitioned to the Program bus, but cannot be Tally Summary for Program and Preset buses. A summary of the **PGM** button tally states is given in [Table 2-2](#).

Table 2-2. PGM Button Tally

Button Tally	Indication
Off	Not selected
Low	Audio breakaway
High	Primary married source
	Primary video source
High/blinking	Married backup source
Initialize	Left-most button (Source #1) tallies high

Source Names Display

The Source Name displays are located directly above the Program bus buttons ([Figure 2-4 on page 2-8](#)). They display an 8-character name for each source. Source Names are defined in Configuration Manager, **Main Sources** form, **PGM/PST/AUX Sources** tab.

The names displayed are usually those associated with the main sources, but may be used to display names for optional Audio Processing Channels 2, 3, and 4.

The Source Name displays will also report the assigned channel names corresponding to the **Channel Control** buttons when the panel is in a quiescent state, as when channels are being assigned ([Figure 2-3 on page 2-4](#)).

If a particular input has been configured as a Router Linked Destination, the name displayed is one of the following:

- If SMS7000 communications are active, the name displayed will be the source name provided by the SMS7000 (in software v5.1 or later).
- If SMS7000 communications are not active for a set time, the name displayed will be *NOLINK*.
- If the proper SMS7000 destination name has not been entered into Configuration Manager, the name displayed will be *NODEST*.

Non-Sync Source Indicators

Two sets of indicators for non-synchronous sources video (V) and audio (A) are located at the end of the Program and Preset rows (Figure 2-4 on page 2-8). The video non-sync indicators display status on the corresponding Program and Preset bus. The two audio non-sync lamps are tied together. When either bus has an audio non-sync condition, both lights will indicate non-sync.

Non-sync conditions for audio and video are defined in Table 2-3.

Table 2-3. Non-sync Conditions

AUDIO buttons high tallies	Some aspect of audio for a selected source (primary, breakaway, Over) on the Program or Preset bus is not in sync.
PGM VIDEO button high tallies	Some aspect of video for a selected source (primary, breakaway) on the Program bus is not in sync.
PST VIDEO button high tallies	Some aspect of video for a selected source (primary, breakaway) on the Preset bus is not in sync.

Note Non-sync backup sources are not reported.

If a Program source goes non-sync, the selected **Transition Type** button will go low tally and the **Take** button will go high tally.

Transition Controls and Operation

A transition is a change from one combination of video and audio elements (or sources) to another combination. These elements can be any of the following:

- Married — video and audio supplied on the same crosspoint.
- Video Only — video only signal supplied on this crosspoint.
- Audio Only — there are four Audio Only PGM/PST crosspoint buttons, located on the Audio Control portion of the Manual Control Panel.
- Custom Transitions — split audio/video transitions by assigning them different parameters in the Configuration Manager. You can configure separate transition types, transition durations, and other associated parameters. This is a software enabled option.

The following transition control buttons are explained in this section:

- **Transition Type**
- **Transition Rate**
- **Audio/Video Breakaway (Mode)**
- **Next Transition**
- **PreRoll/Transition**

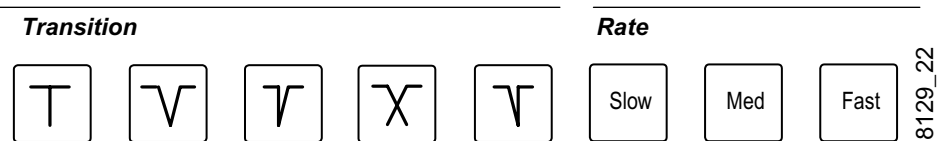
The following transition types are also explained in this section:

- Custom transitions
- Hot switching on the Program bus (Take)

Transition Type

In normal operation, Preset sources are transferred to the Program bus through a transition. Transitions allow you to replace the current Program output with the Preset source at a selected transition rate. There are five standard transition types. The **Transition** and **Rate** pushbuttons on the MMCP are shown in [Figure 2-5](#).

Figure 2-5. Transition and Rate Buttons



From left to right, the **Transition Type** buttons select:

- **Take** — provides a clean, abrupt switch from Preset to Program. Not affected by transition rate selection.
- **Fade/Fade** — causes the current on-air source to fade down to transition matte/silent, at which point, the Preset source will fade up (to on-air) from transition matte/silent.
- **Take/Fade** — causes the current on-air source to go abruptly to transition matte/silent, at which point, the Preset source fades up (to on-air) from transition matte/silent.
- **Mix** — causes the current on-air source to dissolve to the new source selected on the Preset bus.
- **Fade/Take** — causes the current on-air source to fade down to transition matte/silent, at which point, the Preset source switches cleanly and abruptly to on-air.

Transition Rates

There is a Transition rate associated with each transition type. When a transition type is selected, the rate in effect when that transition type was last used will be recalled. A **Take** transition has no rate associated with it.

The transition rate applies the next time the **PreRoll Transition** button is pressed, and is defined as the interval from the time the on-air video begins to be modified to the time the preset audio and video is on-air at full gain.

Transition Rate buttons (Figure 2-5 on page 2-12) are labeled **Slow**, **Medium**, and **Fast**.

The transition rates are set at the factory to the default values below:

- **Slow** — default is 2.0 seconds
- **Medium** — default is 1.0 second
- **Fast** — default is 0.5 second

Transitions rates are set in the **Transition Rates** section of the **MCP** form in the M-2100 Configuration Manager. You may enter the desired transition rate for each **Transition Rate** button.

Hot Switching (Hot Program Cuts)

A hot cut (also called hot punching) is a method used to select a source directly on the Program bus. A hot cut always initiates a **Take** transition. If the selected video source is not present, the LOS (Loss Of Signal) Matte is placed on-air. When LOS Matte is active, a continuous high/low tally flashing occurs on the active **PGM** button.

If the hot cut is performed on a crosspoint configured with a preroll enabled, the hot cut initiates the preroll sequence.

If the crosspoint is configured with a machine start or relay enabled, the hot cut triggers the configured device.

The following hot cut actions will apply to transitions on the M-2100:

- Hot cuts from the Program bus will take precedence over any transition in progress, either from the MMCP or automation.
- Hot cuts from automation will not be accepted if any transition (from the MMCP or automation) is in progress.
- Hot cuts from the Preset bus will take precedence if the **Enable Transition Interrupt** check box has been selected in the MMCP form in Configuration Manager.
- Hot cuts will remove any selected keys or SqueezeBack selections if they are on-air.

Hot Cut Transition Interrupts

A transition interrupt situation occurs when a new Program source is selected during a transition in progress. The following functions take place:

- Any Preroll/Transition is canceled.
- Any Program bus Audio Overs are cancelled.

Selection of a Program audio source will recall the audio level and trim settings in effect when that source was last selected on the Program bus.

Custom Transitions

You can customize audio/video transitions by assigning them different parameters in Configuration Manager. Custom separate transition types, transition durations, and other associated parameters can be configured. A combination of custom transitions and standard transitions is available.

Note This feature, called the 2100-SAV (Split Audio Video) is a software enabled option and must be purchased.

Refer to the Installation and Service Manual for complete configuration instructions. Custom transitions are configured in the **MCP** form, in the **Custom Transitions** menu.

Using Custom Transitions

Having previously defined your custom transitions using the Configuration Manager, you select a custom transition type as you would a standard transition type. For example, if you set up a custom transition for Button Type **Custom2**, selecting the **Mix** transition button on the MMCP invokes that custom transition.

Transition Rates

The transition rate is established by the parameters set up in the **Custom Transition** Configuration form. All of the **Transition Rate** buttons will low tally to indicate that a custom transition is selected.

When a custom transition is active, and a Take transition occurs, the three **Transition Rate** buttons tally off to indicate that the take is in progress.

Transition Rate Button Tally

The **Transition Rate** buttons (all three) display low tally when a custom transition is selected and active on the MMCP.

Matte Duration

Any matte duration times are considered part of the New video.

When using SqueezeBack with matte transitions, the matte is disabled.

Changing from Custom to Standard Transition Types

To revert to standard transition types from Custom Transition types, do the following:

1. In Configuration Manager, click on the **Custom Transition** button on the **MCP** form.
2. In the **Custom Transition** form, uncheck the **Enable Custom Transition** check box for each **Button Type** that was customized.
3. Download the named configuration to the FCM.

Transition Interrupts

When custom transitions are selected and active, you can only make a hot cut on the Program bus.

Transition Logging Tool

The Transition Logging Tool will accommodate custom transition types. Custom transitions types may be logged with the Transition Logging Tool, similar to the standard transition types.

If a selected Transition Type has been defined as custom, the following data will be displayed in the left pane of the main application window:

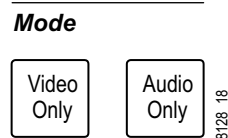
- The TranType column displays the custom transition type, for example; Custom1, Custom2, Custom3, etc.
- The (transition) Rate column displays the rate set for the selected custom transition based on the parameters set in the Configuration Manager, **MCP** form in the Custom Transition section.

