



System 5 Digital Audio System User Guide

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Part I: Introduction to System 5

Chapter 1: Introduction

Welcome to the System 5, a highly advanced digital audio mixing system. System 5's modular control surface can be easily configured to handle large projects with many digital and analog sources. The System 5 is the perfect choice for serious audio production facilities that need a powerful, easy-to-use digital mixing system that supports all common surround formats.

The number of processing cards in the DF66/DF70 Super Cores and SC264D determine the total processing power available to channels and busses in each System 5 configuration. A Mixer Model is a file that specifies how these processing resources are deployed to best suit the session and preferences of the engineer.

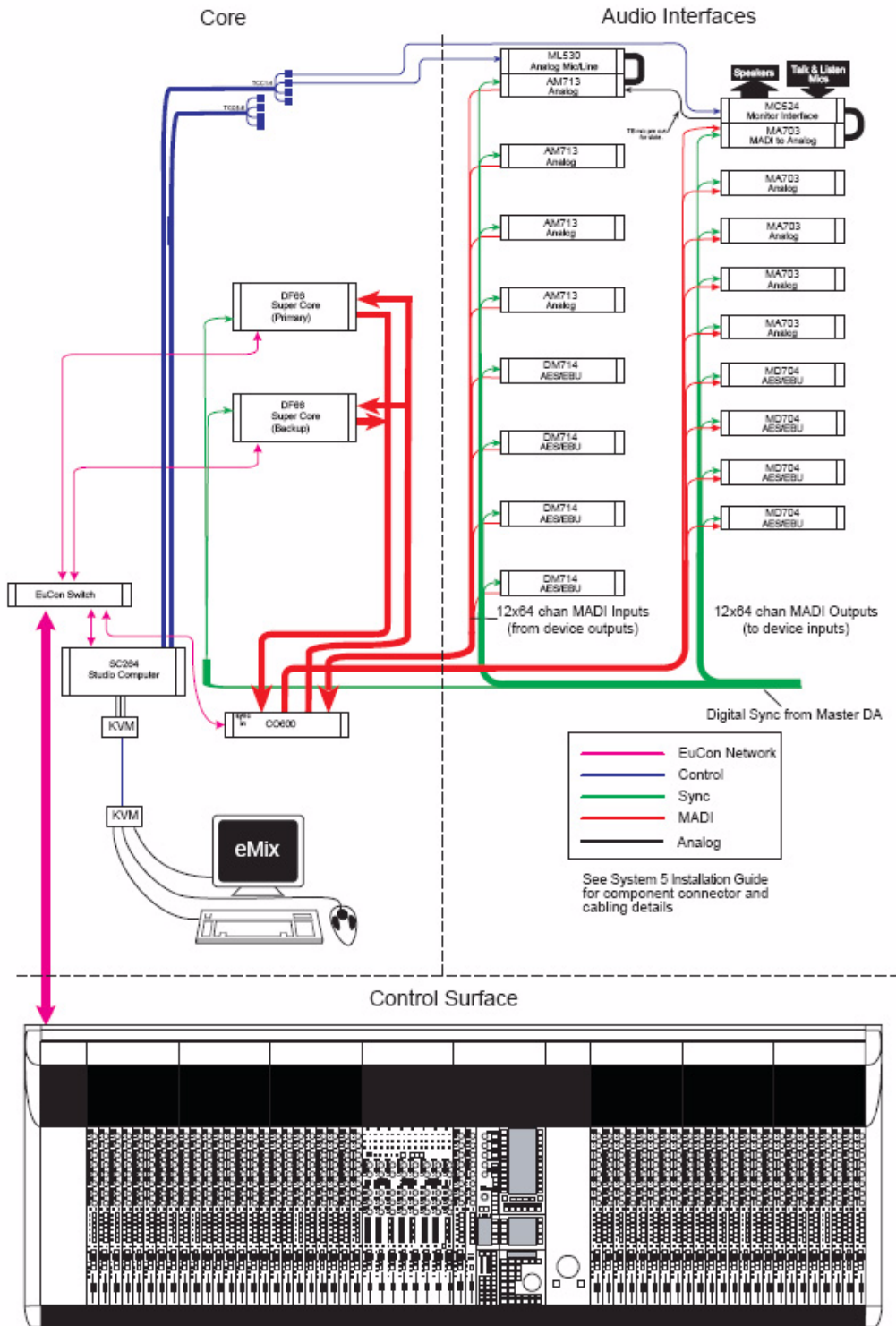
Each System 5 channel has identical processing functions. Channels can receive analog mic-line and digital inputs, as well as audio subgroups and effects returns. The engineer is free to decide how to best route inputs to the console using PatchNet, a software component of the eMix system. PatchNet is the digital patchbay that routes signals between the console I/O and all studio devices. All PatchNet settings are saved within the Title and can be quickly recalled.

System 5 Hardware

Overview of System Components

- The Control Surface connects to the processing core via Ethernet and the EUCON Hub. Audio does not pass through the control surface.
- The SC264 System Computer runs the eMix software application; all file management and system setup is done from this computer. The broadcast version of the console (System S5B) does not support console automation or transport controls (see Chapter 3, “eMix Application”).
- The DF66 Digital Processing Core performs System 5's audio I/O via MADI. The DF66 can have a maximum of six 120 MHz DSP line cards.
- The DF70 Digital Processing Core supports more DSP than the DF66. The DF70's audio I/O is done via MADI and has eight 120 MHz DSP cards.
- The C0600 Changeover Switch (optional) supports a backup DF66/DF70 Super Core.
- The SC264D combines the System Computer with up to two 120 MHz DSP cards and the Hybrid EUCON workstation control.
- The System I/O is comprised of digital and analog I/O units that connect all studio devices to the DF66/DF70 (or CO600) via MADI. See “Console I/O” on page 20.

System 5 Hardware Components



System 5 hardware diagram

System 5 Startup Sequence

With all system components turned off:

- 1 Turn on the Ethernet switch and allow it to complete its startup diagnostics.
- 2 Turn on the SC264 System Computer.
- 3 Turn on all I/O units.
- 4 On the SC264, double-click the eMix icon on the desktop.
- 5 Turn on all of Surface Modules, the CO600 Changeover Switch (if present), and the DF66(s) or DF70.

If system modules have been saved as default, eMix continues to boot when all modules reach 100%. If no modules appear as Unexpected, continue with step 6, otherwise proceed to “If any modules appear as Unexpected” below.

- 6 Click Continue to finish booting eMix and the startup sequence is complete.

If any modules appear as Unexpected:

- 1 Ctrl-click each Unexpected module.
Make sure all are selected.
- 2 Click Save selected as default.
- 3 Confirm the selection by clicking OK.
- 4 Click Continue to finish booting eMix.



When eMix launches, the control surface is temporarily disabled and audio is muted. Launching eMix automatically by putting it in the Windows Startup folder may produce undesirable behavior if the System Computer reboots during a broadcast or session.

System Requirements and Compatibility

Avid can only assure compatibility and provide support for hardware and software it has tested and approved.

For complete system requirements and a list of qualified computers, operating systems, hard drives, and third-party devices, visit:
www.avid.com/compatibility

About This Guide

This guide provides a basic overview of System 5 features and functionality.

For complete instructions on connecting and configuring your system, see the *System 5 Installation Guide*.


Conventions Used in This Guide


All of our guides use the following conventions to indicate menu choices and key commands:

Convention	Action
File > Save	Choose Save from the File menu
Control+N	Hold down the Control key and press the N key
Control-click	Hold down the Control key and click the mouse button
Right-click	Click with the right mouse button


The names of Commands, Options, and Settings that appear on-screen are in a different font.

The following symbols are used to highlight important information:

 *User Tips are helpful hints for getting the most from your system.*

 *Important Notices include information that could affect your data or the performance of your system.*

 *Shortcuts show you useful keyboard or mouse shortcuts.*

 *Cross References point to related sections in this guide and other Avid guides.*

About www.avid.com

The Avid website (www.avid.com) is your best online source for information to help you get the most out of your system. The following are just a few of the services and features available.

Product Registration

Register your purchase online.

Support and Downloads

Contact Avid Customer Success (technical support); download software updates and the latest online manuals; browse the Compatibility documents for system requirements; search the online Knowledge Base or join the worldwide Avid user community on the User Conference.

Training and Education

Study on your own using courses available online or find out how you can learn in a classroom setting at a certified Avid training center.

Products and Developers

Learn about Avid products; download demo software or learn about our Development Partners and their plug-ins, applications, and hardware.

News and Events

Get the latest news from Avid or sign up for a demo.

Chapter 2: Quickstart to Common Tasks

In this chapter, you will learn how to route and patch devices using two simple examples:

- Connect and play a CD
- Connect and monitor a microphone

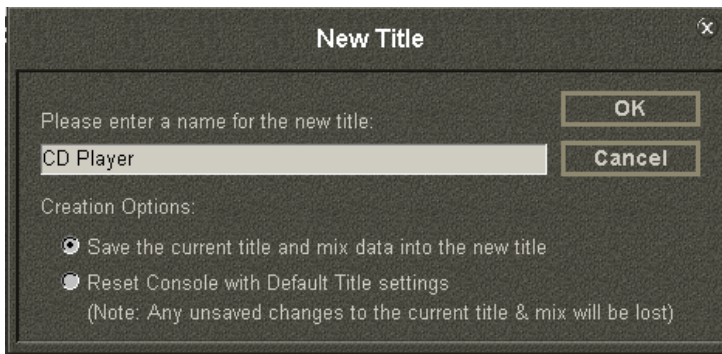
Connect and Play a CD

Connecting and playing a CD illustrates System 5's basic configuration, routing, and monitoring principles:

- Set up eMix
- Assign the CD channels to the console
- Patch the CD player
- Route the CD channels to the mix bus

To set up eMix:

- 1 Select Drives at the bottom of the eMix screen and choose a drive.
- 2 Click Projects > New, and name the new Project.
- 3 Click Titles > New, and name the new Title.
- 4 Click Save the current title and mix data into the new title to use the current Title's settings for the new Title (like Save As); click Reset Console with Default Title settings to use default Title settings.



New Title dialog

To assign channels to console:

- 1 Select Channels from the main panel viewer in the console master section.
- 2 Select Auto then Channel 1.
- 3 Press Chan Sel keys for two neighboring console Strips (n and n+1).
Channels 1 and 2 are now assigned to Strips n and n+1, respectively.

To patch the CD Player:

- 1 Select PatchNet at the bottom of the eMix screen and select Console I/O.
- 2 Select A and B Inputs.
- 3 Select the blue selection box for the A Input of channels 1 and 2.

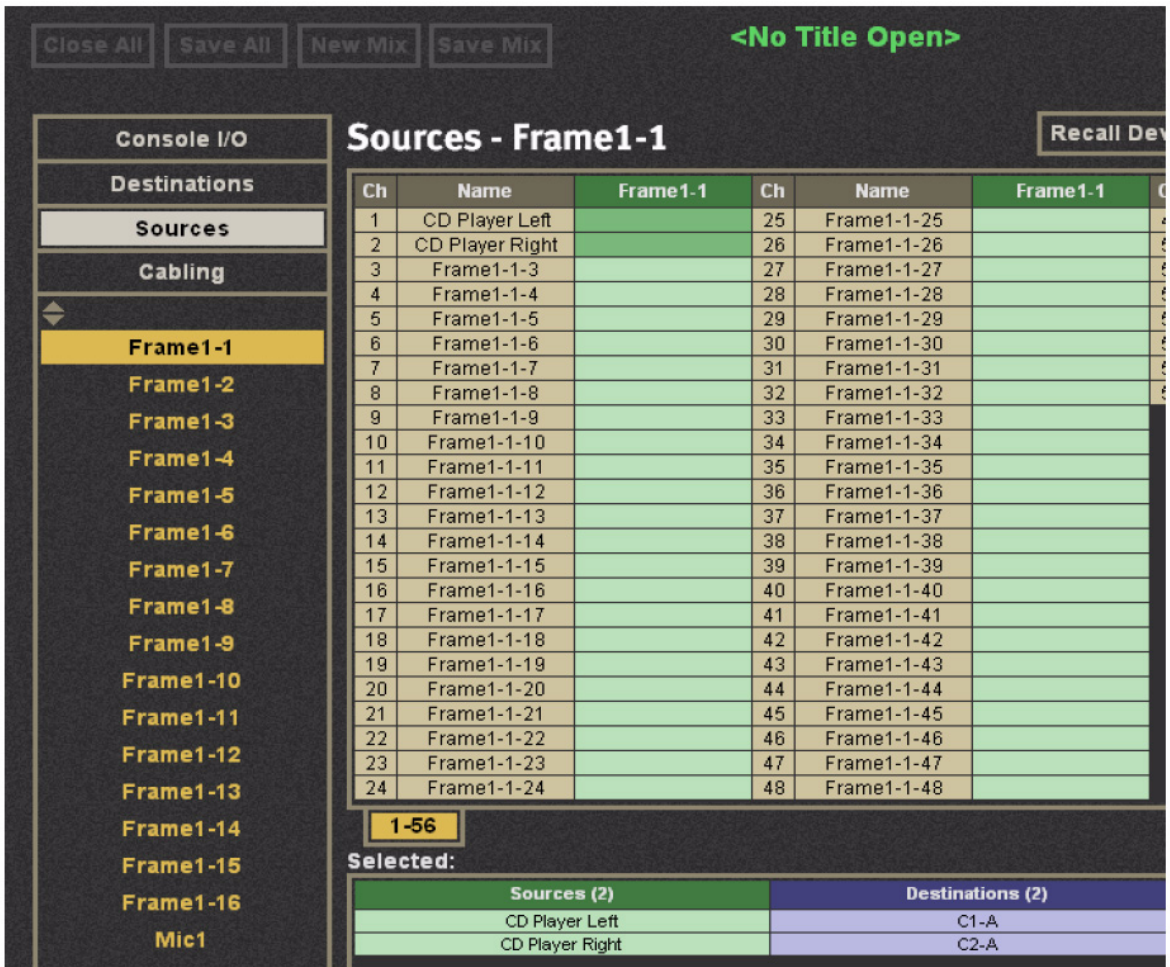
The patch points show up in Selected - Destinations.

- 4 Connect the CD's digital output (AES or SDIF) to channels 1 and 2 on the DM714.

The DM714 should already be connected to DF66 1-1.

- 5 Select Sources, then select Frame 1-1 from the left side of the screen.
- 6 Under Sources - Frame 1-1, click in the Name column for channel 1 and name the device *CD Player Left*.
- 7 Click in the Name column for channel 2 and name it *CD Player Right*.
- 8 Click the green selection fields to add the patch points to Selected - Sources.
- 9 Click the Patch button.
- 10 Select Console I/O, click in the Name column for channels 1 and 2 and name them *CDL* and *CDR*, respectively.
- 11 Press the Main Panel key and select Channels.
- 12 Press the Setup key and then press Show Input Names.

The TFT display above the channel shows the input names.



Sources page in PatchNet

To route to the mix bus:

- 1 Press the Channel On switches for each CD channel.
- 2 Select the Mix button on channels 1 and 2.
- 3 Select the In key of the B Mix Bus, which defaults to two-channel stereo.
- 4 Press the Master Section's CR Source key.

The Mix Busses display in the Panel Viewer.

- 5 Select the B Source.
- 6 Move channel 1 and 2 faders up.
- 7 Press both channel's Pan buttons and set to L and R, respectively.
- 8 Press the Master Section's CR Output key.

The output formats display in the Panel Viewer.

- 9 Select Stereo.
- 10 Press play on the CD player.
- 11 Turn off the Cut button and adjust the control room monitor level with the Master Section's Main Monitor knob.

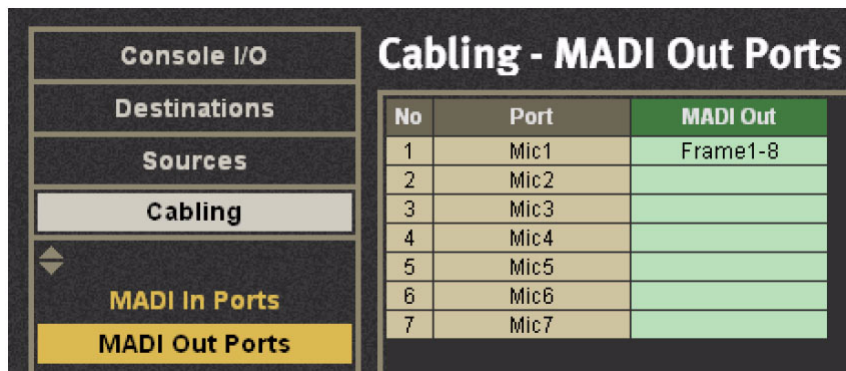
Connect and Monitor a Microphone

Connecting and monitoring a mic illustrates the following basic configuration, routing, and monitoring principles:

- Configure PatchNet
- Assign the channel to the console
- Route to the mix bus

To configure PatchNet:

- 1 Select the Cabling tab from the left side of PatchNet.
- 2 Select MADI In Ports and select Frame 1-8.
In this example, the AM713 is physically paired with the ML530, which is connected via MADI to DF66 MADI input #8.
- 3 Select MADI Out Ports and click in the MADI Out column next to Mic 1.
This informs the DF66 which AM713 is connected to the ML530.
- 4 Click Patch.

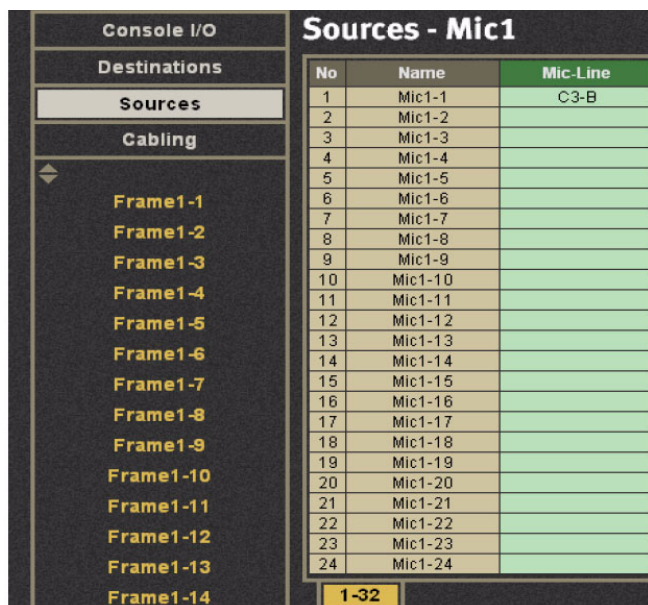


Cabling-MADI Out Ports

To assign the mic channel to the console:

- 1 Select Channels from the Main Panel Viewer.
- 2 Select Auto then Channel 3.
- 3 Press a Strip's Chan Sel key.
- 4 Press the Strip's Inpt button, then turn the Inpt knob clockwise until the B input is selected.
- 5 Press the ► button to display the B input page on the knobset.
- 6 In PatchNet, select Console I/O.
- 7 Select the B Input of Channel 3.
- 8 Select Sources.
- 9 Select Mic-Line 1, Ch 1, and name the channel.
- 10 Click Patch.

The knobs on Channel 3 now display HiZ, 48V, HPF, Gain.



Microphone assignment in Sources

To route the mic channel to the mix bus:

- 1 Connect a microphone to channel 1 of the ML530.
- 2 To listen to the mic return, press the Mix button on channel 3 and select the In key of the B Mix bus.
- 3 Press the Master Section's CR Source key.

The Mix Busses display in the Panel Viewer.

- 4 Select the B Source.
- 5 Move channel 3's fader up.
- 6 Set Pan to center.
- 7 Press the Master Section's CR Output key.

The output formats display in the Panel Viewer.

- 8 Select Stereo.
- 9 Turn off the Cut button and adjust the control room monitor level with the Master Section's Main Monitor knob.

Chapter 3: eMix Application

The eMix application has the following tabs along the bottom of the window:

Directory	File management (see first section below)
PatchNet	Digital patchbay (see page 19)
Busses	Group and mix bus formats (see page 26)
System	System setup (see page 28)
Folddown	Folddown formats (see page 31)
Masters	Format master channels and externals (see Chapter 9, "Control Groups and Multi Format Masters")
Conform	Entering conform information for automation system (see "Automation Conform" on page 148)
Events	GPI/O event configuration (see Chapter 13, "GPI/O Event System")
Diagnostics	Summary of system status (page 32)

Directory

The Directory tab contains its own tabs right above the main eMix tabs: Drives, Projects, Titles, and Mixes. The order of these tabs also represents their hierarchy (i.e., a *Title* is within a *Project* located on a *Drive*). Operations in the Directory are almost identical to those in Windows.

Projects

To browse an existing Project:

- 1 Click the Drives tab to see a list of available Drives.
- 2 Single-click to select the desired Drive and click the Projects tab button.
– or –
Double-click the Drive.
The Projects Window opens with a list of Projects on that Drive.
- 3 Select a Project and click the Titles tab.
– or –
Double-click the Project.
The Titles Window opens with a list of Titles in that Project.
- 4 Select a Title and click the Open button.
The Title opens with the last mix used.
– or –
Double-click the Title.
The Mixes Window opens with a list of Mixes in that Project.

To open a Project:

- 1 Click the Drives tab to see a list of available Drives.
- 2 Select the desired Drive and click the Projects tab or double-click the Drive.

The Projects Window appears with a list of Projects on that Drive.

To create a new Project:

- 1 Click the New button on the right side of the Projects window.

– or –

Double-click an existing Project.

– or –

Select an existing Project and click the Projects tab.

- 2 Name the new Project in the dialog that appears.



Projects Window

Rename, Copy, Paste, and Delete Project

These buttons are arranged vertically along the right side of the Projects Window.

Copying a Project and pasting it to another Drive is the easiest way to backup a Project.

To copy and paste a Project:

- 1 Select a Project from the Projects Window.
- 2 Click the Copy button to copy the selected Project.
The Paste button remains dim until the Copy button is used.
- 3 Click the Paste button to paste the copied Project.
You can navigate the Directory to another Drive before pasting.
If the selected Project's name is *Test*, the copied Project is *Copy of Test*.
- 4 Click the Rename button to rename the selected Project in the dialog that appears.


To delete a Project:

- 1 Select a Project from the Projects Window.
- 2 Click the Delete button to delete the selected Project.
The Project is deleted and *does not get copied to the Copy buffer*.

Title

A Project must exist before selecting, opening, or creating a new Title. The Rename, Copy, Paste, and Delete buttons work the same on Titles as described above for Projects.

If a CMX 3600 EDL is present in the Project with the Title, it may be imported into the Cue list. If an EDL is selected, the Open option changes to Import (see figure below).

 Although Titles from previous versions of eMix are compatible with version 5.x, we recommend rebuilding them as soon as possible to take advantage of increased DSP efficiency and higher channel count.



Titles Window

To create a new Title:

- 1 Click the Drives tab to see a list of available Drives.
- 2 Select the desired Drive and click the Projects tab.

– or –

Double-click the Drive.

The Projects Window appears with a list of Projects on that Drive.

- 3 Select a Project and click the Titles tab.

– or –

Double-click the Project.

The Titles Window appears with all Titles in that Project.

- 4 Click the New button on the right side of the Titles window.


The New Title dialog appears.



New Title dialog

- 5 Name the new Title and select one of the Creation Options radio buttons:

- Save the current title and mix data into the new title: Uses the current state of the console for new Title. If a mix is open, that mix is saved in the new title.
- Reset Console with Default Title settings: Uses settings for Default Title to reset console. See page 17 to see how to change the default settings. There is no mix in the new Title; one must be explicitly created.

 *A Title appears as a folder but is actually a single file with multiple Mixes.*

To open an existing Title:

- 1 Click the Drives tab to see a list of available Drives.
- 2 Select the desired Drive and click the Projects tab.

– or –

Double-click the Drive.

The Projects Window appears with a list of Projects on that Drive.

- 3 Select a Project and click the Titles tab.

– or –

Double-click the Project.

The Titles Window appears with all Titles in that Project.

4 To open a Mix *other* than the last one used, double-click the Title.

– or –

Click the Mixes tab.

The Mixes Window displays existing Mixes. See page 16 to see how to open a Mix.

5 Select the Title and click Open.

This opens the Title with the last Mix used.

Mixes

A Project and Title must exist before selecting, opening, or creating a new Mix. The Rename, Copy, Paste, and Delete buttons work the same on Mixes as described on page 12 for Projects.

To create a new Mix:

1 Click the Drives tab to see a list of available Drives.

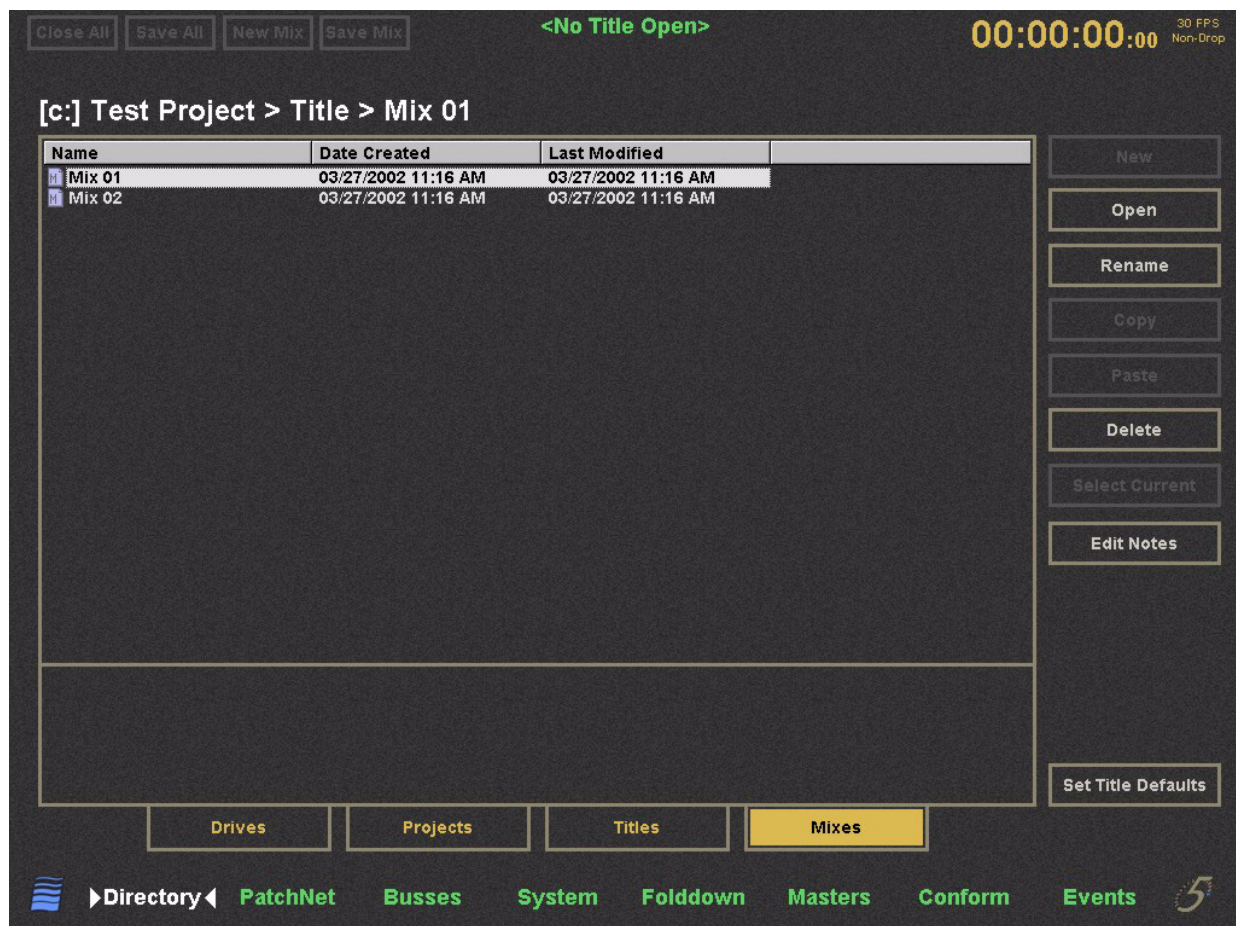
2 Select the desired Drive and then click the Projects tab to see a list of Projects on that Drive.

3 Select a Project and click the Titles tab to see the Titles within that Project.

4 Select the desired Title and click the Open button of the Titles window.

5 Click the New Mix button at the top of the eMix window.

6 Name the Mix in the New Mixes dialog.



Mixes Window

To open an existing Mix:

- 1 Click the Drives tab to see a list of available Drives.
- 2 Select the desired Drive and click the Projects tab or double-click the Drive.
The Projects Window appears with a list of Projects on that Drive.
- 3 Select a Project and click the Titles tab or double-click the Project.
The Titles Window appears with all Titles in that Project.
- 4 To open the Title with the last Mix used, select the Title and click the Open button of the Titles Window.
- 5 To open a Mix *other* than the last used, double-click the Title.
– or –
Click the Mixes tab.
The Mixes Window appears with existing Mixes.
- 6 Select the desired Mix and click the Open button.
– or –
Double-click a Mix to open it.

To change Mix within the same Title:

- 1 Navigate to the Mixes window.
- 2 Click Save Mix or Save All (see page 16 for explanation of difference) at the top of the window.
- 3 Click New Mix at the top of the window.
– or –
Select the desired existing Mix and click the Open button.

Operations on Current Title and Mix



File operations buttons for current Title

The four buttons at the top of each Directory Window provide an easy way to operate on the open Title and/or Mix from any window. They are dim if a Title is not open.

Close All and Save All close and save *both* the Title and Mix, respectively.

Save Mix saves *only* the automation data *without* saving the Title's other data (same as the automation panel's Save Mix key).

New Mix creates a new Mix and prompts to save the current open mix.

Select Current


Click the Select Current button to instantly navigate back to the currently open Mix in the Mixes Window. This is a convenient way to browse the Directory without losing your place.

Edit Notes

Click the Edit Notes button to enter information about the Title or Mix.

Title Defaults


This section describes how to set up basic PatchNet settings when a new Mixer Model is selected. This process includes naming the sources and destinations and connecting group bus outputs to multitrack inputs. The setup process is equivalent to setting and labeling the normalised connections on a conventional patch.

 *A destination refers to an external device input, not the console.*

These settings are stored to the Title Defaults and are automatically included with each new Title. Each Mixer Model has a Title Defaults file.

A new Title inherits these settings from the Title Defaults:

- PatchNet names and settings
- Bus names and formats
- Externals names and formats
- SnapShots
- Layouts
- Meter setups

 *The Title Defaults is a file on the System Computer for each Mixer Model, but it does not appear in the Directory.*

Setting the Title Defaults

The Title Defaults can be set by clicking the Set Title Defaults button on the Titles page in PatchNet. This copies all settings listed above from the currently open Title into the Title Defaults for the current Mixer Model. The figure below warns about this action.

The current title settings (PatchNet, Bussing, Layouts, Externals, etc.) will be made the default settings for ALL NEW TITLES on this system.

Updating Title Defaults warning

Normalled Connections

Inputs and outputs that require normalled connections must be designated in PatchNet and saved to the Title Defaults.

In the figure below, the console Group Bus outputs 1–24 should be patched to the DAW inputs. The figure below shows the Nuendo inputs patched from the Group Bus outputs.

If a Source is normalled to multiple destinations, <MULT> appears in the cell next to the source.

Console I/O		Destinations - Frame1-5			
Destinations		Ch	Name	Frame1-5	Ch
Sources		1	Nuendo In 1	Grp1-Bus-Out	25
Cabling		2	Nuendo In 2	Grp2-Bus-Out	26
Frame1-1		3	Nuendo In 3	Grp3-Bus-Out	27
Frame1-2		4	Nuendo In 4	Grp4-Bus-Out	28
Frame1-3		5	Nuendo In 5	Grp5-Bus-Out	29
Frame1-4		6	Nuendo In 6	Grp6-Bus-Out	30
Frame1-5		7	Nuendo In 7	Grp7-Bus-Out	31
Frame1-6		8	Nuendo In 8	Grp8-Bus-Out	32
Frame1-7		9	Nuendo In 9	Grp9-Bus-Out	33
Frame1-8		10	Nuendo In 10	Grp10-Bus-Out	34
Frame1-9		11	Nuendo In 11	Grp11-Bus-Out	35
Frame1-10		12	Nuendo In 12	Grp12-Bus-Out	36
Frame1-11		13	Nuendo In 13	Grp13-Bus-Out	37
		14	Nuendo In 14	Grp14-Bus-Out	38
		15	Nuendo In 15	Grp15-Bus-Out	39
		16	Nuendo In 16	Grp16-Bus-Out	40
		17	Nuendo In 17	Grp17-Bus-Out	41
		18	Nuendo In 18	Grp18-Bus-Out	42
		19	Nuendo In 19	Grp19-Bus-Out	43
		20	Nuendo In 20	Grp20-Bus-Out	44
		21	Nuendo In 21	Grp21-Bus-Out	45
		22	Nuendo In 22	Grp22-Bus-Out	46
		23	Nuendo In 23	Grp23-Bus-Out	47
		24	Nuendo In 24	Grp24-Bus-Out	48

Destinations normalled

Layouts

The following table shows a typical Layout.

	Main	Swap
Strips 1–24	Channels 1–24	Channels 25–48
Strips 25–28	Channels 49–72	Channels 73–96

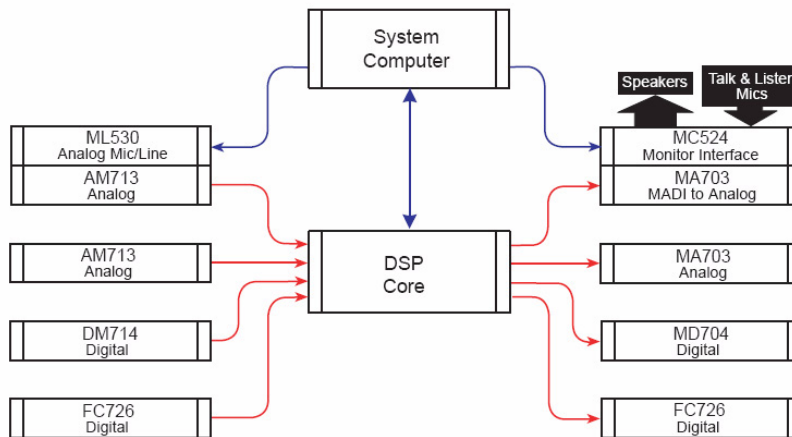
Meter Presets

The following are useful meter presets:

- All meters single; follow fader
- All meters single; Group Bus Outputs
- All meters single; Mix Bus Outputs
- All meters single; Aux Sends
- 1–24 Dual: Fader + Group Bus 1–24

PatchNet

PatchNet is System 5's digital patching system that uses a MADI routing hub to connect sources to destinations.



Simplified MADI routing diagram

The following Avid devices provide a robust and complete I/O interface:

- The DM714 (AES/EBU-to-MADI) and MD704 (MADI-to-AES/EBU) converters provide 26 channel inputs and outputs.
- The AM713 (analog-to-MADI) and MA703 (MADI-to-analog) converters provide 26 fixed-gain channel inputs and outputs.
- The ML530 Analog Mic-Line Preamp provides 24 remote, variable-gain, analog mic-line preamps controlled from the Strip.
- The FC726 Format Converter provides 56 channels of digital format conversion.


Some equipment, such as the Avid R-1, the Sony 3348HR recorder, and some mid- to high-end consoles, offer a MADI interface. DAWs can now have a MADI interface installed. Most equipment, however, (i.e., mics, speakers, DAWs that support AES/EBU and vintage gear) must convert to and from MADI using the appropriate Avid converter.

PatchNet makes connections between the console and external devices just like a conventional analog patchbay. The crucial difference is that complex patches can be saved and recalled with the Title.

Upon entering an analog studio, the following connections have typically been established:

- The patchbay is wired to all the equipment supplied with the room.
- The multitrack is normalled to the console line inputs, the mics to the console mic inputs.
- The outboard gear is ready to be patched into channels.

System 5 must be initially set up so all studio equipment displays on the PatchNet screen and is correctly labelled and normalled. This basic wiring information is stored in the Title Default so these settings can be used when starting a new session with a new Title.

 See "Title Defaults" on page 17 to set up System 5 studio wiring and set the Title Default.

Enter PatchNet by clicking the PatchNet tab at the bottom of the eMix screen. PatchNet has four categories: Console I/O, Sources, Destinations, and Cabling.

Console I/O

To configure console I/O:

- 1 Click Console I/O on the upper-left of the PatchNet window.
- 2 Click A and B Inputs from the sub-categories below it.
Connections to the channel's A and B inputs are made here.
- 3 Click in a Name field and type a channel name.



Console I/O A and B inputs Window

The Selected: area shows the Sources and Destinations for the A Input and B Input cells selected above. The numbered tabs (1–48, etc.) display additional pages of patchpoints. The four buttons on the bottom right perform the following functions:

Patch	Patches selected patchpoints
Unpatch	Unpatches selected patchpoints
Clear	Deselects selected patchpoints
View Log	Shows a log of failed patches
Store Patches	Stores the selected patchpoints
Recall Patches	Recalls selected patchpoints

Sources and Destinations

The console has up to 24 MAD I source/destination ports, each carrying up to 64 channels (44.1/48 kHz) or 32 channels (96 kHz).

Cabling

This category handles MADI cable connections for the ML530s.

Mic-Line Interface Patching

For mic inputs and analog inputs not at +4 dB, the Avid Modular I/O and the ML530 provide preamps with gain, phantom power, high-pass filter, and hiZ/loZ switching (ML530 only). The Modular I/O can provide up to 56 preamp channels per MADI port, while the ML530 provides 24 channels. The ML530 analog outputs are connected to an AM713 Analog-to-MADI converter which then connects to one of the MADI inputs.

For each rack of Modular I/O remote preamps, PatchNet must know which MADI input the rack is connected to so its mic preamp parameters appear on the corresponding channel knobset.

For each ML530, PatchNet must know which MADI input the AM713 is connected to so the mic preamp parameters appear on the corresponding input channel knobset.

Note how each Mic-Line Interface is connected (see the following example).

To route the MADI output from the analog-to-MADI converters of two ML530 Mic-Line interfaces to the inputs of Frame1-1 and Frame1-2:

1 Select Cabling in PatchNet.

2 Select the MADI Out Ports sub-category.

The list shows 7 Mic-Line Interfaces but only configure those wired to the Frame (i.e., Mic1 and Mic2).

3 Drag through the cells to the right of Mic1 and Mic2.

The cells highlight green and the names appear in the Sources column of the Selected: area.

4 Select the MADI In Ports sub-category.

5 Drag through the cells to the right of the two Frame 1 inputs (Frame1-1 and Frame1-2).

The cells highlight green and the names appear in the Destinations column of the Selected: area.

6 Click the Patch button to make the patch.

PatchNet now knows how the two Mic-Line interfaces are connected so the proper input parameters appear at the top of the channels they are connected to.

Because Frame1-1 and Frame1-2 have been designated as MADI connections to the Mic-Line interfaces, clicking on the Frame1-1 and Frame1-2 sub-categories in Sources show Device Patch in the first 24 cells and will not allow selection unless they are un-patched.

Patching Example: 12 Mics Into Channels 25–36

To select the Sources:

- 1 Click on Sources from the four PatchNet categories.
- 2 Click on Mic-Line 1 from the sub-categories.

This displays all inputs in the center of the window from the first Mic-Line Interface. The Mic-Line Interface is connected as part of the initial studio setup.

No	Name	Mic-Line
1	Mic1-1	
2	Mic1-2	
3	Mic1-3	
4	Mic1-4	
5	Mic1-5	
6	Mic1-6	
7	Mic1-7	
8	Mic1-8	
9	Mic1-9	
10	Mic1-10	
11	Mic1-11	
12	Mic1-12	
13	Mic1-13	
14	Mic1-14	
15	Mic1-15	
16	Mic1-16	
17	Mic1-17	
18	Mic1-18	
19	Mic1-19	
20	Mic1-20	
21	Mic1-21	
22	Mic1-22	
23	Mic1-23	
24	Mic1-24	

Selected:

Sources (12)
Mic1-5
Mic1-6
Mic1-7
Mic1-8
Mic1-9
Mic1-10
Mic1-11
Mic1-12

Sources Window

- 3 Select Mic1-1–Mic1-12 from the Mic-Line column by clicking and dragging through the cells.

These entries are highlighted in green in the figure above. These sources appear in the Sources column of the Selected: area. If there were more than 32 sources, additional tabs would appear to the right of the 1–32 tab.

There can be:

- one source to one destination;
- an equal number of sources to destinations;
- one source to multiple destinations.

⚠ *Multiple sources cannot be routed to one destination.*

To set the destinations for the 12 mics:

- 1 Select the Console I/O category and the A and B Inputs sub-category.
- 2 Drag through the A Input column next to C25–C36 to select channels 25–36.

The entries are highlighted in green and the list of A input channels appear in the Destinations column in the Selected: area (see figure below).

Ch	Name	A Input	B Input	Ch	Name	A Input	B In
1	C1			25	C25		
2	C2			26	C26		
3	C3			27	C27		
4	C4			28	C28		
5	C5			29	C29		
6	C6			30	C30		
7	C7			31	C31		
8	C8			32	C32		
9	C9			33	C33		
10	C10			34	C34		
11	C11			35	C35		
12	C12			36	C36		
13	C13			37	C37		
14	C14			38	C38		
15	C15			39	C39		
16	C16			40	C40		
17	C17			41	C41		
18	C18			42	C42		
19	C19			43	C43		
20	C20			44	C44		
21	C21			45	C45		
22	C22			46	C46		
23	C23			47	C47		
24	C24			48	C48		

Selected:	
Sources (12)	Destinations (12)
Mic1-5	C29-A
Mic1-6	C30-A
Mic1-7	C31-A
Mic1-8	C32-A
Mic1-9	C33-A
Mic1-10	C34-A
Mic1-11	C35-A
Mic1-12	C36-A

Setting Destinations

- Click the Patch button to make the connection.

The sources and destinations appear in the A Input and Name columns, respectively (see figure below). The sources and destinations are cleared from the Selected: area.

Ch	Name	A Input
25	C25	Mic1-1
26	C26	Mic1-2
27	C27	Mic1-3
28	C28	Mic1-4
29	C29	Mic1-5
30	C30	Mic1-6
31	C31	Mic1-7
32	C32	Mic1-8
33	C33	Mic1-9
34	C34	Mic1-10
35	C35	Mic1-11
36	C36	Mic1-12

Mics patched to channels

Patch the multitrack returns into channels 1–24:

- 1 Click on the Sources category.
- 2 Click on the Frame 1-3 sub-category.
- 3 Drag through the first 24 cells in the Frame1-3 column.

These cells are highlighted and their names appear in the Sources column in the Selected: area.

- 4 Select the Console I/O category.
- 5 Select the A and B Inputs sub-category.
- 6 Drag through the first 24 cells in the A Input column.

These cells are highlighted and their names appear in the Destinations column in the Selected: area.

- 7 Click the Patch button to make the connection.

The sources and destinations appear in the A Input and Name columns, respectively. The sources and destinations are cleared from the Selected: area.

After connecting the 12 mics and the R-1 returns, the Console I/O - A and B Inputs Window is shown below.