Audio/Video Breakaways

Transitions can be tailored to change only selected signals using the **Mode** (Audio and Video Breakaway) transition selections (Figure 2-6). Normally, audio and video signals are transitioned simultaneously. The **Audio Only** and **Video Only** buttons are used to perform program and preset bus breakaway source selection. These buttons transition audio only or video only signals as described below:

- **Audio Only**—when selected, the next transition will change only the audio portions of the on-air signal.
- **Video Only**—when selected, the next transition will change only the background video portions of the on-air signal.

Figure 2-6. Audio and Video Breakaway Mode Buttons



Pressing either the **Audio Only** or **Video Only** button causes it to toggle between its active and inactive state. Preset selections made while the **Audio Only** or **Video Only** button is in the active state (lighted), unless the button is held, will be restricted as indicated. If an **Audio Only** or **Video Only** button is active when a Preset selection is made, the **Audio Only** or **Video Only** button will toggle to its inactive state automatically.

A typical **Video Only** breakaway operation would be:

1. Press and release **Video Only**, then,
2. Press the desired Preset video source.

A typical **Audio Only** breakaway operation would be:

1. Press and release **Audio Only**, then
2. Press the desired Preset audio source.

Note You cannot have a Backup set while performing Breakaways.

Breakaway Program or Preset bus selections (no Backup Presets) tally as follows:

- Video — high, steady
- Audio — low, steady

Breakaway Selection Examples

Audio Only Breakaway Example #1

1. Select **VTR2** on Preset. Tallies high.
2. Select Breakaway **Audio Only**. Tallies high.
3. Select **RS3** on Preset. Tallies low. **Audio Only** tallies off.

The next transition will take video from **VTR2** and audio from **RS3**.

1. Press the **Preroll/Transition** button.
2. On Program bus, **VTR2** tallies high and **RS3** tallies low.

Video Only Breakaway — Example #2

1. Select **RS3** on Preset. Tallies high.
2. Select Breakaway **Video Only**. (tallies high).
3. Select **VTR2** on Preset. Tallies high. **RS3** on Preset changes to tally low. **Video Only** tallies off.

The next **Preroll Transition** takes video from **VTR2** and audio from **RS3**. On Program bus, **VTR2** tallies high and **RS3** tallies low.

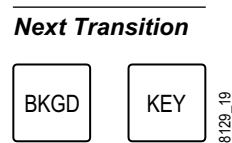
Next Transition Buttons

The **Next Transition** buttons (Figure 2-7) select whether the next transition will consist of Background only, Key only, or both. The two buttons are:

- **Next Transition BKGD** (Background) — when selected, the next transition will change only the Background video portions of the on-air signal, and
- **Next Transition KEY** — when selected, the next transition will change only the Key video portions of the on-air signal.

Both buttons may be selected simultaneously.

Figure 2-7. Next Transition Buttons



If an attempt is made to setup a Key-only transition while **Audio Only** is active, there will be a beep audio warning and the setup is ignored.

If an attempt is made to press the **BKGD** button during preroll, it will be beeped and ignored.

If an attempt is made to press the **KEY** button during preroll, it will be ignored (that is, it will not change its state) but not beeped. This button press is allowed since key cuts are allowed during preroll.

If one of the buttons tallies high and the other tallies off, the buttons will act as follows:

- Pressing and releasing the high tallied button has no effect. It stays high tally.
- Pressing and releasing the off tallied button will cause it to tally high. The other button tallies off.
- Pressing and releasing both buttons simultaneously results in both tallying high.

If both switches tally high, the buttons will act as follows:

- Pressing and releasing either will leave that button's tally high and turn the non-pressed button's tally off.
- Pressing and releasing both buttons simultaneously will have no effect — both continue to tally high.

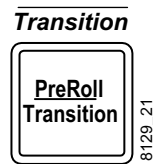
If **KEY** tallies high, and there are no **Key Select** buttons in the active state (that is, with high tally) the next transition will have no effect.

Holding the **Key** button down can have special effects, as described in *Cutting Keys On or Off Air* on page 2-26. (If a Key-cut occurs, releasing the **Key** button does not change its tally.)

Preroll Transitions

A preroll transition causes Preset sources to begin prerolls (if configured), then transition to the Program bus. Preroll transitions can be triggered by pressing the **PreRoll/Transition** button (Figure 2-8) or by selecting a crosspoint that has been configured with a preroll enable.

Figure 2-8. PreRoll/TransitionButton



The **PreRoll Transition** button tallies three conditions:

- Full brightness — Transition in progress,
- Half brightness — One of the selected Preset sources has been configured with a preroll time, and
- Off — No selected Preset source has been configured with a preroll time.

There are several scenarios involving the use of the **PreRoll/Transition** button and the transition type selected as described in the following headings:

First Press Transitions

- Begins a preroll (if any).
- Makes a Preset bus-to-Program bus transition (no preroll), or at the end of the preroll interval.

Second Press (and Subsequent) Transitions

During a preroll, a repeat press of the **PreRoll/Transition** button forces the Preset bus to begin the transition.

- First half of Fade transition: Pressing the **PreRoll/Transition** button again forces the first half of the transition to complete. The Program output is held in transition matte/silent until the newly transitioned source is ready to air, and the **PreRoll/Transition** button is released.
- Second half of a Fade transition: Completes second half of the Fade.
- Mix transition: Pressing the **PreRoll/Transition** button again forces completion of the transition.

Hold Transitions

During a Fade type transition, you can hold a transition in transition matte/silent by pressing and not releasing the **PreRoll/Transition** button. The Program bus is set to transition matte/silent and is held there until you release the button.

Preroll Transitions Summary

Pressing the **PreRoll/Transition** button again after the actual video/audio transition has started (regardless of how Transition Now is configured) has the following effects:

- For fade-fade (while fading down), cut to matte/silent. Hold in matte until the **PreRoll/Transition** button is released, switch Preset sources to the Program bus, then cut the Program bus to on-air.
- For fade-take (while fading down), cut to matte/silent. Hold in matte until the **PreRoll/Transition** button is released, switch Preset sources to the Program bus, then cut the Program bus to on-air.
- For fade-fade and cut-fade (while in fade up mode), immediately set the Program bus to full gain.
- For mix transitions, immediately complete the transfer of Preset sources to the Program bus at full gain.

If flip/flop operation has been configured as enabled:

- For mix transitions, Preset bus output cuts to the previous Program output when the transition is complete.
- For all other transition types, Preset bus output cuts to the previous Program output as soon as Preset video/audio first appears on Program output.

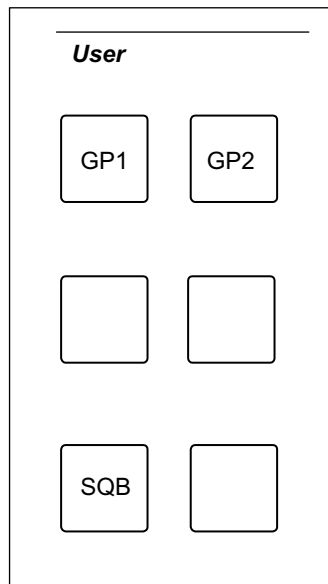
Preroll/Transition can affect main audio/video sources and/or AP 2–4 sources delegated for AFA operation. AP 2–4 details are described in the Installation and Service Manual.

GPI Buttons

Two user-configurable buttons, **GP1** and **GP2**, (Figure 2-9) allow control of MMCP functions and output relays and responses to opto-isolator inputs. The buttons and functions are associated with the 12 GPI relays on the rear of the M-2100 frame. Four GPI input relays are also provided on the rear of the frame and can be configured as opto-inputs to trigger an M-2100 action such as a cut or transition.

When pressed, the **GPI** button high tallies. If a **GPI** button is not configured for one of the activities described below, pressing it has no effect, and results in a warning beep. **GPI** button presses are ignored unless in the quiescent state.

Figure 2-9. GPI Buttons



The GPI buttons can be configured to perform one of the following actions when the assigned button is pressed:

- Assign an output relay (**GPI Outputs 1–12**) to perform a programmed action, or
- Arm opto-inputs (trigger a programmed M-2100 action from **GPI Opto-inputs 1–4**).

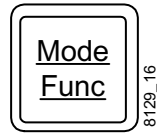
These parameters are configured in the **GPI** form in the Configuration Manager application described in the Installation and Service Manual.

Mode/Function Button

The **Mode/Function** button (Figure 2-10) is a multi-purpose control used in conjunction with other controls on the MMCP to perform the following functions:

- Select SqueezeBack patterns,
- Enable audio functions (set PST unity gain, invert audio phase),
- Recall default key parameters and perform auto-setup, and
- Make Channel Control assignments.

Figure 2-10. Mode/Function Button



Refer to the specific section in this manual for using the **Mode/Function** button with each of the above operations.

Keyer Controls and Operation

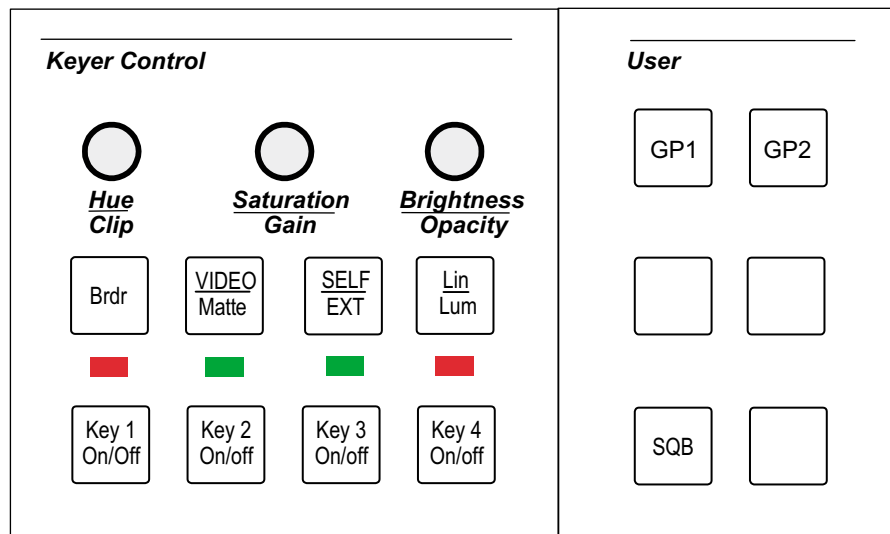
The Keyer Control subpanel (Figure 2-11) offers control of the following keying functions covered in this section:

- Using Keys, including selecting key sources, previewing keys, modifying keys, and setting key parameters.
- Using Squeezeback and Crop functions.
- Creating Chroma Keys (SD only).

The Keyer Control subpanel also provides controls for setting the following matte configurations:

- Matte crosspoints,
- Transition matte,
- Custom key fill matte defaults, and
- Loss of Signal (LOS) matte.

Figure 2-11. Keyer Control Subpanel



Keying Overview

Video keyers allow you to insert additional video into the video background. They are commonly used to insert station logos, or text from character generators, or picture-in-picture feeds from still stores, production switchers, or digital video effects equipment.

Keys can be configured from an external source or be a self-key. They can be filled with matte if desired and the matte parameters adjusted with controls on the Keyer Control subpanel. Linear or luminance type keys can also be defined.

Key modifiers are available to add borders whose luminance parameter can be adjusted. The clip and gain key parameters can be set and are used in conjunction with the optional Chroma Keyer (SD only).

SqueezeBack, a special type of key, is offered as an option on the M-2100 for both SD and HD systems.

Note All video sources to the M-2100, including primary video and key inputs, must be timed within $\pm 1/2$ line ($+1/4$, $-3/4$ for HD) relative to the reference input to be synchronous.

SD Systems

Keys are installed in pairs — you can have 2 or 4. Each keyer module can contain 2 Linear Keyers, or 1 Chroma Keyer and 1 Linear Keyer. Modules can be installed in either or both of slots 5 and 6 of the A/V/C Processor Frame. Chroma Keyers (if present) are controlled by **Key Select** buttons 1 and/or 3.

HD Systems

HD systems can be configured with the same Linear Keyers modules as the SD systems, or a combination of Framestore and Single Luminance/Linear Keyer module(s) and Linear Keyer module(s). Modules can be installed in either or both of slots 6 and 7 of the A/V/C Processor Frame.

Note The M-2100 HD system does not have Chroma Key, Borderline, or Drop Shadow capability.

Selecting and Transitioning Keys

Any combination of keyers (from 1 to all 4 keyers) can be selected at a time, to appear on either, or both, the Program and Preset buses. Select a key by pressing and releasing a **Key Select** button (**Key 1 On/Off**, **Key 2 On/Off**, **Key 3 On/Off**, **Key 4 On/Off** shown in [Figure 2-11 on page 2-24](#)) whose previous tally was off. Switch tally goes low (selected but not active) or high (selected and active), depending on the state of the **Next Transition Key** button. Pressing and releasing the same **Key Select** button again toggles it off. Multiple keys can be selected/deselected independently of each other.

During the next transition, a key that is selected and active will be transitioned to on-air (if currently off-air), or to off-air (if currently on-air).

Note If the **Next Transition Key** button is not enabled (tallies off), key transitions will not occur, and all selected **Key Select** buttons tally low.

To select a Key, press one of the **Key Select** buttons.

- If the key signal is set to be changed by the next transition (**Next Transition Key** button active), the **Key Select** button lights at high tally.
- If the key signal is not set to be changed by the next transition (**Next Transition Key** button inactive), the **Key Select** button lights at low tally.
- After a key signal has been transitioned to the Program bus, the **Key Select** button remains lighted at high tally and the associated LED indicator (just above the button) lights green.

Keys which are on-air will be removed by the next transition unless:

- The **Next Transition Key** button is inactive, or
- You press the **Key Select** button so that it is tallied off before the next transition occurs.

Note The key is dropped if either the background source or the key source becomes non-sync while transitioning to air or when a hot cut is performed.

If configured, selecting a key automatically recalls associated key modifier settings (**Border**, **Clip**, **Gain**, and **Matte** values) previously used for that key selection.

To set keyer default parameters, refer to the Installation and Service Manual, Configuration Manager.

Cutting Keys On or Off Air

Keys can be cut on and off air at any time except when audio/video is actually transitioning. To cut a key immediately on or off air:

1. Press and hold the **Next Transition Key** button,
2. Press a **Key Select** button, and

3. The key cuts on or off air.

Previewing the Key

As long as the key signal is synchronous with background video, it is displayed along with the preset background source on the Look-Ahead-Preview (LAP) monitor under any of the following conditions:

- **Keyer Select** button tallies high; **Next Transition Key** button active; key not on air. (Key status LED indicator off),
- Key on air (LED indicator lights green); **Keyer Select** button off; **Next Transition Key** button active, and
- Key on air (LED indicator lights green); **Keyer Select** button off or high tally; **Next Transition Key** button off.

Non-Synchronous Key

If the key video signal is not synchronous with the intended background video, the key indicator LED will light red and that key cannot be selected.

If an on-air key becomes non-synchronous, it is removed from air. The key indicator LED will light red and the **Key Select** button will go off.

Modifying Keys

Keys can be modified using the following modifier buttons on the Keyer Control subpanel ([Figure 2-11 on page 2-24](#)):

- **Brdr** (Border)
- **VIDEO/Matte**,
- **SELF/EXT**, and
- **LIN** (Linear) or **LUM** (Luminance).

Keys can be modified using the following potentiometer knobs on the Keyer Control subpanel ([Figure 2-11 on page 2-24](#)):

- **Hue/Clip**,
- **Saturation/Gain**, and
- **Brightness/Opacity**.

The **Hue/Clip**, **Saturation/Gain**, and **Brightness/Opacity** share the same controls. The top functions, Hue, Saturation and Brightness, on each knob are accessed by pressing the **Mode/Function** button and making an adjustment with the knob while the button is held down.

Keys can only be modified when in modifier mode as defined below.

Key Modifier Mode Definition

Key modifier mode is defined by one of the following conditions:

Note A key does not have to be visible on the Program or the Preset bus in order to be in Key Modifier Mode.

- Exactly one key is selected and/or active (low or high tally), or
- Any **Key Select** button is selected and held down (its tally will not change).

While the **Key Select** button is held, key modifier buttons may be pressed or any key modifier potentiometer can be adjusted. If such changes are made to the key, releasing the **Key Select** button will not change its original tally. However, if no changes are made to the key, releasing the **Key Select** button will cause its tally to toggle.

Only one key can be modified at a time, and only if in modifier mode. If multiple **Key Select** buttons are held simultaneously, the left-most one is considered to be selected.

If no key is in modify mode, key modifier buttons tally off. If a key is in modifier mode, key modifier buttons tally off/low as per the state of the key.

Matte Button

Pressing this button ([Figure 2-11 on page 2-24](#)) fills the selected keyer in modifier mode with an internally-generated matte signal (matte fill). The **Brightness**, **Saturation**, and **Hue** knobs can be used to control the matte generator parameters (while holding down the **Mode/Function** button) as desired or a default matte can be set or recalled as explained below.

When selected, the **Matte** button will tally low if it was off, or stay low tally if it was already selected. If an adjustment was made, the **Matte** button will always remain selected (low tally) when the button is released. It may be held down during these adjustments.

If no adjustments are made, the **Matte** button toggles between off and low (selected) on button release.