Console I/O - A and B Inputs							
Ch	Name	A Input	B Input	Ch	Name	A Input	B Input
1	C1	Nuendo Out 1		25	C25	Mic1-1	
2	C2	Nuendo Out 2		26	C26	Mic1-2	
3	C3	Nuendo Out 3		27	C27	Mic1-3	
4	C4	Nuendo Out 4		28	C28	Mic1-4	
5	C5	Nuendo Out 5		29	C29	Mic1-5	
6	C6	Nuendo Out 6		30	C30	Mic1-6	
7	C7	Nuendo Out 7		31	C31	Mic1-7	
8	C8	Nuendo Out 8		32	C32	Mic1-8	
9	C9	Nuendo Out 9		33	C33	Mic1-9	
10	C10	Nuendo Out 10		34	C34	Mic1-10	
11	C11	Nuendo Out 11		35	C35	Mic1-11	
12	C12	Nuendo Out 12		36	C36	Mic1-12	
13	C13	Nuendo Out 13		37	C37		
14	C14	Nuendo Out 14		38	C38		
15	C15	Nuendo Out 15		39	C39		
16	C16	Nuendo Out 16		40	C40		
17	C17	Nuendo Out 17		41	C41		
18	C18	Nuendo Out 18		42	C42		
19	C19	Nuendo Out 19		43	C43		
20	C20	Nuendo Out 20		44	C44		
21	C21	Nuendo Out 21		45	C45		
22	C22	Nuendo Out 22		46	C46		
23	C23	Nuendo Out 23		47	C47		
24	C24	Nuendo Out 24		48	C48		

Nuendo and mics patched

Mix Bus Send/Return

Click the Console I/O category, then click the Mix Busses sub-category. Each mix bus has a send and return. In the figure below, the first six sends (a 5.1-channel mix section) are routed to channels 41–46 A inputs. The insert is switched in/out from the Bus Masters Config Page (see “Bus Master Inserts” on page 97).

Bs	Section	Fmt	Send	Return	Out	Mix Return
1	A	5.1 L	C41-A	C41-Post-Fader	Genex In 1	
2	A	5.1 C	C42-A	C42-Post-Fader	Genex In 2	
3	A	5.1 R	C43-A	C43-Post-Fader	Genex In 3	
4	A	5.1 Sl	C44-A	C44-Post-Fader	Genex In 4	
5	A	5.1 Sr	C45-A	C45-Post-Fader	Genex In 5	
6	A	5.1 B	C46-A	C46-Post-Fader	Genex In 6	
7	B	St L				

Mix Bus Send and Return

For every Mix Section, there is a corresponding return in the same format that supports patching the Mix Section recorder output back into the console. The Mix Section Return can be routed to the monitors from the Mix Section page in the CR Source Panel (see “Control Room Monitor Controls” on page 42).

Monitor Patching

The monitor outputs are automatically routed to the analog patch unit supplied with System 5 and are ready to be normalled to the speaker inputs. The monitor feeds are also available within PatchNet for routing to other destinations.

Click on the Console I/O category and the Monitor Busses sub-category. This window shows all 22 monitor feeds:

Monitor	Busses	Format
1–8	Control Room	L, C, R, Sl, Sr, Bm, X, Y
9–16	Mon A	L, C, R, Sl, Sr, Bm, X, Y
17–18	Mon B	L, R
19–20	Mon C	L, R
21–22	Mon D	L, R

The Cascade inputs support direct bus injection prior to the insert point into all monitor signal paths.

Solo Bus and Utility Patching

The Solo Busses sub-category in Console I/O supports custom patching into the stereo Solo Bus.

The Utility Sources sub-category includes the Oscillator output. The Utility Destinations sub-category includes the Slate In which must be patched to the Talkback mic feed from the Monitor Interface.

Talkback Signal Patching

The talkback mics are wired to the MC524 Monitor Controller and amplified to produce a single talkback signal. This analog signal must be fed into the system through an analog-to-MADI converter.

To send talkback to the busses, this signal must be patched to the Slate Input in the Utility Destinations subcategory of the Console I/O category. Note the analog-to-MADI converter input the talkback signal has been patched to and connect it to the Slate Input.

PatchNet Presets

Patches can be stored in PatchNet presets. The presets can be recalled from PatchNet, the Patches menu on the CM401T, or from the Event system. Presets are not specific to the Title or Mixer Model and are stored in the C:\eMix\system\RoutePresets.dat file on the System Computer. Preset recall is recorded in eTracer (logging).

- If one source and more than one destination is selected, the preset is stored as a *mult*.
- If the number of sources and destinations selected is not the same, a dialog appears stating Cannot Store Patch Presets.
- If only destinations are selected, they will be cleared regardless of what is patched.
- Storing a patch preset with nothing selected stores patches that are there but will not store empty patches.

Busses

Click the Busses tab at the bottom of the eMix window to display the Busses window. At the bottom left of the window, click either the Group or Mix buttons to configure the Group or Mix busses, respectively (figure below shows the Mix busses; next figure shows Group busses). Group and Mix busses differ in two ways:

- There are 16 Mix sections but only one set of Group busses.
- Mix sections have associated recorder playback returns.

Mix Bus Window with law palette

Group Bus Window

The letters at the far left of the Mix Bus Window denote the 16 mix sections. The letters “I” and “L” are omitted to avoid confusion with one another. Click the cell to the right of the letter to name the section. The number of busses available is indicated by the blue area (i.e., there are 32 busses). The gray area represents busses that are not available due to the present system configuration.

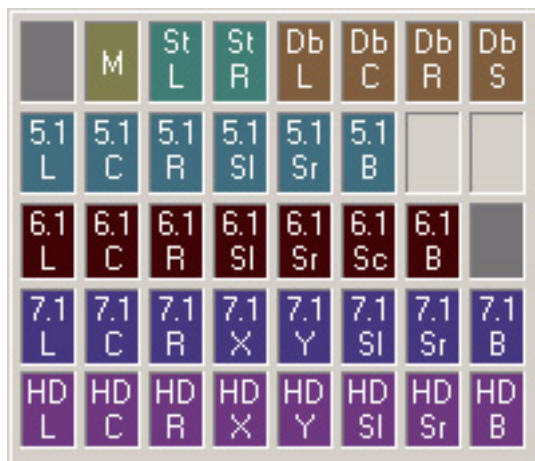
Click Clear All in the top left of the Sections-Busses grid in the Mix Bus Window to clear all Mix bus configurations.

Law Palette

The pan law determines how panning works and should be set to match the mix section’s format.

To set the pan law for a mix section:

- 1 Drag across the busses you want to configure.
- 2 Right-click any selected cell to display the Law Palette.



Law Palette

The possible formats are:

Symbol	Format
–	Remove an existing law from a bus
Mono	M
Stereo	L, R
Dolby Surround	L, C, R, S
5.1	L, C, R, Sl, Sr, B
6.1	L, C, R, Sl, Sr, Sc, B
7.1	L, C, R, X, Y, Sl, Sr, B
HD	L, C, R, X, Y, Sl, Sr, B

- 3 Select the desired pan law by dragging across the Law Palette and releasing the mouse when the cursor is within that Law.

Individual cells can also be assigned by right-clicking and selecting one entry at a time from a pan format. Right-click a format entry to cycle through the channels to reassign the order.

Externals

Click the Masters tab at the bottom of the eMix window. Click the Externals button at the bottom left of the window. Externals are configured like Mix and Group busses.

System

System 5 can be customized for each application. The number of channels, busses, and external inputs available depends on the Mixer Model and amount of processing in the DF66 (or DF70 Super Core, if used instead).

Given a number of processing cards, several different Mixer Models can be configured, each with different numbers of channels, mix and group busses, and aux sends. Mixer models are enabled in MM Pass, which is installed on the desktop with the eMix application installer. A system can be quickly and easily changed to a different channel and bus configuration by selecting an appropriate Mixer Model.

The DF66's number of the DSP Line Cards determines the amount of processing available to the system, which can be expanded up to six cards at any time. For the most powerful DSP, the DF70 has eight cards that yield 454 channels at 48 kHz, or 222 channels at 96 kHz.

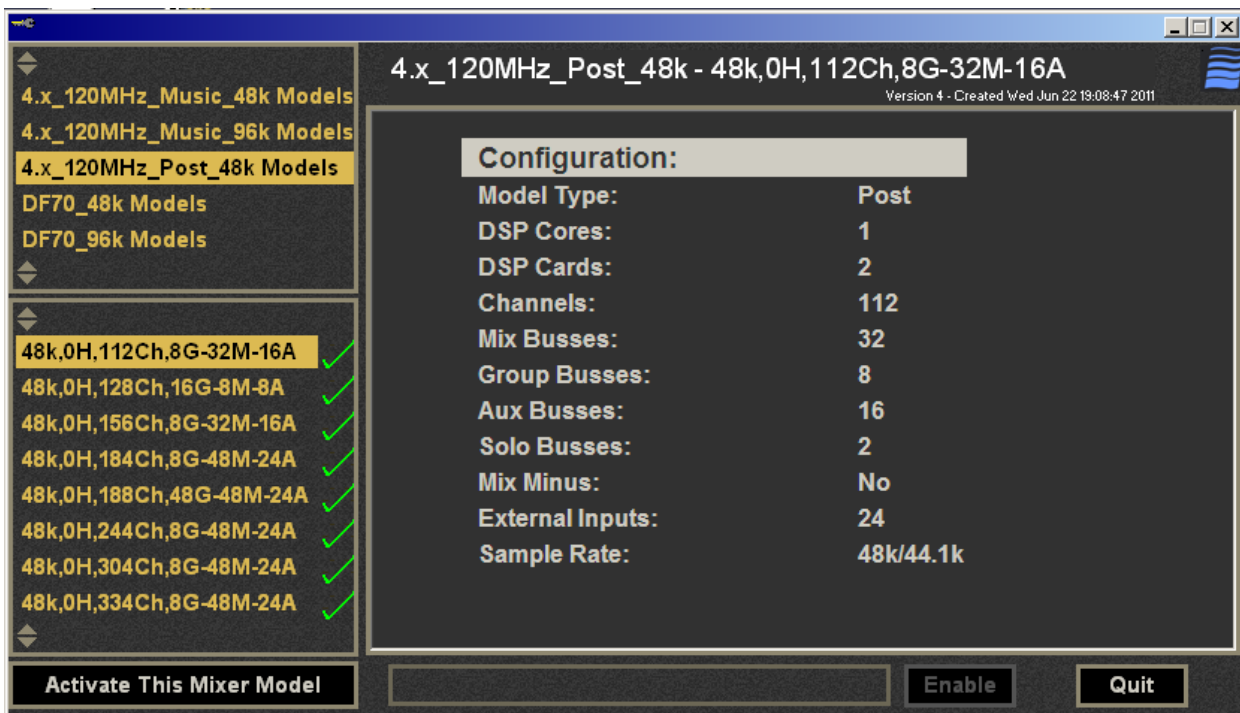
Mixer Model

Choosing a Mixer Model

The Mixer Models that support 96 kHz are intended for music applications requiring the highest digital sound quality (i.e., sources are analog or 24-bit/96 kHz). For lower resolution sources (i.e., 16-bit/44.1 or 48 kHz), a Mixer Model with a 44.1/48kHz sample rate is more suitable. For post-production and on-air broadcast, 48 kHz is a perfectly acceptable sample rate with adequate audio quality and twice as many channels as 96 kHz.

When choosing a Mixer Model, carefully consider the combinations of channels, mix and group busses, and aux sends required. For many applications (other than multiple-stem post mixing), the maximum number of mix busses used is six for a 5.1-channel Mix Section. Be careful to select enough aux sends: they always seem to get used up!

Changing the Mixer Model



Mixer Models

To change the mixer model:

- 1 Click the System tab at the bottom of the eMix Window.
- 2 From the list on the left of the System window, select the desired Mixer Model.

The name of the Mixer Model describes the sample rate, number of channels, and bus architecture. The central part of the window displays the hardware configuration required to run the Mixer Model selected.

- 3 If your system has the required hardware and this is the proper configuration, click Activate Mixer Model.
- 4 Click OK to restart eMix when prompted.
- 5 If the new mixer model has the same sample rate:

Power off the control surface and digital cores and reboot.

– OR –

Execute the steps in the next section.

Changing Sample Rate

Before changing the sample rate, activate a Mixer Model with the desired sample rate as described in the previous section.

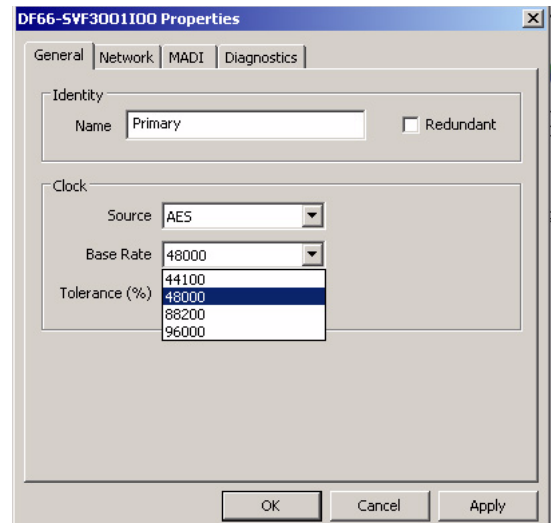
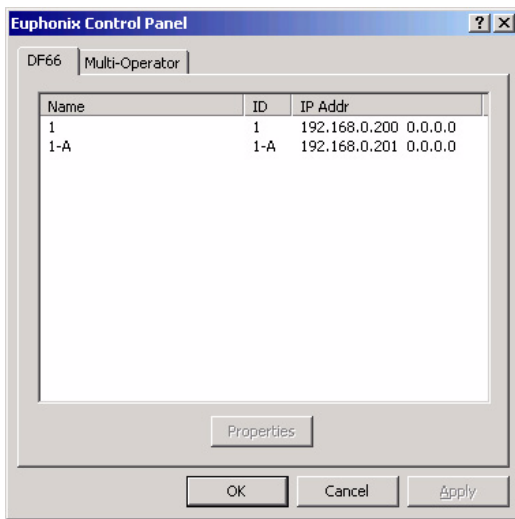
To change the sample rate:

- 1 Change the sample rate of the studio master digital sync generator.

This must be done before changing the Sync Source on the DF66 or DF70 Super Core.

- 2 Click on the Wave logo in the bottom left of the eMix screen, and click the Control Panel button.


The Control Panel appears.



Avid Control Panel (left) and DF66 SVF3001I00 Properties dialog (right)

- 3 Select the DF66 tab.
- 4 Select ID1.
- 5 Click the Properties button.
- 6 Select the desired sample rate from the Base Rate menu.
- 7 Click Apply, then click OK to return to Avid Control Panel.
- 8 If the system has a backup DF66, select ID1-A from the DF66 tab.
- 9 Click the Properties button to change its sample rate.

- 10 Select the new sample rate and click the Apply button to affect the change.
- 11 Click OK to close the dialog.
- 12 Power off the control surface and DF66(s) and reboot.

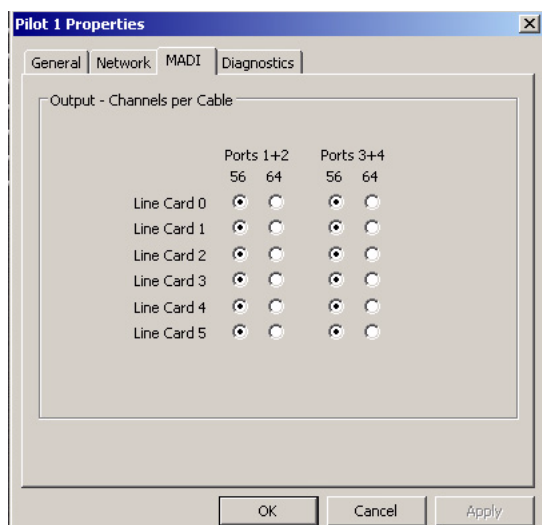
 To change to a Mixer Model not displayed in the eMix System Window, exit eMix and run the MMPass application (accessible from the Desktop). From the MMPass program, you can enable a Mixer Model so it shows up in the eMix System Window. You can also activate a Mixer Model so it becomes the active Mixer Model when eMix relaunches. We recommend selecting a Mixer Model that matches your DSP hardware configuration.

Changing the Number of MADI Channels

The MADI ports on the DSP Line Cards are set at the factory to 56 channels. To connect to a 64-channel device, the Line Card settings can be changed in the Control Panel.


To change the number of MADI channels:

- 1 Display the Control Panel (see preceding page).
- 2 Select the DF66 tab.
- 3 Select ID1 then click the Properties button.



DF66 Properties MADI tab

- 4 Click the MADI tab.
- 5 Find the port on the Line Card that the 64-channel MADI device is connected to, and change its setting to 64.
- 6 Click Apply to affect the change.
- 7 Click OK to exit the dialog.
- 8 If the system has a backup DF66 core, select ID1-A from the DF66 tab.
- 9 Click the Properties button.
- 10 Click the MADI tab and repeat steps 5–7.

 Changing the MADI channel setting on a Line Card affects its MADI ports in pairs. 56-channel MADI devices, such as the FC726 Format Converter, are not compatible with the Line Card at its 64-channel setting. This operation reboots the DSP Pilot app. If eMix is running, it will restart to synchronize.

Folddown

Click the Folddown tab at the bottom of the eMix window to display the Folddown window (see figure below). Folddown supports rules by which one monitor output format (Format In along the left) is played by a different format (Format Out on top). For example, to play a 5.1-channel mix in LCRS, the Boom channel could be attenuated 6 dB and mapped to all channels, and the SI and Sr mapped to the S channel without attenuation.

To maintain all audio information present in the original format, each Format In channel is usually mapped to some channels in the Format Out. However, this is not mandatory and there are some good reasons not to do so. For example, one might choose to omit the Boom channel because the speakers in the output format cannot handle bass below a certain frequency.

Click in any cell and type in the amount of attenuation (-17 to 0 dB) that the Format Out channel will undergo as it is routed to the Format In channel. Drag across multiple cells to enter an amount for all selected cells. Right-click selected cells to display a menu with two options:

- Clear: Clears values so no signal is routed.
- Default: Sets cells to their factory default values. This occurs even in a stored preset.

There are 24 presets available to store and recall different Folddown settings. The Recall Preset and Store Preset buttons are on the top right of the window.

The screenshot shows the Folddown window interface. At the top, there are buttons for 'Close All', 'Save All', 'New Mix', and 'Save Mix'. The title bar indicates 'Title: DKM' and 'Mix: Mix 01'. On the right, a timer shows '00:00:10:16' and 'FC 300 29.97 FPS'. Below the title bar are 'Recall Preset' and 'Store Preset' buttons. The main area is a grid with 'Format Out' channels as columns and 'Format In' channels as rows. The grid contains numerical values representing attenuation in dB. At the bottom, there are 'Folddown' and 'Control' tabs.

Folddown window with formats up to 7.1

Format Out

Recall Preset

Store Preset

Format In	7.1	7.1	7.1	7.1	7.1	7.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	HD	HD	HD	HD	HD	HD	HD	HD	
	X	C	Y	R	SI	Sr	B	L	C	R	SI	Sr	Sc	B	L	C	R	X	Y	SI	Sr	B
7.1 C		0.00							0.00							0.00						
7.1 Y			0.00						-3.00	-3.00						-3.00	-3.00					
7.1 R				0.00						0.00							0.00					
7.1 SI					0.00						0.00		0.00					-3.00		-3.00		
7.1 Sr						0.00						0.00	0.00						-3.00		-3.00	
7.1 B							0.00							0.00								0.00
6.1 L								0.00							0.00							
6.1 C		0.00							0.00							0.00						
6.1 R				0.00						0.00							0.00					
6.1 SI					0.00						0.00							-3.00		-3.00		
6.1 Sr						0.00						0.00							-3.00		-3.00	
6.1 Sc					-3.00	-3.00							0.00							-3.00	-3.00	
6.1 B							0.00							0.00								0.00
HD L								0.00							0.00							
HD C		0.00							0.00							0.00						
HD R				0.00						0.00							0.00					
HD X					-3.00			-3.00			-3.00							0.00				
HD Y				-3.00		-3.00				-3.00		-3.00							0.00			
HD SI					0.00						0.00									0.00		
HD Sr						0.00						0.00									0.00	
HD B							0.00							0.00								0.00

Folddown Control

Folddown window with additional formats

Diagnostics

When a system error occurs and the Diagnostics page is not displayed, the Wave logo and top-screen border flashes. Click the Wave logo at the bottom left corner of the main eMix screen to display the Diagnostics page.

If a control module shows an error condition:

1 Press its Reset button.

A dialog box appears requesting that you resynchronize the system.

The screenshot shows the Diagnostics window with the following data:

Module	Id	Boot	Status	Ack State
401	1-15	100%	Ready	OK
408	1-1	100%	Ready	OK
Pilot	1	100%	Ready	OK
Pilot	1-A	100%	Ready	OK
Pilot	VIF	100%	Ready	OK
SystemPC	1	100%	Ready	OK
408	1-2	100%	Ready	OK

Pilot : 1 192.168.0.200

DspPilot Information
Current Role: Standby

Dsp Card	HW Rev	FW Rev	Sync	Source	Status	Sample Rate
DspCard_0	0	35	Auto	AES	Locked	48000.4
DspCard_1	0	35	Auto	LVDS	Locked	48000.3
DspCard_2	0	35	Auto	LVDS	Locked	48000.9
DspCard_3	0	35	Auto	LVDS	Locked	48000.3
DspCard_4	0	35	Auto	LVDS	Locked	48000.3

DspCard_0


MADI #	Channels	Present	Sharc DSP #	Status	Used
0	56	1	1	Ok	96%
1	56	1	2	Ok	96%
2	56	1	3	Ok	96%
3	56	1	4	Ok	96%
			5	Ok	96%
			6	Ok	96%
			7	Ok	96%
			8	Ok	96%

DspCard_1

MADI #	Channels	Present	Sharc DSP #	Status	Used
0	56	1	9	Ok	96%
1	56	1	10	Ok	96%
2	56	1	11	Ok	96%
3	56	1	12	Ok	96%
			13	Ok	97%
			14	Ok	96%

Diagnostics window

2 Click Yes and the system will function normally again.

 *Ctrl+Alt+F12* disables the diagnostics system warning.

Masters

See Chapter 7, “Busses and Bus Masters.”

Conform

See Chapter 12, “Dynamic Automation (SSP Only).”

Events

See Chapter 13, “GPI/O Event System.”

System 5 Wave Logo


Click on the System 5 Wave logo in the bottom right of the eMix screen to display software version information and shutdown options.

Auto Failover

When Auto Failover is checked (enabled), and an actual or potential failure of the primary DF66 is detected by the diagnostics system, it switches the entire input audio path over to the backup DF66. Clicking on the Restore to Primary DSP button switches the entire audio path back to the primary DF66.

Control Panel

Click the Control Panel button to change the sample rate, sync sources, IP addresses, DSP card MADi channel configuration (56 or 64 channels), and Multi-Operator Status of the attached DF66 Super Cores. DF66 software versions can be displayed from the Control Panel, and a DF66 Restart button is provided.

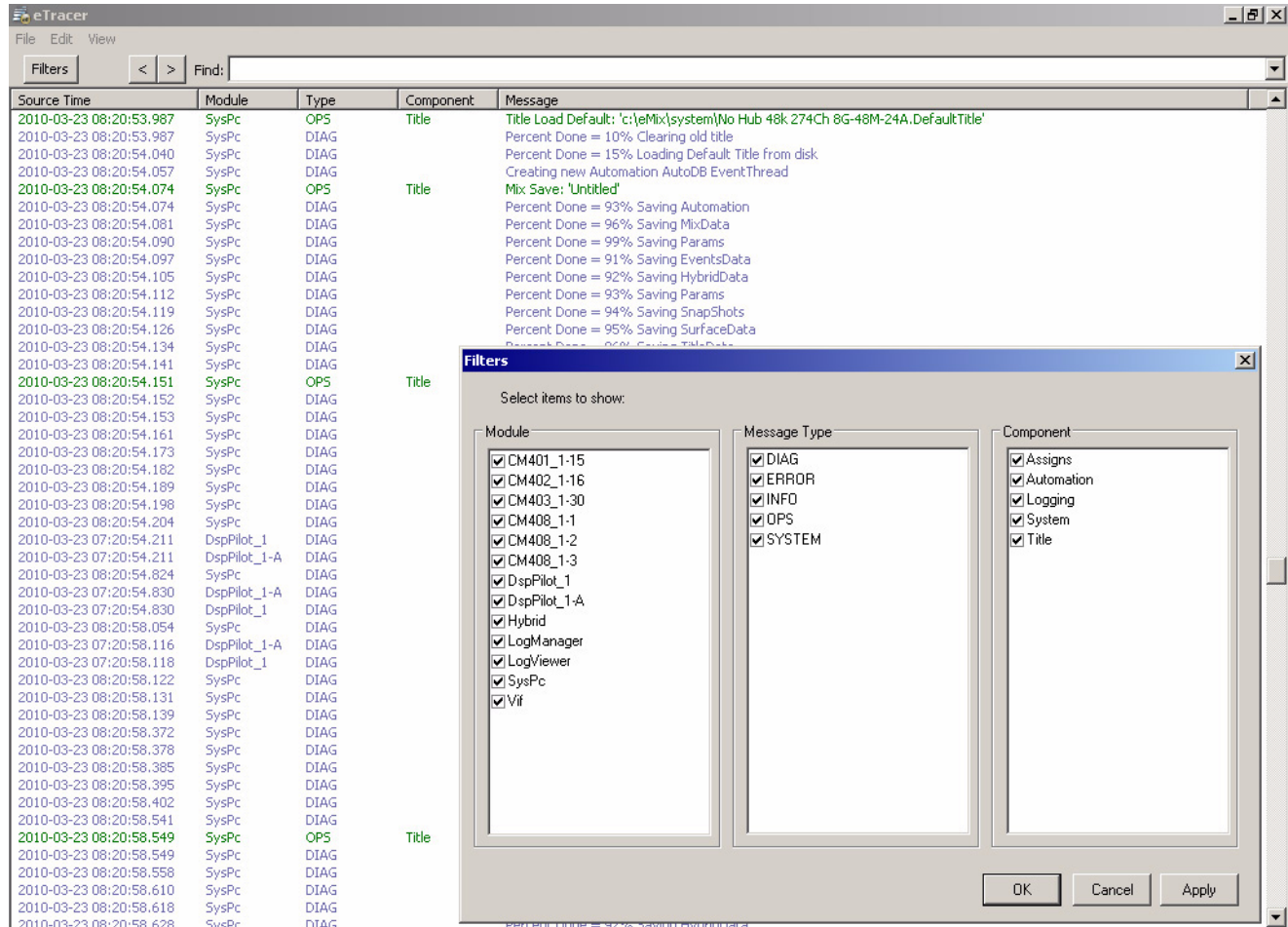
 See “Changing Sample Rate” on page 29 to learn how to change the console sample rate.

View Log

Click the View Log button to display the Diagnostic Log. Avid console network communication failures and recoveries are listed in the Diagnostic Log, along with the error status of other console components.

Console Operation Logging

The System Computer uses the eTracer application to view console information. Log files contain time-stamped descriptions of events pertaining to the console's software operations, including snapshot and layout recalls. These files are stored in the C:\eMix\log folder. A new file is created when the current file exceeds 2 MB. Log information can be filtered to display information for selected modules, message types, and components (see figure below).



eTracer application log

Part II: Master Facilities and Channel Strip

Chapter 4: CM401T Master Section

The CM401T Master Module controls master functions for Monitors, Communications, Solo, and Meters.



CM401T Master Module

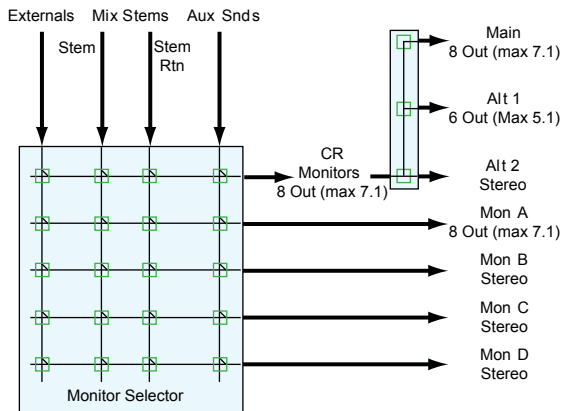
Monitoring

The System 5 monitor system accommodates multiformat outputs up to 7.1 channels.

There are seven monitor outputs (see figure below):

- Main Control Room and Mon A (7.1 max)
- Alt 1 (5.1 max)
- Alt 2, Mon B, C, and D route two busses (stereo)

Mon A, B, C, and D are used for SLS/Cue feeds.



Monitoring Matrix

Monitor output source selection can either intercancel (only one source to a monitor output), or sum (multiple sources). The Control Room monitor outputs can be *folded down* from their multichannel formats (see “Folddown” on page 31).

💡 *Group bus outputs are normally monitored on the Strips by assigning them to Mix busses, but can be routed using external inputs and PatchNet if they require direct monitoring.*

Monitor Source Selection

The sources for Mon A–D and Control Room outputs are selected using the Panel Viewer. Press the Mon A–D or CR Source buttons to display available sources (figure below shows the MonD Source Panel).



Monitor Controls and MonD Source Panel

Use the keys on the bottom of the Panel to select the source type: External (CD, VTR, etc.), Aux Sends, or Mix Sections. The current source type key lights and available sources within that type appear in the Panel. Press a key along the sides of the Panel to select a source. The active source key lights and the name appears in the LCD for that monitor output.

Sum or Intercancel

The Sum key is inactive (not lit) by default, which means that selecting a new source automatically cancels the previous one. When the Sum key is lit, multiple sources can be selected simultaneously. The Sum symbol appears to the left of the first source selected in the LCD in the monitor controls. After selecting multiple sources, pressing the Sum key again (so it is not lit) *does not* deselect these sources until a new source is explicitly selected.

Follow Control Room Monitors

Activate the FlwCR key so the Mon A–D outputs follow the source selected for the Control Room monitors.

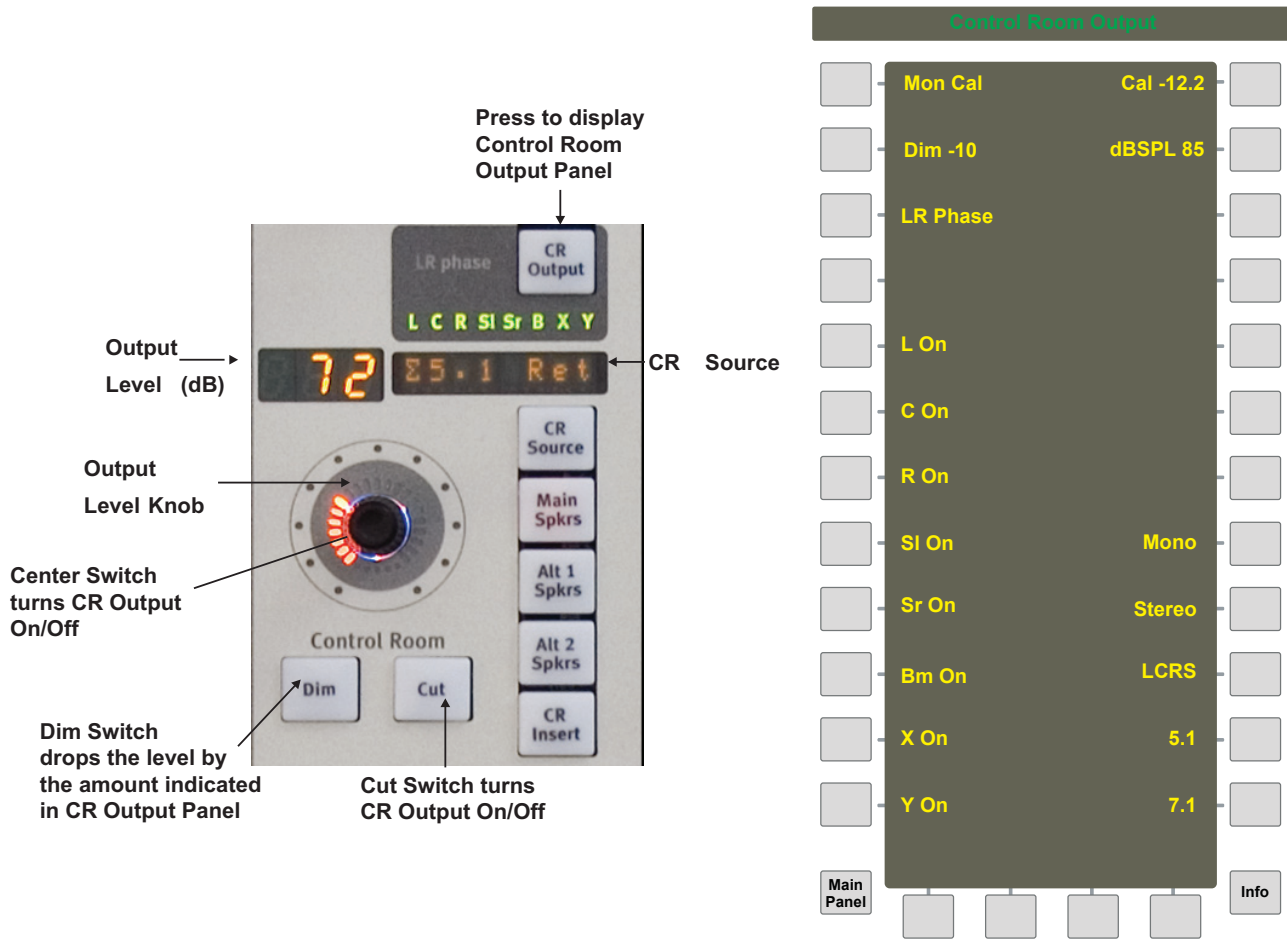
Mix Section and Aux Send Format

Each Mix section also has a return that supports Bus/Tape monitoring. The returns can be patched from the record machine's outputs using PatchNet (see "Mix Bus Send/Return" on page 25). It is not possible to select a Mix section and its return at the same time because they intercancel, even in Summing mode.

Aux Sends appear in the Panel as mono or stereo pairs.

Control Room Monitor Controls

Press the CR Output key above the CR Source LCD to display the Control Room Output Panel.



Output controls and Control Room Output Panel

Dim and Cut

The Dim level can be set in the Control Room Output Panel by pressing the Dim key on the panel viewer and using the Spin Knob to adjust the level. This is the reduction in level (dB) that occurs when the Dim switch is active. The Dim level can also be set by turning the Output Level Knob when Dim is active.

The Control Room Monitors may be switched off/on by pressing the output level knob's center switch or the Cut switch.

Monitors A–D may be switched off/on by pressing the output level knob's center switch. They are off when their output level knob's center LED is not lit.

Cut Individual CR Speakers

The Control Room speakers can be individually switched on and off. The L, C, R, Sl, Sr, Bm, X and Y keys in the Control Room Output Panel are lit when on. In addition, the LEDs above the CR Source LCD light to show active speakers.

Mon Lock

The Mon Lock key on the Bus Master Strip disables the Control Room and Monitor levels. Dim and Cut always remain active.

Phase Reversal for Left and Right CR Speakers

The phase of the left Control Room speaker (Main, Alt1, Alt2) can be reversed by selecting the LR Phase key in the Control Room Output Panel for that output. The LR Phase key lights to indicate the left speaker's phase is reversed with respect to the right. The LR Phase LED to the left of the CR Output key also lights.

CR Level


The Control Room speakers (Main, Alt1, Alt2) have a dedicated level knob and output level LCD. The knob LEDs also indicate the current level.

CR Speakers

The Control Room Monitors have three speaker outputs: Main (7.1), Alt1 (5.1) and Alt2 (stereo). The three switches below CR Source select between the three speakers; these switches are *after* the CR level, dim, and cut functions which affect all three speaker sets.

CR Format Folddown

The Main CR outputs may be folded down from their original format to one with fewer outputs using the keys on the right of the Control Room Output Panel.

 See "Folddown" on page 31.

Control Room Insert

This feature supports insertion of a Surround Matrix, equalizer, or compressor across the control room monitors. Activate the CR Insert switch at the bottom of the CR Output controls.

Calibrated CR Level Controls

Cal Level

The CR level can be set to any true dB value, in the range -30–0 dB, by pressing the Cal button (top right) on the Control Room Output Panel) and using the Jog wheel. The Monitor knob in the CR Output controls can also be used to change the value.

This value persists when rebooting the console and/or loading a new Title.

dB SPL Level

The relative dB SPL value displayed for the Monitor knob can be set by pressing dB SPL button (second from top right) on the Control Room Output Panel and using the Jog wheel to set a value in the range 65–115 dB (integer values only). This is a relative dB SPL value of the actual gain set by Cal Level above. This value, always calculated from the actual level using these values as a reference point, is displayed on the CR Output Controls LCD. For example:

If Cal Level = -10.0 dB and dB SPL = 85, the knob values are in the range 0–95 (85 = -10).

If Cal Level = -0.0 dB and dB SPL = 115, the knob values range from 0–115 (85 = -30, console default).

This value persists when rebooting the console and/or loading a new Title.

Fixed Level Function

The Mon Cal mode can be enabled by pressing the top left button on the CR Output panel so it lights. This turns off the CR Output Control's Monitor knob indicators, showing that the knob no longer functions as a control. The Monitor level is set to the Cal Level discussed above and is displayed in dBSPL.

This value persists when rebooting the console and/or loading a new Title. Dim and Cut operate normally.

SLS/Cue Monitor Outputs

Mon A–D are usually used for SLS and Cue feeds. Each has its own level control and LCD that shows the source and level when adjusted. The center knob switch turns the monitor on/off. These controls are shown on the left of “Monitor Controls and MonD Source Panel” on page 41.

Communications

System 5's communication system includes:

- Two talkback microphone inputs (one mic included)

Each input has 111 dB gain, phantom power, and compressor. They can be mounted anywhere, but normally, Tbk1 is mounted near the engineer and Tbk2 near the client. Talkback can be routed to Mon A–D, the Aux busses, and the Mix sections (via the Slate function). Tbk2 shares the same routing as Tbk1 when it is turned on. Talkback can be remotely triggered to Mon A–D.

- Four listenback mic inputs

Each input has phantom power and compressor. They can be routed to the monitors, and have individual level controls. They are routed directly from the Monitor Interface (MC524) so they do not appear in PatchNet.

- Oscillator with Slate facilities

The oscillator has four fixed frequencies (100 Hz, 440 Hz, 1 kHz, 10 kHz), and a user-selectable frequency. The oscillator can also generate pink or white noise. The oscillator can be routed to the Group, Aux, or Mix busses, or to all busses simultaneously. The Slate function combines Tbk1 and Tbk2 with the user definable tone to identify takes.

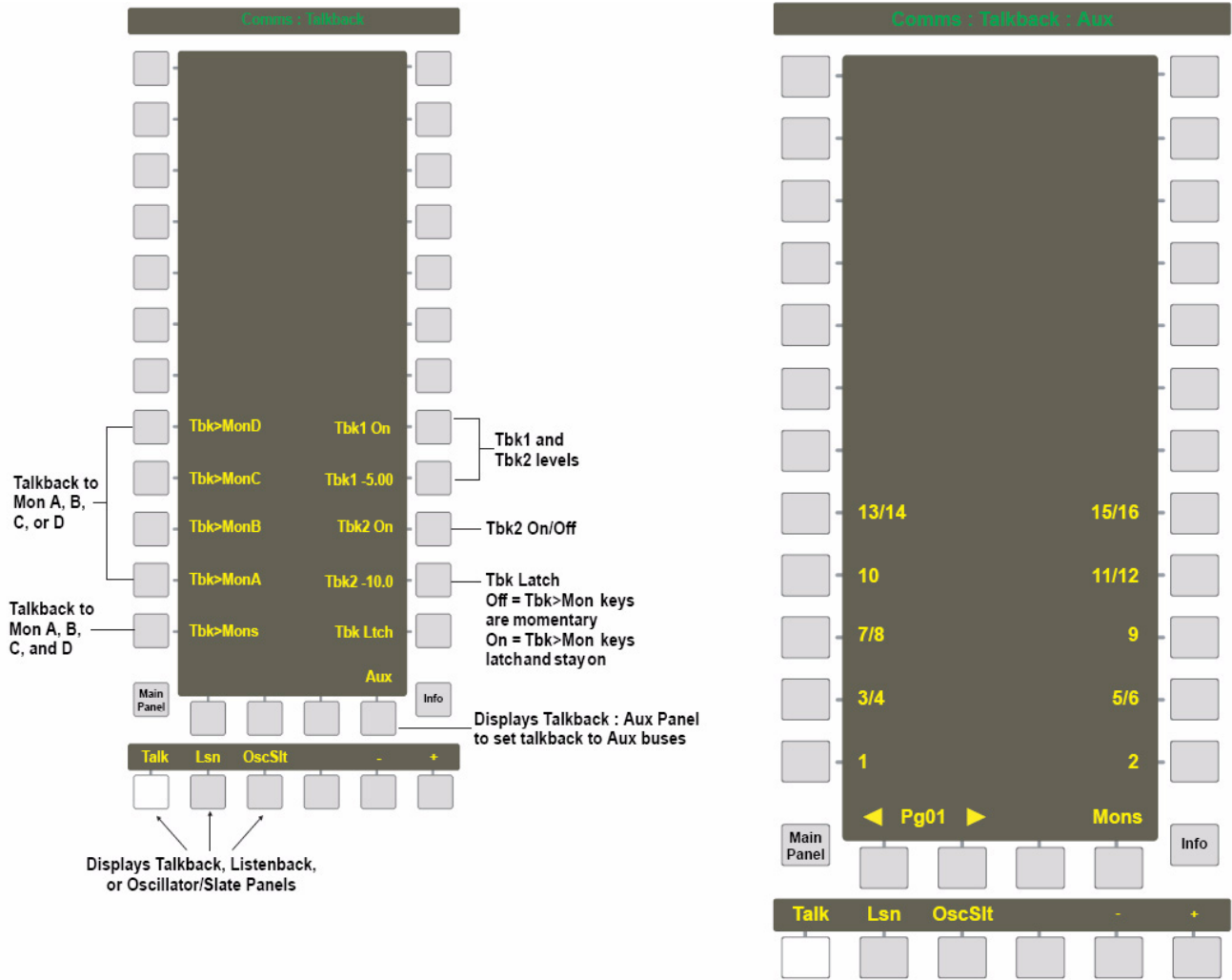
Pressing the Comms Ctrl key in the Solo Ctrl section displays the Comms:Talkback Panel (left of figure below).

The bottom of the Panel has Talk, Lsn, and OscSlit keys to display Talkback (shown), Listenback (page 46), and Oscillator/Slate Panels (page 47), respectively.

Pressing the Aux key at bottom right displays the Comms:Talkback:Aux Panel (right of figure below), which sets the talkback settings for the Aux busses. When displaying the Comms:Talkback:Aux Panel, this key changes to Mons, which switches back to the Comms:Talkback Panel (left of figure below).

Talkback

Press the Talk key at the bottom of the Comms:Talkback Panel to display the Comms:Talkback Panel.



Comms:Talkback Panels

Monitors


Tbk1 and Tbk2 (if Tbk2 On is lit) can be routed to Mon A–D by pressing the Tbk>MonX keys on the left of the Comms:Talkback Panel. These keys are momentary unless Tbk Latch is active, in which case they are toggled on/off each key press. More than one monitor can be active by pressing multiple keys and all can be active by pressing the Tbk>Mons key.

Talkback is not routed to the Control Room speakers but the Main CR speaker and the monitors receiving talkback are dimmed by the level set for the DIM key (see “Dim and Cut” on page 42).