Set and Recall Matte Default

To set a matte fill default the keyer must be in modify mode, viewable on the Preview Monitor, and not on-air. Perform the following steps:

Note This is the only default value (refer to [Table 2-5 on page 2-32](#)) that is set at the MMCP rather than from the Configuration Manager on the PC.

1. Press the **Matte** button to enable matte mode on the selected keyer.

2. Adjust the matte using the **Brightness**, **Hue**, and **Saturation** potentiometers (while holding down the **Mode/Function** button.
3. Continue to press and hold the **Mode/Function** button.
4. Press and release the **Matte** button.
5. Release the **Mode/Function** button and the new matte values are now stored as the defaults.

These default settings can be stored in the database on the Configuration Manager GUI PC for later recall by transferring the configuration from the FCM to the Configuration Manager.

To recall the currently configured matte defaults to the selected keyer, the keyer must be in modify mode. Perform the following steps:

1. Press and hold the **Mode/Function** button.
2. Press the **Keyer** button to which you want to recall the default. The matte color will be set to the default value. All keyer defaults will be recalled, including the default matte values.

Note The matte enabled may not be the default value.

Border (Brdr) Button

The **Brdr** button (Figure 2-11 on page 2-24) is operable if the Border and Dropshadow software enabled option has been purchased and enabled. Selecting the **Brdr** button adds a one-line border to the key. The **Shadow** button is not used on this panel.

This button only has an affect if the selected keyer is in key modifier mode. Pressing a previously unselected button toggles it low, and toggles the other button off (if it was low).

The luminance of the border can be adjusted with the **Brightness** knob or a default luminance can be set or recalled as explained below.

To delegate the **Brightness** knob to the **Brdr** button, select the button. If the **Matte** button is tallied off, the **Brightness** knob automatically delegates to adjust the luminance of the border if either is selected. However, if the **Matte** button is selected (low tally), the **Brightness** knob is delegated to it by default. The **Brdr** button must be held down in order to redelegate the **Brightness** knob to border luminance. While either **Brdr** button is held down, the **Hue** and **Saturation** knobs become inoperable.

Make luminance adjustments with the **Brightness** knob (while holding down the **Mode/Function** button). Release the **Brdr** button and it will continue to tally low. If no adjustments were made, **Brdr** will tally off when released.

Border Luminance Default

The keyer must be in modify mode. The **Brdr** button must be tallied low or off and released.

1. Press and hold the **Mode/Function** button.
2. Press the **Brdr** button.
3. The luminance value for the border will be set to the default value. The **Brdr** button continues to tally low or off.

SELF/EXT and LIN/LUM Buttons

The **SELF/EXT** and **LIN/LUM** buttons determine the key source and whether the key is linear or based on luminance values. These buttons are operable only in key modifier mode.

If the **SELF/EXT** button is pressed, the keyer is configured for an external key (key source is from an external device). When disabled, the keyer is configured for a self key. The **SELF/EXT** button toggles low/off on a button push.

If the **LIN/LUM** button is pressed, the keyer applies S-shaping during key processing making a luminance key. The **LIN/LUM** button toggles low/off on a button push. If the button is not pressed, the key is unshaped (linear key).

Key Modifier Button Tally Summary

Table 2-4. Key Modifier Tally Summary

Off	No keyer in key modify mode.
	A keyer in modify mode, but modifier button not active for that key.
Low	A keyer is in modify mode.
Initialize:	All modifier buttons to off.

Key Modifier Knobs

Hue, Saturation and Brightness

The key modifier potentiometers **Brightness**, **Hue**, and **Saturation** control the matte generator parameters in the delegated keyer when the **Matte** button is selected (low tally). They also allow you to adjust Border luminance as described earlier.

Clip/Foreground and Gain/Background

The **Clip** and **Gain** potentiometer knobs control the key signal amplitude, offset, and edge quality for the selected keyer. The **Clip** knob affects the offset of the key control signal and the **Gain** knob affects the amplitude and the hardness/softness of the edge.

These knobs can also be configured using the **Mode** selection in the **Keyers** section of the **Main Sources** form in Configuration Manager to behave as foreground and background clip adjustments. In this mode, the **Foreground Clip** knob only affects the foreground part of the scene, and the **Background Clip** knob only affects the background part of the scene.

These controls are the only ones which apply to the Chroma Keyer.

Recalling and Initializing Key Parameters

Key Recall

Whenever a key is selected, the set of parameters associated with that key when it was last selected is re-applied. There is only one set of parameters associated with each keyer at any given time.

Keyer Defaults

To set keyer defaults:

1. Press and hold the **Mode/Function** button.

2. Press a **Key Select** button. All setup buttons and knobs associated with that keyer are changed to a default configuration.
3. Release the **Key Select** button and its tally will remain what it was before it was pressed.

Keyer defaults can be set regardless of whether the key is visible on either the Program or Preset bus. It does not matter when the **Mode/Function** button is released as long as **Mode/Function** was pressed when the **Key Select** button was pressed.

This default configuration can be the factory default, or a default configuration defined by the user during system configuration.

Table 2-5. Factory Default Recall Parameters

Border & Shadow	off (border/shadow luminance = 50%)
External Key	on
Linear Key	on
Clip	50%
Opacity	100%
Matte fill	off
50% Luminance	
Hue	Green
Saturation	0%
Unity Gain	

Linear/Luminance Key Unity Clip and Gain Default

A keyer must be in modify mode.

1. Press and hold the **Mode/Function** button.
2. Press and release the **Linear** button. The tally of the **Linear** button remains unchanged. The Key Clip and Gain parameters are set to default values.

Reset Key Parameters

You can reset the current keyer parameters by pressing and holding the **Mode/Function** button and then pressing the appropriate **Key Select** button.

Setting Matte Configurations

The following matte settings are configured at the MMCP:

- Matte Crosspoints,
- Transition Matte, and
- LOS (loss of signal) Matte.

Configuring Matte Crosspoints

A crosspoint must first be configured to be a matte source type crosspoint in Configuration Manager to allow the matte values to be set with the matte controls. If it has been defined as a matte crosspoint, the matte definition for that crosspoint can be set from the MMCP in the following way:

1. The MMCP must be assigned to a channel. The current configuration must have crosspoint(s) configured for mattes.
2. Press and hold the **PST** button corresponding to the configured matte-crosspoint. The matte output of this crosspoint can be viewed on the Preset monitor (default is black). **PST** tallies high.
3. Continue holding the **PST** button. Use the **Brightness**, **Hue**, and **Sat** knobs in the Keyer Control subpanel to adjust the matte (while holding down the **Mode/Function** button. There is no effect on any of the keys.

Note **PGM** buttons do not have this functionality.

Configuring the Transition Matte

A transition matte is where the Program video is held between transitions, that is, between where the old video is transitioning out, and the new video is transitioning in. The **PreRoll/Transition** button is used to setup the Transition Matte, using the following procedure.

1. Select a Fade-type of transition.
2. Press and hold the **PreRoll/Transition** button. The transition will proceed to Transition Matte and be held there as long as the **PreRoll/Transition** button is held down.
3. While viewing the Program monitor, adjust the Transition Matte with the Keyer subpanel **Brightness**, **Hue**, and **Sat** potentiometers (while holding down the **Mode/Function** button).

Note Transition Matte values are reported as read-only values in the **General Parameters** form in Configuration Manager.

Configuring the Loss Of Signal (LOS) Matte

If an on-air source is lost, the Loss Of Signal (LOS) matte is provided to immediately go on-air in its place. When an LOS matte is active, the crosspoint corresponding to the active LOS matte on the Program bus will flash high/low tally continuously.

Configure the LOS matte as follows:

1. Disconnect one of the video input sources on the rear of the A/V/C Processor Frame.
2. On the MMCP Preset bus, select the crosspoint button mapped to the disconnected video input source. The selected **PST** button high tallies. A default LOS Matte of black is displayed.
3. Set up an LOS Matte to fit your site requirements by adjusting the **Hue**, **Saturation**, and **Brightness** controls on the Keyer Control subpanel (while holding down the **Mode/Function** button).
4. Re-connect the video source disconnected in [Step 1](#).

Note LOS Matte values are reported as read-only values in the **General Parameters** form in Configuration Manager.

Using SqueezeBack and Crop

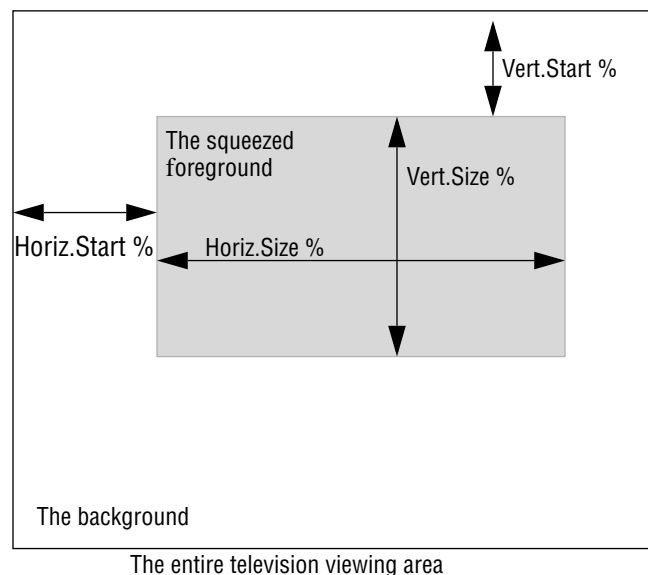
SqueezeBack and Crop are special key-type effects used in the television broadcast industry. Broadcasters typically use SqueezeBack/Crop effects to issue sports scores or current weather conditions on-air without interrupting the current on-air programming. In general, the SqueezeBack function acts like a keyer. The SqueezeBack effect can be cut on/off-air, just like a key.

SqueezeBack squeezes the foreground and opens up a background area for other program material (Figure 2-12). Crop cuts a portion of the foreground image, exposing the background. The background material for both SqueezeBack and Crop comes from a separate SqueezeBack Background input BNC on the rear of the SD and HD processing frames.

Note The Standard Definition system can crop only from the bottom portion of the image.

To use the SqueezeBack function, the software enabled option must be purchased and enabled. You must also have an input signal connected to the SqueezeBack input on the rear of the processor frame.

Figure 2-12. SqueezeBack Parameters Definitions



Defining SqueezeBack and Crop Effects

You can use the factory-built SqueezeBack effects, or the SqueezeBack effects that have been previously programmed by your system engineering staff. SqueezeBack parameters are configured in the Configuration Manager **MCP** form under the **Squeezeback Parameters** tab. Refer to the Installation and Service Manual.

You can store up to four SqueezeBack/Crop effects. The four effects (numbered 1, 2, 3, and 4) are defined in Configuration Manager and are selectable on the Keyer Control subpanel on the MMCP (Figure 2-11 on page 2-24).

Factory Built SqueezeBack Effects

There are four factory-initialized SqueezeBack effects that you may select or they may be configured to suit your own needs. The factory settings are:

- SqueezeBack Effect #1: squeeze to upper left,
- SqueezeBack Effect #2: squeeze to upper right,
- SqueezeBack Effect #3: squeeze to lower left, and
- SqueezeBack Effect #4: squeeze to lower right.

Viewing the Current SqueezeBack Effect

The current SqueezeBack effect can be viewed on the LAP monitor under any one of following three conditions:

- SqueezeBack is not on-air and the next transition will take it to air. SqueezeBack must be selected and active and not on-air. That is, SqueezeBack tallies high and **SQB** status tallies off.
- SqueezeBack is on-air and the next transition will not take it off air. SqueezeBack must be selected and not active and on-air — that is, SqueezeBack tallies low.
- A SqueezeBack effect selection has been made.

Selecting and Displaying SqueezeBack Effects

To select a SqueezeBack effect:

1. Press and hold the **Mode/Function** button.
2. Press the **SQB** button located in the bottom left of the User subpanel. The next SqueezeBack effect will be selected and displayed.
3. Release **SQB** and then press again to view the next effect.

The SqueezeBack effect must be showing on the LAP monitor (that is, selected and active), and must not be on-air.

Releasing the **Mode/Function** button exits the SqueezeBack effect selection. The tally of the **SQB** button does not change. Releasing the **SQB** button causes no change of tally if it was pushed while the **Mode/Function** button was held down.

Making SqueezeBack Transitions

The SqueezeBack effect can be cut on/off-air, just like a key. The **SQB** button is toggle action, if it currently tallies high (selected and active) or low (selected and not active), on the next press and release it will tally off (deselected).

1. Press the **Next Transition Key** button so that it tallies high.
2. Select SqueezeBack by pressing and releasing the **SQB** button.
3. If SqueezeBack is selected and active, the next transition will cause the SqueezeBack effect to transition to air (if not currently on-air), or to be removed (if currently on-air). When a transition occurs:
 - a. If the transition type is **Take**, the SqueezeBack transition occurs in a three-frame transition.
 - b. For any other transition type, the Squeeze-back transition occurs at the rate selected by the **Transition Rate**.
4. Deselect SqueezeBack by pressing and releasing the **SQB** button.

SqueezeBack can occur simultaneously with background and key transitions. If the SqueezeBack background signal becomes non-sync or is dropped, the result is similar to keys becoming non-sync. SqueezeBack tallies to off, any SqueezeBack effect on Program or Preset immediately removes that effect.

Creating Chroma Keys

The optional Chroma Keyer Module (2100-CKM) may be configured in A/V/C Processor Frame slot(s) 5 and/or 6. The module incorporates both chroma keyer and luminance/linear keyer. The chroma keyer includes the following features:

- Auto Setup
- Key processing with clip and gain controls

Keys are installed in pairs; you can have two or four. Each key module can contain two luminance keyers, or one chroma keyer and one luminance keyer. A chroma key module installed in frame slot 5 is controlled by **Key Select** button 1. A chroma key module installed in frame slot 6 is controlled by **Key Select** button 3.

Note Chroma Keyer modules are not run-time swappable. After installing modules, or changing module locations, you must reboot the FCM for the change to take effect.

Note The Chroma Key option is not available on the M-2100 HD system.

Chroma keys operate in a similar manner to other keys, with the differences described in this section.

Chroma Key Adjustments

Most chroma key adjustments are made using the Chroma Keyer Expert Level Control Panel PC application that is not available with this panel. The MMCP key modifier buttons that do affect chroma keyers are:

- **Hue** and **Saturation** controls
- **Clip/Foreground, Gain/Background, and Opacity/Softness** controls

For more information on these controls, refer to the *Modifying Keys on page 2-27*.

You may also run Auto Setup to set up a chroma key.

Auto Setup Mode

The auto setup mode is used to graphically select a color to suppress. The **Next Transition** key button must be enabled (tally high) and the chroma keyer must be selected and active (**Key Select** button tally high). You must set up a chroma key manually, as the Chroma Key Expert Level Panel application is not available with this panel.

Entering Auto Setup Mode

Press and hold the **Mode/Function** button. Then press a **Key Select** button. The **Key Select** button tallies high/blinking to indicate that the keyer is in auto-setup mode. The LAP monitor shows the Fill (foreground) input of the chroma keyer with a small cursor box superimposed over the video.

Moving and Re-Sizing the Cursor Box

Use the **Clip/Foreground** knob to move the cursor box horizontally (X-position). CCW rotation moves the cursor box left and CW rotation moves the cursor box right.

Use the **Gain/Background** knob to move the cursor box vertically (Y-position). CCW rotation moves the cursor box up and CW rotation moves the cursor box down.

Use the **Brightness/Opacity** knob to adjust the size of the box. The average chrominance inside the box is calculated and used as the color to suppress. CCW rotation decreases the size of the cursor box and CW increases the size of the cursor box.

Exiting Auto-Setup Mode without Change

Press and hold the **Mode/Function** button. Then press the **Key Select** button. The **Key Select** button tallies high and the LAP monitor displays the chroma key. The chroma keyer setup will be unchanged.

Exiting Auto-Setup with Change

Press the **Key Select** button. The **Key Select** button tallies high and the LAP monitor displays the chroma key. The key reflects the new chroma keyer setup.

Using Auto Setup

Follow the instructions given below to use Auto Setup. Depending on where you installed the Chroma Key module, the Key Select button you use will be either **Key Select** button #1, or **Key Select** button #3.

1. Prepare a key for transition, just as you would for a luminance key. (That is, have the **Next Transition** key button enabled, **Key Select** button 1 or 3 selected and the key source selected on the Preset bus.)
2. Press and hold the **Mode/Function** button, then press and release the **Key Select** button.
3. You should now see the chroma key source material with a cursor box around it on the LAP monitor.
4. Move the cursor box, as described in *Moving and Re-Sizing the Cursor Box on page 2-39*.
5. Press the **Key Select** button again to select a color you have positioned in the box.
6. To cancel your color select choice, press and hold the **Mode/Function** button; press and release the **Key Select** button.
7. After completing an Auto Setup procedure, you may need to fine tune the Clip and Gain values.