Set the Tbk1 level by activating the Tbk1 xx.x key and using the SpinKnob to adjust the level. Use the same process for Tbk2. Tbk1 is always on but Tbk2 must be turned on by activating the key below Tbk2 xx.x level.

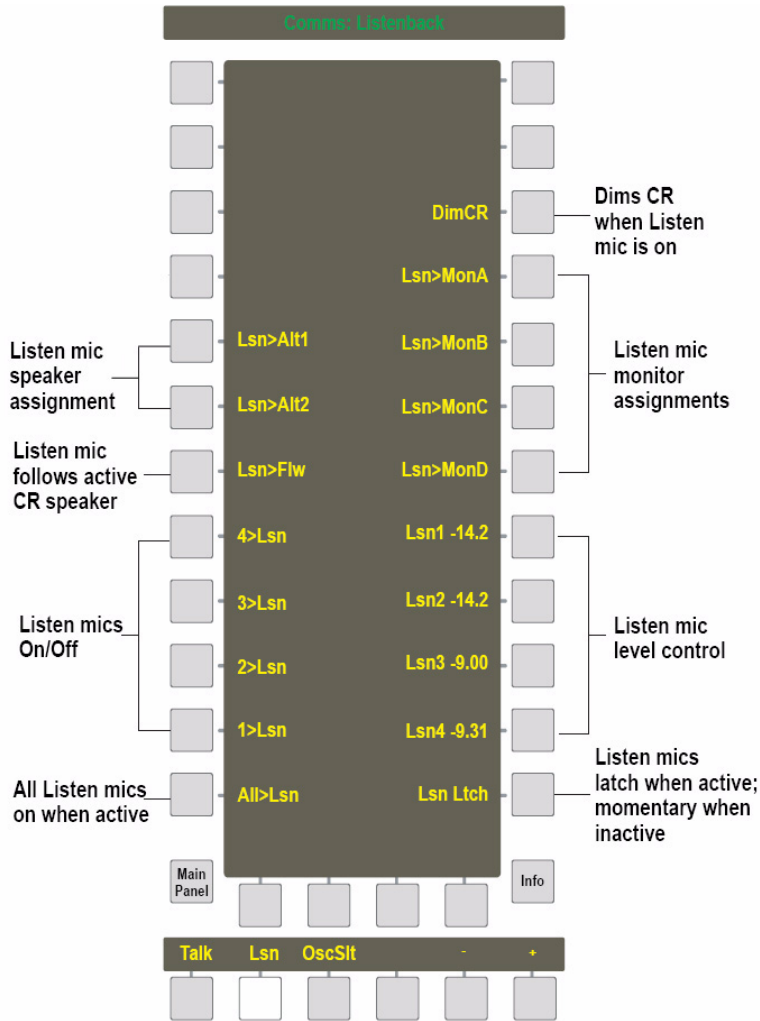
Aux Busses

Press the Aux key at bottom right of the Comms:Talkback Panel to display the Aux busses. The same rules apply to the Aux Busses as monitors. Select the Aux Busses (single or pairs) to route the talkback signals. They latch, or are momentary based on the Tbk Latch setting, and their levels are set on the Mons page.

 *The talkback signal must be patched to be routed to the Aux Busses. See “Talkback Signal Patching” on page 24.*

Listenback

Press the Lsn key at the bottom of the Comms:Talkback Panel to display the Comms:Listenback Panel.



Comms:Listenback Panel

The listen mics can feed any combination of the CR Main, Alt1, Alt2, or Mon A–D speakers by activating their keys on the top half of the Panel. Activate Lsn>Flw to route the listen mics to the active CR Speaker.

Activate the DimCR key to dim the CR Speaker by the level set for the DIM key when the listen mics are on (see “Dim and Cut” on page 42).

Turn the listen mics on/off by pressing the 1>Lsn – 4>Lsn keys on the left of the Panel. Turn all listen mics on/off by pressing the All>Lsn key. The on/off keys are momentary unless Lsn Ltch is active.

Set the listen mic levels by pressing one of the Lsn1 – Lsn4 xx.x keys on the right of the Panel and using the SpinKnob to set the level.

Oscillator/Slate

Oscillator

Press the OscSlt key at the bottom of the Comms:Talkback Panel to display the Comms:Slate/Osc Panel (see figure below).

Turn the oscillator on by activating the Osc>On key. Select the oscillator type by pressing the Osc>Sine, Osc>White, or Osc>Pink keys on the top right of the Panel. These keys intercancel so only one type can be selected at a time.

Select the oscillator frequency by pressing the Osc>100Hz, Osc>440Hz, Osc>1kHz, or Osc>10kHz keys on the left of the Panel. In addition, there is a user-selectable frequency key below the Osc>10kHz key. Activate this key and use the SpinKnob to set the frequency (20 Hz to 21 kHz). All frequency keys intercancel.

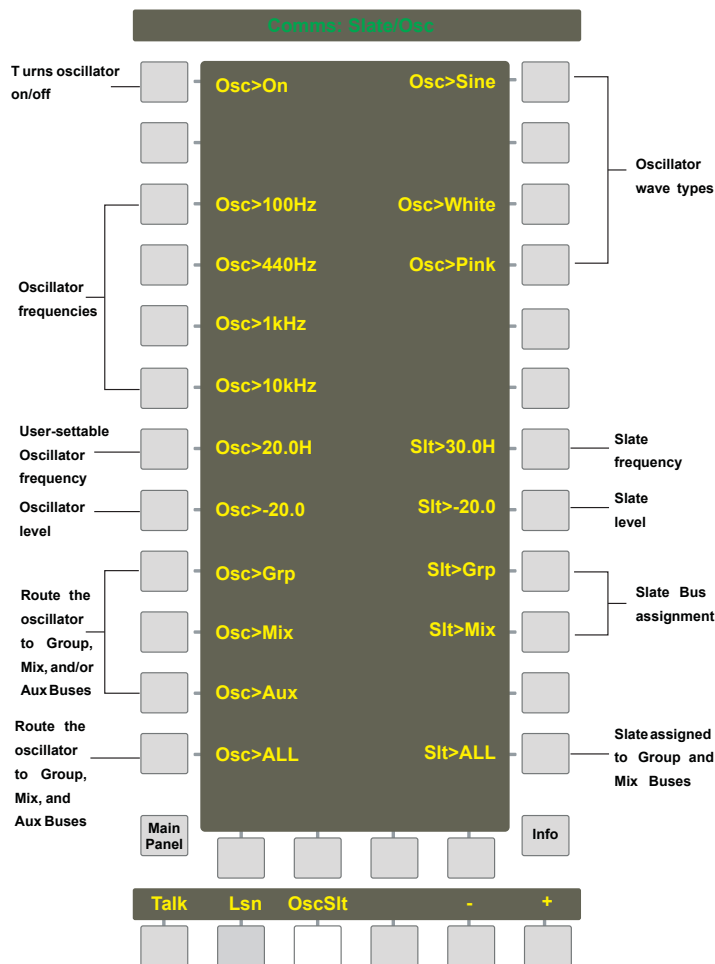
Set the oscillator level by activating the Osc>xx.x key (above Osc>Grp), and using the SpinKnob (111 dB of gain).

Slate

Set the Slate frequency by activating the Slt>xx.xH key and using the SpinKnob. Set the Slate level by activating the Slt>xx.x key and using the SpinKnob (111 dB of gain).

The Slate input is in Patchnet > Console I/O > Utility Destinations.

Activate the Slt>Grp and Slt>Mix keys to route the Slate to Group and/or Mix Busses, respectively. Activate the Slt>ALL key to route the Slate to Group and Mix Busses.



Comms:Slate/Osc Panel

Quick Access Communications Panels

The Quick Access Panel, located below the CR Level area, accesses the most commonly used Communications parameters without using the Panel Viewer. Use the buttons above the panel to display Quick Access Panels for general Communications, Talkback, Listen, and Slate/Osc.



Quick Access Communication Panels

Solo

System 5 has an extensive solo control system that is accessed from the center section. Press the Master Solo section's Solo Ctrl switch to display the Solo Panel.



Master solo controls (left) and Solo panel (right)

Solo Mode

Three Solo modes can be selected by pressing their respective switches in the Solo Panel. Selecting one mode automatically deselects the previous mode.

- APL (After-Pan Listen): Signal is post-fader and pan (stereo)
- PFL (Pre-Fader Listen): Signal is pre-fader in mono
- SIP (Solo-In-Place): This mode supports Solo channels through to the mix busses. All channels not soloed are muted but not channels designated Solo-Safe (page 50). This mode supports monitoring soloed channels with panning and effects if the effects returns have been designated Solo-Safe. We do not recommend this destructive solo mode for live broadcast or for recording a mix or dub.
- Film Mode: This mode switches any mix busses in playback to bus so an SIP solo can be heard.

Solo Level

The Solo knob controls the solo level (APL and PFL modes) sent to the speakers or the Solo Output in PatchNet. The level is indicated on the LEDs surrounding the knob. The knob's center LED flashes when a channel is soloed.

Solo Clear

All solo channels can be cleared using either of these methods:

- Press the Solo Knob Top switch.
 - or –
- Press the Clear key on the bottom right of the Solo Panel.

Intercancel, Momentary, and Sum

The Solo keys on the Strips *sum* by default: the Sum key in the Solo Panel is illuminated when first displayed. This means multiple channels can be soloed by pressing additional Solo keys; they must be explicitly cleared. There are two other options available in the Solo Panel that control the Solo key:

- Momentary: The Solo key must be held down but multiple channels can be active at a time.
- Intercancel: Pressing each new Solo key clears the last solo channel and activates the new one.

Solo Speaker Selection

The APL and PFL solo signals can be routed to the following speakers by activating their respective keys in the Solo Panel:

- Solo>None: The Solo signal is not sent to a speaker but can be routed using PatchNet.
- Solo>Alt1: The Solo signal is sent to the Alt1 speaker.
- Solo>Alt2: The Solo signal is sent to the Alt2 speaker.
- Solo>Flw: The Solo signal follows the active control room speaker selection (Alt1 or Alt2).

Solo Speaker Dim

In APL and PFL modes, pressing the Solo Panel's DimCR key dims the speakers not fed by the Solo signal.

Solo-Safe

Solo-Safe is used with the SIP mode; it has no effect in APL or PFL modes. SIP mode effectively mutes all channels except the soloed channel. Designating a channel Solo-Safe sends it through to the mix busses even when another signal is soloed. Solo signals can be heard with effects if the effects returns are designated Solo-Safe.

To make a channel Solo-Safe:

- 1 Press the Solo-Safe key in the Solo Panel.
- 2 Press the Chan Select key of the channel to make Solo-Safe.
The Chan Select key flashes to show it has been made Solo-Safe. The channel's Solo key also lights dimly when in Solo-safe mode.
- 3 Press additional Chan Select keys.
- 4 Press the Solo-Safe key again or another Solo Panel key to exit the mode.

Backstop PFL

Each System 5 fader has a backstop PFL switch past the bottom of its travel.

To activate and use Backstop PFL:

- 1 Press Solo Ctrl on the Center Section.
The Solo Panel appears.
- 2 Select Backstop PFL to enable this feature.
- 3 Pull and hold a fader past the bottom of its travel to route the signal's PFL level to the Solo bus.
- 4 Release the fader to cancel its routing to the Solo bus.

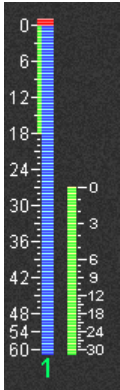
Backstop PFL does not affect normal solo operations and can be used on Control Group and Multi Format master faders to PFL a group of channels.

- 5 Deactivate Backstop PFL in the Solo Panel to cancel the mode.

Meters

The System 5 meters are displayed on the TFT screen at the top of each Strip. Each Strip's meter can be independently set and can measure:

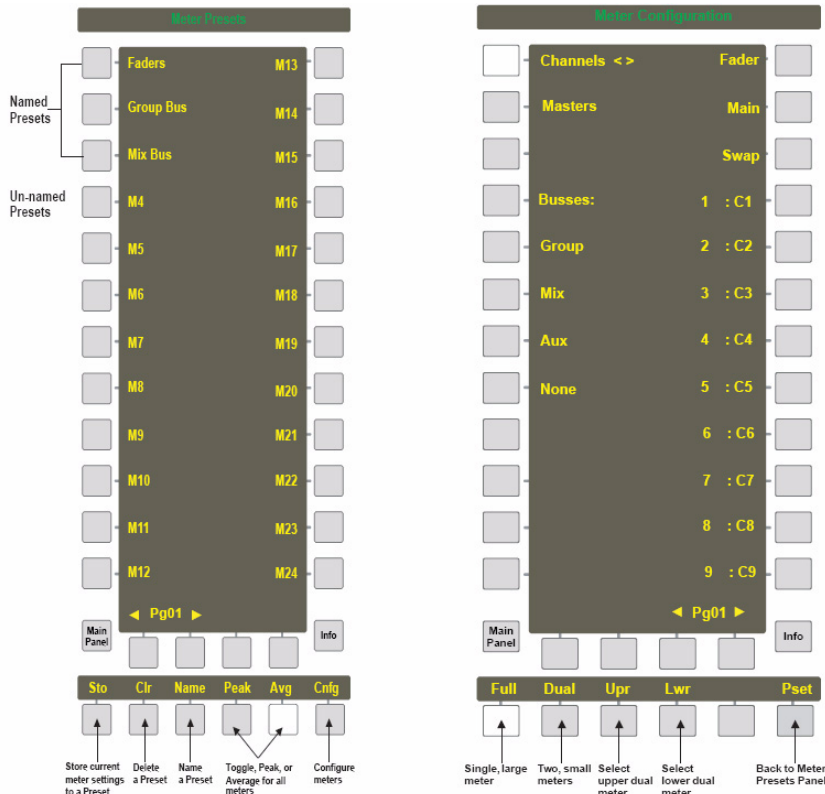
- Channel: The fader, Swap, Main, or any channel, even one not assigned to that Strip can be metered. There is an option to display two meters that track different information. When displaying one meter, the dynamics gain reduction is shown to the right of the channel meter (see figure below).
- Group, Mix, Aux: Any Group, Mix, or Aux Bus.



Channel meter with dynamics gain reduction meter on right

Meter Presets and Configurations Panels

From the Main Panel, press the Meters switch to display the Meter Presets Panel (left figure below). Twenty four meter presets can be stored and recalled via the Meter Presets Panel. Before creating presets, configure each Strip's meters.



Meter Presets and Meter Configuration Panels

Meter Configuration

Press the Cnfg key at the bottom of the Meter Presets Panel. The Meter Configuration Panel appears (right of figure above). By default, the Full key (bottom-left) is lit, which selects one large meter; the Channel key is also lit, which displays the Channel options along the right side of the Panel. The double arrows to the right of Channel mean that the right side displays Channel options. For example, press Group to display Grp 1, Grp 2, etc. along the right side and the arrows appear opposite Group.

Each Strip can have a different meter configuration but it is also easy to assign the same configuration to consecutive Strips (with automatic incrementing).

To select one meter:

- 1 While displaying the Meter Configuration Panel, press Strip 1's Wave key.
- 2 Press the Full key from the bottom row to select one large meter.
- 3 Select Channel as the signal type for Strip 1's meter from the options on the left side of the Meter Configuration Panel.

The right side of the figure above shows the relevant Channel options. Group, Mix, and Aux have different options.

- 4 Select Fader, Main, Swap, or Ch # to assign the signal to meter.

Fader: Meter measures whatever the fader controls (i.e., the active Swap/Main channel). Despite the name, the signal is measured pre-fader.

Main: Meter measures the Main channel even when Swap is active.

Swap: Meter measures the Swap channel even when Main is active.

Ch #: Meter measures the assigned channel even if it is not assigned to that Strip.



It is most common to meter the Fader, Main, or Swap signals. The TFT meter and fader meter follow the meter source point as set in the path order. See "Channel Process Order and Patch Points" on page 74.

To select dual meters:

- 1 From the Meter Configuration Panel, press Strip 1's Wave key.
- 2 Press the Dual key from the bottom row to select two, small meters.

The Dual and Lwr keys light.

- 3 Press the Channel key on the left.
- 4 Press the Fader key on the right.

The lower meter now measures the signal applied to Strip 1's fader.

- 5 Press the Up key to set the upper meter's options.
- 6 Press the Group key on the left side.

The double arrows move down to appear opposite Group. The options change along the right side to Grp 1, Grp 2, etc.

- 7 Press the Grp 1 key on the right side.

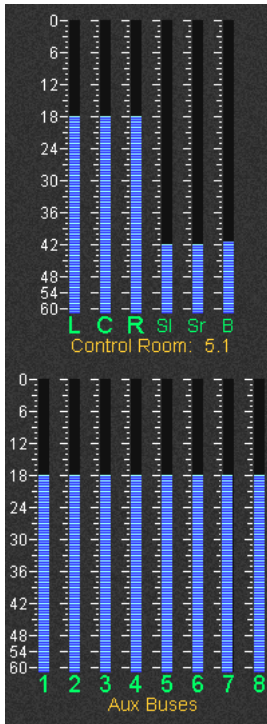
Strip 1's upper meter now measures the Group 1 Bus.

To select the same meter configuration for multiple Strips, press another Strip's Wave key after configuring the first Strip. Because each meter's signal is automatically incremented by one, set the lowest numbered Strip first and then set additional Strips consecutively. For the dual meter example above, pressing Strip 2's Wave key assigns Group Bus 2 to the upper meter and Strip 2's fader to the bottom meter. If Strip 3's Wave key was pressed instead of Strip 2, Group Bus 2 would still be assigned to Strip 3's upper meter.

Master Section Meters

The TFT screen above the center section shows two meters. The upper meter automatically shows the selected monitor output format. For example, if the Control Room monitors Mix Bus A and it is a 5.1-channel format, the meter automatically displays 5.1 channels.

The lower meter automatically displays whatever is currently assigned to the Bus Master Strip: Aux, Mix, or Group Masters, Mon A, B, C, D, or Solo Master. The meter displays the eight meters corresponding to the Bus Master knobset. If there are more than eight masters, use the ◀▶ keys on the Bus Master Strip to change pages. For example, if Group Bus Masters 9–16 are on the knobset, the meters display these automatically. Press the Mon A–D Source or the Solo Ctrl switches to meter these signals on the lower meter.



Master section meters showing 5.1-channel CR and Aux Busses 1–8

Chapter 5: CM402T Expanded Channel Module

The CM402T module (see figure on next page) is located to the left of the CM401T Master Section that contains the Center Strip. The CM402T expands access to Strip functions, so they are more readily available than from their normal Strip.

The CM402T includes the following functional sections, from top to bottom:

- Bus Routing and Track Arming Panels

See “Bus Routing Panel” on page 60 and “Track Arming” on page 106.

- Aux, Input, and Filters knobsets with Select Panel

The Select Panel determines which Center Strip channel functions are displayed on the knobsets.

- Dynamics and EQ knobsets

The Center Strip channel’s dynamics and EQ are always displayed on these knobsets.

- Channel Select Panel

- Eight assignable Strip faders

These are traditionally used for Control Groups but any channel can be assigned using the same techniques used to assign a Strip on the CM408T.

Any console Strip channel can be displayed on the Center Strip by pressing its Wave key. The Channel Select Panel can also assign channels to the Center Strip.

Assigning a Strip to the Center Strip has the following implications for the original Strip:

- Reassigning the Swap or Main channels on the original Strip is *not* reflected in the Center Strip.
- Reassigning the Swap or Main channels on the Center Strip is *not* reflected in the original Strip.
- The original Strip can still control its functions.



CM402T Expanded Channel Module

Channel Select Panel



Channel Select Panel

The Channel Select Panel provides easy physical access to any channel or Control Group in your System 5 configuration. It defaults to displaying the first 32 channels, each with a four-character LCD, ON/Solo, and Channel Select keys.

- The Page keys display additional channels in groups of 32. If the Scroll key is lit, the Page keys display one new row of channels (eight) instead of 32.
- The right key beneath each channel's LCD assigns that channel, Control Group, or Master to the Center Strip, replacing the channel in the active layer (Swap or Main). This key functions identically to a CM408T Strip's Wave key.
- The Number key toggles between displaying the channel, Control Group, or Multi Format Master number (key is lit) and the name.
- The Group key toggles between displaying channels and Control Groups (key is lit).
- The Masters key toggles between displaying channels and Multi Format Masters (key is lit).

The global ON and Solo keys on the bottom of the panel determine whether the left key on each channel's controls performs an On/Off or Solo function. The ON and Solo keys intercancel: they cannot be lit simultaneously:

- If ON is lit, the key turns the Control Group or Channel On/Off.
- If Solo is lit, the key Solos the Control Group or Channel.
- If both are unlit, the key has no effect.



The Wave key at the far right of the Channel Select Panel is not functional.

Copy, Paste, and Clear

To copy:

- 1 Select the channel to copy by pressing its Wave key.
That channel is attentioned to the CM401T.
- 2 Press and hold the Copy key.
The Copy key lights red.
- 3 Select the channel to copy again on the CM402T and release the Copy key.
All other channels on the CM402T dim, and the Copy key flashes.
- 4 Select a function, multiple functions or the entire channel.

To paste:

- 1 Press and hold the Paste key.
- 2 Select a function or channel to paste to.

To clear:

- 1 Press and hold the Clear key.
- 2 Select a function or channel to clear.

⚠ Use the Clear operation with caution. Data is not copied during a Clear operation.

Knobset Panels



Center Panel knobsets

The Center Section's knobsets extend access to the Center Strip's functions. The two panels (12 knobs each) above the Channel Select Panel are dedicated to dynamics (left) and EQ (right). The two panels (eight knobs each) above the Knobset Control Panel display different combinations of Aux, Input, and Filters depending on the preset selected from the Knobset Control Panel.

Knobset Control Panel

The Knobset Control Panel configures the knobs above the panel and which pages of Dynamics and EQ appear below it. The Input and Aux functions have configuration pages which can be accessed by pressing both **cfg** ◀▶ keys simultaneously (see “Channel Functions” on page 77 for details about configuration pages). The LCD in the center of the panel shows the current Center Strip channel.



Knobset Control Panel

The Knob Values key toggles the knob’s LCD between the parameter name (unlit) and the parameter value (lit). The LCD always displays the value when the knob is adjusted, but reverts to the name unless Knob Values is lit.


The five Preset keys (P1–P5) configure the two panels of eight knobs above the Knobset Control Panel. The current preset key remains lit and the top two (right and left) LCDs show the selected functions. The bottom two LCDs are fixed at Dynamics and EQ.

Center Panel Knobset Presets

Preset #	Left	Right
1	Aux	Filters
2	Aux	Input
3	Input	Filters
4	Aux	Aux
5	Input	Input


The Select switch punches in the knobset during automation, or selects it for inclusion in a Snapshot. The In key switches the function In (lit) and Out (unlit). The switch to the right of the In key is the Select/Punch for the In key.

All knobset functions and displays are discussed in “Channel Functions” on page 77.

 *The Store P and Assign Knobs switches are not currently operational.*

Bus Routing Panel

This panel shows the Group and Mix Bus routing for channels assigned to the Center Strip. The Rec Ready, Route Grp, Route Mix, and Route Section switches, on the bottom of the panel, determine what is displayed and controlled. These switches intercancel: only one can be lit and active at a time. The Pan To: GRP Busses and MIX Busses keys switch pan in/out for the Group and Mix Busses.

 *The Reverse Route switch is not currently operational.*



Bus Routing Panel

Route Grp

- All 48 switches indicate Group Bus routing.
- The green number LEDs light to indicate the available busses.
- The switches light to show that the Center Strip channel is routed to that Group Bus.

Route Mix

- All 48 switches indicate Mix Bus routing.
- The green number LEDs light to indicate the available busses.
- The switches light to show that the Center Strip channel is routed to that Mix Bus.

Route Section

This is the default mode of operation. The top two rows indicate Group Bus routing. The bottom row is for the 16 Mix Busses.

Rec Ready

This mode supports track arming up to 48 recorder tracks.

Chapter 6: Channels and Strips

Strips

A CM408T module contains eight identical Strips, each with independent Main and Swap channels. The Strip is the console's physical control area that contains switches, knobs, displays, and a fader. The figure below shows a Strip, its displays that appear on the meter bridge above the channel, and block diagrams for the Swap and Main channels.

System 5 has several innovative, efficient methods that manage channel-to-Strip mapping and channel settings:

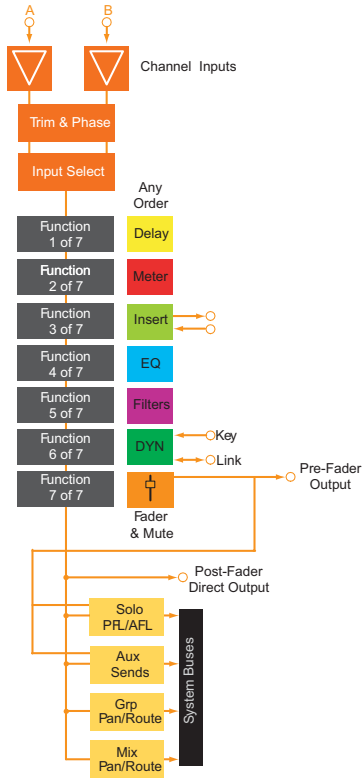
- Any channel can be assigned to any Strip, and assignments need not be consecutive.
- Two Strips can control one channel, so two users can simultaneously operate that channel.
- Channels with related functions (i.e., individual drums, drum submixes) can be assigned to neighboring Strips.
- Channel-to-Strip mappings can be named, stored, and recalled as Layouts (see "Layouts" on page 113).
- Channel settings can be named, stored, and recalled as Snapshots (see "Snapshots" on page 116).

A 48-Strip/96-channel configuration could map all channels to the control surface:

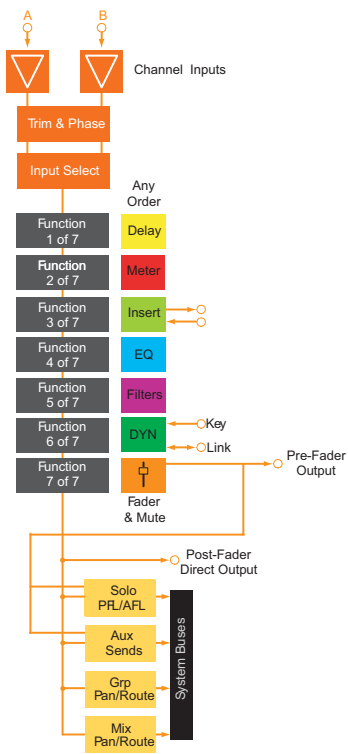
- Main (channels 1–48 to Strips 1–48)
- Swap (channels 49–96 to Strips 1–48)

A 24-Strip/96-channel configuration cannot map all channels to the console at once but could use two Layouts to easily interchange all channels.

Swap Channel



Main Channel



Meter and Status Display



The Strip with block diagram for Main/Swap channels and meter/status display

Map Channels, Control Groups, and Busses to Strips

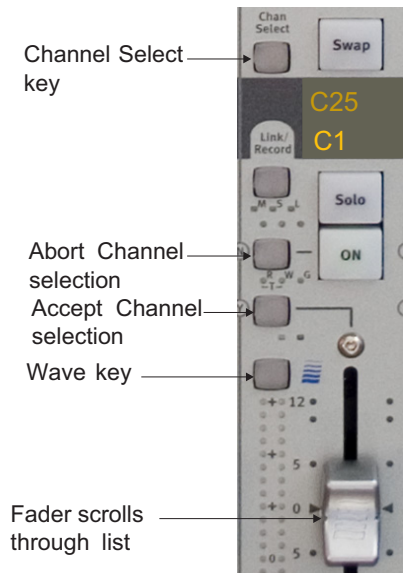
Each Strip can control a Main and Swap channel. One or both of the channels can be a Control Group or Bus instead of a normal channel. Channels can be assigned individually using the Strip controls or to multiple Strips using the Channel Assign Panel (page 64) or Bus Assign Panel (page 65).

Individual Assignment: Strip Controls

The Chan Select key can be used to assign individual channels to a Strip on the console surface:

- 1 Press the Main or Swap key to assign the desired channel.
- 2 Press and hold down the Wave key and press the Chan Select key.

The channel list appears on the meter bridge screen at the top of the Strip. Control Groups that have been created also appear in the list. The Accept and Abort keys flash (see figure below).



Strip controls during channel assignment

- 3 Use the fader to scroll through the list of channels and Control Groups on the screen; the selected entry is highlighted.
- 4 Press the Accept key to assign the selected channel, or the Abort key to cancel.

To assign the Swap channel, press the Swap key and begin with step 2.

Multiple Assignments: Channel Assign Panel

The Channel Assign Panel is typically used to assign channels to multiple Strips:

- 1 Press the Main Panel key in the center section.
- 2 Press the Channels key.
The Channel Assign Panel appears.
- 3 Press the Page keys to display additional channels.



Channel Assign Panel

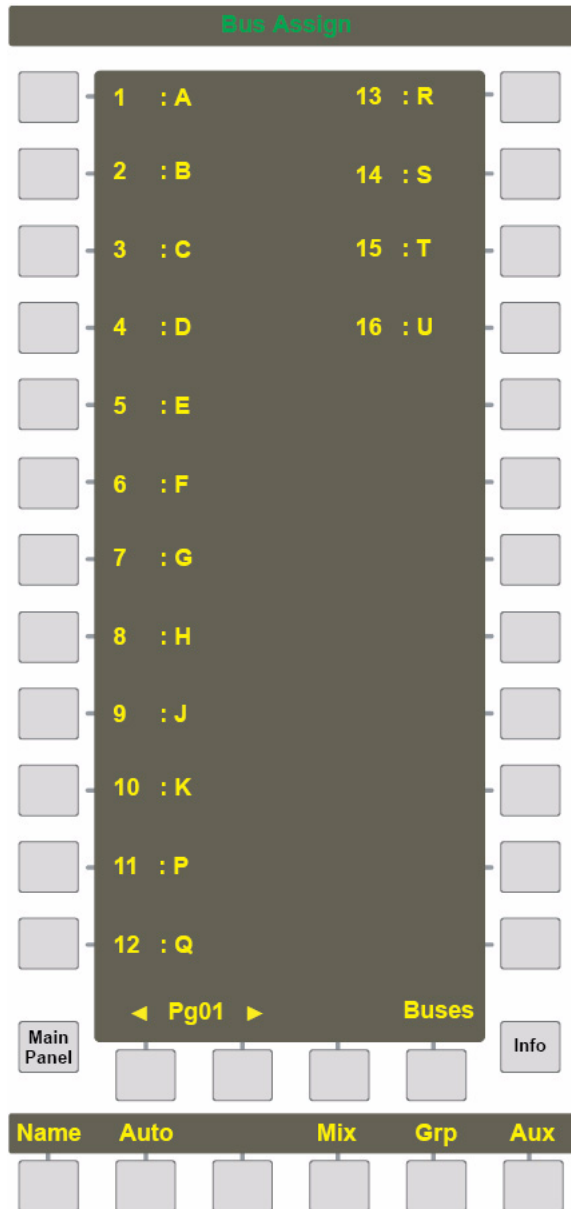
- 4 In the Channel Assign Panel Viewer, press the key beside the channel you want to assign.
- 5 Activate the Main or Swap channel on the Strip to which you will assign the selected channel, and press its Chan Select key.
- 6 Repeat steps 4 and 5 to assign multiple channels.

Multiple Assignments: Bus Assign Panel

The Bus Assign Panel is typically used to assign busses to multiple Strips but can also be used for a single assignment.

- 1 Press the Main Panel key in the center section.
- 2 Press the Busses key.

The Bus Assign Panel appears.



Bus Assign Panel

- 3 Press the Mix, Grp, or Aux keys to select the type of bus to assign.
- 4 In the Bus Assign Panel, press the key beside the bus to assign.
In Mix Bus View, choose Mix sections or individual mix busses.
In Aux Bus View, choose mono or stereo auxes.
- 5 Activate the Main or Swap channel on the Strip to which the selected channel will be assigned, and press its Chan Select key.

Shortcut Assignment for Multiple Channels

To assign multiple, consecutive channels to the console surface:

1 Press the Main Panel key at the bottom of the Panel Viewer.

2 Press the Channels key in the Main Panel.

The Channel Assign Panel appears.

3 Press the Auto key so it illuminates.

4 Press the key beside the channel to designate as the starting channel.

5 Position your finger over the Chan Select key for the first Strip (left-most) you would like to assign on the console.

Because this technique requires a two-key sequence beginning with Chan Select and moving to the right to the Swap key, the first Strip *must be at the far left of those being assigned*.

6 Begin by pressing the Chan Select key on the first Strip, but continue moving your finger to the right across to the Swap key of the same Strip.

7 Continue sliding your finger to the right over the Chan Select and Swap keys of each Strip until you have pressed the Swap key on the last Strip you want to assign.

You have just assigned the Main level on each Strip by pressing its Chan Select key. Pressing its Swap key enables that Strip to assign its Swap level in step 8.

8 Move your finger back to the first Strip's Chan Select key and repeat the same sequence of key presses.

You have mapped the next series of channels to the Swap level on the same Strips on which you set the Main levels.

For example, if the first sequence mapped channels 1–8 to the Main level on eight Strips, the second sequence would map channels 9–16 to the Swap level on the same eight Strips.

Input Names or Channel Number

To display a channel's input number or name:

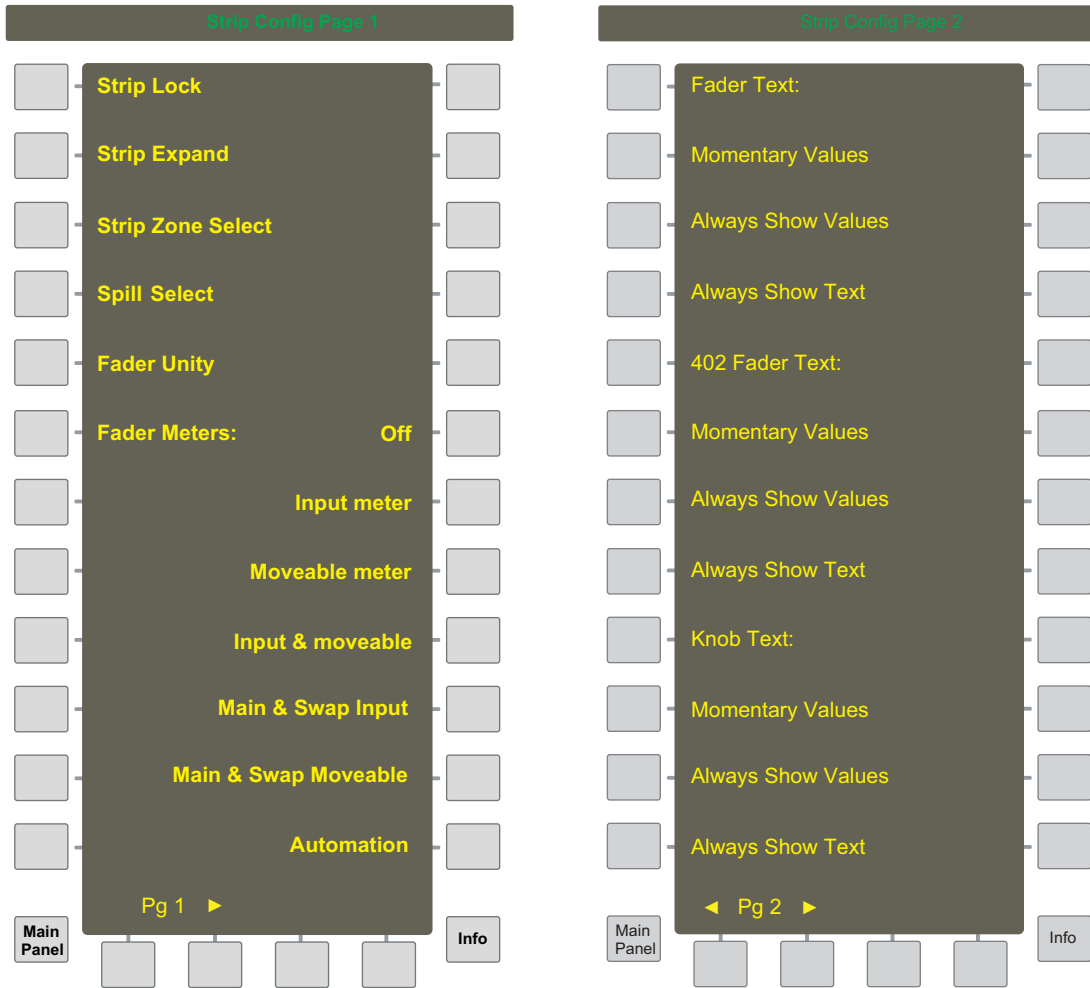
1 Press the Channels key in the Main Panel.

2 Press the Setup key in the Channel Assign Panel.

3 Press the Show Input Name key to toggle between displaying the channel number and the names patched into the channel's A and B inputs.

Strip Utilities

The Strip Config Panel contains useful utilities that make Strip operations more efficient: Strip Lock, Strip Expand, Strip Zone Select, Spill Select, Fader Unity, and Fader Meters.



Strip Config Panel: Pg 1-2 of 4

Strip Lock

Strip Lock prevents Strip assignments from being changed when:

- a Layout is recalled,
- or –
- the All function is active for another channel.

To activate Strip Lock:

- 1 Press the Strips key in the Main Panel.
- 2 Press the Strip Lock key at the top left of the Strip Config Panel.

The key flashes when active.

- 3 Press the Wave key on each Strip to lock it.

The red Strip Lock LED (above the Wave key) illuminates to show the Strip is locked. Press the Wave key again to unlock it.

The TFT display shows Locked above that Strip.

Strip Expand

Strip Expand expands the display and control of a single Strip over several Strips, permitting easier access to knobset functions (i.e., one Strip has EQ, the next Dynamics, etc.). Changes to the Main or Swap level affects all expanded Strips. Strip Expand is also useful when showing multiple Aux send pages with more than eight aux sends.

To expand a Strip:

- 1 Press the Strips key in the Main Panel.
- 2 Press the Strip Expand key in the Strip Config Panel.

The key illuminates when active.

- 3 Press the Wave key on the Strip to expand.

The Wave key illuminates.

The yellow Strip Expand LEDs (above the Wave key) illuminate to designate the expanded Strips.

Strip Zone Select

Strip Zone Select designates two Strip Zones on the control surface, simulating a dual-operator console. The selected Strips are isolated from the All mode and Spill functions of the rest of the non-selected Strips. A separate All mode and Spill function can work only on Strips selected in Spill Zone Select.

To create a Strip Zone:

- 1 Press the Strips key in the Main Panel.
- 2 Press the Strip Zone Select key in the Strip Config Panel.
- 3 Press the Wave key for each Strip to include in the Strip Zone.

The Wave keys for selected Strips illuminate.

Spill Select

Control Groups and Multi Format Masters can *spill* their slaves to a defined area using Spill Select (see “Spill Area” on page 112 to learn how to spill the channels).

To specify a spill area:

- 1 From the Main Panel, press the Strips key.
- 2 Press the Spill Select key in the Strip Config Panel.
- 3 Press the Wave key for each Strip to include in the spill area.

The Wave keys for selected Strips illuminate.

Fader Unity

To set faders to unity gain (0 dB):

- 1 Press the Strips key in the Main Panel.
- 2 Press the Fader Unity key in the Strip Config Panel.
- 3 Press the Chan Select key for each channel on which to set unity gain.

The fader moves to 0 dB.

You can also press that channel's Chan Select key in the center section Select Panel.



Center Section Select Panel

4 Deselect the Fader Unity key when finished to turn off the Fader Unity function.

Fader Meters

The Fader Meters parameter controls what the Strip fader's LEDs measure. They are set using the keys that appear below and indented from the Fader Meters key.

Off	Turns the Fader Meters off so nothing is displayed.
Input	Displays the channel's input. Busses do not have a channel input so nothing is displayed.
Moveable	Right meter is the same meter as on the TFT display and may be moved in the process order.
Input & moveable	Left meter is input, right meter is moveable.
Main & Swap Input	Left meter is Main input, right meter is Swap input.
Main & Swap moveable	Left meter is Main Moveable, right meter is Swap moveable.
Automation	Displays the underlying fader position while recording automation. When the fader is punched out, the LEDs turn off. In Write Abs mode, the underlying absolute level is displayed while recording new automation. Underlying levels are also displayed when a fader is in Preview or Suspend modes while touching the fader. See "Automation Modes" on page 128.

Knob and Fader Text Displays

The Strip Config Panel supports choosing between values and names on the text displays for knobs, faders, and CM02T fader. Each can be set to: Momentary Values, Always Show Name, Or Always Show Value

Joystick Assign Mode

Three options in the Strip Config Panel (Pg 3) control how to assign the CM403's joysticks.

- Cycle: A channel, Control Group, or bus is assigned to a joystick by pressing a previously assigned channel Strip's Wave key. For example, if G1 (Control Group 1) is assigned to a Strip, pressing its Wave key assigns G1 to the left joystick. Pressing another assigned channel Strip's Wave key assigns its channel, Control Group, or bus to the right joystick. Left/right joystick assignments alternate each time a Wave key is pressed.
- Direct Assign: A channel is assigned to a joystick via the Channel Assign Panel (see page 64). Assigns a Control Group or Bus to a joystick via the Bus Assign Panel (see page 65). Direct Assign is always active even if its key is not selected.
- 402 Cycle: A channel is assigned to a joystick from the CM402T Chan Select keys. Left/right joystick assignments alternate each time a Chan Select key is pressed.

Delay Display Modes

Three delay display modes are available in the Strip Config Panel (Pg 3) when the Dly parameter is selected on the channel strip:

Mode	Input Delay Units
Samples	kS (kilo-samples), S (samples)
Seconds/Frames	Sec (seconds), Fr (frames), Fr (sub-frames), S (samples)
Seconds/Milliseconds	Sec (seconds), mSec (milliseconds), S (samples)



Strip Config Panel: Pg 3-4 of 4

Aux View Enabled

The Aux View Enabled function enables the Aux view on the TFT display. This shows the Aux bus turned on in green. If the Aux is pre-fader, the Aux bus number is displayed in a yellow box.

Knob Touch Enabled

If Knob Text is set to Momentary Values (see page 69), selecting Knob Touch Enabled displays the knob's values when touched.

To punch in a knob when touched with automation running:

- 1 Enable Knob Touch Punch.
- 2 Select Knob Touch Enabled.

Clear Defaults

The Clear Defaults file determines what happens when a function or channel is cleared. For example, a certain set of equalizer settings can be restored when you clear a channel's EQ.

Clear Defaults settings are stored in the C:\emix\system\ClearDefaults.dat file and may be moved between Titles, systems, or Mixer Models.

To modify the current Clear Defaults file:

1 Press the Capture key.

A dialog with the message Capture Selected Yes or No? appears.

2 Select a function or channel, and press Yes to confirm or No to abort.

3 Press the Save To Disk key.

Select Restore To Factory to reset the Clear Defaults settings to those set at the factory. You must then press the Save To Disk key to save those settings to the Clear Defaults file.

Select Load From Disk to modify the current Clear Defaults settings. Press the Save To Disk key to save your new settings.

Channel Control Features

Channel Name

The Main and Swap channels are designated by a number (C# by default) or by a four-character name assigned in the Channel Assign Panel (see page 64). The Main channel is below the Swap channel; the *active* channel's display is brighter. Press the Swap key to switch between the Swap and Main channels. The Strip controls only the active channel.