Audio Controls and Operation

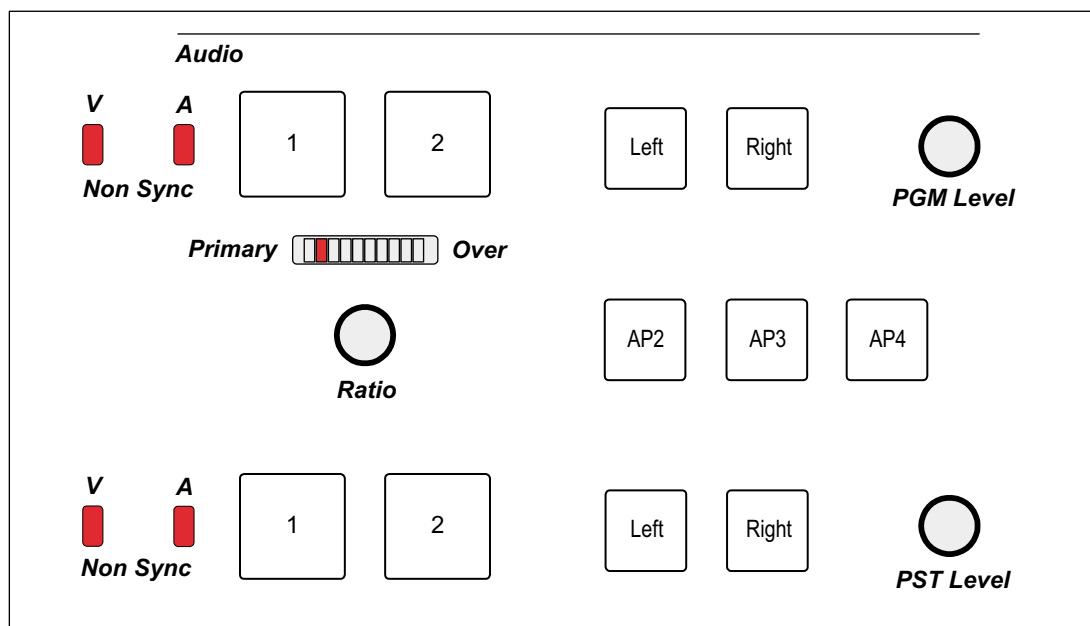
This section covers the controls and operation of the Audio Control subpanel and the Audio Monitor subpanel in the M-2100 MMCP (Figure 2-1 on page 2-2). One Audio Processor (AP 1) is standard equipment. Audio Processors AP 2, AP 3, and AP 4 (SD systems only) are optional.

Audio Control Subpanel

The Audio Control subpanel (Figure 2-13) functionality includes:

- Selection of the Audio Processors, AP 1, AP 2, AP 3, AP 4 (SD only), delegated to MMCP control, Audio Processor breakaway of these channels, and selection of Audio Processors for audio monitoring,
- Selection of **PGM** and **PST** audio only crosspoints (Audio Onlies) as Overs or Breakaways for up to four Audio Processors,
- Program and Preset **Left** and **Right** buttons to enable Stereo, L-Mono or R-Mono routing, allow toggling of left or right channel phase, and allow adjustment of the Program or Preset levels for any one of the audio processors,
- Adjustment of **PGM** or **PST Level** knobs, for either or both the left and right channels for any one of the Audio Processors (AP), and
- Adjustment of the **Ratio** knob, which, for an Audio Over, selects the ratio of Over to Primary material.

Figure 2-13. Audio Control Subpanel



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Audio Processor Delegation

Audio Processor 1 (AP 1), the standard audio processor, is always under MMCP control except during an AP Breakaway operation. It has no delegation button, as it is always delegated by default. To delegate control of the Audio Control subpanel or MMCP to Audio Processors 2-4, the Audio Processor delegation buttons (**AP 2, AP 3, AP 4**) (Figure 2-13 on page 2-41) are used.

The buttons delegate an AP to the Audio Control subpanel and MMCP control for setting level adjustment and monitoring the audio signal. If an Audio Processor 2-4 is not delegated to MMCP control, it is independent of the other APs and is not affected by any MMCP actions directed to video or other audio processors. It can be slaved to follow AP 1 if desired.

The Audio Processor Delegation buttons (**AP 2, AP 3, AP 4**) delegate an AP to MMCP control, delegate level adjust, and delegate monitoring. If an Audio Processor 2-4 is not delegated to MCP control, it acts independently and is not affected by any MCP actions directed to video or other audio processors.

There are two delegation states associated with the **AP 2-4** buttons:

- Low tally, and
- High tally.

Low Tally Mode

In Low Tally (slave) mode the Audio Processor is crosspoint selection and transition controlled in the same way as is the primary audio processor AP 1 (that is, slaved to AP 1 control).

Low tally is toggle-selected. Pushing and releasing an **AP 2-4** button alternately toggles it low tally and off, except in the case where, while the button is high tally, a selection or adjustment is made as described in this section.

In low tally (slave) state, the selected Audio Processor is slaved to AP 1 control. The slaved AP(s) will follow the modifications made to AP 1 listed below:

- Crosspoint selections,
- Transition control,
- PGM/PST Level potentiometer adjustments (if so PGM and PST Trim/Levels are enabled in Configuration Manager, and
- Output meter and monitor drive signals.

High Tally Mode

In High Tally mode the buttons, selections, adjustments, and monitoring selections of the MCP are delegated to the indicated Audio Processor only.

High tally is a push-and-hold function. If any selection or adjustment is made on either the MCP or Audio Monitor Panel the AP button will not toggle when released. Its tally remains as it was before the button was pushed.

While an AP button is pressed it shows high tally, indicating which AP is delegated. When one button is pressed, the other **AP 2–4** button tallies do not change. When the AP button is released, if an adjustment was made, the AP button returns to its previous tally state. If, while pressing and holding an **AP 2–4** button, another **AP 2–4** button is pressed, the lower numbered **AP 2–4** button operation takes precedence (left side priority).

The following modifications can be made to a single AP (not affecting any other APs) while in a high tally state:

- Crosspoint selection of **PGM/PST** and **Audio Only** buttons,
- PGM or PST Level adjustments (if so enabled in configuration),
- **Ratio** knob control of an Over function,
- Stereo, L-Mono and R-Mono routing mode selection,
- Phase inversion of a stereo signal, and
- Enabling of selected AP meter and monitor output only.

Audio Only PST Buttons

The Audio Only crosspoint buttons—**Audio Only 1** through **Audio Only 4**—allow selection of Program and Preset Audio Onlies as Overs or Breakaways for up to four Audio Processors They represent only audio sources (not associated video as with other **PST** and **PGM** buttons).

Audio Over Operations

If neither the **Video Only** nor **Audio Only** buttons in the **Breakaway** section of the MMCP are selected, selecting an Audio Control subpanel **PST** button performs an Audio Over (at the recalled level and Over **Ratio** control setting). (Refer to *Audio Ratio Control on page 2-48*.) The **PST** button in the Audio Control subpanel displays high tally to indicate the Audio Over selection. Any previous Over (for this AP) is dropped. An Audio Over can only be selected from one of the four Audio Only sources in the Audio Control subpanel. Just one Over can be selected; two or more cannot be summed together.

Selecting another Over drops the first. Re-selecting a selected Over drops the Over (toggle action). If more than one of the **Audio Only** buttons are pushed simultaneously, the lower numbered one (left side priority) is honored. Selection of another primary married or breakaway source drops the Over.

Audio Breakaway Operations

If the **Audio Only** button in the **Breakaway** section has been selected (high tally), pressing any of the **PST** buttons on the Program/Presets bus causes an Audio Breakaway to occur, switching just the audio matrix crosspoint to that indicated by the newly selected button. This Audio Breakaway crosspoint displays low tally. Audio Only tally in the Breakaway section is dropped. If there was a Breakaway or/and an Over previously selected, it is dropped.

You may also press an Audio Control subpanel **PST** button to perform an Audio Breakaway with the **Audio Only** button selected. The **PST** button in the Audio Control subpanel shows low tally to indicate the Audio Breakaway. The four Audio Only sources are an extension of the 16 primary inputs, allowing an Audio Breakaway to be one of 20 sources.

There can be both a Breakaway and an Over. The Breakaway and Over source can both be crosspoints in the Audio Control subpanel. It is possible for an Audio Only to be selected as an Over on one bus (Program for example) and as a Breakaway on the other (Presets for example). There can be no more than one Over at a time on a bus.

Selecting a married or breakaway source drops an Over if present. Thus, Overs must be selected last.

Audio Only PGM Buttons

Audio Only **PGM** buttons select the Program source in the manner described previously for the **PST** buttons. The source(s) selected on the Program bus are immediately transitioned to air, (Over or Breakaway) as a hot cut. If an Over is selected, it is transitioned as discussed in the Audio Ratio Profile section (see *Audio Ratio Profiles on page 2-50*).

Audio Breakaway Audio (ABA) Control

The system is in the Audio Breakaway Audio (ABA) mode when control is delegated to one Audio Processor, AP 2-4. The following operations are enabled for the selected Audio Processor:

To Change or Select an Over

Select the desired **PST** or **PGM** button in the Audio Control subpanel. Any previously selected Over is dropped. Re-selecting the same Over drops it (toggle off). Since a primary audio source selection drops an Over, Over selection must be done last.

To Change or Select an Audio Source as an Audio Breakaway

If the desired crosspoint is on the Program/Presets bus, selection can be made regardless of the state of the **Audio Only** button in the Breakaway subpanel. An Over, if present, is dropped.