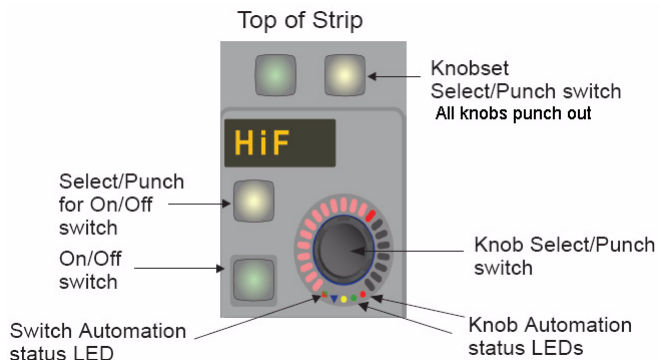
Function Keys

The Routing, Input, Dynamics, EQ/Filters, Aux Sends, and Pan functions can be assigned to a Strip's eight rotary knobs by the five switches below the knobs. If the function has more than eight parameters, the ◀▶ keys (above the * key) page between the additional settings. Four function in/out switches are located to the left of the function selection switches.

Rotary Knobs

Each Strip has eight illuminated, rotary knobs each with a four-character display and two switches. The knob is a continuous controller: as the knob turns, the LEDs on the outer ring light to show the current level. The LCD shows the knob's current function except while touching the knob, when it shows the knob's parameter value.

The lower switch to the left of the knob toggles the knob's function in/out.



Rotary Knob Controls

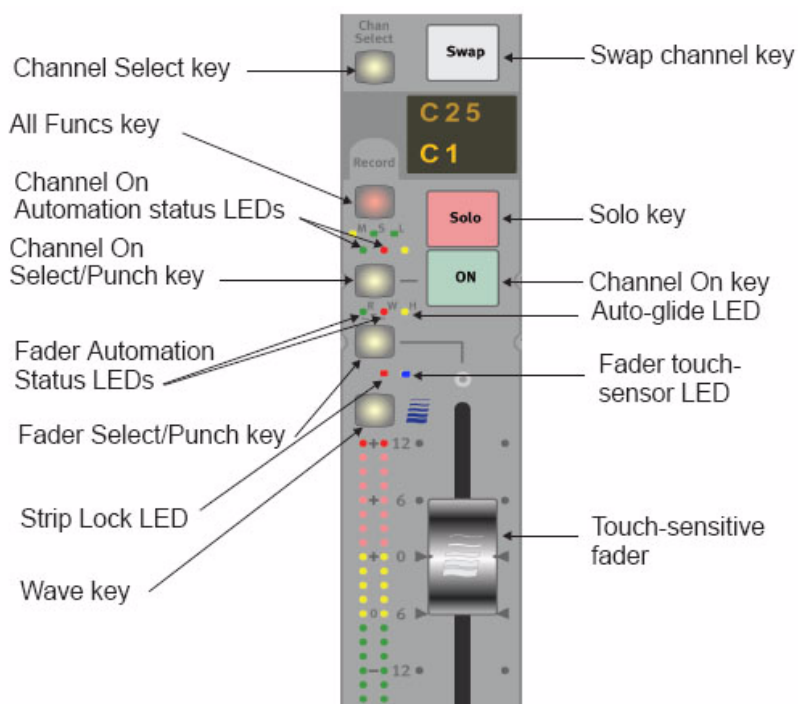
Select/Punch Keys

There are several Select/Punch keys on a Strip that operate on different levels:

- At the top of the Strip (see page 62), the Knobset Select/Punch key selects parameters for the currently selected function or punches out *ALL* knobs.
- The upper switch to the left of the knob is the Select/Punch key for the On/Off switch below it. When the transport is moving, it is the punch-in/out key for the On/Off switch. This key is also used to select the On/Off switch for inclusion in a Snapshot, and pages to a second knob function, if it exists.
- Each knob has a center switch that punches the knob in/out during automation. It also selects that knob for inclusion in a Snapshot. When not in automation, tapping the knob switch shows the value in the display instead of the function name.

Touch-Sensitive Fader and Controls


Each Strip has a touch-sensitive fader that moves automatically in response to recorded automation. When the fader is touched, the Fader touch-sensor LED lights and automatically punches it into automation (the Select/Punch key also punches the fader in/out). The Fader Automation Status LEDs show the automation mode status for the fader.



Fader Controls

Backstop PFL

System 5 faders have a backstop switch past the bottom of their travel.

 See “Backstop PFL” on page 50 for details.

Wave Key

The Wave key has three functions.

- It assigns that Strip (Swap and Main channels) to the center Strip (see “CM402T Expanded Channel Module” on page 55).
- It selects Strips and channels for Layouts, Strip Expand, Strip Lock, or other operations.
- It modifies other keys like a shift key.

See “Global Mode/Strip Function” on page 130, “Strip Mode/Strip Function” on page 131, “Changing an Individual Parameter’s Automation Mode” on page 131, and “Copy and Paste” on page 73 for examples.

All Mode

When All mode is active on a Strip, that Strip's function and Swap keys operate on *all channels currently mapped to the console*. This mode changes only which parameters are currently *displayed*. For example, assigning EQ to one Strip's knobs assigns EQ to all Strip knobs. However, setting EQ parameters on a Strip *does not* change the EQ on other Strips.

To activate All mode:


- 1 Hold down the Wave key and press the Clear key at the top of the Strip (above the top knob's display).
All appears above Clear.
- 2 Press any function key (i.e., EQ, Dyn, etc.) on that Strip and all knobsets on the console display that function.
- 3 Press Swap to toggle all Strips between their Main and Swap levels.
- 4 Hold down the Wave key and press the Clear key again to disable All mode.

Another method to activate ALL mode:

- 1 Press the All key on the CM401T.
The All key lights and All mode is enabled.
- 2 Press the All key again to disable All mode.

Link Key

Linking supports altering multiple parameters by changing the value of one of them.

 See page 121 for a full explanation of the Link key.

Copy and Paste

Settings from one channel may be copied and pasted to others.

To copy the settings:

- 1 Press and hold the Wave key down and press the Copy key.
The Strip dims and the Copy key flashes.
- 2 Press the Func Select key (to the left of the * key) to copy the function currently assigned to the knobs to the copy buffer.
Other functions can be added to the buffer by pressing their function keys.
- 3 Press and hold the Wave key down and press the Copy key to stop it from flashing and exit the mode.

To paste the settings to a new channel:

- 1 Select the Swap or Main channel within the desired Strip.
- 2 Press and hold the Wave key down and press the Paste key on the new channel.
The copied information is pasted to the channel on the new Strip.

Talk (S5B Only)

Holding down the Talk key switches the talkback mic into the channel's Mix Minus output.

Channel Process Order and Patch Points

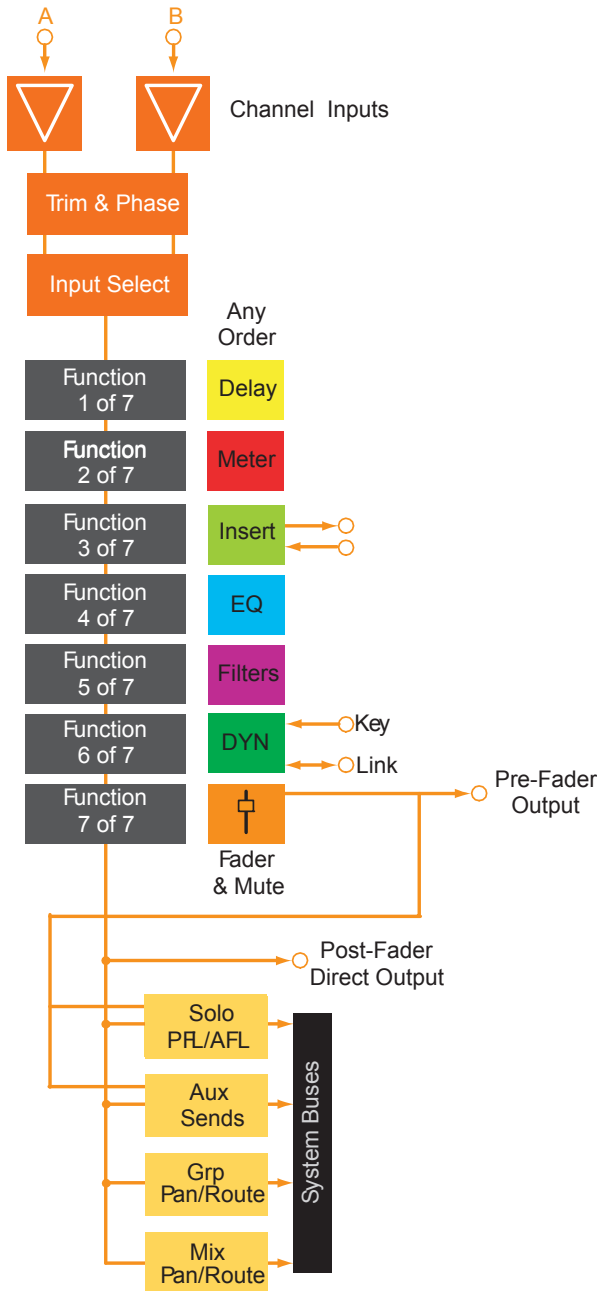
The seven channel processing functions can be placed in any order to suit different applications. The default order is:

Delay, Meter, Insert, EQ, Filters, Dynamics, and Fader.

The nine patch points are:

A Input, B Input, Insert Send/Return, Pre-fader Output, Post-fader Direct Output, Dynamics Key Input, and Dynamics Side-Chain Link In/Out.

All patching is performed from eMix (see Chapter 3, “eMix Application”). The A, B, and Key channel inputs can be assigned from the Strip.



Channel processor order and patch points

To display the configuration controls for processor order and patch points:

- 1 Press the Input function key to assign the Input controls to the knobs.
- 2 Press both cfg ◀▶ keys simultaneously.

The cfg keys flash to show configuration mode is active.

The configuration pages display the patching and processor order for that knobset.

- 3 Press either of the ◀▶ keys individually to navigate between the two configuration pages.

Channel Patch Points

The first configuration page assigns sources to the Key, A, and B inputs. Each input has identical controls.

All patch points are set in eMix (see “Console I/O” on page 20).

To change the source to the A input:

- 1 Press the A Input knob switch.

A scrolling list appears on the TFT display above the Strip.

- 2 Use the switches to the left of the knob to display other groups of sources.

These switches function as page up/down keys in this mode. Each group is an internal digital or MADI connection that can contain up to 56 audio sources.

For example, one group could be mic inputs, another inputs from a digital multitrack machine.

- 3 Use the knob to scroll the list to highlight the desired input.
- 4 Press the knob switch to select that input.
- 5 Exit configuration mode by pressing both cfg ◀▶ keys simultaneously.

They stop flashing to show configuration mode is no longer active.

Channel Processor Order

The channel process order is accessed in eMix (Masters > Process Order) and changed for pairs of channels. The upper part is for Multi Format Masters, and the lower part is for channels.

- 1 Select the process and drag it to the desired position.
- 2 Change the process order for all channels by altering the column on the left.
- 3 To reset to the default process order, right-click the channel number and select Reset Process Order.

Channel processor order in Masters tab of eMix

Insert Point

Each channel can have an insert point with a send and return patched with eMix. The insert point can be anywhere among the six processors (Delay, Meter, EQ, Filters, Dynamics, and Fader) and can be considered as another processor.

The insert point can be switched in/out using the Ins In key next to the Strip's function keys or from Input knobset page 3.

Channel Functions

System 5 provides exceptional programmable functions for each channel:

Input, Dynamics, EQ and Filters, Aux Sends, and Pan.

Function Presets

Function Presets support storing and recalling function settings to a channel. They can be moved between Titles, systems, and Mixer Models. Multiple functions can be included in one Preset.

Function Presets are stored in the c:\emix\system\FunctionPresets.dat file.

To store a Function Preset:

- 1 Press the Func Presets key from the Main Panel.
- 2 Press the New key on the bottom of the panel.
- 3 Choose a function by pressing its function select key.

Multiple functions can be selected for a Preset. They need not be from the same channel.

- 4 Select a Preset location from the panel.

There are 240 Presets. Use the page keys to display additional Presets.

- 5 Name the Preset using the CM401T's keyboard (eight characters maximum) and press Enter.

To recall a Function Preset:

- 1 Press the Func Presets key from the Main Panel.
- 2 Select an existing Preset.
- 3 Press the Recall key on the bottom of the panel.

Press the Recall key quickly and it flashes to denote this will recall just one Preset to the selected channel.

Hold the Recall key down for more than 2.5 s and the key lights solid, allowing that Preset to be recalled to multiple channels. (Not implemented on the CM402T panel.)

- 4 Press the Chan Select key on the desired channels to recall the Preset.

To modify a Function Preset:

- 1 Edit the function on the channel used to store the preset.

There is no way to retrieve this information so keep careful track of it if you want to modify the Preset.

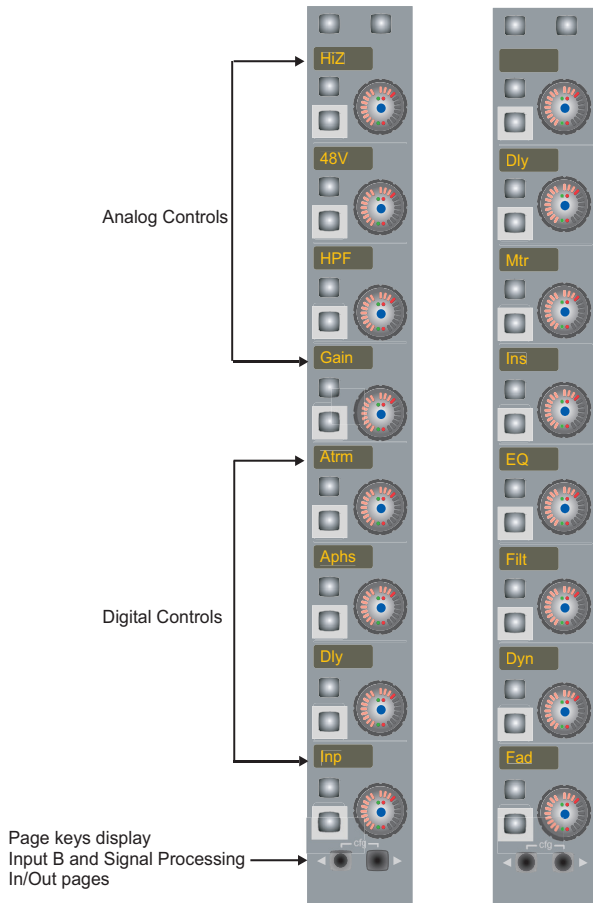
- 2 Press the Store key on bottom of the panel.
- 3 Select the Preset to store.

Inputs

Each channel has an A and B input. See “Channel Patch Points” on page 75 to learn how to assign sources for these inputs. The Inpt knob (bottom) can feed A, B, or A+B to the channel. These two inputs can be used in many clever ways, but a common application is one mic and one line. Another common use is for monitor inputs: Channel 1A is from the Group 1 Bus output, while 1B is from the recorder’s track 1 output. The A/B source switch then acts as a bus/tape switch.

- 1 Press the Input function key to display the input controls on the knobset (see figure below).
- 2 Press the ► key to display the B input page with the same controls as the A input.
- 3 Press the ► key again to display the Signal Processing In/Out page.

Atm and Apha have corresponding controls for the B input; Dly and Inp adjust one parameter that applies to both inputs.




Input A (left) and Signal Processing In/Out (right) knobsets

Analog Controls

If an ML530 Mic-Line Interface or Modular I/O preamp is patched to the input, the top four knobs show the analog mic-line controls. Otherwise, they are blank.

- The top knob shows whether the input is high or low impedance (HiZ = line; LowZ = mic).
Press the lower switch to the left of the knob to toggle between values.
- The second knob shows whether the 48 V phantom power is on/off.
Press the lower switch to the left of the knob to toggle phantom power on/off.
- The third knob shows whether the high-pass filter is on/off.
Press the lower switch to the left of the knob to toggle the HPF on/off.
- The fourth knob controls the analog input gain.
Spin the knob to adjust the gain between -12 and +72 dB.

 *There is a +12 dB offset between the gain knob dB reading and the Modular I/O Remote preamp's actual gain position. When the gain knob displays -12 dB, the Modular I/O Remote preamp's setting is 0 dB.*

Digital Controls

The bottom four knobs control the digital parameters of the A and B inputs:

Atrm

The Atrm knob adjusts the digital trim ± 15 dB.

Aphs

The Aphs knob controls the phase of the A input.

The lower switch to the left of the knob toggles the phase. The switch lights to indicate phase reversal, which is indicated on the TFT screen above the Strip.

Dly

The Dly knob controls the delay for both inputs. The lower switch to the left of the knob enables the delay. The switch lights to indicate the delay is active. Rotate the knob to adjust the delay. The default delay time format is Samples (0–2160).

To change the delay time format:

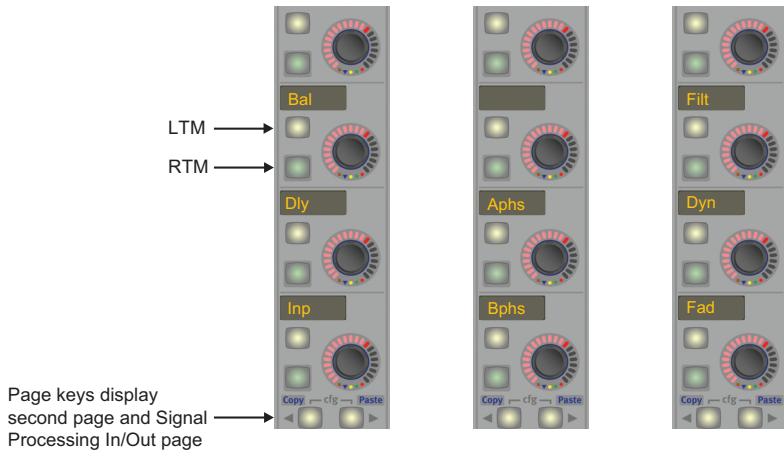
- 1 Press the upper switch to the left of the knob.
- 2 Display Strip Config Panel Pg3 (see “Delay Display Modes” on page 70).
- 3 Select a Delay Display Mode: Samples, Seconds/Frames, or Seconds/Milliseconds.

Inpt

The Inpt knob selects between A, B, and A+B. The selection is indicated on the TFT screen above the Strip.

Stereo Controls

Stereo channels have additional controls (see “Multi Format Masters” on page 111).



Stereo Controls

Balance

Rotate the Bal knob left to hear more of the left channel. Rotate it right to hear more of their right channel. Rotate left or right until the display reads 100L or 100R to hear only the left or right channel.

The table below describes the four options for left and right channel routing.

Left-to-mono	Press the upper key next to the Bal knob to send the left channel equally to both the left and right sides of the stereo channel.
Right-to-mono	Press the lower key next to the Bal knob to send the right channel equally to both the left and right sides of the stereo channel.
Both-to-mono	Press both keys next to the Bal knob to send a mono mix of both channels equally to both sides of the stereo channel. The Bal knob then adjusts the mix between left and right channels.
Swap	Press the lower key to reverse the left and right channels.

Signal Processing In/Out

Press the ► key (once from the B Input page, twice from the A Input page) to display the Signal Processing In/Out page. The seven lower knobs show the seven processors; the signal path is from top to bottom. Press the lower button to the left of the knob to toggle the In/Out status of that processor; the switch lights when the processor is *in*.

💡 *The function In/Out switches to the left of the Strip’s function switches also toggle the processors In/Out.*

📄 *See “Channel Processor Order” on page 76.*

Dynamics

Each channel has a compressor/expander/gate with external key input and filtered sidechain. Press the Dyn function key to assign Dynamics to the knobset; the TFT display at the top of the Strip shows the dynamics graph (yellow when dynamics are *In*, gray when bypassed). The red dot is a *GainBall* that shows the signal's current gain (y-axis), and the attack and release times, as the ball rides up and down the curve.

The entire Dynamics section may be switched in/out with the Dyn In key to the left of the Strip's function keys. The Expander/Gate and Compressor can be switched in/out individually on their respective knobset configuration pages. Use the knob to adjust the parameters. Each Dynamics section below discusses the effect, if any, of the switches.

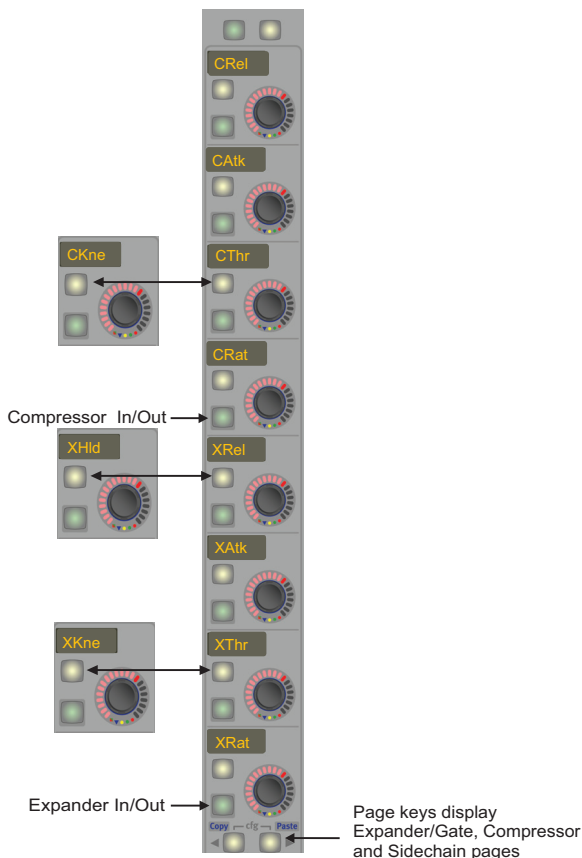
The first Dynamics page (see figure below) shows the main controls for both the compressor and expander/gate. Press the ► key to display pages with the complete parameters for Expander/Gate, Compressor, and Sidechain/filters.

The sidechain can be sent to any source (see "Channel Patch Points" on page 75). The sidechain can also be patched in eMix.

Compressor/Expander (Page 1)

The knobs have four compressor and four expander parameters (see figure below). The knobs with two parameters listed (i.e., cThr/cKne) toggle between parameters by pressing the upper switch to the left of the knob.

The lower switch next to the cRat knob switches the compressor in/out. The lower switch next to the xRat knob switches the expander in/out.



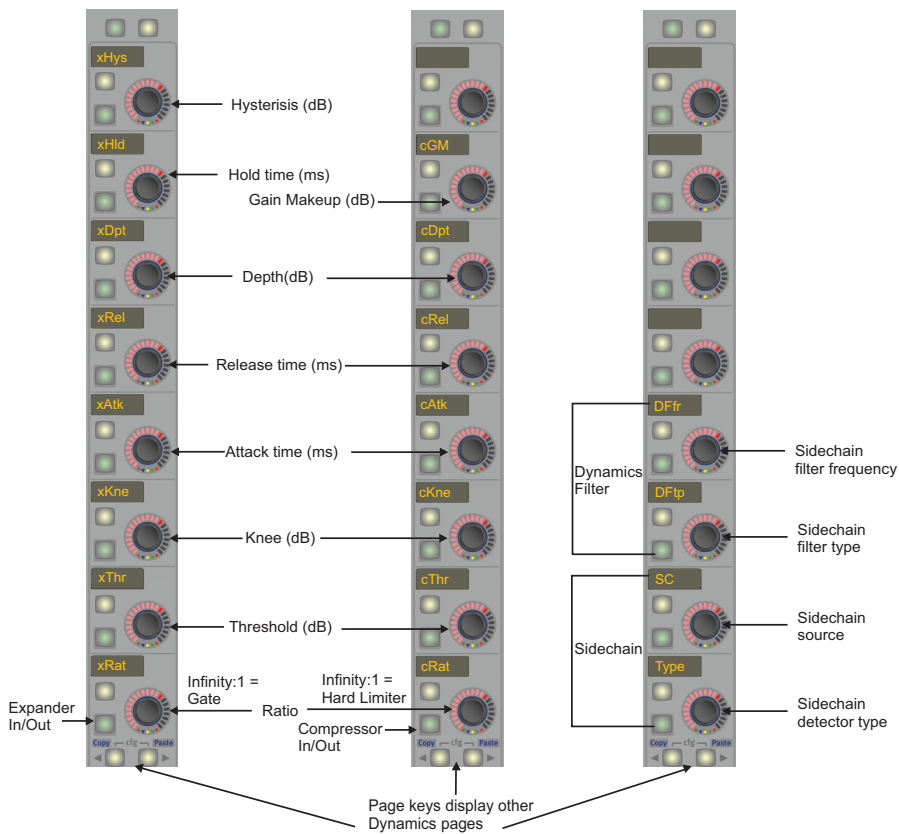
Dynamics knobset page 1

Expander/Gate (Page 2)

The lower switch next to the xRat knob switches the expander in/out.

The expander parameters are summarized in the table below.

xHys	Hysteresis (dB) sets the level that the gain of the expander must fall below to turn off. This prevents the expander from turning on and off if the level hovers around the threshold.
xKne	knee (0–30)
xRat	ratio (infinity:1 = gate)



Expander/Gate, Compressor, and Sidechain/filters knobset pages

Compressor (Page 3)

The compressor parameters are shown in the figure above. The lower switch next to the cRat knob switches the compressor in/out.

The compressor parameters are summarized in the table below.

cGM	gain makeup (dB)
cKne	knee (0–30)
cRat	ratio (infinity:1 = hard limiter)

Sidechain/Filters (Page 4)

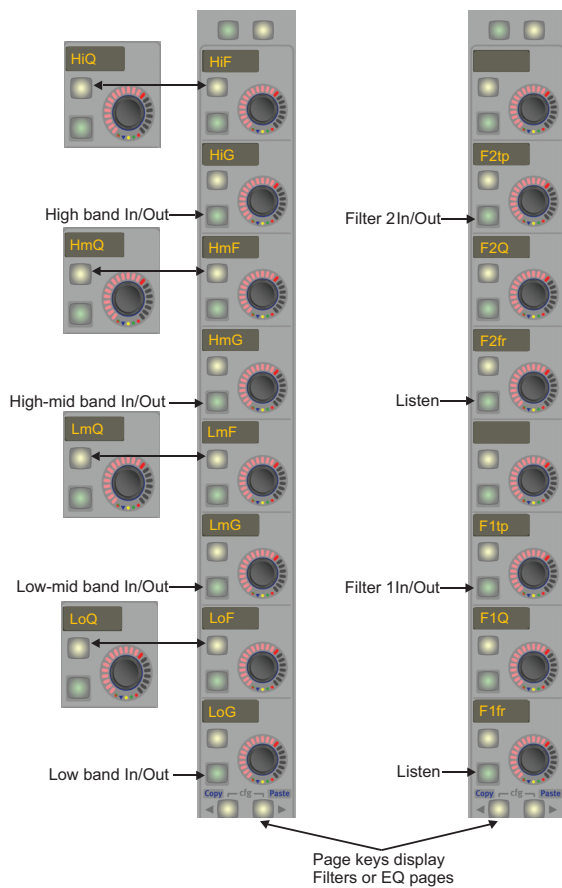
The Sidechain/Filters knobset page is shown in the figure above. The lower switch next to the SC knob activates sidechain listen mode for that channel.

The Sidechain/Filters parameters are summarized in the table below.

DFfr	Dynamics Filter; sidechain filter frequency (range = 20 Hz to 21 kHz)
DFtp	Dynamics Filter; sidechain filter type: (HPF, LPF, BPF, NTCH, OFF-default)
SC	Sidechain source (channel, key, link)
Type	Sidechain detector type for meter display (peak, average)

Equalizers and Filters

Each channel has a four-band, parametric equalizer and two filters. Press the EQ function switch to display the EQ controls on the knobset. Press the ► key to display the Filters page.



Expander/Gate, Compressor, and Sidechain/filters knobset pages

Parametric EQ

Each parametric EQ band has two knobs: one shared between frequency and Q, and another for gain. Press the upper switch to the left of any frequency knob to toggle between Q and frequency. Use the gain knob to adjust the gain for that band. The lower switch to the left of the gain knob switches that band In/Out.

The four bands are identical (20.5 Hz – 21 kHz) except the HiF and LoF bands can be either peak or shelf filters. Press the lower of the switches to the left of the HiF or LoF knob to toggle between peak (switch lights green) and shelf (no light). This switch indication is present only when displaying frequency on this knob, not Q.

The gain can be adjusted in approximately $1/8$ -dB increments in the range -24 to +24 dB. As the gain is changed from 0, the LEDs light dimly from the center LED in the direction turned (clockwise = boost); the peak level is indicated by a bright LED. The LEDs light for every 2-dB change.

Q can be adjusted in the range 0.2–12 (higher value corresponds to narrower bandwidth). At a given Q setting, changing the gain affects the bandwidth slightly: the bandwidth decreases as gain increases. This creates a wider area of boost/cut at low gain and supports a more natural sound as gain changes without altering the Q. At full boost or cut, the bandwidth is measured 3 dB down from the center frequency.



Use the EQ graph on the TFT display to create a filter with any desired bandwidth.

Since Q and Frequency share the same knob, both parameters are indicated on the knob LEDs: Frequency is indicated by a dim LED at its proportional position from first to last LED. For example, 10 kHz would be approximately in the middle. Q is indicated by bright LEDs extending to either side of the frequency LED.



These LED indicators are for fast reference use only; consult the LCD and TFT displays for accurate values.

The TFT screen above the Strip shows the resultant EQ curve (yellow when active, gray when bypassed).

Filters

Two filters are available on each channel. Four filter types are available:

HPF (high-pass filter), LPF (low-pass filter), BPF (band-pass filter), and NTCH (notch filter).

The knobs control the two filters that can be active at one time. The displays are:

F2tp (filter 2 type), F2Q (filter 2 Q), F2fr (filter 2 frequency), F1tp (filter 1 type), F1Q (filter 1 Q) and F1fr (filter 1 frequency).

- Select a filter type by rotating the knob. Disable it by selecting OFF.
- Rotate the frequency knob to select the filter frequency.
- Rotate the Q knob to change Q for a notch filter or bandwidth for a band-pass filter. Filter Q is variable in the range 0.2–12.
- Each filter can be switched In/Out separately. The filters are not attached to the EQ.



See “Channel Processor Order” on page 76.

To help find problematic frequencies, the Notch filter can be put into a listen mode by pressing the Listen key next to the frequency knob. This temporarily changes the filter to band-pass. The listen setting is not saved in the Title and is not automated. Listen defaults to Off.

Aux Sends

The number of Aux sends available depends on the number of cards in the DF66 (or whether the DF70 is used instead) and the current Mixer Model.

See “Choosing a Mixer Model” on page 28 to learn about these issues.

The CM401T Master module has a Group/Aux Strip used for Aux Master functions.

See “Bus Master Functions” on page 92 for general information and “Group and Aux Busses” on page 95 to learn how to set up mono and stereo Aux busses.

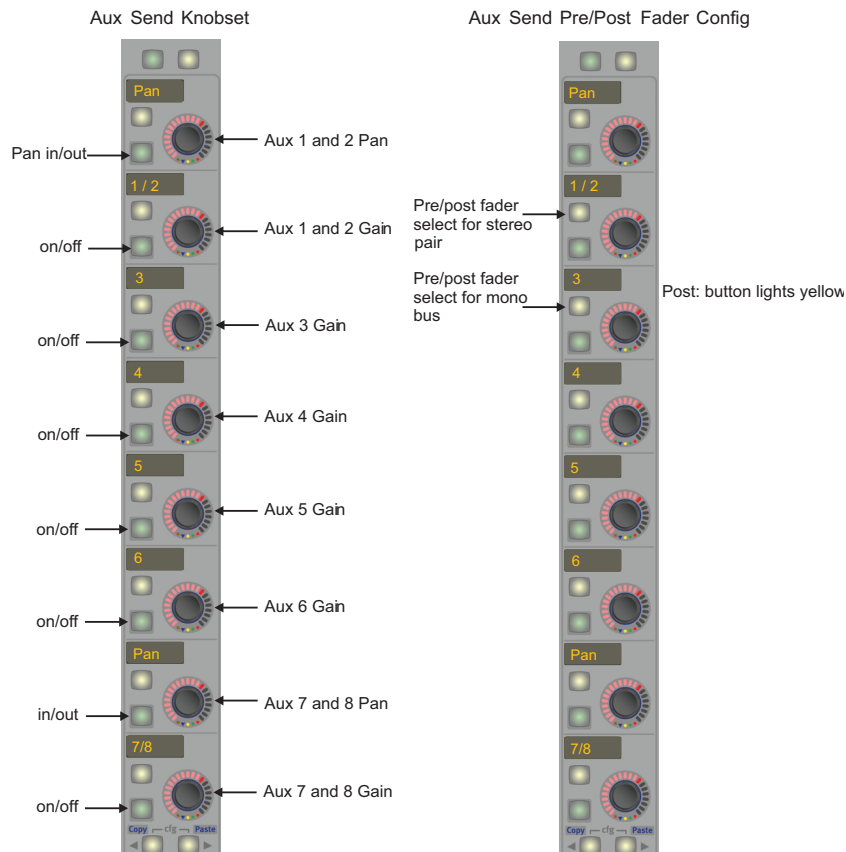
Aux Sends can be mono or stereo odd/even pairs (i.e., 1/2 not 2/3). Each Aux Send can be configured as pre- or post-fader from the Aux Send Config page.

Aux Send Knobsets

The figure below shows the first eight Aux busses with Aux Sends 1/2 and 7/8 set as stereo pairs and others are mono. Press the ► key to display additional busses. Stereo busses use two knobs:

- The Pan knob (top) adjusts the stereo Pan and its lower-left button switches Pan in/out.
- The Gain knob (labeled with the send numbers) adjusts the overall Gain for both sends and its lower-left button switches the pair in/out.

Mono busses use one Gain knob and its lower-left button switches the send in/out. Aux busses default as post-fader sends. Select the Gain knob’s upper-left switch to set the Aux bus as pre-fader.



Press a page key to display additional Aux Send pages (if more than eight)

Aux Send Knobset and pre/post config pages

Aux Send Config

Aux Sends can be individually or globally set to pre- or post-fader.

To set each Aux Bus individually:

1 Press the Aux function key to display the Aux Bus knobset.

2 Press the upper-left button beside each Gain knob to toggle the pre- or post-fader status for that send (or pair for stereo).

The button lights yellow to indicate pre-fader and does not light for post-fader. All Aux busses are set to post-fader by default.

Another option is to copy/paste the desired Aux to other channels.

After setting one channel to the desired pre/post status for each Aux Send above:

1 Press and hold down the Wave key and press the ◀ Copy key on the channel just set.

The channel dims to show it awaits selection of items to copy.

2 Press the Strip's Aux key to select all Aux parameters (pre/post, levels, and on/off states).


3 Press and hold down the Wave key on the channel you want to paste to, and press the Paste ▶ key.

After the first paste, the copied channel undims, but you can continue pasting to other channels.


Pan

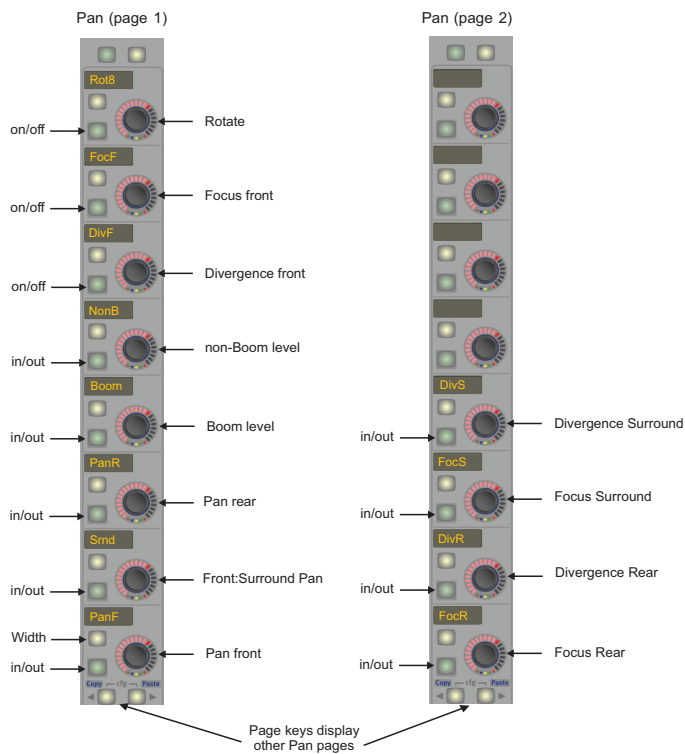
Unlike a traditional analog console, System 5 is not limited to one pan format and one pan control per channel. System 5 supports the following pan formats (also called *pan laws*): mono, stereo, LCR, LCRS, 5.1, 6.1, and 7.1.

A single panner can control several different Mix or Group busses at once, each with different formats.

 See “Mix and Group Bus Setup” on page 97 to learn how to assign Mix and Group Bus format.

Press the Pan function key to assign Pan parameters to the knobset (see figure below).

 See “Group Bus Routing” on page 89 and/or “Mix Bus Routing” on page 90 to review how to use the Pan to: switch to insert Pan.



Pan Knobsets

Page 1

Rotate (Rot8)

This feature supports circular panning.

Focus Front (FocF)

This parameter requires at least three speakers to function. Focus ranges from 0–100%. At 100%, the signal has a pinpoint image: as the signal is panned, it crossfades directly from one channel to the next, completely fading from the first *before* entering the third. As Focus decreases, the signal blurs across multiple channels: the signal moves from channel one into two, and then begins crossfading into channel three before channel one has completely faded out. This results in smoother, dynamically panned objects across the sound field.

0% Focus eliminates the center channel from the pan range entirely. The pan control still functions, although the signal crossfades directly from bus one to bus three. One use of 0% Focus is to create phantom-centered images, where the signal is sourced equally from the left and right front speakers instead of directly from the center speaker.

Divergence Front (DivF)

This parameter requires at least three speakers to function. Divergence ranges from 0–100%. At 100%, panning works as expected: Panned to maximum left, there is no signal present in the right or center channels; at the center position, no signal is present in the left or right channel, etc. As the Divergence is decreased, the degree of panning is decreased: The signal level increases in channels that previously had no signal and the difference in signal level between channels decreases.

The purpose of Divergence is to allow someone listening on the extreme left or right to hear a sound panned fully to the other side. For example, at 50% Divergence, a sound panned fully left will retain approximately half its signal level in the right channel compared to the left.

Non-Boom Level (nonB)

The level to all channels except the Boom channel. For example, in 5.1-channel format, the Non-Boom level applies to L, C, R, Ls, Rs.

Boom Level (Boom)

The level to *only* the Boom channel. For example, in 5.1-channel format, the Boom level applies to only the subwoofer channel.

Pan Rear (PanR)

Same as PanF for rear speakers.

Front:Surround Pan (Srnd)

Controls the front-to-surround levels without changing the individual front or surround pan settings.

Pan Front (PanF)

Controls the front channel levels only (i.e., in 5.1-channel format, pan applies to L, C, R).

Page 2

Divergence Surround (DivS): Same as Divergence Front.

Focus Surround (FocS): Same as Focus Front.

Divergence Rear (DivR): Same as Divergence Front.

Focus Rear (FocR): Same as Focus Front.

Pan Graph

When the Pan parameters are on the knobset, a pan graph appears on the TFT screen showing the two-dimensional position (front:surround and left:right) for that channel.



Pan graph


SmartPan

The System 5 has an automatic function called *SmartPan* that prevents the disappearance of the audio signal during panning if some of that Mix Section's busses are not assigned. For example, if a channel assigned to a 5.1 Mix Section does not send anything to the center mix bus, SmartPan automatically uses a stereo pan law so the signal is still present when panned to the center. SmartPan is always on and cannot be disabled by the user.

Track Panner Module


The Track Panner Module is a four-Strip wide optional addition to the System 5 console. It controls the Pan of a channel, Multi Format Master, or Control Group assigned to the Center Strip. Press a Strip's Wave key to assign it to the Center Strip; the active channel's Pan is automatically controlled by the Track Panner Module.

The switch to the lower left of the trackball is the Select/Punch key for the trackball panner. The switch to the lower right of the trackball provides the same function as the Pan function key on the assigned channel: the Pan parameters are assigned to the knobset and the Pan graph appears in the TFT display.

 See "CM403 Film/Post Module (S5 Only)" on page 165 to learn more about the CM403's joystick functions.

Channel Mixing Functions

The number of Group or Mix busses available depends on the number of cards in the DF66 (or whether the DF70 is used instead) and the current Mixer Model.

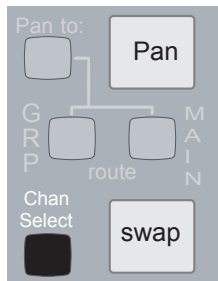
 See "Choosing a Mixer Model" on page 28 to learn more about configuration options.

Group Bus Routing

System 5's Group busses route signals to multitracks, DAWs, and sub-groups. The center section (CM401T) has a Mix/Group/Aux master Strip that controls the master Group functions (see Chapter 7, "Busses and Bus Masters").

Route a Channel to a Group Bus

To route the post-fader channel signal to a Group bus, press the GRP route key below the function switches (see figure below). This assigns the Group routing parameters to the knobset. Two Group busses are displayed per knob (i.e., 1/2, 3/4, etc.). Since the display shows only four characters, Group 11/12 is displayed as 11/2.



GRP and MIX route switches

The upper switch to the left of each knob assigns the first of the two Groups in the display, the lower switch assigns the second (i.e., for 1/2, the upper switch assigns 1, the lower assigns 2). Group busses can be assigned in pairs from the switch in the center of the knob. Those keys light to indicate this channel is assigned to that Group Bus.

Press the Pan to: key to switch Pan in/out for the Group Bus. This key is active only when accessing the Mix or Group Bus routing pages. The key lights dimly in other modes to show that Pan is active in Mix and/or Group Bus routing. The GRP route key also lights dimly in other modes to show that channel is assigned to one or more Group Busses.

Pressing the ► key displays additional Group Routing pages (if there are more than 16 Group busses in this configuration), or the last page, which has the GSL (Group Send Level) controls on the bottom knob.

The Select/Punch key (upper key to the left of the GSL knob) supports selecting and punching in all Group busses at once.

The Group Send on/off key (lower key to the left of the GSL knob) turns the Group Send on/off.

The GSL knob adjusts the master level for all Group busses.

Mix Bus Routing

The 16 Mix Bus sections consist of individual busses in a defined pan format. For example, one section with an LCRS format uses four busses, another section with a 5.1 format uses six busses. A system with 16 mix busses could have eight sections each with a stereo format.

Route a Channel to a Mix Section

To route the post-fader channel signal to a Mix bus:

- 1 Press the MIX route key below the function switches. (See “GRP and MIX route switches” on page 89.)

This assigns the first eight Mix sections that have been defined in eMix to the knobset.

- 2 Press the ► key to display additional Mix Routing pages if there are more than eight.

- 3 Press the lower switch to the left of the knob to assign that section.

- 4 Press the knob's center switch to display the individual mix bus sections on the knobset.

When an individual section is assigned to the knobset, the lower switch to the left of the knob toggles that bus on/off.

- 5 Press the Pan to: key to switch Pan in/out for the Mix sections.

This key is active only when accessing the Mix or Group Bus routing pages. The key lights dimly in other modes to show that Pan is active in Mix and/or Group routing. The MIX route key also lights dimly in other modes to show that channel is assigned to one or more busses.

Assignments and pan settings are remembered when routing is toggled off and on.

Mix Minus (S5B Only)

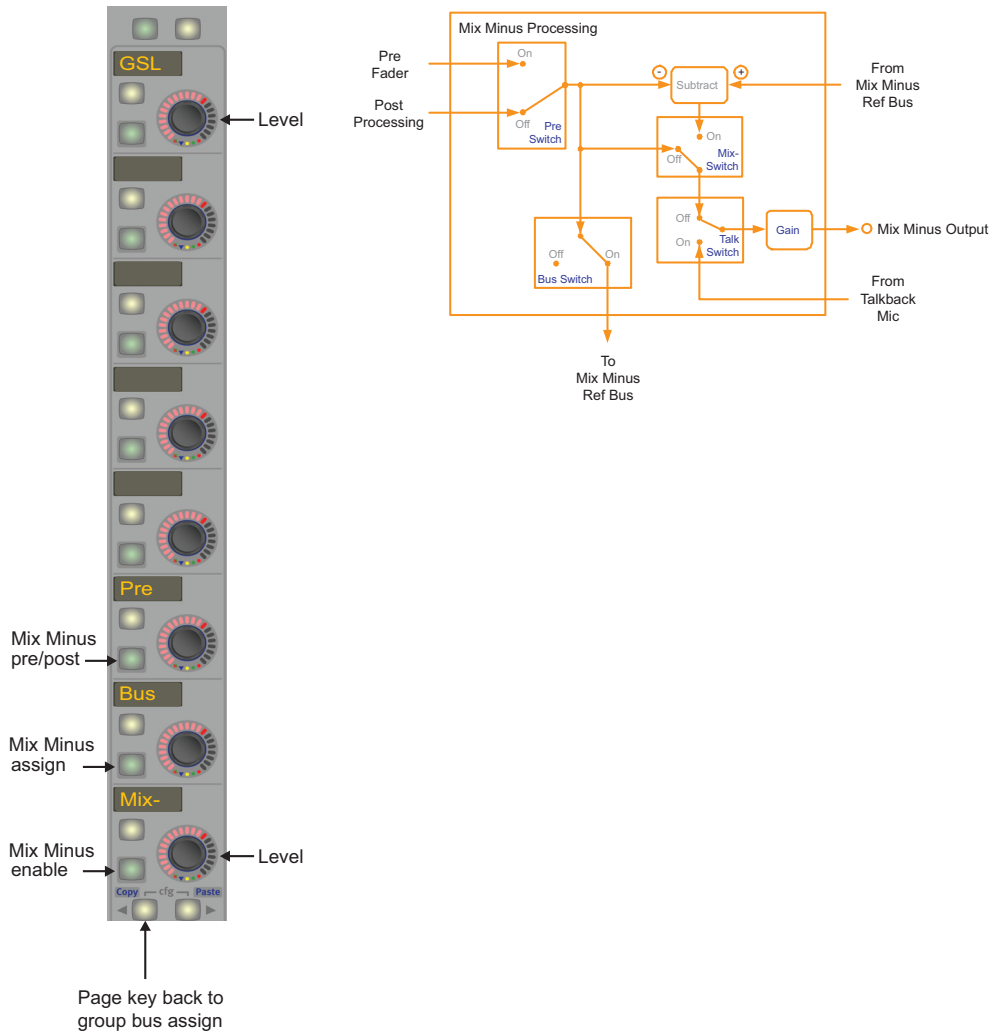
Each channel has a Mix Minus output that can send a unique feed to an announcer. The Mix Minus Reference Bus is configured on the last page of the GRP routing knobset.

The signal from the channel to the mix minus system can be set pre- or post-fader using the Pre key. The Mix- knob controls the Mix Minus Output's gain.

To create a Mix Minus assignment:

- 1 Press the Bus key on a channel Strip to route it to the Mix Minus bus.
- 2 Press the Mix- key to create a feed for an announcer's ear piece on that channel's Mix Minus output.

The channel's signal is subtracted from the Mix Minus bus so the announcer can hear all voices on the bus except their own.



Mix Minus parameters (left) and block diagram (right)

Chapter 7: Busses and Bus Masters

The number of busses and channels available in your System 5 configuration is determined by the processing power in the DF66 Super Core (number of cards) or the DF70 (if used instead) and the Mixer Model: more channels = less busses and vice versa. See “Choosing a Mixer Model” on page 28 for a complete discussion of these system resource issues.

System 5 has four bus types: Mix, Group, Aux, and Solo.

Mix Busses

A maximum of 96 Mix Busses can be configured in up to 16 Mix Sections. Each Mix Section can have between one and eight individual busses (i.e., a stereo pair uses two, and an LCRS set uses four) and can be set to any format. Mix Busses have playback returns; Aux and Group busses do not.

Group Busses

Group Busses route channels to multitracks, DAWs, mix-minus feeds, and sub-groups. Group Busses can be configured to any format but are usually set to odd/even stereo pairs. With Pan switched out, they act as mono assign busses.

Auxiliary Sends

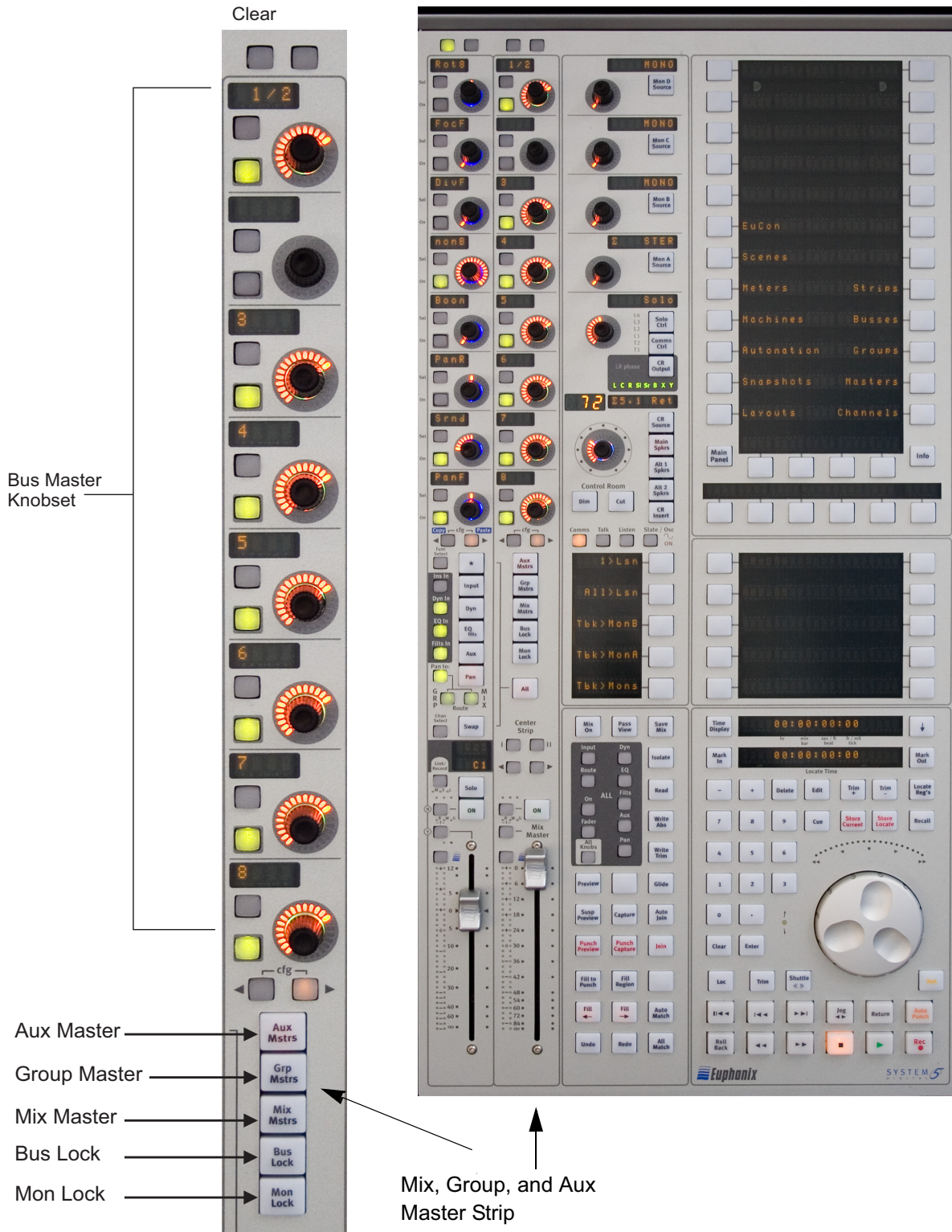
Aux sends are used for effects, foldback, and mix-minus feeds. Aux sends can be configured as mono or stereo pairs, pre- or post-fader.

Solo Busses

The Solo bus is fixed at stereo. After-Pan Listen (APL) and Pre-Fader Listen (PFL) route signals to the Solo Bus. Each Strip's fader also has a Backstop PFL function: move and hold the fader past the bottom of its travel to activate the PFL Solo mode (see “Backstop PFL” on page 72). Solo In Place (SIP) is a destructive Solo mode and does not use the Solo busses. See “Solo Mode” on page 49 for more information on SIP.

Bus Master Functions

The Bus Master Strip has eight knobs and five function keys that control all Bus Master functions.



CM401T Center Section with Bus Master Strip

Aux, Grp, and Mix Masters


Pressing the Aux Mstrs, Grp Mstrs, or Mix Mstrs keys displays the Aux Bus, Group Bus, or Mix Bus functions, respectively, on the Bus Master knobset.

Bus Lock

The Bus Lock key disables the following functions when activated: Bus Levels (Mix Master, Master Trims, and Leg Trims), Bus Inserts, Bus On/Off switches. While these functions are disabled, their values may still be interrogated.


Mon Lock

The Mon Lock key disables the Control Room and Monitor levels. Dim and Cut always remain active.

 See “Monitoring” on page 40 for more information on monitor controls.

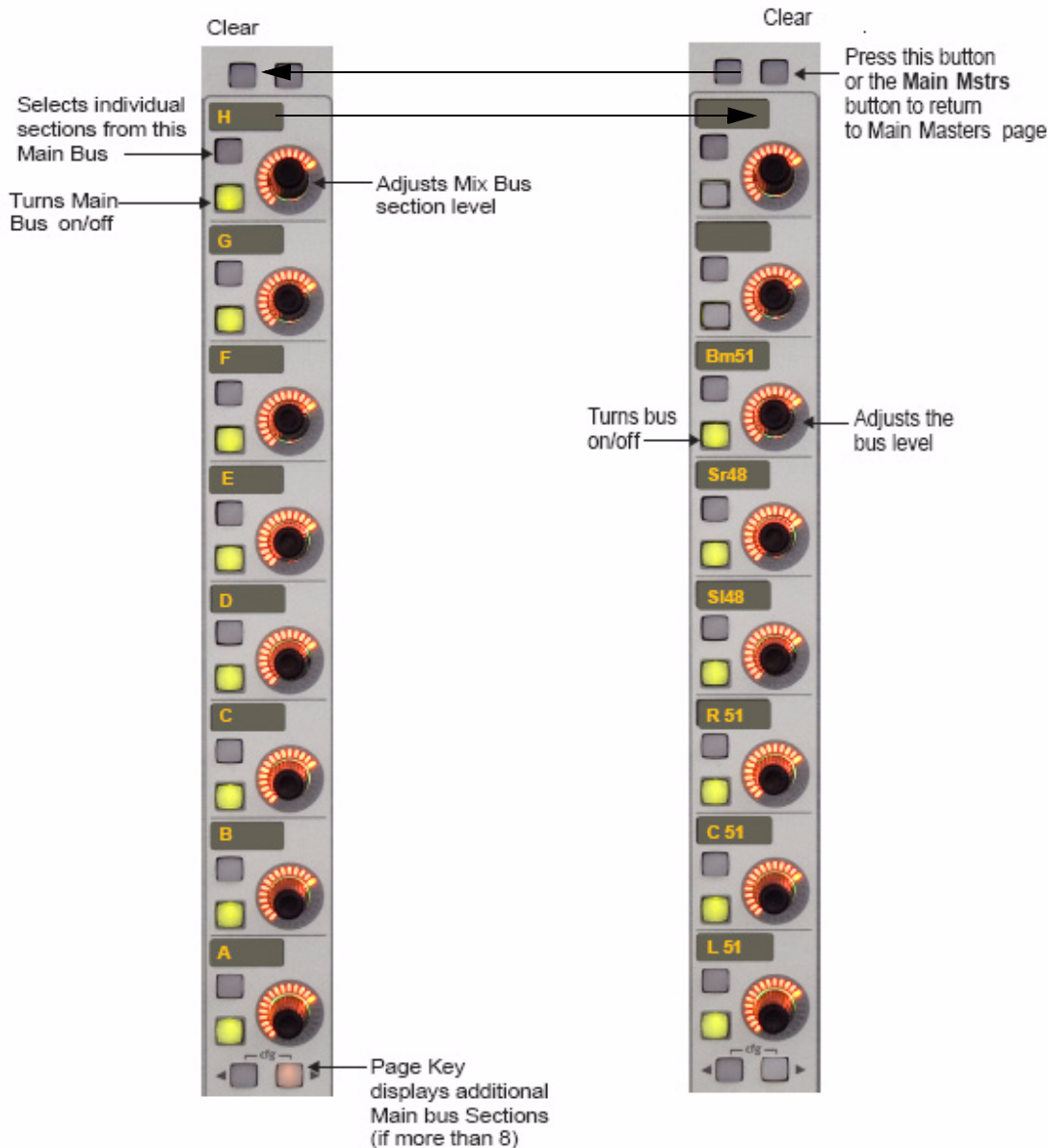
All Key

The All key sets all strips to All Mode.

 See “All Mode” on page 73 for more information.

Mix Bus

Press the Mix Mstrs key to assign the mix bus sections to the Bus Master knobset. The Master Fader controls the overall Mix section levels. Each Mix section has its own level control as well as trim controls for each Mix Bus in its selected format. (See “Buses” on page 26 to see how to set the format.) Relative levels are maintained when adjusting the Mix Bus Master or Mix Bus section level until a maximum or minimum value is reached.



Mix Bus Master (left) and Individual Bus (right) Displays

The left side of the figure above shows the Mix Bus Master display after pressing the Mix Mstrs button (or the top-right knobset function key next to Clear). The important functions are summarized below:

- Press the upper of the two buttons to the left of each knob to display the individual busses for that Mix Section.
- Adjust the knob to control the Mix Bus overall level.
- Press a knob to display individual Section meters on the TFT screen.
- Press the lower of the two buttons to the left of each knob to turn that Mix Bus On/Off. All individual bus parameters are retained if the Bus is turned on after being off.
- Use the ◀ and ▶ buttons to display additional pages if there are more than eight busses.

Individual Mix Busses

The right side of the figure above displays the individual Mix Bus selected by pressing the upper of the two buttons to the left of each knob. The important functionality is summarized below:

- Press the lower of the two buttons to the left of each knob to turn the individual bus On/Off. Its level is retained if that bus is turned on after being off.
- Adjust a knob to set the level for that bus.

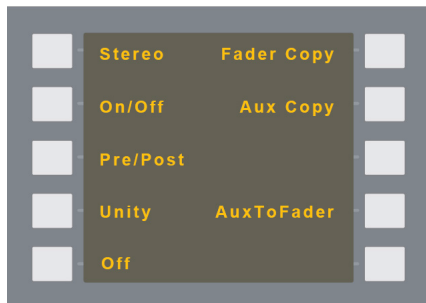
Group and Aux Busses

The Group and Aux Bus Masters have the same controls. Press the Grp Mstrs or Aux Mstrs button to display the first eight Group or Aux Bus Masters. Use the ◀ and ▶ keys to display additional busses. The knobs control the bus levels, and the lower button to the left of the knob turns that bus on/off. See “Law Palette” on page 27 to learn how to select the format.

Configuring Aux Busses

To set the Aux Busses to configuration mode, assign the Aux Busses to the Bus Master knobset and press both cfg ◀ and ▶ keys simultaneously. The Aux Bus Settings display in the Quick Access Panel. Both cfg keys flash to designate the Aux Bus configuration mode.

Each button pertains to an Aux function discussed in the following sections. These functions affect only busses currently assigned to the surface except Stereo, which applies to the master and all sends.



Aux Bus Settings

💡 *There can be 4, 8, 16, or 24 aux busses depending on the Mixer Model.*

Stereo

To toggle pairs of Aux busses between stereo and mono:

- 1 Press the Stereo button.
- 2 Press an odd numbered Aux bus knob followed by an even numbered Aux bus knob.
Both toggle between mono and stereo.
- 3 When finished, toggle additional odd/even numbered pairs or select a different Aux function.

This operation affects *all channels including those not on the surface.*

On/Off

To toggle selected Aux sends on/off:

- 1 Press the On/Off button.
- 2 Press the desired Aux send knobs.
- 3 When finished, select a different Aux function.

Pre/Post

To toggle selected Aux sends between pre-/post-fader:

- 1 Press the Pre/Post button.
- 2 Press the desired Aux bus knobs.
- 3 When finished, select a different Aux function.

Unity

To set selected Aux send level to unity:

- 1 Press the Unity button.
- 2 Press the Aux bus knobs to set to unity.
- 3 When finished, select a different Aux function.

Fader Copy

A useful technique to create a performer's monitor mix is to first create the mix on the faders, which typically feed an output bus, and use those settings as a starting point for the aux mix.

To copy fader levels (and pan positions for stereo channels) to a selected Aux bus:

- 1 Press the Fader Copy button.
- 2 Press the Aux bus knob that corresponds to the destination for the settings.
- 3 When finished, select a different Aux function.

Aux Copy

A monitor mix can be created faster by starting with another performer's aux mix with similar requirements and copying it to additional aux busses.

To copy settings for one Aux bus to another:

- 1 Press the Aux Copy button.
- 2 Press the Aux bus knob *from* which the settings are to be copied.
- 3 Press the Aux bus knob *to* which the copied settings are to be pasted.
- 4 When finished, select other Aux busses to copy or select a different Aux function.

AuxtoFader

Aux busses are often used for customized monitor mixes for individual performers. However, mixing on the knobs is not as easy as using the faders, which have finer control and better visual indication of relative levels. AuxtoFader supports controlling a selected Aux bus from the faders. Aux busses have 12 dB of gain to match the range of the channel fader. After the aux mix is set, the faders can be restored to their normal function.

To map a selected Aux bus to the faders:

- 1 Press the AuxtoFader button.
- 2 Press an Aux bus knob to map that Aux bus onto the faders.
- 3 When finished, select another Aux or select a different Aux function.

This mode stays enabled if you navigate to a different panel so press AuxtoFader again to disable this function when finished.

This operation affects *all channels including those not on the surface*.

Bus Master Inserts

Each Group, Mix, and Aux Bus has an insert point. See “Mix Bus Send/Return” on page 25 to learn about bus insert send and returns specified in PatchNet.

To switch the insert in/out:

- 1 Press the Aux Mstrs, Grp Mstrs, or Mix Mstrs button to display that bus on the Bus Master knobset.
- 2 Press both **cfg** ◀ and ▶ keys simultaneously.
- 3 Press the lower button to the left of the knob to activate that bus insert (In: button lit).
- 4 Press the button again to deactivate the bus insert (Out: button not lit).

This procedure works the same for Aux, Mix, and Group busses.

Mix and Group Bus Setup

See “Busses” on page 26 to learn about how to configure the Mix and Group Busses.

Bus Processing

Digital processing can be performed on up to 16 Mix, Group, or Aux busses. Processing functions include: limiter, compressor, and filters. The selected busses (see figure below) can be assigned to a channel Strip for processing. Changing the bus processing order affects all busses.

The screenshot displays the Bus Processing interface with the following components:

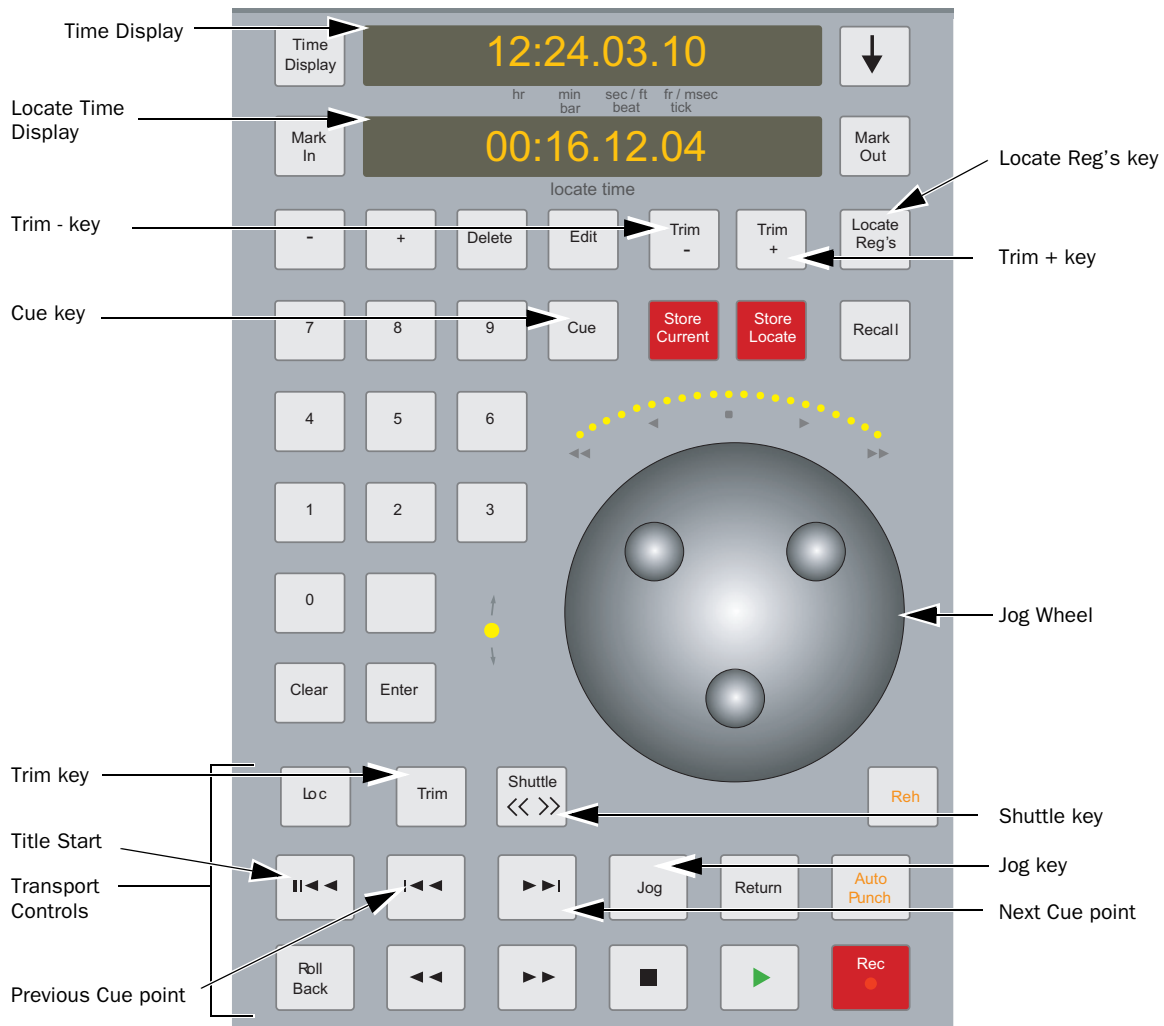
- Top Bar:** Includes buttons for "Close All", "Save All", "New Mix", and "Save Mix". The title is "Title: Title" and "Mix: Mix 01". A timer shows "00:00:00:00" and "30 Fr Non-Drop".
- Mix Busses:** A grid with rows A through U and columns for various bus types (5.1 L, 5.1 C, 5.1 R, 5.1 SI, 5.1 Sr, 5.1 B, St L, St R, 7.1 L, 7.1 C, 7.1 R, 7.1 X, 7.1 Y, 7.1 SI, 7.1 Sr, 7.1 B, Db L, Db C, Db R, Db S).
- Group Busses:** A grid with columns for St L, St R, St L, St R, St L, St R, St L, St R.
- Aux Busses:** A grid with columns for M (1-12) and M (13-16).
- Buttons:** "Attach", "Detach", and "Clear" buttons are located at the bottom right.
- Status:** "2 of 8 Bus Processors Available" is displayed.
- Bottom Bar:** Includes buttons for "Mix", "Group", and "Processing".

Bus Processing functions

Part III: Control, Layouts and Snapshots, and Linking

Chapter 8: Machine Control (S5P Only)

The center section Machine Control Panel contains System 5's Transport and Locate functions. Use the figure below as a reference for this chapter.



Machine Control Panel

Transport Controls

The Transport section has the standard Play, Rewind, Fast Forward, Stop, and Record keys.

The Shuttle and Jog keys provide additional transport functions:

1 Press the Shuttle key so it lights.

The SpinKnob moves the transport backward or forward. The speed depends on the degree of the SpinKnob's rotation.

2 Press the Shuttle key again to deactivate.

3 Press the Jog key so it lights.

The SpinKnob moves the transport backward or forward. The speed depends on the degree of the SpinKnob's rotation; maximum rotation moves the transport at the Play speed. This function is helpful for setting precise edit and cue points.

4 Press the Jog key again to deactivate.

Locate Registers

The Locate controls move the transport to a precise time rather than moving continuously.

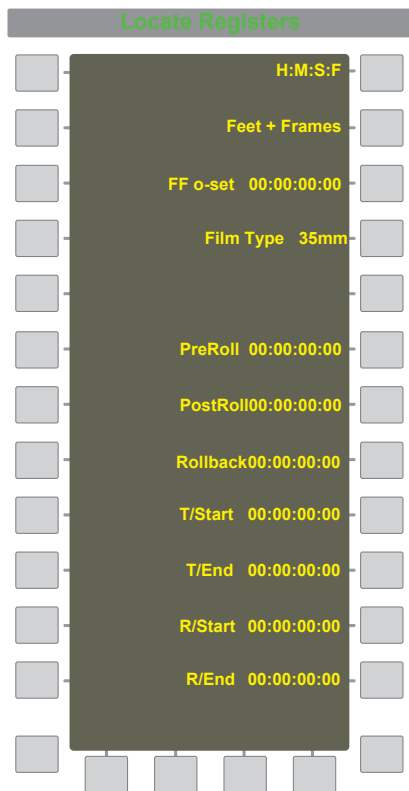
Time Displays

The Current and Locate Time Displays (top of the figure above) are an integral part of the Locate functions.

Press the Locate Reg's key (below the Locate Time Display) to display the Locate Registers Panel in the Panel Viewer.

The Current Time Display shows the absolute time code at the current transport location.

The Locate Time Display contains the Locate Time Register value. This value can be stored to any of the registers displayed in the Locate Registers Panel (see below).



Locate Registers Panel

Feet + Frames or H:M:S:F Display

The recorder's time can be displayed in the H:M:S:F format (the default SMPTE timecode) or the Feet + Frames format commonly used for film. To choose the format, press the H:M:S:F or the Feet + Frames key in the Locate Registers Panel to activate that display format.

Feet + Frames Offset

The FF o-set (offset) is applied to incoming timecode only if Feet + Frames is active. The timecode is displayed without the offset if the H:M:S:F format is active.

To set the FF o-set time:

- 1 Enter a timecode into the locate time display using the numeric keypad on the center section Automation Panel.
The entire time must be entered. When the first numeric key is pressed, the display clears to enter the new value.
- 2 Press Store Locate and then the FF o-set key in the Locate Registers Panel to transfer the locate time to the FF o-set field.

Film Type

The Feet+Frames display can be set to 3 mm, 35 mm 25 Fr, 16 mm, or 16 mm Key (half-feet).

Entering and Modifying Time Displays

There are three ways to enter a time into the Locate Time Display:


- **Numeric Keypad:** Use the numbers along the left of the Machine Control Panel to enter a time. To enter 5 seconds, press 5, 0, Enter. It is not necessary to enter leading zeros.
- **Transfer Current Time to Locate Time:** Press the downward arrow to the right of the Current Time Display to transfer it to the Locate Time Display.
- **Recall Key:** Press the Recall key (it flashes), then press Pre-Roll, Post-Roll, Rollback, T/Start, T/End, R/Start or R/End in the Locate Registers Panel to transfer its value to the Locate Time Display.

There are two ways to modify the Locate Time:

- Press the Trim + and Trim - keys to add or subtract one frame to or from the Locate Time.
- Press the Trim key (it flashes). Use the SpinKnob to modify the Locate Time. Press the Trim key again (stops flashing) when finished. Note that this is different than Trim +/Trim - keys.


Store Locate Value to a Register

Press the Store Locate key (it flashes until destination key pressed) followed by the Pre-Roll, Post-Roll, Rollback, T/Start, T/End, R/Start or R/End keys to store the Locate Time to that register.

 See page 103 to see how to store to the FF o-set key.

Store Current Value to a Register

Press the Store Current key (it flashes until the destination key is pressed) followed by the Pre-Roll, Post-Roll, Rollback, T/Start, T/End, R/Start or R/End keys to store the Current Time to that register.

 See page 103 to see how to store a value for the FF o-set key.

Mark In/Mark Out

Press Mark In or Mark Out to capture the Current Time into the R/Start or R/End parameters, respectively.

Press the Store Locate key before pressing Mark In or Mark Out, to capture the Locate Time instead of the Current Time.

Press the Recall key and then Mark In or Mark Out to recall the stored R/Start or R/End time to the Locate Time display.

Locate Key

Press the Loc key to move the transport to the value in the Locate Time Register.

Return Key

Press the Return key to cycle the transport between the R/Start and R/End locations (pre- or post-roll times are observed).

Title Start

Press the Title Start key (see figure above) to locate to the T/Start time set in the Locate Registers Panel.

Cue Points

Each Title can store virtually unlimited Cue points.

CMX 3600 EDL files can be imported into the cue list from the Titles folder. When an EDL is selected, the Open button changes to Import. If a cue point in the EDL matches one already in the Title, the cue in the Title is kept so the Cue notes are maintained.

To create a new Cue:

- 1 Press the Store Locate or Store Current key to use the Locate or Current Time, respectively.
- 2 Press the Cue key.

The Cue is placed in the Cue list sorted by increasing timecode values.

Displaying and Using Cue Points

- 1 Press the Cue key by itself.

The key lights when active and the Cue list displays on the TFT screen above the Master section.

- 2 Use the SpinKnob to scroll through the list.

The Current Cue is highlighted in the list and its value displays in the Locate Time Display.

- 3 Press the Loc key to locate to that Cue Point.

- 4 Press the Cue key to deactivate it.



If any of the Store Locate, Store Current, or Recall keys are flashing to indicate they are waiting for a destination key to be pressed, pressing the Cue key does not display the Cue list.

Next and Previous Cues

The Next and Previous Cue keys navigate the Cue list sequentially.

Editing and Deleting Cue Points

Press the Edit key (flashes when active) to edit the Current Cue Point's timecode and name. See "Entering and Modifying Time Displays" on page 104 to see how to enter and modify times.

To edit the name, type the new name and press Enter on the Machine Control Panel or the keyboard. Press Edit again to exit the mode.

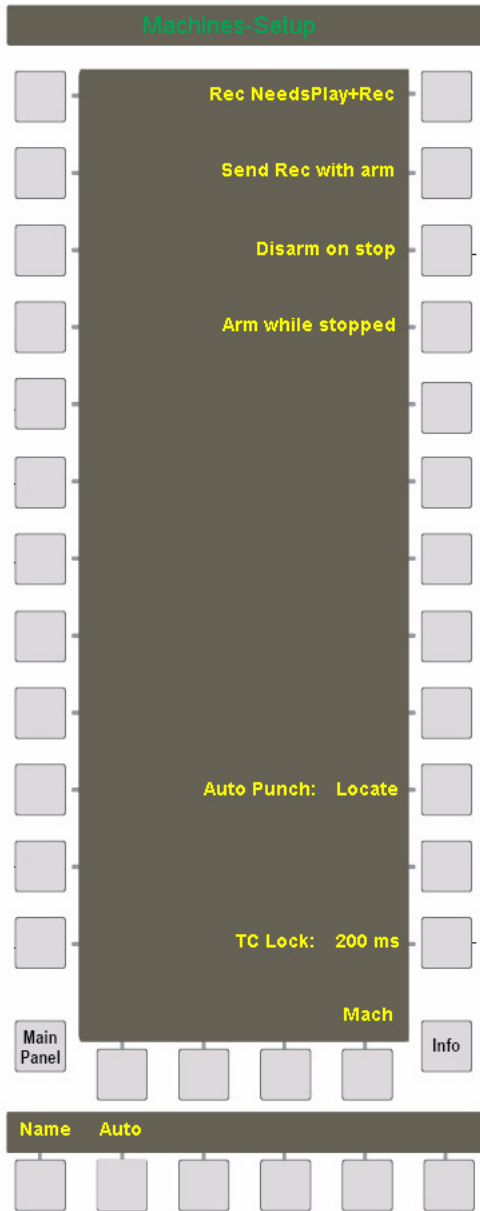
To delete a highlighted Cue, press the Delete key (next to Edit) or on the computer keyboard.

Track Arming

The Machines - Setup Panel controls track arming (see figure below), and can be displayed by pressing the Machine Setup button from the Main Panel. The Record in Motion, Track Arm in Motion, On Transport Stop, and Arm While Stopped each have two, mutually exclusive settings.

A single serial port of the TT002 can provide up to 64 channels of track arming. Track arming and record tally information is sent to the console and is used to generate a true track status tally on the surface (top of CM402T and record paddles in CM403):

- flashing = armed
- solid = recording



Machines - Setup Panel

Record in Motion

These controls affect the recorder while the transport is in motion.

- Activate the Rec NeedsPlay+Rec key to place armed tracks into record by pressing the play and record keys together.
- Activate the Send Rec with arm key to place armed tracks into record by pressing just the record key.

On Transport Stop

These controls determine what happens to armed tracks when the transport is stopped.

- Activate Disarm on stop so armed tracks are disarmed.
- Activate Arm while stopped so armed tracks stay armed for the next pass.

Auto Punch: Locate

Auto Punch: Locate works with Auto Punch (see “Mix Bus Auto Punch” on page 143). With Auto Punch: Locate enabled (lit), pressing Auto Punch starts automation playback/record at the time stored in the AR/Start register, and stops at the time stored in the AR/End register (see “Setting Fill Start and End Times” on page 141).

TC Lock

TC Lock sets the elapsed time before System 5 locks to the incoming timecode. This setting accounts for the time required by the tape deck to ramp up to its playback speed. If System 5 locks to the signal before the playback speed stabilizes, the automation will not properly synchronize with the audio on the tape.

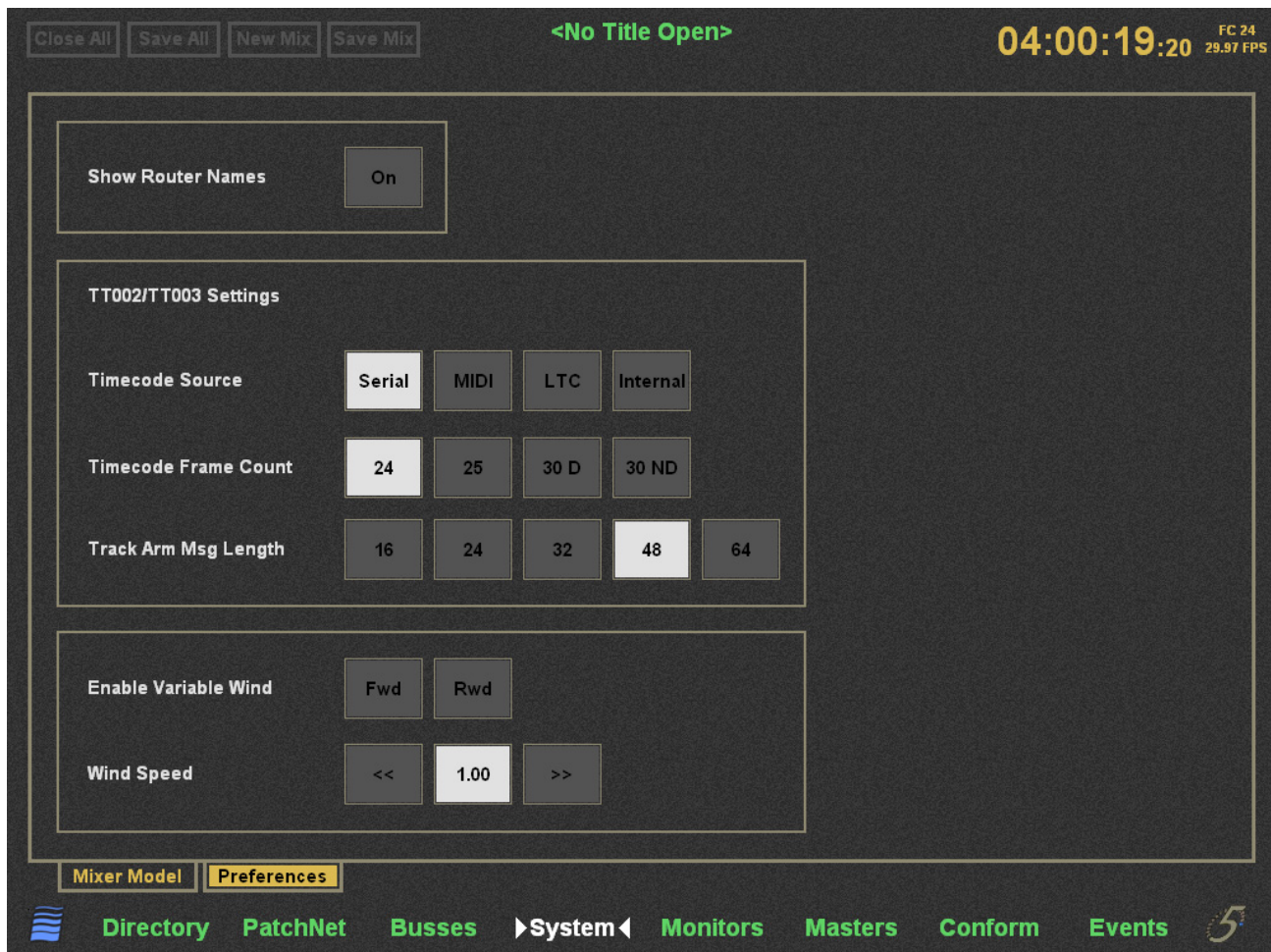
The default TC Lock setting is 200 ms, which is sufficient for most devices. When active, TC Lock can be set using the SpinKnob. While it is desirable to set TC Lock to the minimum time required by the device, it is better to use a longer rather than a shorter time, to prevent an inaccurate lock before the tape speed stabilizes. We recommend 200 ms for non-linear operation.

TT002

The TT002 is a single-port RS422 (Sony 9-pin), USB device and MMC machine controller (not a synchronizer). It replaces the TT007, MOTU MIDI Interface, and GP132, and ships with all System Computers. It locks to a machine more quickly and simply than previous devices and reads LTC. To control more than one machine, a Sound Master, Colin Broad RM6, or similar device is required.

The System 5 software can auto-sense the TT002 or TT007. The setup options are done from the Machines page on the CM401T (see page 102), and the System Preferences Page (see figure below). From the System Preferences page, select the timecode source, frame rate, track arming length, and fast forward/rewind speeds. The CM401T TFT displays the selected frame count and incoming frame rate.

A TT003 machine controller is available for dual-operator System 5 configurations. It is physically different from the TT002, and requires different firmware. An additional USB port is provided to connect the two System Computers.



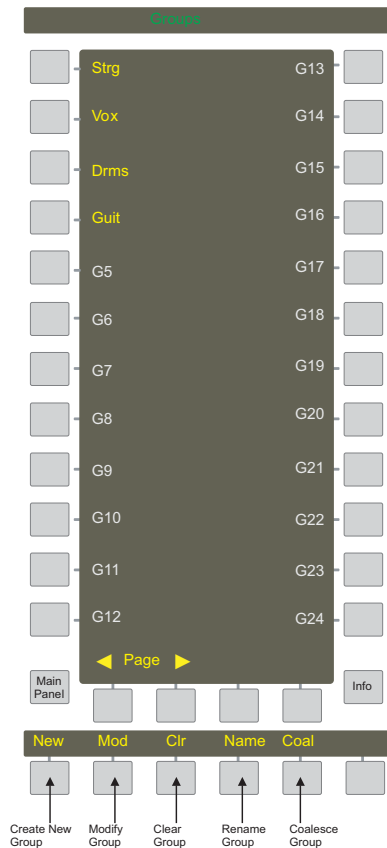
Machines - Setup Panel

Chapter 9: Control Groups and Multi Format Masters

Control Groups

A *Control Group* consists of a *Group Master* channel that controls multiple *slave channels*. Control Groups are similar to traditional VCA Groups, and the Group Master channel can be assigned to a Strip just like any other channel. The most common Control Group application uses a Group Master channel to control similar channels. For example, a single master fader can change the fader level of all announcer mics. System 5 supports up to 48 Control Groups, each of which can control Fader, On/Off, Pan, Aux, Filters, EQ, Dynamics and Input channel settings.

The relative fader level of each slave channel can be individually set and the master channel preserves these relative fader levels as the master fader is altered. This supports smoothly fading out all slave channels by bringing down the master fader. The Groups Panel (see figure below) is used to configure the settings. Empty Control Groups are displayed with dim illumination (G5–G24). Press the Page keys to toggle the display between the two pages (24 Control Groups per page).



Groups Panel

Create Control Group

To create a Control Group:

- 1 Press the New key at the bottom left of the Groups Panel (see figure above).
- 2 Select the slave channels by pressing their Chan Select keys.

The Chan Select keys flash to show they are included in the Control Group. Press the Chan Select key again to remove it from the Control Group. The Slave LED lights.

- 3 Press a Control Group key in the Groups Panel.

The Name key flashes to show the Control Group is ready to be named from the keyboard (four characters maximum).

Other Groups can be included as slaves but a slave from another Control Group cannot be included in the new Control Group.

Assign Control Group to Strip

Assigning a Control Group to a Strip is identical to assigning any other channel: Control Groups appear in the list when assigning a channel (see “Map Channels, Control Groups, and Busses to Strips” on page 63). The Master LED lights when a Control Group is assigned to a channel.

Modify Control Group

To modify a Control Group:

- 1 Press the Mod key at the bottom left of the Groups Panel (see figure above).

The Mod key flashes.

- 2 Press the Control Group key to modify.

The Control Group key flashes to show it is ready to be modified. The Chan Select keys flash for all channels assigned to that Control Group. The appropriate Swap/Main must be active to see the Chan Select key flash.

- 3 Press the flashing Chan Select keys to delete them from the Control Group and non-flashing Chan Select keys to add them.
- 4 Exit this mode by pressing Mod again, another Control Group key, or any key that accesses the Panel Viewer.

Name Control Group

To name a Control Group:

- 1 Press the Name key at the bottom of the Groups Panel.

The Name key begins flashing.

- 2 Press the Control Group key to rename.
- 3 Name the Control Group from the keyboard (four characters).

Clear Control Group

To clear a Control Group:

- 1 Press the Clr key at the bottom of the Groups Panel.

The Clr key begins flashing.

- 2 Press the Control Group key to clear.

All slaves are deleted from the Control Group, the name reverts to the default (G#), and the display dims to show it is empty.

Coalesce Control Group

This operation transfers automation from the Control Group master to the slaves. The audio result is identical to before the coalesce operation, and the Control Group remains intact.