If the desired crosspoint is in the Audio Control subpanel, select the **Audio Only** button in the Breakaway subpanel, indicating that this selection is a breakaway and not an Over. An Over, if present, is dropped.

Audio Breakaway Audio and Embedded Audio Sources

The architecture of the video switching matrix prohibits certain AP audio breakaway operations (ABA) since a single video switch serves for all APs.

The following rules will be effective in preventing problem ABA breakaways involving Embedded Audio sources:

- If an embedded source is selected on either bus (Program or Preset) of AP 1, then the selection of a non-embedded source on any of AP 2–4 for that bus will not be restricted.

If, however, an embedded source is selected on AP 1 and an attempt is made to select another embedded source on any on AP 2–4, this selection will be denied.

- If an embedded source is selected as above on AP 1 and a non-embedded source on any of AP 2–4, and an attempt is made to switch to an embedded source on this AP on this bus, the switch will be allowed only if the switch is made to the source already selected on AP 1.
- If AP 1 currently is switched to an embedded source and AP 1 selects another source, than any or all of AP 2–4 that were also switched to this same embedded source will be switched to the new embedded source. If any or all of these APs were not delegated to AP 1 control, they will be so delegated (and show low tally).
- If the source selected on either bus of AP 1 is not embedded, an attempt to switch to an embedded source on this bus on any of AP 2–4 will be honored only if currently no other AP 2–4 selects an embedded source on this bus.
- If a transition on AP 1 includes an embedded source on the Program bus (or also Preset bus if flip-flop is enabled), then these APs will be included in the transition. If these other APs were not delegated, they will be unconditionally delegated.
- If a transition on any of AP 2–4 only (AP selected) is attempted and an embedded source (as defined above) is involved, and any other AP has embedded sources selected (as defined above), then this transition will be denied.

Left and Right (Audio) Buttons

There are two sets of **Left** and **Right** buttons (Figure 2-13 on page 2-41); one set for the Program bus and one set for the Preset bus. These buttons have three functions:

1. Enable Stereo, L-Mono or R-Mono routing,
2. Allow toggling of Left or Right channel phase, and
3. Allow adjustment of the Program or Preset levels.

These buttons are delegated to AP 1 unless an AP has been slaved to AP 1 or selected and held (high tally) with the **AP 2-4** buttons.

Level, mode and ratio settings are copied from the Preset to Program bus data storage for that source when a transition from Preset to Program is made for that source. In a similar manner, level, mode and ratio settings are copied from the Program to the Preset bus data storage for a source, at the end of a Program to Preset transition of that source, when the buses flip-flop (if flip-flop mode has been enabled in configuration).

Stereo, L-Mono and R-Mono Modes

There are mode (Stereo, L-Mono or R-Mono) and level settings associated with each audio source, for each Audio Processor, for each bus (Program and Preset). Additionally, there are mono mode, left/right phase, level and ratio (of Over to primary audio) settings associated with each Over source for each bus, for each Audio Processor. These settings are recalled and executed when a source is selected on a bus.

An audio breakaway, or the audio component of a married source, or an Audio Only, can be Stereo, L-Mono or R-Mono. To enable one of the modes, select the audio source in the delegated AP and press the Right (R-Mono), Left (L-Mono) or both buttons (Stereo).

When this source is selected on a bus, the tally of the **Left** and **Right** buttons indicate the selection in effect the last time this source was updated. L-Mono or R-Mono high tallies the respective button. Stereo mode high tallies both. At least one of the **Left** or **Right** buttons must always tally high. The default mode is Stereo.

Phase Inversion

When in Stereo mode, the phase of either the left or the right channel can be inverted. When inverted, the **Left** or **Right** button will blink off/high tally. To invert phase of a stereo source on either bus, press and hold the **Function** button while pressing and releasing the **Left** or **Right** button.

Note that if both the left and right channels are inverted the result is as if neither were inverted, thus if **Left** button flashes indicating inversion and the **Right** button is used to invert right channel, that neither the **Left** and **Right**

button will flash. Also note that phase invert is effective only in Stereo mode, so selection of L-Mono or R-Mono will result in only that lamp tally and no phase inversion.

The selection made by the button push is made on button release in order to allow level adjustments to be made. If a level adjustment is made, the left/right selection does not change when the button(s) is released. The button tallies do not change when the buttons are pushed, only when they are released.

Regardless of the state of the two buttons—pressing and releasing either the **Left** or **Right** buttons on either the Program or Preset buses, (and not performing a level adjust while one is being pressed and held), enables only that channel (L-Mono or R-Mono mode).

Simultaneously pressing and releasing both buttons on either Preset or Program buses, (and not performing a level adjust) selects Stereo mode for the selected audio processor, and both buttons high tally.

PGM Level and PST Level Controls

The **PGM Level** and **PST Level** knob controls (Figure 2-13 on page 2-41) must be enabled for the Program and Preset bus separately in Configuration Manager using the **Trim/Level Enable** function in **Audio Controls** section of the **MMCP** form. Refer to the M-2100 Installation and Service Manual for complete details.

If **PGM Trim/Level** is enabled, the **PGM Level** knob (and Ratio knob for the Program source if an Over is selected) is enabled. **PST Trim/Level** enables adjustments using the **PST Level** control. There is a level setting associated with each source on each bus, including the Only sources.

Note If one of the level controls has not been enabled, turning it will result in a chirping sound, indicating it is not functional.

If an Over source is selected on a bus, that bus' level and **Left/Right** buttons are delegated to the Over source.

If either **Left** or **Right** buttons of either Preset or Program subgroup are pressed and held, and **Trim/Level** is enabled for this bus, adjustment of the **Level** control knob for the selected channel of the delegated Audio Processor is enabled. This adjustment affects only the indicated left or right channel of the delegated Audio Processor. Note that the **Left** or **Right** buttons do not tally when pressed unless they were already on, since their tally changes (if it changes at all) only when released.

If **Trim/Level** is enabled for this bus, regardless of the states of the **Left** and **Right** buttons, the **PGM** or **PST level** control is active and adjusts the level of both the left and right channels equally. Pressing and holding both the **Left** and **Right** buttons simultaneously, regardless of the previous state of the buttons, enables adjustment of both the left and right channels equally.

The level associated with an Only source is effective when the Only source is used as an Over. This level is summed with the ratio attenuation to attain the final level.

When there is an Over on the Program or Preset bus, adjustment of the **Level** control affects the Primary and Over level equally. In order to adjust only the Primary level, it is necessary to drop the Over while the adjustment is made.

While adjusting the right and left channels together:

- If the left and right channels are not the same level, and one of them hits either the top or bottom limit, additional adjustment will continue to adjust the channel not yet at the limit until both channels are at this limit. At this time a chirp alarm sounds.
- A chirp alarm sounds if the level controls are at their limits and no further adjustment is possible or allowed.

If this source was not already the selected source it will be so selected. An Over, if present, will be dropped. If the source is an Over, its ratio will be set to 50%.

Subject to the conditions of level updating as previously described, the last level adjust made to a source will be recalled the next time that source is selected.

Setting Audio Unity Gain

The level of any audio crosspoint on any AP can be set to unity gain (0 dB) with the following procedure. Be sure to follow the button presses in the order they are given here.

1. Press and hold the **AP** button for the AP you wish to delegate.
2. Press and hold the **Mode/Function** button.
3. Press and hold the crosspoint button on the Preset bus with the audio you wish to set for at least one second.

The audio gain for this crosspoint will now be set to unity gain (0 dB).

Audio Ratio Control

The Ratio knob ([Figure 2-13 on page 2-41](#)) controls the ratio of Over to Primary audio levels for an Over in the delegated Audio Processor as follows:

- When in the center of its adjustment range, there is no attenuation of either the Primary or Over audio levels.
- Clockwise rotation attenuates the Primary source.
- Counter clockwise rotation attenuates the Over source.

The **Primary/Over** LED display shows the ratio of an Over to the Primary on either the Program or Preset bus for the delegated Audio Processor. Its bar graph display shows the relative values of Over to Primary audio. This display is delegated to Program or Preset with the following rules:

- If there is not an Over selected on either bus, it is blank.
- If the Over ratio adjustment is being performed, the display is delegated to this adjustment.
- If either the Program or Preset bus has an Over selected, the display is delegated to that Over.
- If both Program and Preset buses have an Over selected, the display is blank.

The **Ratio** knob is delegated in the same manner as the display. If either but not both of the buses have an Over selected and the display shows the ratio for that bus, the **Ratio** knob is controlling that ratio. It is acceptable to press and hold a Program or Preset **Audio Only** button as described below to adjust the ratio, even if the **Ratio** knob is already delegated.

Use of the ratio control is further delegated by pressing and holding a Program or Preset **Audio Only** button for the delegated Audio Processor. If the **Ratio** knob is adjusted and the **Audio Only** button is released, this source will be or remain selected as an Over, and not toggle off if previously selected.