To coalesce a Control Group:

- 1 Press the Coal key at the bottom of the Groups Panel.

The Coal key begins flashing.

- 2 Press the key for the Control Group you want to coalesce.

Multi Format Masters

A *Multi Format Master* supports building stereo, LCRS, 5.1, 6.1, and 7.1 channels from mono channels. A Multi Format Master channel can be assigned to a Strip just like a normal channel. There can be up to 48 Multi Format Master channels.

Multi Format Masters are most commonly used to implement stereo channels, which have the following additional controls:

- Balance
- LTM (Left to Mono)
- RTM (Right to Mono)
- Left/Right Swap

A *both-to-mono* function is available by pressing both the RTM and LTM keys simultaneously (see “Stereo Controls” on page 80).

To set up a Multi Format Master channel in PatchNet:

- 1 In PatchNet, click the Masters tab at the bottom of the window.




Masters Tab

2 Select the channels to include in the master channel by left-clicking and dragging across the desired channels.

The selected channels are now highlighted.

3 Right-click on any highlighted channel to select their channel format.

To group discontinuous channels into a Multi Format Master, right-click each channel and select the same format.

 PatchNet automatically links dynamics to stereo, LCRS, 5.1, 6.1, or 7.1 channels.

To place the master on a channel strip:


1 On the console, press the Masters key from the Main Panel.

2 Select a master channel and assign it to a Strip.

All Multi Format channels have a pan width control activated by the upper switch to the left of the PanF knob. Multi Format masters can be automated just like a mono channel.

Spill Area

The Spill function temporarily assigns the slaves channels of a Control Group or Multi Format Master to predefined Strips.

 See “Spill Select” on page 68 for details.

To Spill slave channels:

1 Press the Strips key in the Main Panel.

2 Press the Spill Select key in the Strips Panel.

3 Press the Wave key on each Strip to include in the Spill area.

4 Press the Chan Select key on a master to spill its slaves into the selected Spill area.

5 To *unspill* the slave channels from the Spill area and restore the Strip’s previous channels, press any master or slave Chan Select key.

Control Groups or Multi Format Masters

It is important to decide whether to use a Control Group or Multi Format Master for a given task. If you need to adjust individual parameters on the slave channels, use a Control Group. Multi Format Master channels are set up with all functions on the slave channels switched in. Therefore, adjusting the EQ on the Multi Format Master channel affects all the slave channels. Adjusting parameters on the Control Group Master affects the slave channels only if that function is switched in at the slave when the Control Group was created or subsequently. For example, adjusting EQ on a Control Group master has no effect on the slave channel unless the slave channel’s EQ is switched in.

To play dual mono signals (i.e., dialog and music), use a Control Group or just two mono channels because you may want to apply different EQ and compression settings to each signal. Use a Control Group to control multiple mics on a similar source (i.e., crowd or drums).

To play a stereo format, use a Multi Format Master because they include dedicated stereo functions: LTM, RTM, Balance and Swap (see “Stereo Controls” on page 80).


To summarize:

- Dual mono: Control Group (adjust functions on the slave channels)
- True stereo source: Multi Format Master (do not adjust the slave channels)
- Multiple similar signals: Control Group (adjust functions on the slave channels)


Chapter 10: Layouts and Snapshots

System 5 performs mix-management functions significantly faster than a traditional analog mixing system:

- The PatchNet digital signal patching system can save a complex patch system for each Title.

 See Chapter 3, “eMix Application.”

- Automation supports recording, refining, and replaying virtually all settings with unprecedented precision.

 See Chapter 12, “Dynamic Automation (SSP Only).”

Snapshots and Layouts further extend this flexible model by storing information that describes the console state at a given time:

- *Layouts* store the channel-to-strip mapping.

For example, channel 8 is mapped to Strip 3 Main level.

- *Snapshots* store the settings of selected channel functions, even if they are not currently assigned to the console surface.

For example, a Snapshot that contains Channel 3’s EQ and Dynamics will restore the values to both functions, regardless of the current knobset function.

Snapshots and Layouts complement each other because their information, while related, does not overlap: Layouts map channels to Strips, and Snapshots determine all, or part of, their channel settings.

Naming, storing, modifying, and recalling functions are accomplished through the Snapshot and Layout Panels, accessed from the Main Panel.

Layouts

A system with 24 Strips and 96 channels cannot map all channels to the console surface at once. Since each Strip can have two channels (Main and Swap), two Layouts are required to map all 96 channels:

- 1 Channels 1–24 to Strips 1–24 Main
Channels 25–48 to Strips 1–24 Swap
- 2 Channels 49–72 to Strips 1–24 Main
Channels 73–96 to Strips 1–24 Swap

A Layout typically consists of channels sharing a common attribute that are required on the console at the same time (i.e., drums, vocals, or dialogue).

The Layouts Panel can name, store, modify, and recall up to 48 Layouts.

New Layout

To create a new Layout:

- 1 From the Main Panel, press the Layout key.

The Layout Panel appears. The button beside the last Layout recalled is illuminated.

- 2 Press the New key at the bottom left of the Layout Panel.

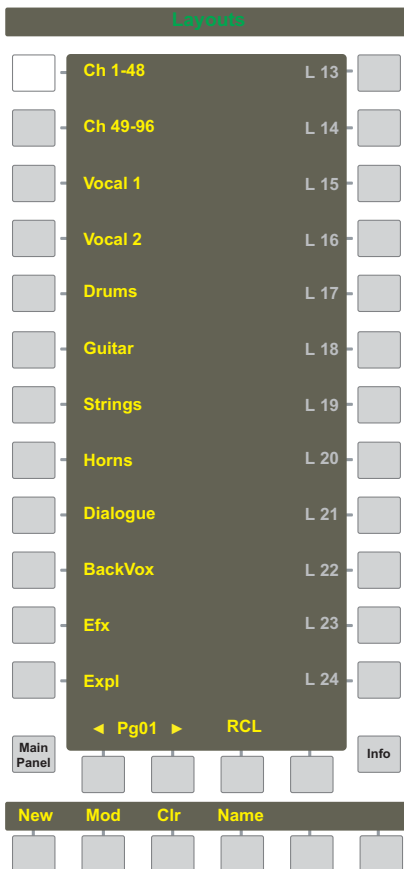
The key flashes to signify creation of a new Layout.

- 3 Select the channels to include in the new Layout:

Press the ALL key at the bottom right of the Layout Panel to select all console Strips.

– or –

Press the Wave key for each Strip to include in the Layout.



Layouts Panel

- 4 To store the new Layout, press the desired Layout key in the Layout Panel.

The New key darkens and the Name key illuminates.

Unused locations are darkened and have a default name (L #). In the figure above, the first unused location is L 13.

- 5 Use the console keyboard to name the new Layout.

Recall a Layout

To recall a single Layout:

- 1 If the RCL key is not lit, press it once so it flashes.
- 2 Press the location key for the desired Layout.

The Layout reconfigures the console surface and the RCL key turns off.

It can be useful to recall several Layouts consecutively to decide which to work with:

- 1 If the RCL key is not lit, press it *twice* so it illuminates but does not flash.
If the RCL key is flashing, press it once.
- 2 Press the location key for the desired Layout.

The Layout reconfigures the console surface and the RCL key remains illuminated for another Recall selection.

Modify a Layout

To modify a Layout:

- 1 Press the Mod key at the bottom of the Layout Panel so it flashes.
- 2 Press the Layout key to modify.

The key begins flashing and the Wave keys for Strips in this Layout illuminate.

- 3 Press an illuminated Wave key to exclude a Strip currently in the Layout.
- 4 Press an unlit Wave key to include a new Strip in the Layout.

The Wave key begins flashing.

- 5 Press the Layout's key again to store changes to this Layout.
- 6 Press the Mod key again to exit the modification process.

Rename a Layout

To rename a Layout:

- 1 Press the Name key at the bottom of the Layout Panel.

The Name key begins flashing.

- 2 Press the Layout key to rename.

That key also flashes.

- 3 Use the console keyboard to rename the Layout (eight characters maximum).
- 4 Press Enter to exit the process.

You can also press the Layout's key or the Name key again to store the new name and exit the renaming process.

Delete a Layout

To delete a Layout:

- 1 Press the Clr key at the bottom of the Layout Panel so it begins flashing.
- 2 Press the key corresponding to the Layout to delete.

That key's display darkens and the name returns to the default (i.e., L #).

Snapshots

A Snapshot stores selected channel functions, switch states, fader and pan settings, and routings, for a selected number of channels. System 5 provides easy methods to store:

- an individual function parameter or switch state;
- the current Knobset function;
- all functions from one or more channels;
- all functions from all channels currently on console surface;
- all functions in all channels in the Mixer Model.

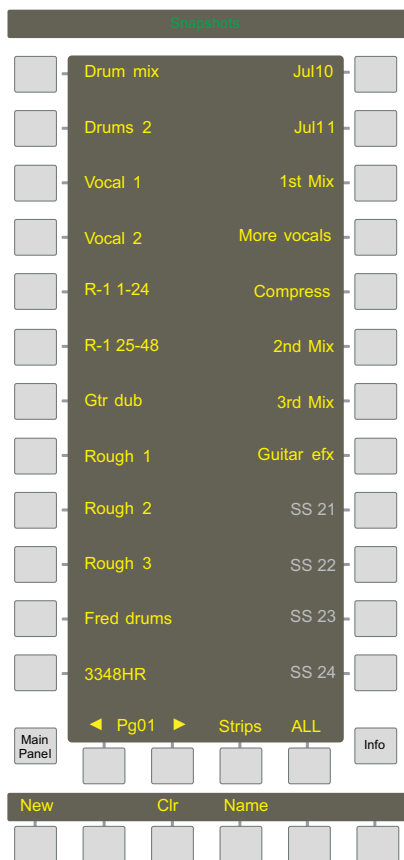
There are 240 Snapshot storage locations, but the number that can actually be stored depends on their content. Only a small number can be stored if they all use the largest console configuration and store all settings for all channels.

New Snapshot

To create a new Snapshot:

- 1 From the Main Panel, press the Snapshot key.

The Snapshot Panel appears. The button beside the last Snapshot recalled is illuminated.



Snapshots Panel

- 2 Press the New key at the bottom left of the Snapshot Panel.

The New key flashes to signify creation of a new Snapshot.

- 3 Select the functions to include in the Snapshot using any of the following methods:

Individual Function or Channel Parameter

Press a Strip function's parameter key or switch to select only that parameter (i.e., High EQ, fader on/off, etc.).

– or –

Current Knobset Function

Press the Knobset Select switch at the top right of the Strip or the Func Sel switch (to the left of the * key) to select all parameters for the current knobset function in the current channel (Main or Swap).

– or –

Individual Channels

Press the Chan Select key for each channel to include in the Snapshot. All channel settings are included but only for the active layer (Main or Swap).

– or –

All Strips on Console Surface

Press the Strps key at the bottom of the Snapshot Panel to select all Knobset functions and switches for all Strips (both Main and Swap channels) currently on the surface.

– or –

All Functions in All Channels in Mixer Model

Press the ALL key at the bottom right of the Snapshot Panel to select all Knobset functions in all console channels (Main and Swap for each channel in the Mixer Model). The ALL keys in the automation area perform the same function.

- 4 Press an unused key in the Snapshot Panel to store the new Snapshot.

Unused locations are darkened and have a default name SS #. In the figure above, the first unused location is SS 21. *It is not possible to overwrite an existing Snapshot. To reuse an existing location, delete the Snapshot first (see page 118).*

The New key darkens and the Name key illuminates.

- 5 Use the console keyboard to name the new Snapshot and press Enter.

After a Snapshot is created, there is no method to query its contents. Therefore, we recommend storing complete channels using a descriptive name. See “Update Snapshot” on page 118 for information.

Recall a Snapshot

To recall a single Snapshot:

- 1 If the RCL key is not lit, press it once so it begins flashing.
- 2 Press the key corresponding to the Snapshot you want to recall.

The Snapshot restores the selected settings and the RCL key stops flashing.

It is sometimes useful to recall several Snapshots consecutively to decide which one to work with:

- 1 If the RCL key is not lit, press it *twice* so it illuminates. If the RCL key is flashing, press it once.
- 2 Press the Snapshot key to recall.

The Snapshot reconfigures the console surface and the RCL key remains illuminated for another selection.

Update Snapshot

If function or switch values in a Snapshot change, they can be easily updated.

- 1 Press the STO key at bottom right of the Snapshot Panel.

The STO key begins flashing.

- 2 Press the Snapshot key to update.

Only the items from the Snapshot are updated to the current settings.

Rename Snapshot

To rename a Snapshot:

- 1 Press the Name key at the bottom of the Snapshot Panel so it begins flashing.

- 2 Press the Snapshot key to rename.

That key flashes.

- 3 Use the console keyboard to rename the Snapshot (eight characters maximum).

- 4 Press the Enter key on the keyboard, the Snapshot's key, or Name key again to store the new name and exit the process.


Delete Snapshot

To delete a Snapshot:

- 1 Press the Clr key at the bottom of the Snapshot Panel so it begins flashing.

- 2 Press the Snapshot key to delete.

That key's display darkens and the name returns to the default (i.e., SS #).

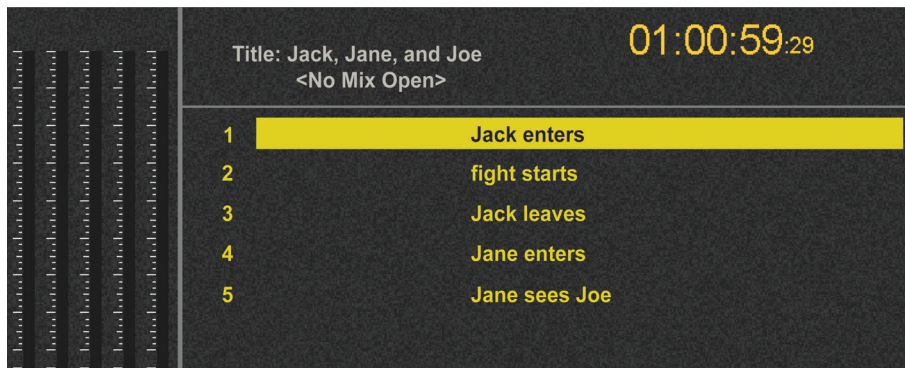
 A Snapshot must be deleted before its location can be used again.

Scene Automation

Scene Automation supports triggering a single Snapshot or an automated sequence of Snapshots either manually or via the event system. Crossfading between scenes can be programmed by setting fader/knob glide times. The delay time between scenes can also be programmed.

Scene List

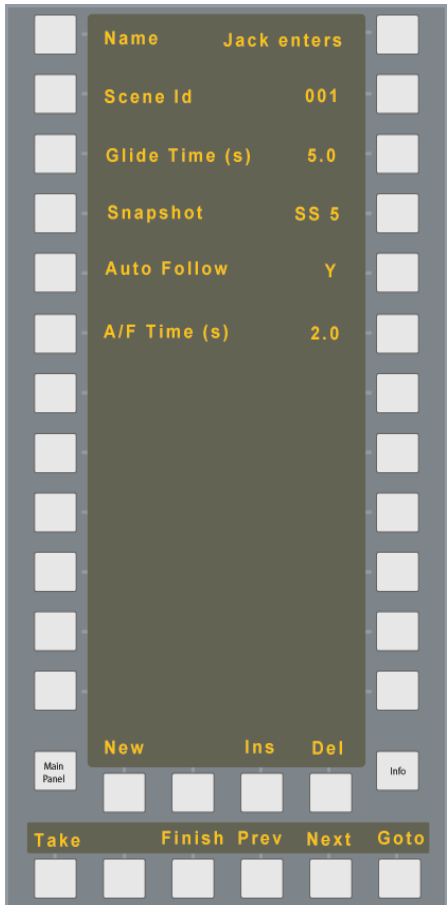
The Scene List is shown on the CM401T. Navigate the Scene List and change properties without recalling the scene using the Next and Prev buttons.



CM401T Scene List

Scenes Panel

To access the Scene Panel, press the Scenes key on the CM401T Main Panel. If there are no Scenes, press New or Ins to create one to edit. The Scene List shows the currently selected parameters. To edit parameter values, press the button to the right of the Scene parameter displayed (see figure above). Use the CM401T keyboard to change the parameters.



CM401T Scene Automation Edit Page

A Scene contains the following parameters:

Name	Enter up to 15 alphanumeric characters for the Scene Name.
Scene Id	The Scene Id is automatically created with the Scene and cannot be edited.
Glide Time	Enter a Glide Time in the range 0–1000 s (resolution to 0.1 s). Typical Glide (crossfade) times are 1, 2, 5, and 7 s.
Snapshot #	Enter the number of the Snapshot to be recalled with the Scene.
Auto Follow	Enter Y if you want another Scene to follow, otherwise leave it at N.
A/F Time (S)	This parameter is used if Auto Follow is enabled. Enter the amount of time between the start of the current Scene and the start of the next Scene. The Auto Follow Time range is 0–2 s (default is 2 s).

The buttons along the bottom of the Scene Panel create and manipulate Scenes.

New	Creates a new Scene at the end of the Scene List. The Glide Time and Auto Follow status of the previous Scene are automatically entered in the new Scene.
Ins	Inserts a Scene after the currently selected Scene. The Glide Time and Auto Follow status of the previous Scene are automatically entered in the new Scene.
Del	Deletes the currently selected Scene.
Take	Executes (fires) the current Scene. This is the only button that can execute a Scene.
Finish	Completes all outstanding glides. It is used to quickly edit a Scene's snapshot values.
Prev and Next	These buttons navigate through the Scene List. They do not execute (or Take) any scenes.

To execute a Scene, select a Scene in the Scene List with the Next or Prev buttons, and press the Take button. When the Scene starts, the "scene cursor" moves to the next Scene in the list, so you can press Take repeatedly to sequence through multiple scenes.

Non-continuous parameters, such as switch status, change as soon as a Scene Snapshot is recalled. A new Scene can be executed while another Scene's Snapshot is still gliding to its final setting. Thus, multiple Scenes can be gliding simultaneously.

For example, if Scene 1 has a Snapshot gliding fader A from Off (minus infinity) to 0 dB in 10 s, and 1 s later, Scene 2 is fired and it glides fader B from Off to 0 dB in 2 s, fader B's glide finishes 7 s before fader A. Although there are no fixed upper limits set for Glide Time and Auto Follow Time, be advised that very long times (e.g., 100,000 s) may affect the reliability and predictability of console performance. There are also no fixed limits for the number of Scenes.

A knob or fader can glide but a switch can not. For example: If a fader is currently down and its ON switch is inactive (off), and a Snapshot has the fader up and its ON switch is active, the fader first moves up, then the switch turns on, so the glide is inaudible.

Chapter 11: Linking (S5P Only)

Multiple parameters can be *linked* such that altering one of them affects them all. Relative offsets are retained between linked continuous controls (fader, EQ, frequency, etc.) so moving any member of a linked group causes all other members to track the magnitude of that move *relative to their start position*. A parameter can be suspended from the Link so it can be moved independently without affecting the others.

When recording automation, all members of the Link drop in together as if they were individually activated. There is no Master/Slave relationship. If the user touches two touch-sensitive controls, the Link is temporarily suspended and the objects move independently. When either is released, the Link is re-established.

Creating a Link

To create a Link:

- 1 To enter Link mode, press and hold a strip's Wave key, and press the Link key.

To indicate Link mode, the surface dims and the *scope* of the current channel's Link is displayed by illuminating the objects in linked channels. If no Link has been set for that channel, all objects are initially selected.

- 2 Select specific objects for Linking using their Select/Punch keys; select specific knobset functions using the Knobset Select keys.

Individual function/object assignment cancels the initial default selection of all objects.

- 3 After defining the Linked objects/functions, select the channels to include in the Linked group by pressing their Link keys.

Each channel's Link key lights to show it is part of the Link. Controls within the scope of that Link illuminate on all Linked channels.

- 4 To exit Link mode, press and hold down the Wave key and press the Link key on any channel in the Link.

The L LED next to the fader lights to show that channel is part of a Link.

The following important issues pertain to links:

- A channel in a Link cannot be included in another until it is removed from its current Link.
- Links are stored with the Title.
- Control Group Masters and MF Masters can be linked.

Modifying and Clearing a Link

To modify a Link, enter Link mode on any channel in the Link (see Step 1 above) and then choose the desired action:

- The Linked functions/objects can be modified from any channel in the link (repeat Step 2 above). All channels reflect the new scope.
- Press the Link keys to add or subtract channels from the Link. If all the channels in a Link are removed, the Link is cleared and the surface exits Link mode.
- Press the Clear key at the top of any Linked channel to clear the entire Link.

Link Suspend

Hold down the Link key to suspend any controls on that channel from the Link. That channel's Linked controls can now be adjusted without affecting the others or being affected by them. Release the Link key to re-establish the Link.

To latch a control into Suspend mode:

- 1 Hold down the Link key and press that function's Select/Punch key.

Suspended objects are indicated by a flashing RGB LED on the knob or a flashing Select/Punch key.

To suspend the entire channel, hold down the Link key and press the Chan Select key. The L LED next to the fader also flashes if the entire channel is suspended.

- 2 To suspend an entire Link, press the Link keys on any two channels in the Link simultaneously. The L LED next to each fader for all channels in the Link flashes to show that they are suspended.

To toggle all channels out of Link Suspend, press the Link key on any two channels in the Link group.

Links and Automation

Linked channel controls all share the same Automation mode. When a channel is added to a Link, its controls adopts the Automation mode already set in the Link. The Automation mode can be changed from any member of the Link. For example, the EQ Band 1 frequency controls for all Linked channels can be set to Isolate in one operation.

If a Linked control requires a different Automation mode than its Linked members, that function or channel must be removed from the Link.

Joystick Linking

Linked channels can be controlled from a joystick panner. A common application uses the joystick to control the pan for several Linked channels. The joystick panel has a Link key above the Solo key (see "CM403 Film/Post Module (S5 Only)" on page 165).

Joystick Operations

To set up a Link from the joystick without existing channel Links:

- 1 Hold down the Wave key and press the joystick's Link key.

The Link key flashes and the joystick displays ?? in the channel display to indicate Link mode.

- 2 Press the Link key on any channel to link it to the joystick.

That strip enters Link mode. Panners are automatically included in the default scope.

- 3 Press Link keys on additional channels to add them to the Link.

- 4 Hold down the Wave key and press the joystick's Link key (or the Link key on any of the selected channels) to exit Link mode.

The joystick Link key stays lit to indicate it controls the Link.

To set up a Link from the joystick with existing channel Links:

- 1 Hold down the Wave key and the press the joystick's Link key.
The Link key flashes and the joystick displays ?? in the channel display to indicate Link mode.
- 2 Press the Link key on any channel already in a Link.
That channel is Linked to the joystick. Strips for all Linked channels enter Link mode.
- 3 Press the Link keys on additional channels to add them to the Link.
Panners are automatically included if they were not already.
- 4 Hold down the Wave key and press the joystick's Link key (or the Link key on any of the selected channels) to exit Link mode.
The joystick's Link key stays lit to indicate it controls the link.

To set up a joystick Link from a Strip:

- 1 Hold down a strip's Wave key and press its Link key.
The Strip enters Link mode and the Link key flashes.
- 2 Press the Link keys on other Strips to add/subtract channels.
Those Strips also enter Link mode. Panners are automatically included.
- 3 Press the joystick's Link key.
The channels in Link mode are assigned to the joystick.
- 4 Hold down the Wave key and press the joystick's Link key (or the Link key on any of the selected channels) to exit Link mode.
The joystick Link key stays lit to indicate it controls the Link.

To clear a Link from the joystick:

- 1 Hold down the Wave key and the press the joystick's Link key.
The Link key flashes and the joystick displays ?? in the channel display to indicate Link mode.
- 2 Press the joystick's Chan Select key to remove the Link from the joystick.
If the joystick controlled an existing channel Link, it is returned to the state prior to the joystick Link.
If the joystick controlled a Link created from the joystick, that Link is cleared.

Joystick Absolute vs. Relative Control

If an unlinked channel is assigned to a joystick using the CM401T's Channels function or the Joystick Quick Assign function, the joystick controls only that channel.

When a Linked channel is assigned to the joystick, two modes are available with different behaviors.

Link Mode	Behavior
Relative	The Link key lights dimly. Moving the joystick alters the assigned channel while maintaining the original relative offsets among linked channels. Pressing the Link key toggles the joystick to Absolute mode.
Absolute	The Link key lights normally. The joystick controls the entire Link by moving all channels to the same absolute position.

Chapter 12: Dynamic Automation (S5P Only)

System 5's dynamic automation records and plays back the movements and settings of the console faders, knobs, and switches. Each parameter displays its automation read/write status with dedicated status LEDs. System 5 provides utilities to easily rehearse automation settings before committing to recording them. After recording initial automation, several editing methods assist smoothing transitions at the punch in/out points and making other refinements. Previous automation passes can even be preserved and restored, which further encourages risk-free experimentation.

These important parameters can be automated:
f

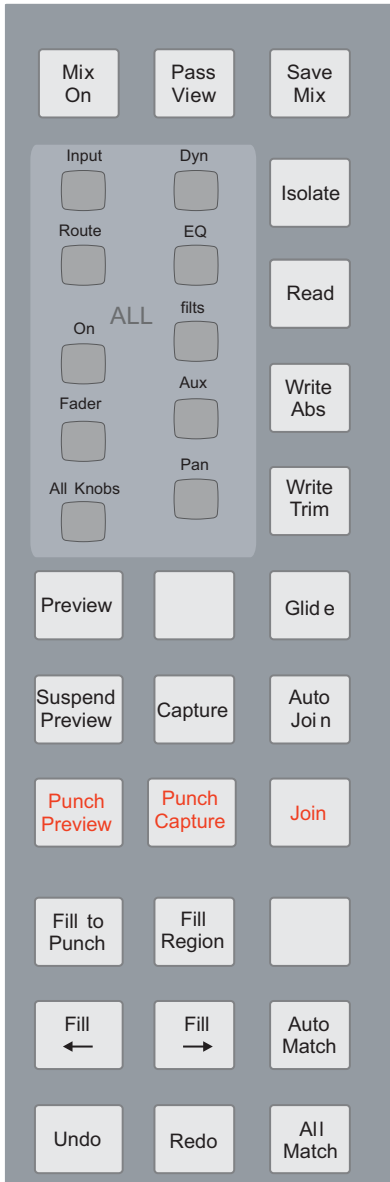
Input	A/B or A+B switching; A and B trim, insert In/Out
Dynamics	Compression, expansion, sidechain, and filters; In/Out
EQ	Frequency, gain, and Q; In/Out
Filters	Frequency; In/Out
Aux Send	Gain and pan (if not mono); On/Off; Pre/Post
Pan	Standard L/R as well as LCR, LCRS, 5.1, 6.1, and 7.1; In/Out
Channel Fader	The channel gain fader is touch sensitive and moves in response to recorded automation; Channel On
Routing	Mix Stem On/Off

These parameters cannot be automated:

- Group bus routing
- Channel path order
- Input A and B Gain

Automation Interface

The interface for each automated channel parameter consists of its Read/Write automation status LEDs and Select/Punch keys. The center section Automation Panel (see figure below) is the global interface that sets automation modes and functions, such as Aux, EQ, Pan, and Dynamics, on all channels.

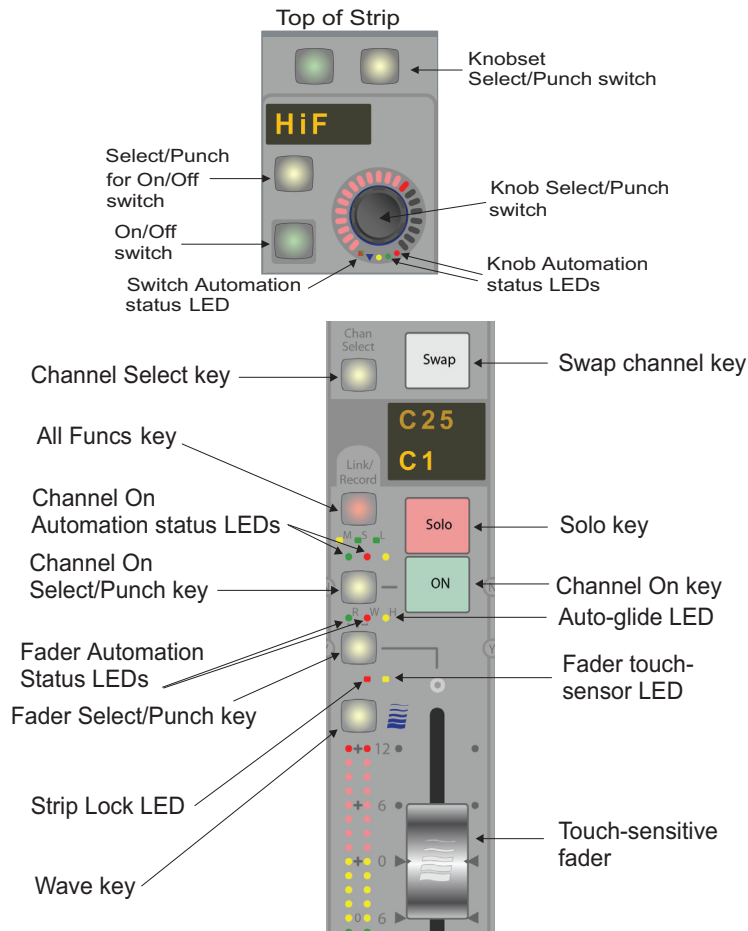


Center Section Automation Panel

Automation LEDs

The figure below shows the fader, switch, and knob automation interfaces. Each automated parameter has two status LEDs:

- The red LED (right) indicates the parameter is in Write mode.
- The green LED (left) indicates the parameter is in Read mode.



Knob (top) and fader (bottom) automation and control features

Select/Punch Keys

The Select/Punch keys

- punch the control into and out of recording automation;
– and –
- assign the selected automation mode to its corresponding parameter.

Automation Modes

The automation mode is stored along with the other parameter settings. Each mode is defined and discussed in detail in the following sections.

Isolate

All parameters default to Isolate mode at the beginning of a new mix. A parameter in Isolate mode will not record or playback automation and operates manually only. If a parameter is set to Isolate mode after recording automation, the automation is preserved but ignored until another mode is selected. Isolate mode is useful when it is important to restrict attention to automation in other functions, and to support manual adjustments without automation playback.

Read

Read mode permits replaying existing automation but not recording new data. It protects against accidentally recording new automation.

During automation playback, the control shows and plays the recorded moves: the LED indication on the knob changes and the fader moves.

Read Suspended: Fader

Touching or moving a fader set to Read mode during automation playback initiates Read Suspended status which overrides the underlying automation with the manual fader moves. The green LED flashes rapidly and the new moves are audible *but not recorded*. Releasing the fader reverts to playing the recorded automation. This is an excellent method to rehearse automation without changing modes or recording over existing automation.

Read Suspended: Knob/Switch

Pressing the Select/Punch key of a knob or switch set to Read mode during automation playback initiates Read Suspended status. The green LED flashes rapidly and the new knob moves and switch states are audible *but not recorded*. Pressing the Select/Punch key again returns to Read mode.

Write Absolute

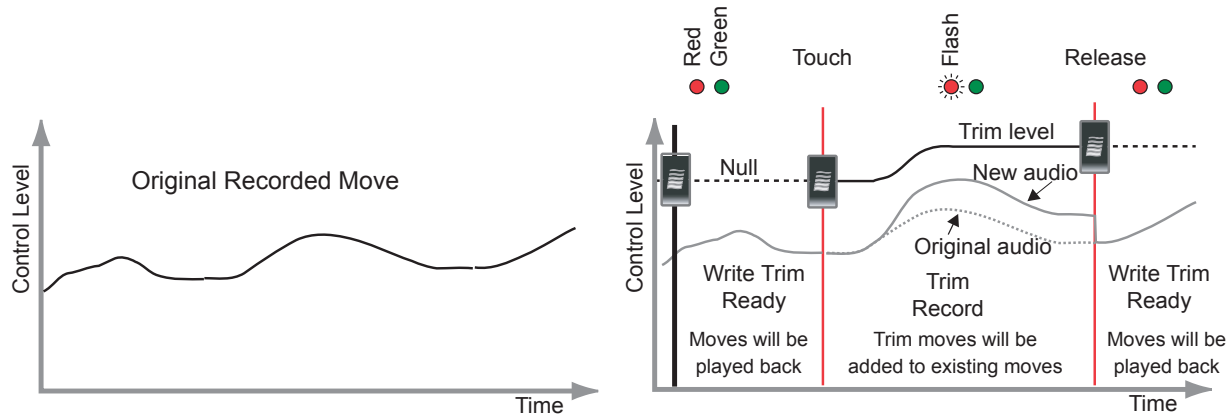
The parameter can record and replay Absolute automation. The red LED flashes while recording. The parameter also plays Trim automation, if it exists, but the indicator reflects the Absolute level.

Write Trim

A knob or fader set to Write Trim mode and punched into record for the first time moves to the null trim position at 0 dB. A trim range of ± 15 dB can augment the Absolute value. Trim settings are maintained separately from Absolute values unless they are merged.

 See “Merge Trim” on page 147.

For example, moving the control up 5 dB from the null position adds 5 dB to the underlying move. Punching in and out without moving the control does not change the underlying move. The figure below shows the effect of writing new Trim data.



Write Trim mode adds Trim moves to Absolute automation values

Summary of Automation Modes

The table below summarizes the four automation modes and their read/write LED state.

Automation Mode	Write LED	Read LED	Description
Isolated	Off	Off	Will not record or playback automation; operates manually only. Previously recorded automation is preserved but ignored until another mode is selected.
Read	Off	Green	Replays existing Absolute and Trim data but will not record new automation.
Write Absolute	Red	Off	Records and replays Absolute automation; replays Trim data but indicates Absolute level. (Applies to Faders and Aux Sends Only)
Write Trim	Red	Green	Records and replays Trim automation; replays Absolute data but indicates Trim level.
AGlide			When enabled, the yellow LED next to the fader is on and Auto Glide is enabled. When not enabled, the yellow LED is off and the mode is Manual Glide (“Fader Glide Modes” on page 135).

Assigning an Automation Mode

An automation mode can be assigned using three methods, each discussed in its own section below.

- Global Mode/Global Function: Assign a globally selected automation mode to all console functions of a given type.
 - or –
- Global Mode/Strip Function: Assign a globally selected automation mode to selected Strip functions.
 - or –
- Strip Mode/Strip Function: Assign a Strip's automation mode to an individual Strip function.

Global Mode/Global Function

To set a global automation mode for all function parameters of one type using the ALL keys in the center section Automation Panel:

- 1 Press the Write Abs key so it begins flashing.
- 2 Press the EQ key in the ALL section.

All channel EQs are now set to Write Absolute mode.

- 3 While the Write Abs key is still flashing, other functions can be set to Write Absolute mode by pressing another ALL section function key.
- 4 When finished, press the Write Abs key again so it stops flashing.

Global Mode/Strip Function

To assign a global automation mode to all knobset functions, the current knobset function, or an individual parameter on the Strip:

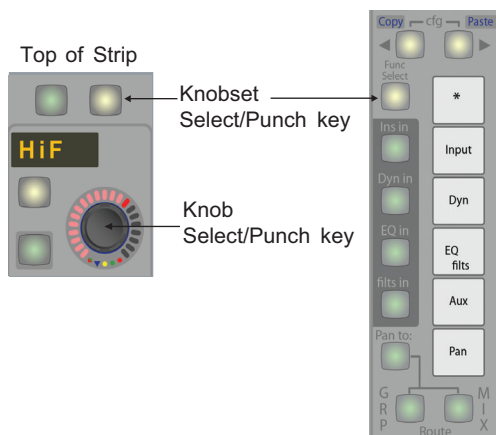
- 1 Press the Write Abs key in the center section Automation Panel.

The Write Abs key begins flashing and the surface controls dim.

- 2 Assign the selected mode to the entire knobset currently on the Strip by pressing the Knobset Select switch at the top right of the Strip, or at the top of the Strip's function keys (see figure below).

Assign the automation mode to *all* of the Strip's knobset parameters by pressing the All Knobs key.

Assign the automation mode to an individual knob by pressing that knob's Select/Punch key.



Knobset Select/Punch keys

- 3 While the Write Abs key is still flashing, other individual Strip functions can be set to Write Absolute mode.
- 4 When finished, press the Write Abs key again so it stops flashing.

Strip Mode/Strip Function

To assign an automation mode selected on the Strip to an entire function or individual parameters on a Strip:

- 1 Hold down the Strip's Wave key and press its Select/Punch key.

The popup menu above the Strip displays automation modes. The current mode is highlighted in green.

- 2 Press the Select/Punch key until the desired mode is highlighted green.
- 3 Release the Select/Punch key, but keep holding down the Wave key.
- 4 To assign the mode to an individual parameter, press a knob's Select/Punch key.

To assign the mode to the entire knobset, press the Knobset Select/Punch key at the top right of the Strip (or at the top of the Strip's function keys) repeatedly until the desired mode is highlighted.

Changing an Individual Parameter's Automation Mode

To change the automation mode of an individual parameter, even if it has been assigned globally:

- 1 Simultaneously press the Wave key and Select/Punch key for the parameter to assign.

A popup menu above the Strip displays the automation modes.

Keep hold holding down the Wave key.

- 2 Press the Select/Punch key repeatedly until the desired mode is highlighted.
- 3 Release both keys to select the last mode highlighted.



Toggleing the automation mode is closely related to setting the Glide settings. Continuing to hold down the Wave key and repeatedly pressing the Select/Punch key cycles through the automation modes. To toggle the Glide setting, be sure to press the Select/Punch key once and then release both keys.


Recording Automation

Since Isolate is the default mode for all parameters, the read and write LEDs are off at the beginning of a new mixing session. To record and play automation, the Mix On key must be lit at the top left of the center section Automation Panel (see the figure on page 125).

Knob and Fader Automation

To record basic fader and knob automation:

- 1 Press the Mix On button so it is lit.
- 2 Set the automation mode to Write Absolute or Write Trim for desired parameters.

 See "Automation Modes" on page 128.

- 3 Play an audio source that includes timecode into the console.
- 4 Press an automated parameter's Select/Punch key or touch the fader to punch in.

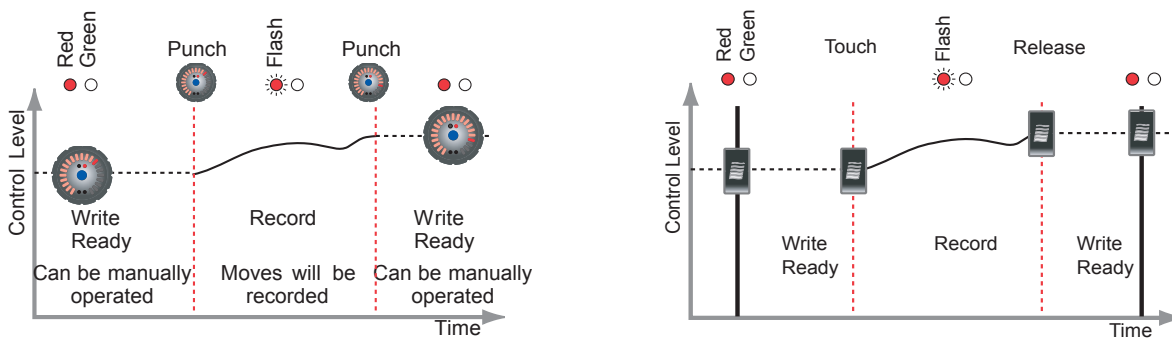
The parameter's automation LED flashes red.

The Chan Select key cannot be used to punch in an entire channel.

- 5 Adjust the parameter.

- 6 Press the parameter's Select/Punch key again, or release the fader to punch out.

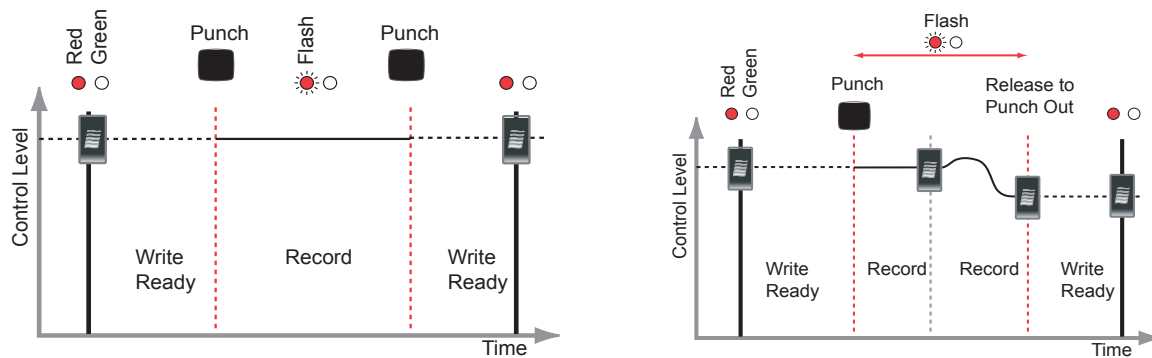
Press the All Knobs key to punch out all knobset parameters.



Knob (left) and fader (right) punch record methods

Additional Fader Punch Record Methods

- To record a flat move without touching the fader, punch the fader in and out with the fader Select/Punch key (left of figure below).



Additional punch record methods

- Press the fader Select/Punch key to punch in the fader, move to the desired level, and release it to punch out (right of figure above).
- Touch the fader to punch in, and press the fader Select/Punch key to punch out.
- Touch the fader to punch in, and release it to punch out.

💡 See “Fader Glide Modes” on page 135 for details about how the glide setting affects punch-out behavior.

Knob Touch Enabled

Knob Touch Enabled mode means that knobs punch in automatically when *touched* and punch out when released (see “Rotary Knobs” on page 71). The Knob Touch Punch setting is in the Automation Panel Page 2.

💡 If Knob Touch Punch is not active, press the knob top to punch in.

Knob Pickup

Knob Pickup means that knobs punch in automatically when *moved enough to change the parameter’s value*. The Knob Pickup setting is in the Automation Panel Page 2. If Knob Touch Enabled is active, releasing the knob punches out. Otherwise, press the knob’s Select/Punch key to punch out.

Switches

Switches behave exactly like knobs and faders except their value can only be *Off* or *On*. Switches cannot record Trim data nor are they touch sensitive. Switches must be explicitly punched in and out using their Select/Punch keys unless Switch Pickup is active (see below).

Switch on Release

Switch on Release (Automation Panel Page 2) means the switch activates when *released*, not when *pressed*.

💡 This mode is useful to prepare for a precise event. Press down the switch well in advance, wait for the cue, and release it.


Switch Pickup

Switch Pickup (Automation Panel Page 2) means that switches punch in automatically when first pressed down. Press the switch’s Select/Punch key to punch out.

💡 If Switch Pickup and Switch on Release are both active, the switch will punch in when pressed down but will not toggle its value until released.

Playing Back Automation

A control's behavior during automation playback depends on its type (knob, fader, switch) and the automation mode. This section describes only those control/mode combinations that, during playback, neither respond to automation nor begin recording automatically when adjusted manually.

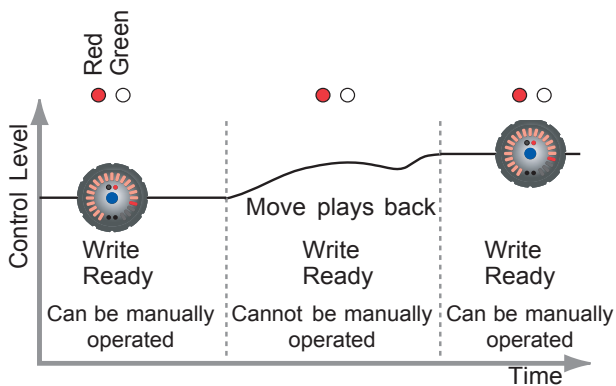
 See "Automation Modes" on page 128 for descriptions of the automation modes.

Write Absolute

Knob

Rewind to just prior to the recorded automation. In Write Absolute mode, playing back knob automation has the following response (see figure below):

- The knob can be adjusted manually if it has no underlying automation.
- If Knob Pickup is not enabled, the knob LED ring indicates the current parameter value, but does not respond to manual adjustment.



Playing a knob automation move in Write Absolute mode

Fader

During automation playback, the fader moves to reflect the recorded moves. Touching a fader during playback punches into record again. The behavior upon releasing the fader depends on the Glide setting ("Fader Glide Modes" on page 135).

Read

A control set to Read mode plays, but does not record, automation.

Fader

Manually adjusting a fader in Read mode overrides the recorded automation. The manual fader moves are audible but not recorded. Releasing the fader returns control to automation playback.

Knob/Switch

Manually adjusting a knob or switch in Read mode during automation playback has no effect unless

- the knob or switch's Select/Punch key is pressed;
 - or –
- Knob Pickup (page 133) or Switch Pickup (page 133) is active.

These conditions initiate the Read Suspended state: The green LED flashes rapidly and the new knob moves or switch states are audible *but not recorded*. This is an effective method of rehearsing automation moves without changing modes. Press the Select/Punch key again to return to Read mode.

Isolate

In Isolate mode, parameters do not play or record automation, but can be manually adjusted.

Write Trim

Playing back Trim automation for an Aux knob or fader has the following behavior:

- If the control is in Write Trim mode, it indicates the Trim level of the recorded automation, while the audio reflects the total level (Absolute + Trim).
- If the control is in Read mode, the control and audio playback reflect the total level (Absolute + Trim).

Modifying Automation

Audio engineers are well acquainted with the challenges of punching in and out to fix audio tracks without creating jarring level changes or other anomalies that call attention to the editing. Punching in and out to modify automation presents similar issues: the setting at the punch-out point must closely match the underlying automation that will resume after that point or the transition may be audible.

Knobs and faders have three modes that determine what happens after punching out of an automation pass: Auto Glide, Manual Glide, and Auto-TakeOver (ATO).

Auto and Manual Glide offer different methods to create a seamless punch-out point, but both automatically glide after punching out. They differ in *how* the punch out occurs.

- In Auto Glide, the knob or fader punches out *automatically* when released.
- In Manual Glide, the knob or fader's Select/Punch key must be *manually* pressed.
The All Match key in the center section Automation Panel can also punch out.

The A/Glide and M/Glide settings (in the Automation Panel) set the glide time between the punch-out level and the automation level that continues after punch out.

Auto-TakeOver lets you control the post-punch out glide behavior. After manually punching out with the control's Select/Punch or the All Match key, move the control until its value intersects the underlying automation. To make a smooth transition, you must know whether the punch-out level is above or below the underlying automation.

Fader Glide Modes



The screen above the Strip indicates the Auto or Manual Glide status for the knobs only, not the fader.

Auto and Manual Glide inter-cancel: faders are always set to Auto or Manual Glide and they toggle between values. The yellow LED next to the Read/Write automation LEDs illuminates when the fader is set to Auto Glide.

To toggle a fader's Auto/Manual glide setting:

- 1 Press and hold down the Wave key.
- 2 Press the fader's Select/Punch key *once*.
- 3 Release both keys.

Alternately, press the Glide key in the Automation Panel and then the Faders key in the All Panel to toggle between Auto (Glide key lit) and Manual Glide.

The Glide key in the center section Automation Panel can also toggle the fader's status:

- 1 Press the Glide key so it illuminates.
- 2 Press the Chan Select key.

Auto-TakeOver is independent of the fader's Auto/Manual Glide status.

The fader's ATO setting can be changed “on the fly” to override either Auto or Manual Glide:

- 1 While holding the fader, press its Select/Punch key.

The red automation LED blinks rapidly.

- 2 Move the fader until its level intersects with the underlying automation.

The fader automatically punches out.

The ATO setting is not *sticky*: the current Auto/Manual Glide setting resumes control during the next automation record session.

Knob Glide Modes

If Knob Touch Enabled is active (see page 133), Auto and Manual Glide intercancel: knobs toggle between these values.

Manual Glide functions the same for knobs and faders: After manually punching out with the knob's Select/Punch or All Match key, the control uses the time set in the M/Glide field (in the Automation Panel Page 1) to glide from the setting at the punch-out point to the underlying automation.

To toggle the knob's Auto/Manual Glide status:

- 1 Activate Knob Touch Enabled (see page 133).
- 2 Press and hold down the Wave key.
- 3 Press the knob's Func Select key *once*.
- 4 Release both keys.

The screen above the Strip indicates the status for the knobs only, not the fader.

Alternately, press the Glide key in the Automation Panel, and then the Knobs key in the All Panel to toggle between Auto (Glide key lit) and Manual Glide.

Auto-TakeOver is independent of the knob's Auto/Manual Glide status.

The knob's ATO setting can be changed “on the fly” to override either Auto or Manual Glide:

- 1 While holding the knob, press its knob top.

The red automation LED blinks rapidly.


- 2 Move the knob until its level intersects with the underlying automation.

The knob automatically punches out.

The ATO setting is not *sticky*: the current Auto/Manual Glide setting resumes control during the next automation record session.

The Glide key in the center section Automation Panel can also toggle the fader's status:

- 1 Activate Knob Touch Enabled (see page 133).
- 2 Press the Glide key so it illuminates.
- 3 Press the knob.

 *Toggling the Glide settings is closely related to setting the automation mode. Continuing to hold down the Wave key and repeatedly pressing the Func Select key cycles through the automation modes. To toggle the Glide setting, press the Func Select key once and then release both keys.*

Setting Auto and Manual Glide Times


To set the Auto Glide time in the Automation Panel:

- 1 From the Main Panel, press the Automation button to display Automation Panel Page 1.
- 2 Enter a timecode into the locate time display using the center section numeric keypad.

The entire time must be entered, beginning with frames. When the first numeric key is pressed, the display clears to enter the new value.

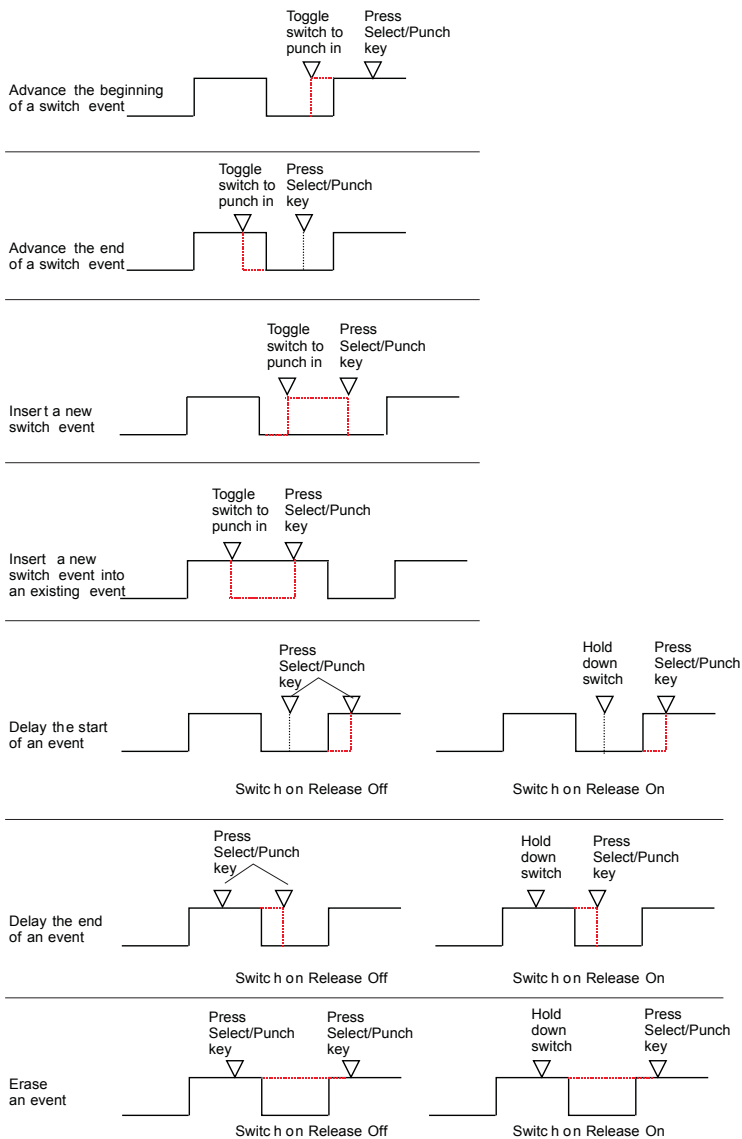
- 3 Press Store Locate and then the A/Glide key in Automation Panel Page 1 to transfer the locate time to the A/Glide field.

Perform the same steps to set the M/Glide time but press the M/Glide key instead of the A/Glide key in step 3.

 *If the A/Glide or M/Glide time is 0, a fader in that mode snaps abruptly to match the underlying automation. This is the same behavior enabled by Snap Mode (see "Snap Mode" on page 144).*

Switch Automation

The figure below summarizes most of the methods to add, erase, and modify switch automation events.



Adding, erasing, and modifying the times of switch automation events

Fill Features

To understand the utility of System 5's Fill features, consider this situation:

Fader automation has been recorded from 00:01:00:00 to 00:02:00:00 and from 00:04:00:00 to 00:05:00:00. What initial fader value should be used if recording or playback begins at 00:03:00:00? Because there is no automation written at this time, it is called *virgin territory*.

System 5 derives a fader value using two methods:

- First, it looks from the current position back to the beginning of the mix for the last value recorded. In the example above, the last fader value at the punch-out point (00:02:00:00) would be used.
 - or –
- Then, it looks from the current position towards the end of the mix for the next recorded fader value.

The Fill features make it unnecessary to do a complete initial pass just to write settings throughout the mix; the engineer can record only necessary moves.

It is sometimes desirable, though, to write nominal values in all, or selected areas of the mix. System 5's Fill utilities accomplish this: AutoFill, Fill Start, Fill End, Fill Region, and Fill to Punch.

Refer to the figure below to locate the Automation Panel keys mentioned in this section.

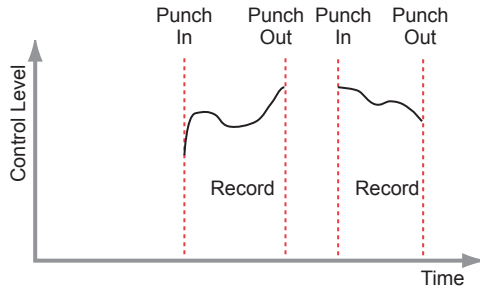


Center Section Automation Panel

AutoFill

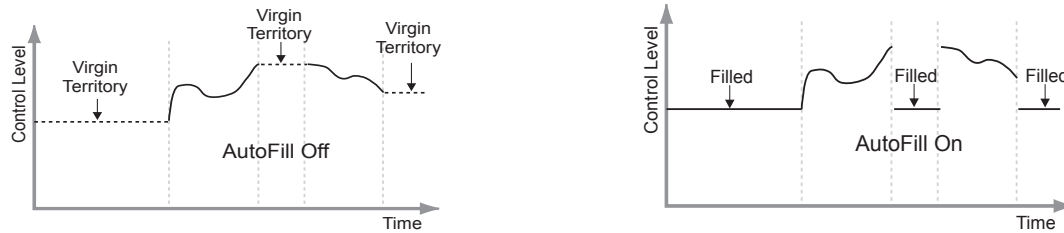
AutoFill writes the value at the punch-in point back to the beginning of the mix (or previous punch-out point) and to the end of the mix (or next punch-in point). AutoFill can only be used during a parameter's first automation pass, which ends when the recorder stops; more than one punch in/out is permitted. If automation has already been recorded for that parameter, AutoFill can be set to *On* but will have no effect. AutoFill acts independently on Absolute and Trim automation but has only one setting.

The figure below shows the results of recording fader movements in two discontinuous sections during a first automation pass.



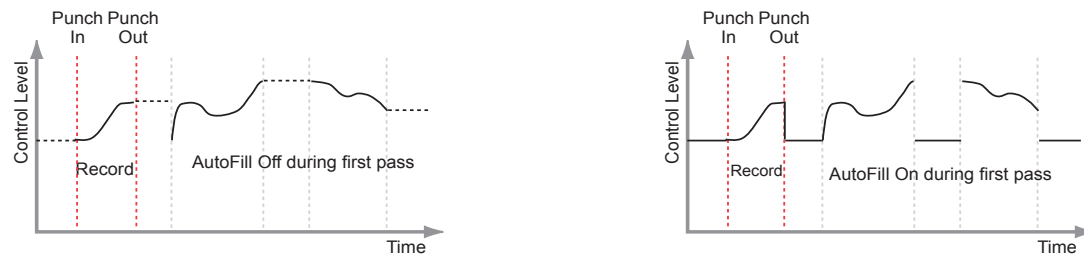
Fader values recorded during first pass

The figure below (left) shows the resulting fader values with AutoFill Off. The dotted lines indicate virgin territory and the level derived for the fader if the tape were located there. The figure below (right) shows the resulting fader values with AutoFill On. The flat solid lines, marked *Filled*, indicate where AutoFill wrote values. Two or more discontinuous punch sections can be used during the first pass *only if the recorder is not stopped before recording the additional punch in/out sections*.



Fader values resulting from the first pass with AutoFill Off (left) and On (right)

The figure below shows the results of punching in for a second pass after a first pass with AutoFill Off (left) and On (right). With AutoFill Off, the initial fader value cannot be derived by looking earlier in the mix so the value from the first punch-in point is used instead. With AutoFill On, the initial value has already been written so the new section merely replaces the section filled by AutoFill.

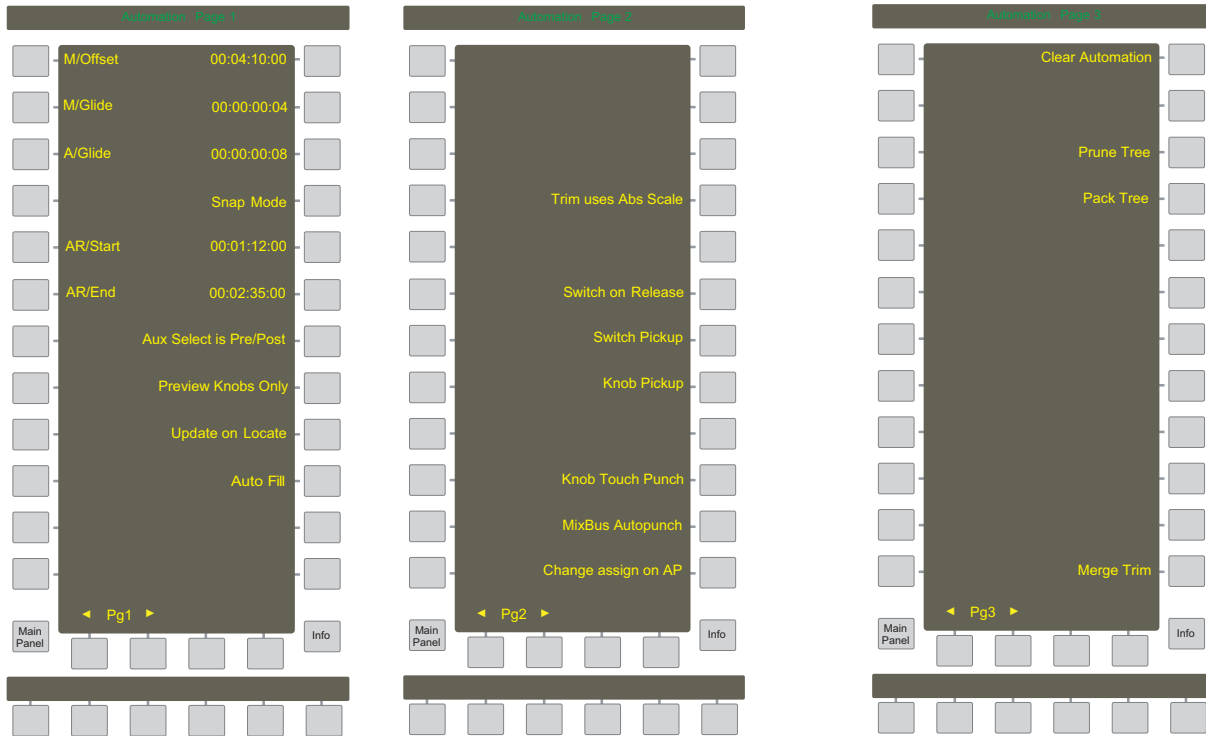


Recording a second pass after AutoFill was Off (left) and On (right) during first pass

Setting AutoFill to On

AutoFill defaults to *Off* so you must set it explicitly to *On* prior to the first pass.

- 1 From the Main Panel, press the Automation button to display Automation Panel Page 1.
- 2 Press the Page > key to display Automation Panel Page 2 (see figure below).
- 3 Press the AutoFill key to enable AutoFill for the first pass.



Automation Panel Pages 1-3

Fill Start

- 1 Press the Fill Start key in the center section automation panel.
The Fill Start key flashes.
- 2 Punch in the parameter and adjust the control.
- 3 Punch out and the level at that time is written to the start of the mix.

The Fill End key stops flashing indicating it is no longer active.

Fill Start is useful for writing mutes to the beginning of a song.

- 1 Locate to the Title start.
- 2 Set all Fader On switches to Write Absolute mode for channels that should *not* be active at the song start.
- 3 Punch in, mute the On switch and punch out just before the song actually starts.

This mutes the channel back to the Title start.

Fill End

- 1 Press the Fill End key in the center section automation panel.

The Fill End key flashes.

- 2 Punch in the parameter and adjust the control.
- 3 Punch out and the level at that time is written to the end of the mix.

The Fill End key stops flashing indicating it is no longer active.

Fill End is useful to quickly fill a static value to the end of a mix without recording to the end.



Pressing Fill Start or Fill End twice in rapid succession will cause the key to latch on so it remains active after the pass ends.

Fill Start + Fill End

- 1 Press Fill End then Fill Start in the center section automation panel.

Both keys must be illuminated.

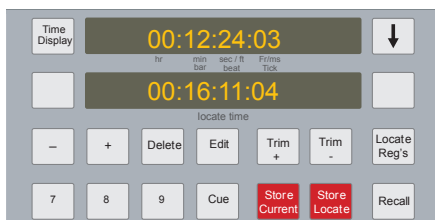
- 2 Punch in the parameter and adjust the control.
- 3 Punch out and the level at that time is written throughout the mix.

Using Fill Start and Fill End together is a useful way to set a static value all the way through the mix.

Setting Fill Start and End Times

The Fill Region features, discussed in the next sections, require setting the AR/Start and AR/End time fields in the Automation Panel. The Fill Region key *must be lit for these times to be used*.

- 1 From the Main Panel, press the Automation button to display Automation Panel Page 1.
- 2 Enter a complete timecode (begin with frames) into the locate time display using the center section numeric keypad. After pressing the first numeric key, the display clears to enter the new value. You can also recall a Cue to enter the time (see “Cue Points” on page 105).
- 3 Press Store Locate and then the AR/Start key in Automation Panel Page 1 to transfer the locate time to the AR/Start field.
- 4 Enter the AR/End time into the locate time display by repeating step 2.
- 5 Press Store Locate and then the AR/End key in Automation Panel Page 1 to transfer the locate time to the AR/End field.



Setting times in the machine control panel

To adjust the AR/Start or AR/End time by a few frames:

- 1 On the center section, press Recall then AR/Start to transfer the AR/Start time to the locate time display.
- 2 Press the Trim +/- keys to adjust the value in one frame increments.
- 3 Press Store Locate and then AR/Start to transfer the new value to the AR/Start field.

To modify the AR/End time, perform the same steps but substitute the AR/End for the AR/Start key.



The center section Fill Start and Fill End keys can be used interchangeably with the AR/Start and AR/End keys.

Fill Region + Fill Start + Fill End

Fill Region is used in combination with Fill Start and Fill End to set a value for a defined region rather than throughout the mix. The punch-out point must be within the defined region for the fill to apply.

- 1 Record a fader level from 00:01:00:00 to 00:02:00:00 so you can see how the new level will override an existing one.
- 2 Enter 00:01:00:00 into the AR/Start field and 00:02:00:00 into the AR/End field.
See “Setting Fill Start and End Times” on page 141 to see how to set the times.
- 3 Now activate Fill Start, Fill End and Fill Region.
- 4 Record new fader movements in this section and punch out at the desired level. The new level will be written from 1 to 2 minutes.

Fill Region + Fill End

- 1 Set the AR/End time.
See “Setting Fill Start and End Times” on page 141 to see how to set the times.
- 2 Activate Fill End and Fill Region. Do not activate Fill Start.
- 3 Punch in, adjust the control, and punch out.
The value at the punch-out time is written to the time set for AR/End.

Fill Region + Fill Start

- 1 Set the AR/Start time.
See “Setting Fill Start and End Times” on page 141 to see how to set the times.
- 2 Activate Fill Start and Fill Region. Do not activate Fill End.
- 3 Punch in, adjust the control and punch out.
The value at the punch-out time is written to the time set for AR/Start.

Fill to Punch

Fill to Punch and Fill Start inter-cancel; selecting one deselects the other.

Fill to Punch behaves like Fill Region except the area is not designated prior to punching in by setting AR/Start and AR/End times. Fill to Punch writes the value at the punch-out time back to the punch-in time.

Automation Performance Utilities

Preview

Preview mode is an easy way to set a parameter to a specific level without recording the moves necessary to locate that level or changing the automation mode. Activate the Preview key in the center section Automation Panel so it is illuminated. The first punch-in action (i.e., touching a knob or fader, or pressing the Select/Punch key) punches that parameter into Preview mode, and its level can be adjusted. The next punch-in action for that parameter punches it into its assigned automation mode at the level set in Preview. Turning Preview off cancels any parameters with Preview levels.

Suspend Preview

Suspend Preview makes it easy to record automation without removing parameters designated for Preview. Press the Suspend Preview key so it is illuminated to display and hear the underlying automation rather than the Preview level. The parameter will punch in at the Preview level regardless of the state of the Suspend Preview key.

Punch Preview

Press the Punch Preview key to punch in all parameters in Preview mode at the level set when punched out in the Preview pass. Activating the Punch Preview key automatically illuminates the Suspend Preview key.

Knobs and Switches

Punching in a knob or switch set to Write Absolute (or Write Trim for the knob) with Preview On permits manual changes to the parameter, but ignores underlying automation. Pressing the Select/Punch key a second time punches in with the selected automation mode.

This feature is useful to record an abrupt discontinuous change, such as described below.

To shift the Pan setting from the current setting of extreme left to extreme right:

- 1 Activate Preview in the center section Automation Panel.
- 2 Select Write Absolute mode for the Pan knob on the desired Strip.
- 3 Press the Pan Select/Punch switch and set the control to extreme right.
- 4 At the appropriate point, press the Select/Punch key again.

The previewed level is recorded from that point until the Select/Punch key is pressed again to punch out.

Faders

Preview for a fader can be initiated by touching the fader or pressing the Select/Punch key. To punch into record from Preview, press either the fader's Select/Punch key or the All Match key in the center section.

Preview remains active after the punch out, so the fader stays in manual control until the recorder stops and the pass is complete.

Preview Knobs Only

This option supports entering Preview mode on the knobs only, while writing moves on the faders.

Auto Punch

Auto Punch supports punching in automatically, starting at the time stored in the AR/Start register and ending at the time stored in the AR/End register (see "Setting Fill Start and End Times" on page 141). When Auto Punch: Locate is turned on (see page 107), pressing Auto Punch starts automation playback/record at the AR/Start time and stops at the AR/End time.

Rehearse

Reh switches the Control Room monitor source from Mix Bus Outputs (playback) to Mix Bus Returns (input) so you can listen to the recorder tracks. Reh works only on record-enabled tracks.

Mix Bus Auto Punch

With Mix Bus Auto Punch enabled, automation punches in on all mix sections when any one of them is automated. This reduces the chances of *double bussing* a channel by ensuring that the routing change is written across all the stems.

Join

When the recorder stops while recording automation, the pass ends and any parameters still recording are automatically punched out. It is useful to remember which parameters were punched in when the tape stopped so they can be punched back in during the next pass. Join and Auto Join offer different ways to accomplish this automatically.

Press the Join key during the automation pass in which you want to remember the punched in parameters. After stopping and resuming recording automation, press the Join key again to punch in the automation parameters from the last pass.

Auto Join

Press the Auto Join key during the pass in which you want to remember the punched in parameters. After stopping the recorder, rewinding, and resuming recording automation, all parameters from the last pass automatically punch in when the recorder arrives at the end of the last pass.

Capture

During an automation pass, press the Capture key to store a snapshot of all parameters currently in record or preview in the Capture Buffer. If no objects are in record or preview, no action is taken and the previous Capture Buffer is maintained.

The unlabeled key above the Capture key is an additional independent Capture buffer. Activate either key to store to the desired buffer.

Punch Capture

During an automation pass, press the Punch Capture key to punch all objects in the active Capture buffer (see above) into record at their captured values.

Snap Mode

Snap Mode overrides the A/Glide or M/Glide times for knobs and faders set to Auto or Manual Glide by causing the knob or fader to abruptly shift from the level at the punch-out point to the underlying automation level. Snap Mode is activated in the Automation Panel Page 1.

Update on Locate

Update on Locate (Automation Panel Page 2) controls how automation values are derived when the recorder is relocated between playbacks. When active, the automation values from the new location are loaded *before* beginning playback. Update on Locate should usually be active when automation values are stable and not being edited or recorded.

When Update on Locate is inactive, the last value used during the previous playback for that parameter is retained at the new location *prior* to playback. When playback begins, the current location's value (or the value derived from looking ahead or back) is used. However, if the parameter is punched into record *prior* to beginning playback, the *previous* setting is used. This is useful if you experimented with a parameter setting during the previous playback and want to use that setting to begin another section.

All Match

All Match punches out *all* parameters currently recording and glides/snaps them back to their underlying automation value.

Auto Match

Auto Match automatically snaps to the underlying automation when the recorder stops.

Synchronizing Automation with an External Device

System 5's automation can be synchronized to incoming timecode from an external device, such as a tape recorder. TC Lock and TC Slave, available from the Setup menu in the Machines Panel, establish the type and sensitivity of the synchronization.

TC Lock

TC Lock sets the elapsed time before System 5 locks to the incoming timecode. This setting accounts for the time required by the tape deck to ramp up to its playback speed. If the console locks to the signal before the playback speed stabilizes, the automation will not properly synchronize with the audio on the tape.

The default TC Lock setting is 1000 ms. When active, TC Lock can be set using the SpinKnob. We recommend starting at 200 ms and increasing in 50 ms increments until the automation is free of errors.

Bus Master Automation

The Bus Masters can be automated using the same modes as a normal channel. The automation mode popup list appears in the standard channel's graphic display, next to the Bus Master Strip.

Mix Assigns

The mix bus section legs can be automated like any other switch. The center switch accesses the legs from the mix route page. The Select/Punch (bottom left) switch assigns the legs.

Automation Management

Group Coalesce

Group Coalesce transfers automation from the Control Group master fader to the slaves.

- 1 Press the Panel Viewer's Main Panel key.
- 2 Press the Groups button to display the Groups Panel.
- 3 Press the Coalesce key at the bottom of the Groups Panel.

The Coalesce key begins flashing.

- 4 Press the Groups key to coalesce the group.

All master fader moves get transferred to the slaves and the Control Group is deleted.

Mix Passes

A *mix pass* is created each time an automation punch in occurs until the recorder stops. If the recorder stops before the all parameters punch out, the pass consists of all automation from the first parameter punched in to when playback stops. If playback stops *after* a punch out, the pass ends when the last parameter punches out.

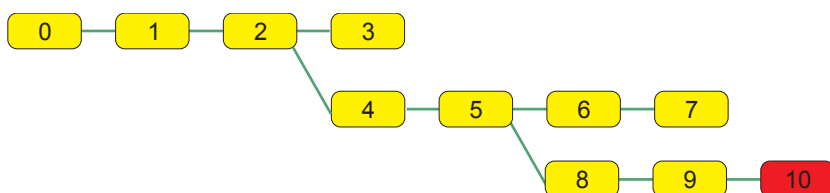
Each pass is stored automatically and numbered chronologically. All mix passes are saved with a Mix and loaded when the Mix is re-opened (see "Save Mix" on page 147).

View Mix Passes

Press the Pass View key at the top of the center section Automation Panel to display the Pass Tree.

To navigate through the Pass Tree to activate a different pass:

- 1 Rotate the SpinKnob clockwise to move to higher pass numbers, counter-clockwise to move to lower numbers.
- 2 Press the Enter key to select the highlighted pass.



Mix Pass tree

The following analysis of the example Pass Tree in the figure above explains most of its features:

- Pass 1 contains additional automation, but is based on Pass 0's automation.
Pass 1 may have new automation, modify Pass 0's automation, or both.
- Pass 2 is derived from Pass 1 like Pass 1 was from Pass 0.
- Pass 3 is derived from Pass 2.
- Pass 4 is derived from Pass 2, *not from Pass 3*.
Pass 3 may be an experiment the user saved but decided not to continue using.
- Pass 5 is derived from Pass 4.
- Pass 6 is derived from Pass 5.
- Pass 7 is derived from Pass 6.
- Pass 8 is derived from Pass 5, *not from Pass 7*.
Passes 6 and 7, like Pass 3, have been saved, but the user decided to continue with a different path.

Prune Tree

Pruning the mix tree deletes all passes that are not in the direct line from the first to the last pass. In the figure above, passes 3, 6, and 7 would be deleted but the existing numbers are retained. This frees up space and simplifies complicated trees. Prune the tree only when you are sure you will not need the information in those passes.

- 1 Press the Prune Tree key in Automation Panel Page 2.
- 2 Confirm at the bottom of the panel to prune the pass tree.

Merge Trim

Merge Trim adds the Trim data to the Absolute automation. This operation does not change the audio but does set the Trim automation to zero. When a Trim move yields a satisfactory modification, it is simpler to use Merge Trim to keep all the automation in the Absolute domain. Merge Trim also reserves the full 15-dB range for further trim operations, if necessary.

Clear Automation

Clear Automation deletes all automation passes leaving only an empty pass 0.



Since this erases all automation, be careful before executing this command!

- 1 Press the Clear Automation key in Automation Panel Page 2.
- 2 Confirm at the bottom of the panel to clear automation.

Mix Offset

Normally, the current time display shows the absolute timecode from the beginning of the Title. It can be useful to show a different time in the current time display. For example, set the beginning of a song within the Title to 00:00:00:00 so the song time is readily visible.

To offset the current mix against the incoming timecode:

- 1 Enter an offset value into the locate time display using the numeric keypad or recall a Cue.

The entire time must be entered, beginning with frames. When the first numeric key is pressed, the display clears to enter the new value.

- 2 Press the Store Locate key followed by the M/Offset key in Automation Panel Page 1 to store the value in the locate time display.

– or –

Press the Store Current key to store the value in the current time display.

Save Mix

The mix can be saved from the eMix directory software on the System Computer. It is faster, though, to use the dedicated Save Mix key in the center section to save the mix and automation passes to disk.



See Chapter 3, “eMix Application” for more detailed information on the file system.

Automation Conform

As video or film sections are inserted, deleted, and moved during post-production, the Conform utility realigns the automation data to match the edited film. It is important to emphasize that Conform affects the automation data only; the audio must be realigned in a separate operation.

Most film editing programs produce an Edit Decision List (EDL) with the start and end times, and duration for each edit, the operation type (insert, delete, move), and a name or other descriptive information. The Conform utility *does not process the EDL automatically*. The EDL provides information that is manually delivered to the Conform utility.

Navigating the Conform Screen

From the bottom of the eMix screen, press the Conform tab to display the Conform screen.

Each entry is a *note* that appears in chronological order, and consists of: Start Time, Duration, End Time, Operation, and Total Change.



Conform screen

Hot Keys

Tab and Shift+Tab	Moves to next/previous field. This may trigger time fields to be calculated and displayed
Arrow Up/down	Moves to the previous/next entry
Page Up/Down	Scrolls up/down the list by one page
Home/End	Scrolls to the top/bottom of the list
Shift+Page Up/Down	Scrolls to the top/bottom of the list

Operation Types

Seven types can be selected from the Operation menu.

When the Operation field is selected, typing *d*, *i*, or *p* on the keyboard selects Delete, Insert, or Paste, respectively. Typing *m* toggles Move and Move to file, and typing *c* toggles Copy and Copy to file.

Delete	Deletes the Duration between the Start and End Times.
Insert Gap	Inserts a blank Duration without automation data between the Start and End Times.
Move data	Deletes the Duration between the Start to the End Times, then Inserts that data at the to field location.
Copy data	Copies the Duration between the Start to the End Times, then Inserts that data at to field location.
Move to file	Deletes the Duration between the Start and End times, then copies that data into a file*.
Copy to file	Copies the Duration between the Start and End times, and copies it into a file*.
Paste from file	Inserts the Duration data from a user-numbered file at the present location*.

**Moved and copied data is stored in user-numbered files located in: C:\eMix\ConformData. These files can be accessed by number for Paste operations.*

Time Display

Click the button labeled FeetFrames or SMPTE (above the Start Time field) to toggle between time display formats. The figure above shows the Conform screen with SMPTE times.

The next two sections discuss the rules governing time entry into their respective formats.

Feet+Frames

Entering a number larger than 16 into the Frames is converted automatically into FeetFrames.

Entering a single number, instead of two numbers separated by +, is assumed to be Frames and is automatically converted to Feet-Frames.

SMPTE

In general, the number is parsed in two-digit intervals, from right to left. For example, if 321215 is entered, the field is resolved to 00:32:12:15.

Two-digit numbers separated by “:” are parsed right to left. For example, if 12:34:22 is entered, the field is resolved to 00:12:34:22.

A number greater than 59 entered into the seconds or minutes field is properly converted. For example, if 12:78:14 is entered, the field is resolved to 00:13:18:14. The maximum number that can appear in the hours field is 23.

A number greater than or equal to the FPS value (upper right of the Conform screen) entered into the Frames field is properly converted. At 24 FPS, if 12:18:32 is entered, the field is resolved to 00:12:19:08.

Entering Notes

Click in the Start Time field to begin entering a note. Press the Enter or Tab keys on the keyboard to move one field to the right. The fields do not have to be entered from left to right and some fields are calculated automatically. For example, you can select an Operation before setting time fields. If Start and End Times are entered, the Duration field is calculated automatically. If Start Time and Duration fields are entered, End is calculated automatically. The Total Change field is calculated automatically, not set by the user. It displays the net time change for all notes up to and including the present one.

When all notes fields have been filled with valid entries, you must press the Add button to automatically enter the note chronologically. Pressing Enter or Tab with all fields filled with valid entries is equivalent to clicking the Add button. When the number of notes exceeds the maximum screen size, a scroll bar appears to display additional pages. The figure below shows all three operation types: Insert, Delete, and Move.

	Start Time	Duration	End Time	Operation	Total Change	
1.	2+12	1+02	3+13	Insert	+ 1+02	Delete
2.	22+02	0+05	22+06	Delete	+ 0+13	Delete
3.	33+01	0+10	33+10	Move	+ 0+03	Delete
4.	44+01	0+10	44+10	to	44+01	+ 0+13
5.						Add

Conform screen with notes

For a Move operation, fill in the first row, including the to field. These values are used to automatically calculate the corresponding insert row after clicking the Add button. The to field designates the Start Time for the inserted data and the Duration is identical to that of the deleted data. The inserted row does not have an Operation field and need not be adjacent to the row labeled Move. Each row is processed in the order in which it was entered.

Offset

The initial Offset value is derived from the FeetFrames o-set field in the Locate Registers Panel. However, entering a new value in the Conform screen's Offset field updates the FeetFrames o-set value in the Locate Registers Panel. Offset is always stated in SMPTE format, regardless of the Conform screen's display format.

Since the Offset typically designates the film's reel number, the first reel uses an Offset value of 00:01:00:00. When toggling to SMPTE, the Offset is added to the values in the time fields. For example, if a Start Time field is 0+6 and the Offset is 00:01:00:00, clicking FeetFrames changes to SMPTE and the Start Time now displays 00:01:00:06.

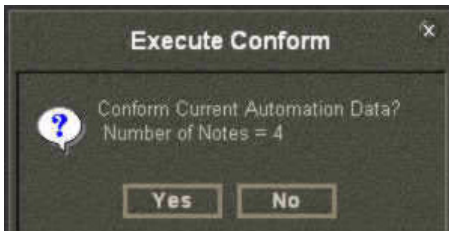
Storing and Recalling Notes

The tabs below the time display perform global file operations.

Clear Notes	Removes all note entries from the current Conform screen. Notes are <i>not</i> automatically cleared after a Conform operation.
Store Notes	Stores the current notes using a Windows file interface.
Recall Notes	Recalls a notes file into the current screen using a Windows file interface.

Executing the Conform Operation

After all notes have been entered and verified, press the Conform button at the bottom-center of the screen. The Execute Conform dialog appears to confirm that you want to proceed. This realigns the automation with the edited film.



Execute Conform dialog

Each Conform operation adds a new pass to the Pass Tree. To undo the Conform operation, return to the previous pass to the one just created (see “Mix Passes” on page 146).


After the Conform operation, the notes remain displayed in the Conform screen. Be careful to avoid clicking the Conform button again as this mis-aligns the data. If that happens by mistake, don’t worry! Just undo the second Conform operation.

Reel Balancing

While mixing and editing a program, a scene may need to move from one reel to another. Since each reel normally has its own Title, the console automation for the moved scene must also be moved into the other reel’s Title.

To move automation from one Title to another:

- 1 Select Move to file to delete the moved scene automation into the conform file.
- 2 Open the Title of the reel with the moved scene.
- 3 At the start of the moved scene, select Paste from file.
- 4 Click Conform.

 *Automation data in the conform file always starts at 00:00:00:00.*

Chapter 13: GPI/O Event System

The event system can program useful System 5 features such as:

- Use a fader to start a cart machine or turn speakers on/off.
- Turn a channel on/off in response to a camera turning on/off.

An event consists of a set of input conditions governed by a logical operator that determines the output condition. Inputs can be surface parameters (i.e., channel on, fader, etc.) or external inputs via the TT002. Outputs can be System 5 parameters or external outputs via the TT002.

The TT002 provides 32 GPIOs on two 37-pin DC-type connectors. The GP inputs are opto-isolated, and the GP outputs are relays. See the *System 5 Installation Guide* for GPIO pin-out information. Two TT002 cards can be used for 64 GPIOs, but only one can work as a machine controller. The TT002 is shipped with all systems, but many events do not require it.

Input Types

GP Input Types, Settings, and Activation Values

Input Type	Settings	Activation Values
Control Room	Monitor A Monitor B Monitor C Monitor D Control Room Cut Control Room Dim	On Off
Cue List	Cue #	Offset
Fader	Channel #	Activation Level (dB) Activation Type (Above/Below)
GP Input	Relay Input #:(1-32) Machine: GP132 One GP132 Two GP132 Three GP132 Four GP132 Five TT002	On Off
Switch Input	Channel # Channel EQ Filters Dynamics Mono Aux In/Out Mono Aux Pre/Post Stereo Aux In/Out Stereo Aux Pre/Post Out	On Off
Transport Ctrl	Play Stop Fast Forward Rewind Record	On Off
Scene	Scene #	Take Event
Changeover		Changeover Normal
On Air	Start Channel # End Channel #	Activation Level (dB) Activation State (Mute/UnMute)

Output Types

GP Output Types, Settings, and Activation Values

Output Type	Settings	Activation Values
Control Room	Monitor A Monitor B Monitor C Monitor D Control Room Cut Control Room Dim	On Off
GP Output	Relay Output #: (1-32) Pulse length (0 to latch): 0 to 1000 ms Machine: GP132 One GP132 Two GP132 Three GP132 Four GP132 Five	Open Closed
MIDI Output	Event Type MIDI Channel 1-16 MIDI Note 0-127 MIDI Velocity 0-127	On Off
Switch Output	Channel EQ Filters Dynamics Mono Aux In/Out Mono Aux Pre/Post Stereo Aux In/Out Stereo Aux Pre/Post	On Off
Transport	Play Stop Fast Forward Rewind	
Scene	Take Finish Next Prev Goto Recall	
Recall Layout	Layout #	
Recall Meter Preset	Meter Preset #	
Recall Patch Preset	Preset # 1-24	
Recall Snapshot	Snapshot #	
Talkback Control	Mon A Mon B Mon C Mon D All Mons Aux Bus	On Off

Logical Operators

The logical operators process input event conditions to determine if the output event is executed.

All logical operators are transitive: for example, 1 AND 0 = 0 AND 1.

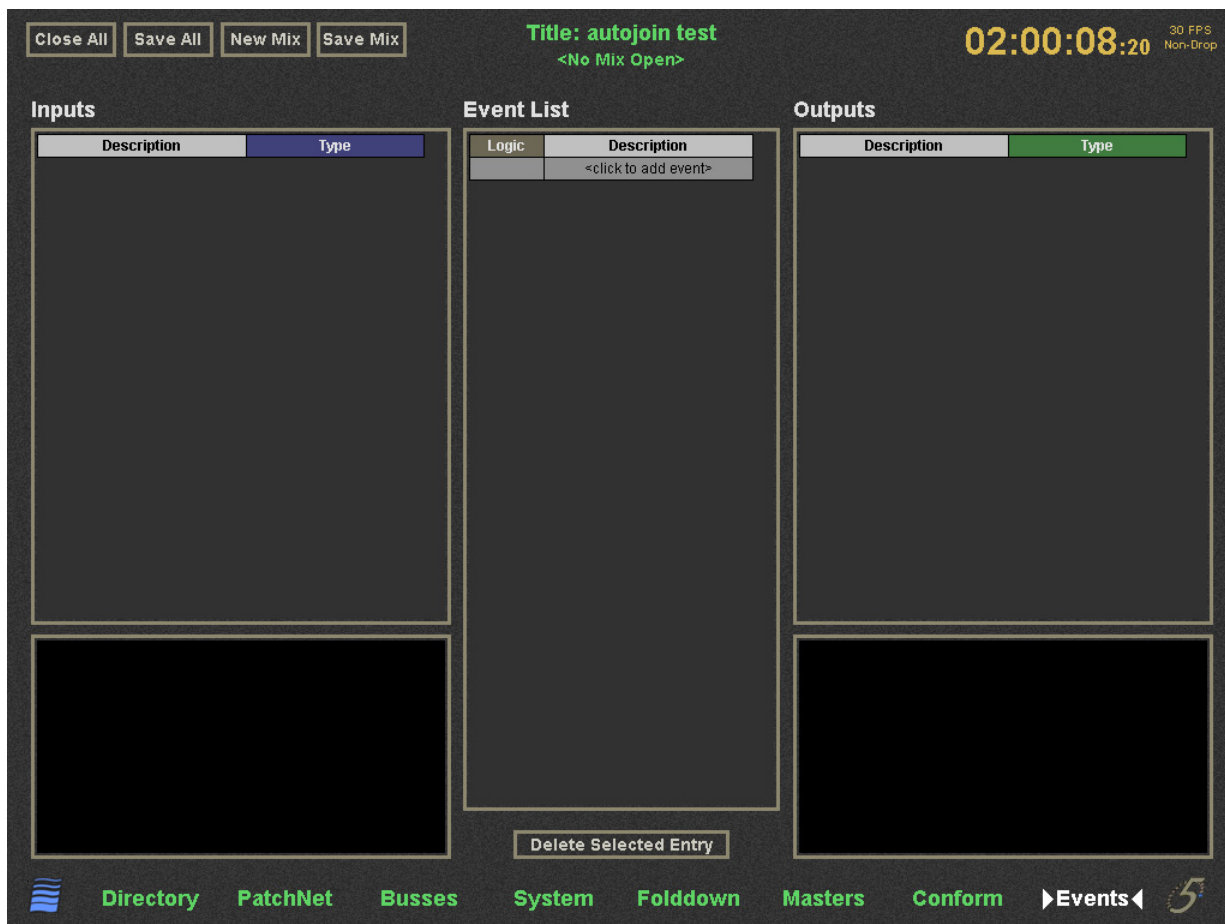
Logical Operators Used for GPI/O Event Processing

Logical Operator	Required Input Conditions for Output Event Execution	Truth Tables
AND	All input events must be true	1 AND 1 = 1 1 AND 0 = 0 0 AND 0 = 0
OR	Any input event true	1 OR 1 = 1 1 OR 0 = 1 0 OR 0 = 0
XOR	Any input event true, but <i>not all</i> true	1 XOR 1 = 0 1 XOR 0 = 1 0 XOR 0 = 0

Event Configuration Display

To display the Events configuration screen, click the Events tab at the bottom of the eMix screen. The Events screen has three sections: Inputs, Event List, and Outputs.