For Audio Processor 1, selection of an audio Over on the Program or Preset bus will recall the audio ratio setting that was in effect the last time that audio Over was updated. For AP 2–4 ratio recall can be configured.

Audio Ratio Summary Facts

- The ratio control setting is set to 50% by default.
- A ratio setting of 0% mixes full Main source with zero Over source.
- As the ratio is advanced from 0% to 50%, the level of the Over source is increased from 0% to 100% while the level of the main source remains unchanged. At a ratio of 50%, both the Main source and the Over source are contributing 100% of their full level.
- As the ratio is advanced from 50% to 100%, the contribution of the Main source is decreased, until it is zero at ratio of 100%. The level of the Over source does not change.

Audio Ratio Profiles

This section describes how Overs are transitioned to the Program bus—either as part of a Preroll transition, or a hot cut to/from the Program bus.

Cut Transition—Cut in Over only

Conditions:

- No change in audio Main sources
- No Over currently on Program bus
- Over is on Preset bus

If the ratio associated with the Over source is greater than 50%, then the ratio is set to 50% immediately at cut-in time and is transitioned to the final ratio Over the fade to under period. This yields the effect of a constant Over level, with the main level fading under to its final level which is dictated by the ratio setting. If the ratio associated with the Over source is 50% or less, then an immediate cut is done to this ratio.

Cut Transition—Cut in Over and Change Main Source

Conditions:

- Change in audio Main source
- No Over currently on Program bus
- Over is on Preset bus

To avoid any downstream analog pops and clicks, a main audio source cut is upgraded to a fade-fade transition with a nominal fade interval of 100 ms. Therefore, this transition will behave identically to a fade-fade with an Over in.

At the effective time of the beginning of the first half of the transition (considering preroll, transition hold and transition now), the old Program main source begins a transition to silent by action of the main Program/Preset mixer.

At the effective time of the beginning of the second half of the transition (considering transition hold, but normally immediately upon completion of the first half), a fade from silent to the new main source and Over, with the Over source ratio preset to the ratio associated with the Over source, is begun.

The audible result is a short fade down of the old Program material followed by a short fade up from silent of both the new main source and Over source, with the ratio preset and unchanging.

Cut Transition—Cut out Over only

Conditions:

- No change in audio Main sources
- Over currently on Program bus
- No Over is on Preset bus

At the effective time of the transition cut (considering preroll, transition hold and transition now), the old Program Over source begins to ratio down to zero. This ratio transition occurs Over the FTU (fade to under) interval. At the end of this interval, the Program bus Over source is removed (its button lamp tallies low).

The audible result is the fading out of the Over source and the fading back to full level of the Program main source over the FTU interval. The extinguishing of the Over source tally will be delayed by the FTU interval.

Cut Transition—Cut out Over and Change Main Source

Conditions:

- Change in audio Main source
- Over currently on Program bus
- No Over is on Preset bus

Again this transition is upgraded to a fade-fade transition with a nominal fade interval of 100 ms. Therefore, this transition will behave identically to a fade-fade with an Over out.

At the effective time of the beginning of the first half of the transition (considering preroll, transition hold and transition now), the old Program main source and Over begins a transition to silent by action of the main Program-Preset mixer. There is no change in the old Program source ratio during this fade.

At the effective time of the beginning of the second half of the transition (considering transition hold, but normally immediately upon completion of the first half), a fade from silent to the new main source is begun.

The audible result is a short fade to silent taking out the old Program main source and its Over. The new source is then faded in.

Cut Transition—Cut to New Over only

Conditions:

- Change in audio Main source
- Over currently on Program bus
- Over is on Preset bus

At the effective time of the transition cut (considering preroll, transition hold and transition now), the old Program Over and ratio are immediately replaced with the new Over source at its associated ratio. The main source is unchanged.

The audible result is an immediate cut to new Over source at its ratio. The panel tally will be immediate.

Cut Transition—Cut to New Over and Change Main Source

Conditions:

- Change in audio Main source
- Over currently on Program bus
- Over is on Preset bus

Identical to cut an Over on and change main source: this audio cut is treated as a fade-fade and the ratios are not changed during the transition.

Hot Cut Transition 1

Conditions:

- Change Program Main source
- Over was on Program bus

The new Program main source will be selected immediately and will high tally on the panel. Over the FTU interval the ratio of the Over source is transitioned to zero, at which time the Over source is removed and the panel tally is removed.

The audible result is an immediate cut of the main source but at the pre-existing ratio (not full level, Over will still be present). Over the FTU interval the new main source is faded up to full level and the Over is faded to zero. The Over is then removed and the Over panel tally is removed.

Hot Cut Transition 2

Conditions:

- Hot cut on an Over on the Program bus
- No Over currently on Program bus

The new Program Over source will be selected immediately and will high tally on the panel. If the ratio associated with the Over source is greater than 50%, then the ratio is set to 50% immediately at cut-in time and is transitioned to the final ratio Over the FTU period. This yields the effect of a constant Over level, with the main level fading under to its final level which is dictated by the ratio setting.

If the ratio associated with the Over source is 50% or less, than an immediate cut is done to this ratio.

Hot Cut Transition 3

Conditions:

- Hot cut: Remove an Over on the Program bus by pressing the button for an already on-air Over source

Over the FTU interval the ratio is transitioned from current ratio to zero, at which time the tally will be removed.

The audible result is that over the FTU interval the Over source is faded down and the main source is faded up to full level. The tally of the removed Over will be delayed by the FTU interval.

Hot Cut Transition 4

Conditions:

- Hot cut: Change an Over on the Program bus
- Over currently on Program bus; select another Over

The new Over source with its ratio preset to that associated with the new source will immediately appear on the Program bus.

The audible result is an immediate cut away from the old Over source and an immediate cut to the new Over source at its associated ratio. The panel tally change is immediate.

All Other Transition Types 1

Conditions:

- No change in audio Main source

If there is no change in the audio component of the main source (and the transition type includes audio) and an Over is present on either or both the Program or Preset buses, then this transition is assumed to be an Over-only transition.

Over-only transitions ignore the transition type and always behave as previously described for CUT transitions with no change in Main Sources.

All Other Transition Types 2

Conditions:

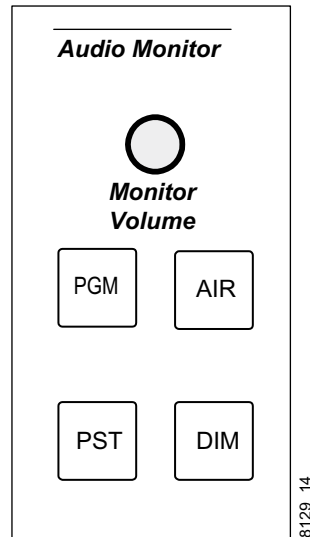
- Change in audio Main source

If there is a change in the audio component of the main source then, due to mixer architecture, the ratio values are preset and not changed during the transition. The operation and audible results are identical to those described previously for cut transitions with a change in main source.

Audio Monitor Subpanel

The Audio Monitor subpanel (Figure 2-14) provides control of the external audio monitoring output, Monitor 1, available from audio connectors on the rear of the frame. The monitor source can be selected from **PST**, **PGM** or **Off-Air** and the volume adjusted or dimmed.

Figure 2-14. Audio Monitoring Subpanel



PST, PGM, and AIR Buttons

These three buttons select the audio source for Monitor 1. In a system configured with more than one Audio Processor, the Preset and Program monitors always follow the monitor delegation of AP 2–4 as noted in this section. In a system with only one Audio Processor the monitoring is always assigned to AP 1.

The Air monitor listens to the Audio Processor as configured as previously noted.

These buttons operate in the following fashion as radio buttons:

- Selection of one deselects any of the other two that might be selected.
- Buttons can be either off or high tally.
- One of these buttons for a monitor must always be on.
- Selecting a button that is already selected does not change the selection.

Monitor Volume Control

These control knobs are always enabled. They adjust the volume of the monitoring of their respective channels without regard to delegation or configuration. They adjust the volume of both the left and right channels equally.

The monitor levels are associated with the monitor, and not the Audio Processor, nor PGM/PST or Off-Air sources. Thus, if the volume of Monitor 1 was turned down for Preset on Audio Processor 2, selections of PGM and/or Audio Processor 1 would not change the effective monitor volume.

DIM Buttons

The **DIM** buttons provide an attenuation of a configurable amount of the level of the associated monitor. These buttons are either off or high tally (On meaning monitor level attenuated). They are toggle action selected on the leading edge of the button press. Like the other controls and buttons, these belong to Monitor 1, and not the source or Audio Processor. Thus a change of source or Audio Processor cannot change the state of these buttons.

The attenuation level of the **DIM** buttons is set using the **General Parameters** form in Configuration Manager. Enter a dB value into the **Audio Monitor Dim Attenuation** field in this form. Refer Configuration Manager in the Installation and Service Manual.

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