 See "GPI Examples" on page 158.



Event Configuration Window

Event List

An *event* is composed of:

- an input description and type;
 - and –
- a logical operator;
 - and –
- an output description and type.

To add an event to the list:

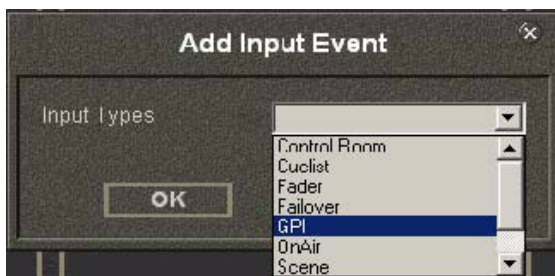
- 1 Click the <click to add event> field at the bottom of the Description column.
- 2 Click in the Description field, and type a description.
- 3 Select the logical operator from the Logic menu.

Input

The input area has two sections:

- The top area contains a list of inputs for all events in the Event List.
 - The lower area shows the properties of the selected input.
- 1 Create a new input by clicking the <click to add input> field at the bottom of the list.

The Add Input Event dialog opens to select the input type:



Add Input Event Dialog

- 2 Select the Input Type from the menu and click OK.
- 3 Enter a text description that identifies the event by typing in the Description field.

The properties area displays the settings for the selected input type (see the table on page 154).
- 4 Modify and customize the settings for your event by clicking on the menu and/or edit the display.

Output

The output area has two sections:

- The top area contains a list of output actions for all events in the Event List.

These actions occur only if the input conditions for the selected event, combined with their logical operator, yield *True (1)*.
- The lower area shows the properties of the selected output.


The outputs are set using the same methods as the inputs.

Deleting Events

Delete an event by selecting the event, input, or output and pressing the Delete Selected Entry button at the bottom left of the Events screen.

GPI Examples

Refer to the two previous figures for these examples. The options available in the Input and Output Properties areas are summarized in tables on page 154 and page 155.

 *An event with just one input delivers the same result with AND and OR, so they may be used interchangeably.*

Using a Fader to Turn Devices On and Off

To turn off the floor monitors by moving any one of several faders above a selected level:

- 1 In the Event Configuration window, under Event List, click the <click to add event> field.

The Add Event dialog appears.

- 2 Select Or as the logical operator from the menu.

- 3 Under Input, click the <click to add input> field.

The Add Input Event dialog appears.

- 4 Select Fader from the menu and click OK.

- 5 Configure the Input Properties to the following settings:

Channel #	1
Activation level (dB)	-50
Activation Type	Above

- 6 Repeat steps 3–5 for additional channel faders, but set the Channel # in step 5 to the new channel number.

- 7 Under Output, click on the <click to add output> field.

The Add Output Event dialog appears.

- 8 Select Control Room from the menu and click OK.

- 9 Configure the Output Properties to the following settings:

Action	Monitor A
Active State	Off

To turn on the floor monitors by moving any one of several faders below a selected level:

- 1 In the Event Configuration window, under Event List, click on the <click to add event> field.

The Add Event dialog appears.

- 2 Select OR as the logical operator from the menu.

- 3 Under Input, click on the <click to add input> field.

The Add Input Event dialog appears.

- 4 Select Fader from the menu and click OK.

5 Configure the Input Properties to the following settings:

Channel #	1
Activation level (dB)	-50
Activation Type	Below

6 Repeat steps 3–5 for any additional channel faders, but set the Channel # in step 5 to the new channel number.

7 Under Output, click on the <click to add output> field.

The Add Output Event dialog appears.

8 Select Control Room from the menu and click OK.

9 Configure the Output Properties to the following settings:

Action	Monitor A
Active State	On

To start a Cart machine by moving a fader above a selected level:

1 In the Event Configuration window, under Event List, click the <click to add event> field.

The Add Event dialog appears.

2 Select AND as the logical operator from the menu.

3 Under Input, click on the <click to add input> field.

The Add Input Event dialog appears.

4 Select Fader from the menu and click OK.

5 Configure the Input Properties to the following settings:

Channel #	2
Activation level (dB)	-50
Activation Type	Above

6 Under Output, click the <click to add output> field.

The Add Output Event dialog appears.

7 Select GPO from the menu and click OK.

8 Configure the Output Properties to the following settings:

Output Number	1
Active State	Closed
Pulse Length	10
Machine	TT002

To stop a Cart machine by moving a fader below a selected level:

1 In the Event Configuration window, under Event List, click the <click to add event> field.

The Add Event dialog appears.

2 Select AND as the logical operator from the menu.

3 Under Input, click the <click to add input> field.

The Add Input Event dialog appears.

4 Select Fader from the menu and click OK.

5 Configure the Input Properties to the following settings:

Channel #	2
Activation level (dB)	-55
Activation Type	Below

6 Under Output, click the <click to add output> field.

The Add Output Event dialog appears.

7 Select GPO from the menu and click OK.

8 Configure the Output Properties to the following settings:

Output Number	2
Active State	Closed
Pulse Length	10
Machine	TT002

Using a Video Switcher to Turn a Camera Mic On/Off

To have a video switcher turn a specific camera mic channel on:

1 In the Event Configuration window, under Event List, click the <click to add event> field.

The Add Event dialog appears.

2 Select AND as the logical operator from the menu.

3 Under Input, click the <click to add input> field.

The Add Input Event dialog appears.

4 Select GPI from the menu and click OK.

5 Configure the Input Properties to the following settings:

Input	1
Active State	On
Machine	TT002

6 Under Output, click the <click to add output> field.

The Add Output Event dialog appears.

7 Select Switch Output from the menu and click OK.

8 Configure the Output Properties to the following settings:

Channel #	3
Switch Function	Channel
Activation Value	On

To have a video switcher turn a specific camera mic channel off:

1 In the Event Configuration window, under Event List, click on the <click to add event> field.

The Add Event dialog appears.

2 Select AND as the logical operator from the menu.

3 Under Input, click on the <click to add input> field.

The Add Input Event dialog appears.

4 Select GPI from the menu and click OK.

5 Configure the Input Properties to the following settings:

Input	1
Active State	Off
Machine	TT002

6 Under Output, click on the <click to add output> field.

The Add Output Event dialog appears.

7 Select Switch Output from the menu and click OK.

8 Configure the Output Properties area to the following settings:

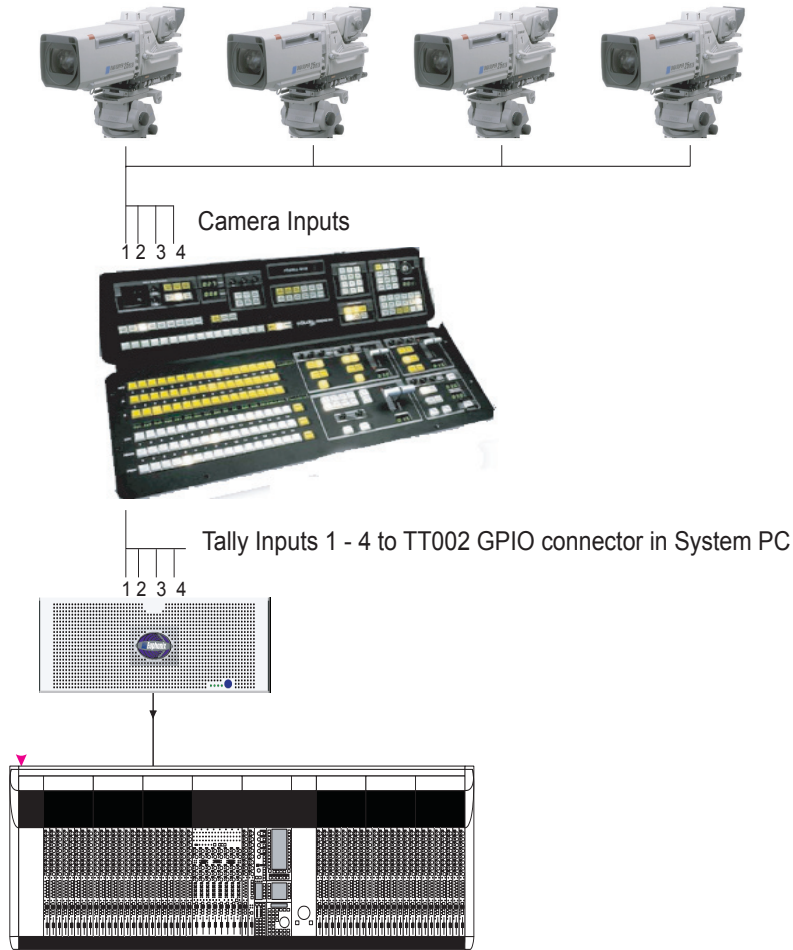
Channel #	3
Switch Function	Channel
Activation Value	Off

Audio Follow Video

This example has four cameras, each with a microphone, configured with a video switcher, TT002 GP Input, and System 5 console.

We want to implement the following functionality:

- When the video switcher takes camera 1, channel 1's audio is *on* while channels 2–4 are *muted*.
- When the video switcher takes camera 2, channel 2's audio is *on* while channels 1, 3, and 4 are *muted*.
- When the video switcher takes camera 3, channel 3's audio is *on* while channels 1, 2, and 4 are *muted*.
- When the video switcher takes camera 4, channel 4's audio is *on* while channels 1–3 are *muted*.



Audio follow video

To turn on channel 1 and mute the other channels when the video switcher takes camera 1:

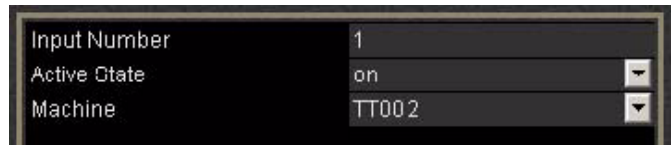
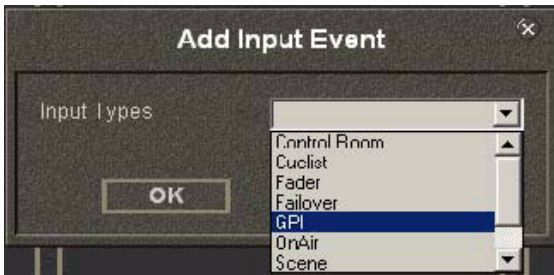
- 1 Choose a tally input to use on the TT002.

For example, tally input 1 uses pins 1 and 33 on the first GPIO card connector on the System PC.

- 2 In Events page of eMix, click <click to add event> in the Events List section, and select OR as the logic operator.

3 From the Inputs section, click <click to add input>.

The Add Input Event dialog opens.



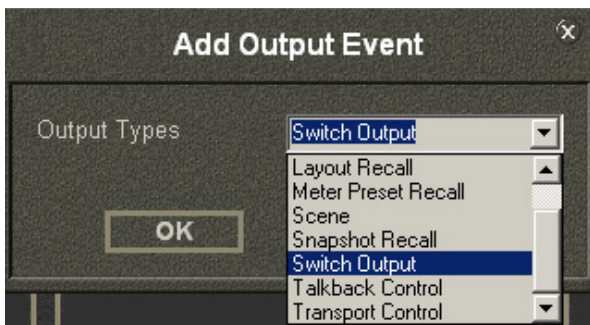
Add Input Event Dialog (left) and Input Events Properties (right)

4 Select GPI from the Input Types menu.

5 Configure the lower area of the Input section to the settings in the figure above (right).

6 From the Output section, click <click to add output event>.

The Add Output Event dialog opens.



Add Output Event dialog (left) and Output Events Properties (right)

7 Select Switch Output from the Output Type menu.

8 Configure the lower area of the Output section to the settings in the figure above (right).

This turns channel 1 on when camera 1 is selected by the video switcher.

9 Repeat Steps 6–7 to create additional output events to mute channels 2–4, but use the following settings instead of those from Step 8:



Output Events Properties to mute channels 2-4

The figure above shows Channel 2's settings. Each channel uses its own number but Switch Function = Channel and Active State = off for each.

Now when the video switcher selects camera 1, System 5's channel 1 turns on and channels 2–4 mute.

Repeat the steps above to program channel 2 to turn on when the video switcher selects camera 2, and mute channels 1, 3, and 4. Each tally input requires a discrete connection at the GPIO card at the System PC.

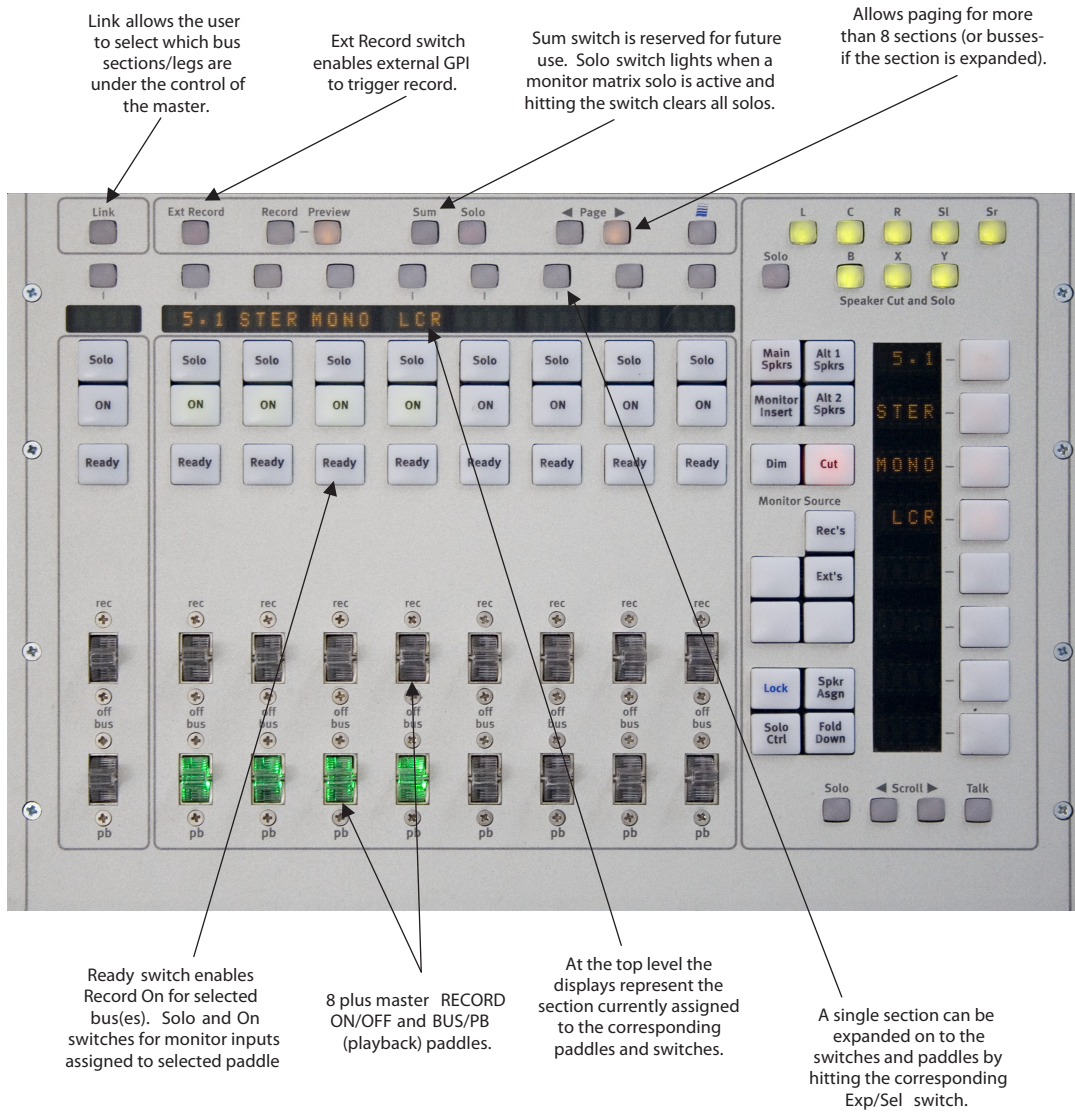
Chapter 14: CM403 Film/Post Module (S5 Only)

The CM403 fulfills the requirements for a traditional PEC/Direct monitoring system for the post-production environment. It can be used in single- and multi-operator System 5 consoles. Up to four Post Panels can be installed in a single system. The CM403's form factor is the same as other CM40x control modules. The CM403 contains a TFT and three same-size panels, two of which are taken by the Film and the Dual-Joystick Panels. The Film Panel can be placed above or below the Dual-Joystick Panel. The user can place their own motion controller or other third-party equipment into the spare third panel.



CM403 Film/Post Module

The Film Panel



CM403 Film/Post Module

The Film Panel is divided into two distinct parts: the traditional PEC/DIR panel on the left, and an additional utility panel to the right. The right panel duplicates most of the CM401T's monitoring and setup functions.

The PEC/DIR Panel

This panel houses the traditional paddles used for PEC/DIR, Bus/Playback, or Bus/Tape switching. The second set of paddles are used to put tracks into record. There are eight paddle strips, with associated switches above them, and a master control strip.

Bus/Tape switching on the paddles is consistent with the Dir/Ret CR Source switching on the CM401T (see “Monitoring” on page 40) between the Mix busses and their associated returns. However, it is possible to switch not only the whole bus section, but also the individual busses (legs).

By default, each mix bus section is assigned to a paddle. The master simply controls all linked bus sections at once: press the On switch on the master, and all linked On switches turn *On*. The bus section name appears in the four-character display. All operations take place within the monitor matrix and affect only the main CR monitors.

Turn a section *On* and it is sent to the monitors (same as the CM401T monitor section). Solo a section and anything currently assigned to the main monitors is removed, leaving only the soloed section. The bus section Bus/Playback switch toggles between listening to the mix busses and their associated returns. The Ready switch enables dropping the tracks associated with the bus section into record using the record paddle.



Link Key Lit

Link Key

When the Link key is lit, the user can select which sections to link to the master strip paddles and switches. For example, in the figure above, only the FX1 and FX2 sections are affected by the master controls.

When the Link key is not lit, the keys directly above the display descend a level. This means that the busses within the selected bus section are now assigned to the paddles, and the master strip becomes the selected bus section strip.



Link Key Not Lit

The same functionality applies when the Link key is not lit, except the individual busses are accessed.

The Link operation also still applies; the user dictates which busses within the section would be affected by the master. Here the C and the R busses are lit to indicate they are linked to the master strip.

Press the Exp/Sel key on the master strip to return the panel to the top level again.

< Page > Keys

These keys switch the display between two pages of eight-bus sections.

Sum and Solo Keys

The Solo key lights when something is in solo. Pressing the lit Solo key clears the current solo. The Sum key is reserved for future use.

Ext Record Key

When the Ext Record key is lit, the master record paddle can be triggered remotely from a GPI.

Record, Preview Keys

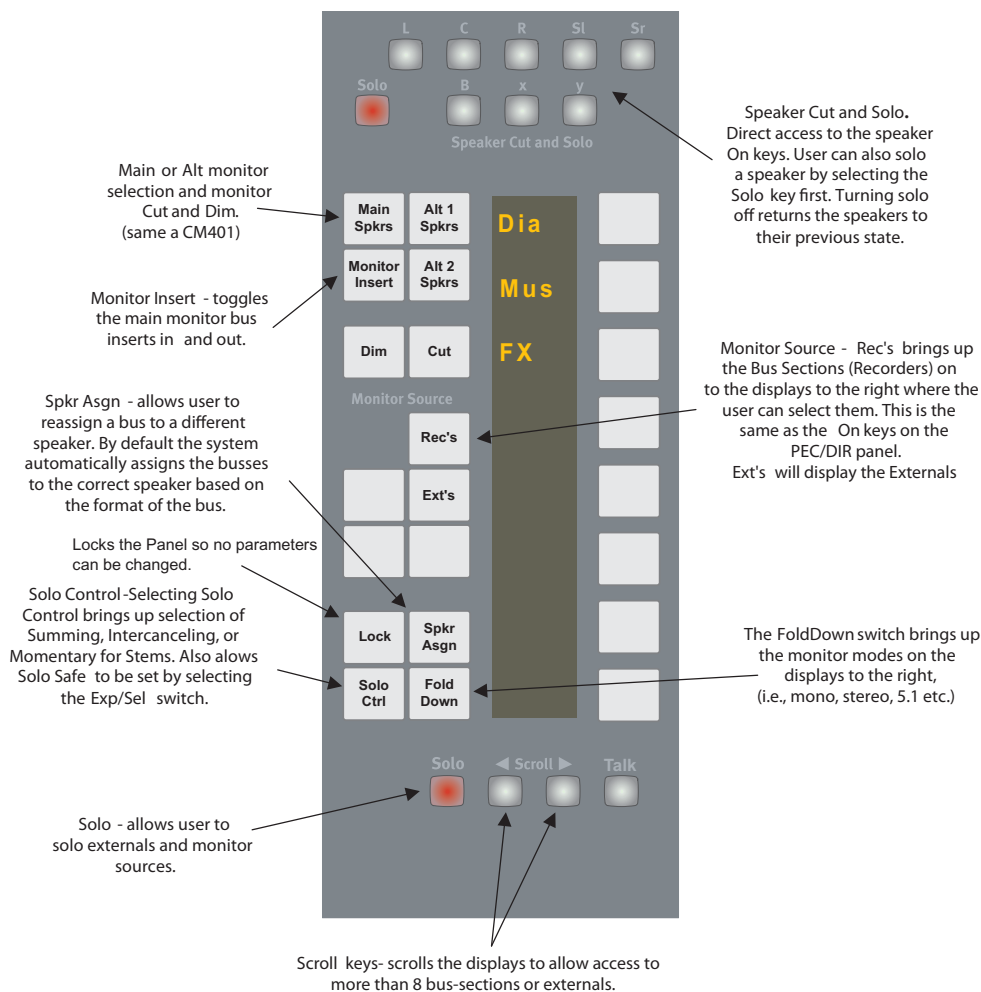
These keys toggle the Ext Record between record and preview, record (master record paddle), and preview (master PEC/DIR paddle).

Wave Key

This key is used with the < Page > keys to access busses higher than 48.

The Monitor Utility Section

Most of these functions already exist on the current CM401T (see "Monitoring" on page 40). The new features are Spkr Asgn, (Speaker Re-Assign) and Lock.

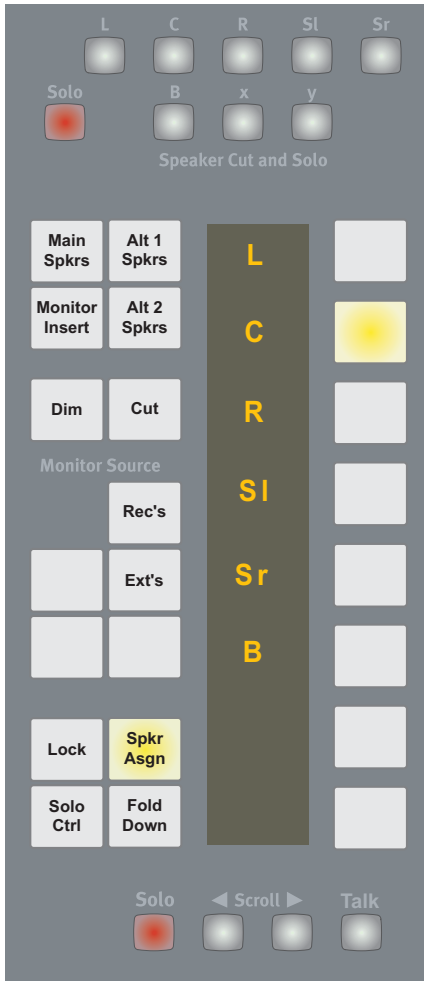


Monitor Utility Section

Speaker Re-Assign

The system automatically sends mix busses to the correct monitor bus based on the bus format. For example, when monitoring *FX1*, the left bus of the section is automatically sent to the left monitor bus. It is sometimes necessary to override this assignment and send a mix bus to a different monitor bus than was intended.

The Exp/Sel keys (above the displays on the PEC/DIR panel) can select busses within a section. When a bus is selected, the Speaker Re-Assign panel illuminates the current monitor bus assignment. Selecting a different speaker from the panel re-assigns the bus within the monitor matrix.



Speaker Re-assign

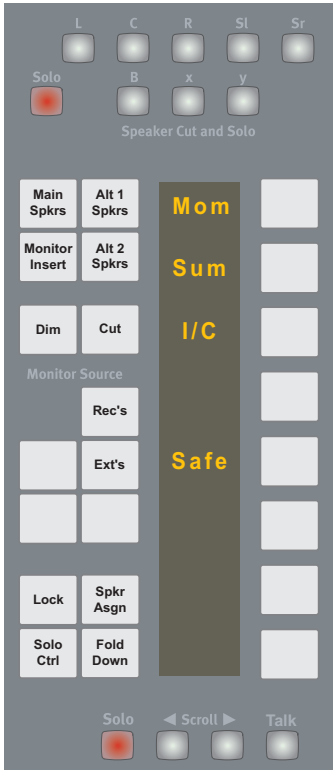
Lock

Hold down the CM403's Wave key and press the Lock button. Lock lights when active. Hold down the Wave key and press Lock again to disable the function.

Solo Control

The Solo Control switch controls the solo modes, which are similar to the those in the CM401T: summing, intercancel, momentary, and safe.

Solo Safe is applied to the stems by selecting the Exp/Sel key above the stem you want to make *safe*.



Solo Safe

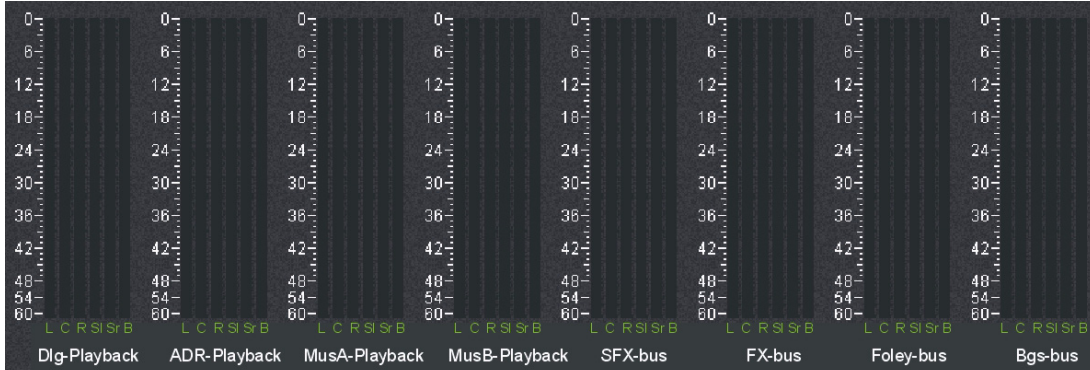
CM403 TFT Display

The TFT displays meters and an overview of the monitor bus assignments.

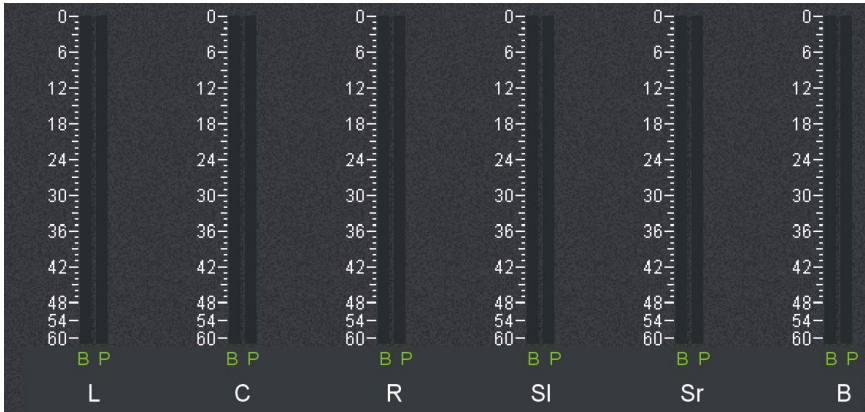
Metering Display

The meters track what is currently assigned to the paddles. The send and return for each bus are displayed on separate meters.

At the top level, where the paddles are assigned to the bus sections, eight meters can be displayed for each of the mix busses within the section.



Top Level Metering Display



Bus Level Metering Display

Bus/Track and Monitor Assignments Display

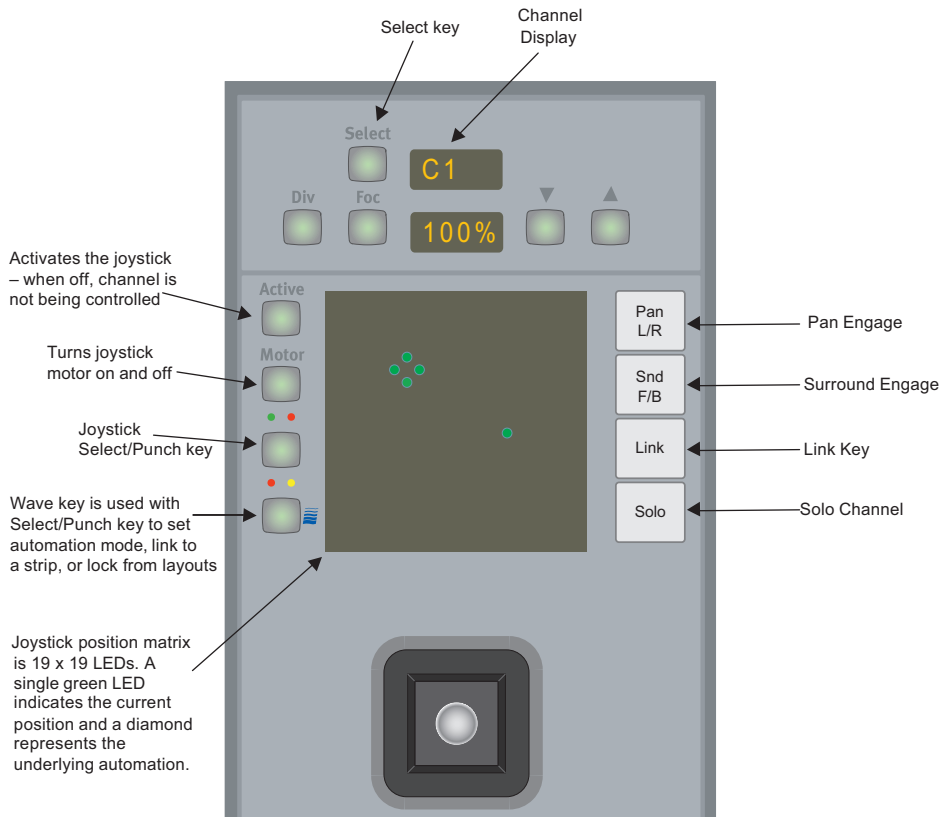
The lower half of the screen displays 48 mix busses across the top, the first eight bus sections down the side, and the eight speaker (main monitor bus) outputs.



Bus/Track and Monitor Assignments Display

Dual Joystick Panel

The Dual Joystick Panel houses two joysticks in a full-width panel mounted in the CM403 module.



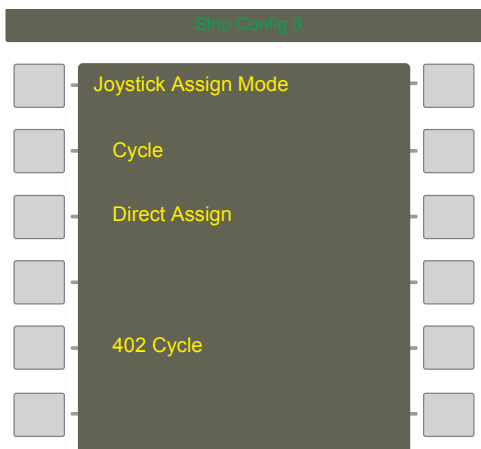
Joystick Panel controls (only one joystick shown)

Assigning a Channel to a Joystick

Assign a channel to the joystick with the same key strokes used to assign a channel to a strip (see page 69).

Joystick Assign Mode

The Joystick Assign Mode is in Strip Config Panel Page 3 (see below).



Joystick Assign Mode

Cycle

Selecting a channel using the Wave key assigns it to the left joystick. Selecting a second channel within 2.5 s assigns it to the right joystick.

Direct Assign

Hold a channel's Wave key down and select Pan To: to assign that channel to the left joystick. Hold the Wave key down and select the Pan knobset key to assign the channel to the right joystick.

402 Cycle

This assigns channels to the joystick using the channel select keys on the CM402T's channel select panel. Selecting a channel assigns it to the left joystick. Selecting a second channel within 2.5 s assigns it to the right joystick.

Hybrid Joysticks

Assign a hybrid channel to the joystick with the same key strokes used to assign a channel to a strip (see page 69).

Layouts

Joystick assignments can be stored/recalled with Layouts and can also be protected from Layouts using Strip Lock in the Strip Config Panel (see page 67).

Setting a Joystick's Automation Mode

The automation mode for pan and surround parameters controlled by the joystick are set the same as a standard strip:

Hold down the joystick's Wave key and press its Select/Punch key repeatedly to cycle through the automation modes (Isolate, Write Absolute, Read).

The automation mode can also be set by pressing the desired automation mode key on the CM401T (i.e., Write Abs), which puts the console into a select mode. Then press the joystick's Select/Punch key.

Punching In a Joystick

Punch the joystick into record/write by pressing its Select/Punch key, or simply move the joystick (it is always touch-sensitive) to automatically begin recording.

Linking

See Chapter 11, "Linking (SSP Only)" to learn how to control channels from a joystick panner.

Multi-Operator Console

System 5's multi-operator post environment creates one large console that can be operated by multiple engineers. In reality, each section is a unique System 5 console, which supports a maximum number of channels per operator.

The Mix and Solo busses are normally linked across the consoles, while the Aux and Group busses are not. In a two-operator system, one console usually handles the FX, and the other music and dialogue.

Only one console, designated the *Master*, uses its monitor matrix. Each operator has a Post Panel located in their section. Although positioned near a particular operator's surface, each panel is connected to the Master console network for access to the monitor matrix.

Solo Linking

Although the consoles are almost entirely independent (i.e., file system, automation system, snapshots, group busses, etc.), the solo system can be linked across consoles by connecting the System PCs using the unused Ethernet port. This can be done via a small hub or a single crossover cable. Contact Avid customer support for more information.

Patching

The main patching issue for two-operator consoles is cascading the busses. This is done using the bus cascade inputs on the DSP Frame.

To patch the Slave Console's outputs:

- 1 In PatchNet>Console I/O, select the desired Bus Outputs.
- 2 Select the desired Frame output from the Destinations section.
- 3 Press Patch.

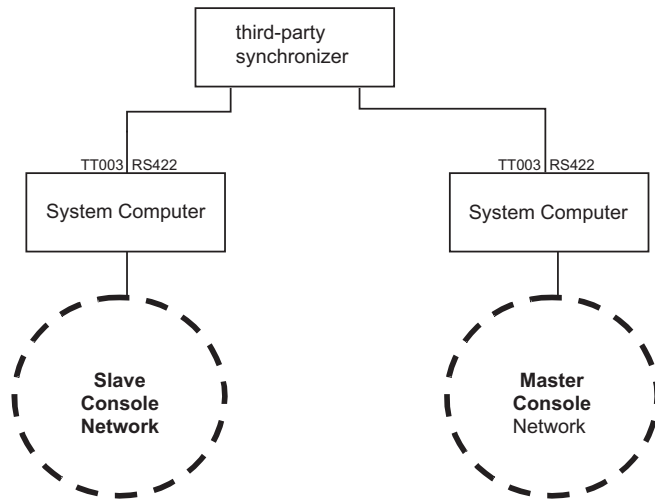
To patch the Master Console's inputs:

- 1 In PatchNet>Sources, select the desired Frame inputs.
- 2 In PatchNet>Console I/O, select the Bus Cascade inputs.
- 3 Press Patch.

Connect a BNC cable between the designated ports on the slave and master consoles. We recommend storing these patches as PatchNet Presets (see page 26).

Machine Control

Film environments often require both operators to share control over the machines. A single synchronizer (such as a CB RM6 or SoundMaster) can combine the machine control commands from two consoles.



Master and Slave Console Hookup

Track Arming

Up to 48 tracks of a single machine can be track armed via MIDI or P2. The 48 mix busses are hard-mapped to the 48 tracks. To support arming over multiple P2 machines (i.e., eight 6-track, six 8-track, or two 24-track machines), a third-party device is required to distribute 48 tracks from one P2 port to multiple P2 ports. Contact Avid customer support for more information.

Solo-In-Place

Whenever a channel is in solo, any sources currently assigned to the monitors are temporarily removed (i.e., externals and returns). The monitors automatically source the direct outputs from the console busses. When the channel is no longer in solo, the monitors revert to their setup prior to the solo.

Chapter 15: Hybrid Pilot and System 5 Fusion Options

The Hybrid option supports controlling EUCON-enabled workstations from the System 5 control surface. It requires a SC254H Pilot computer and is appropriate for larger applications that use a separate DF66 or DF70 to handle DSP.

The Fusion option uses the SC264D System computer to perform system DSP (up to two cards installed), and run eMix and the Hybrid software. The Fusion option is appropriate for smaller Mixer Models (i.e., 128 channels for post systems, 116 for music, 76 for broadcast).

To access Hybrid and Fusion workstations:

- 1 Press the Main Panel key.
- 2 Press the EUCON key.
- 3 Press the Setup key.

A list of available workstations on your network is displayed. The CM401T's Quick Access Panel can set each workstation to correspond to a specific DVI port on your switch, or reorder the workstations.

- 4 Hold down the desired Quick Access key, and select a workstation.

The workstation automatically realigns to that slot. The sub-panel currently supports five workstations.

- 5 Press the Back key.
- 6 If channels are not displayed, press the Chan key at the bottom of the panel.
- 7 Toggle between the DAW channels and smart keys by pressing the chan/smr key on the bottom of the panel.

If you attempt to connect to a workstation and the Main Panel workstation key flashes, the workstation is available, but the DAW application is either not running or not in focus. Start the application or switch to it, and try to connect again.

If the Hybrid system is busy, a message appears on the CM401T Main Panel. The Main menu is still accessible during this time.

Hybrid CM403 Joysticks

Assign a channel to the joystick with the same key strokes used to assign a channel to a strip (see page 63).

To assign stereo channels to the joystick:

- 1 Press the Wave key twice quickly (within 2.5 s) to assign the same channel to both joysticks.
- 2 Press the up arrow on the right joystick to select the right panner.

Appendix A: Compliance Information

Environmental Compliance

Disposal of Waste Equipment by Users in the European Union



This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city recycling office or the dealer from whom you purchased the product.

Proposition 65 Warning

▲ *This product contains chemicals, including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.*

Perchlorate Notice

This product may contain a lithium coin battery. The State of California requires the following disclosure statement: "Perchlorate Material – special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate."

Recycling Notice



EMC (Electromagnetic Compliance)

Avid declares that this product complies with the following standards regulating emissions and immunity:

- FCC Part 15 Class A
- EN55103-1 E4
- EN55103-2 E4
- AS/NZS CISPR 22 Class A
- CISPR 22 Class A

FCC Compliance for United States

Communication Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any modifications to the unit, unless expressly approved by Avid, could void the user's authority to operate the equipment.

Australian Compliance



Canadian Compliance

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE Compliance

(EMC and Safety)



Avid is authorized to apply the CE (Conformité Européenne) mark on this compliant equipment thereby declaring conformity to EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.

Safety Compliance

Safety Statement

This equipment has been tested to comply with USA and Canadian safety certification in accordance with the specifications of UL Standards: UL60950-1:2007, 2nd Ed and CAN/CSA C22.2 No. 60950-1-07, 2nd Ed. Avid Technology Inc., has been authorized to apply the appropriate NRTL mark on its compliant equipment.

Warning



Important Safety Instructions

- 1) Read these instructions.
 - 2) Keep these instructions.
 - 3) Heed all warnings.
 - 4) Follow all instructions.
 - 5) Do not use this equipment near water.
 - 6) Clean only with dry cloth.
 - 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
 - 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
 - 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
 - 10) Protect power cords from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the equipment.
 - 11) Only use attachments/accessories specified by the manufacturer.
 - 12) For products that are not rack-mountable: Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the equipment. When a cart is used, use caution when moving the cart/equipment combination to avoid injury from tip-over.
 - 13) Unplug this equipment during lightning storms or when unused for long periods of time.
 - 14) Refer all servicing to qualified service personnel. Servicing is required when the equipment has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the equipment, the equipment has been exposed to rain or moisture, does not operate normally, or has been dropped.
 - 15) For products that are a Mains powered device:
The equipment shall not be exposed to dripping or splashing and no objects filled with liquids (such as vases) shall be placed on the equipment.
- Warning!** To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.
- 16) For products containing a lithium battery:
CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.

17) For products with a power switch:
It should remain accessible after installation.

18) The equipment shall be used at a maximum ambient temperature of 40° C.

19) This unit is provided with a power supply cord set suitable for 120V AC input only (for U.S.A. and Canada). For other than U.S.A. and Canada, a qualified person must provide for use with this unit, an appropriate, approved power supply cord set which is in compliance with the end use country requirements and has a minimum cross-sectional area of 1.0mm².

20) For products with more than one power cord:

CAUTION: This unit has more than one power supply cord. Disconnect two power supply cords before servicing to avoid electrical shock.

ATTENTION: Cet appareil comporte plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher les deux cordons d'alimentation avant de faire le dépannage.

21) For products with an operator-accessible fuse:

CAUTION: For continued protection against risk of fire, replace only with same type and rating of fuse.

ATTENTION: Pour ne pas compromettre la protection contre les risques d'incendie, remplacer par un fusible de même type et de même caractéristiques nominales.



Avid
2001 Junipero Serra Boulevard
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