



NETWORKING  
AUDIO  
SYSTEMS

# mc<sup>2</sup>66

## Tutorial

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# Table of Contents

<b>TUTORIAL</b>	<b>2</b>
<b>TABLE OF CONTENTS</b>	<b>5</b>
<b>PREFACE</b>	<b>8</b>
About This Manual	8
<i>Conventions</i>	8
<i>Headings</i>	8
<i>Instructions and Results</i>	8
<i>Marginal notes</i>	8
<i>Action Buttons</i>	9
<b>CHAPTER 1: TUTORIAL</b>	<b>11</b>
Welcome	11
Control Surface Overview	11
Signal Flow	12
The Power of Layering	13
Integrated Digital Routing Matrix	14
Console Reset	15
Timecode Automation	16
<b>ACCESS CHANNEL/ASSIGN and SCREEN CONTROL</b>	<b>17</b>
<i>The ACCESS CHANNEL/ASSIGN control panel</i>	18
<b>SCREEN CONTROL</b>	21
<i>Entering Names from the Keyboard</i>	26
Getting Started	27
<i>Switching on the Power</i>	27
<i>Loading a Setup Production</i>	28
<i>Interrogating the Channel Fader Strips</i>	30
<i>Switching Banks and Layers</i>	30
Creating Your Own Configuration	32
<i>Assigning Channels to Fader Strips</i>	32
<i>Source Routing</i>	35
<i>Bus Assignments</i>	37
<i>Control Room Monitoring</i>	38
<i>AFL &amp; PFL Monitoring</i>	39
<i>Routing Sources to Multiple Channels</i>	40
<i>Controlling Microphone Pre-amplifier Settings</i>	42
Saving Your Settings	43
<i>Saving a New Production</i>	43
<i>Renaming the Production</i>	45
<i>Updating the Production</i>	46
Configuring Audio Sub Group Masters	47
<i>Re-assigning Channels to Groups</i>	47
<i>Monitoring the Group Output</i>	50
Creating Stereo Channels or Masters	51

Routing Masters to Output Destinations	52
Using Auxiliary Sends	54
Creating a Mix Minus (N-1)	55
<i>Configuring the Mix Minus Auxiliary Sends</i>	55
<i>Activating the Mix Minus Sends</i>	58
Using VCA Grouping	59
<i>Assigning VCA Masters to the Control Surface</i>	59
<i>Assigning Channels to a VCA Master</i>	60
Applying Signal Processing	61
<i>Using the 4-band Equaliser</i>	63
<i>Using the High and Low Pass Filters</i>	64
<i>Setting a Compressor</i>	65
<i>Inserting Channel Delay</i>	66
<i>Inserting Outboard Processing</i>	66
Assigning the Fader Strip Free Controls	69



## Preface

### About This Manual

Before we guide you through the operation of the **mc<sup>2</sup>66** broadcast production console, first a few words about this manual.

Chapter 1 provides a step-by-step tutorial to common console operations. If you are new to the console, please read this chapter first.

Chapters 2 to 8 cover each area of operation in greater detail. Use the Table of Contents at the beginning of the manual or Index Directory (Page **Fehler! Textmarke nicht definiert.**) to locate help on a particular topic.

Appendices, technical data and the index directory are provided at the end of the manual.

### Conventions

Throughout this manual we will be using a number of conventions:

#### Headings

Every new topic is clearly identified in large, **bold** font.

#### Instructions and Results

Specific operational procedures are written as a sequence of numbered instructions which guide you through the task. The result of the operation is written in italic letters giving you the chance to identify errors at an early stage. For example:

1. To make the route press the **CONN** (Connection) soft key located above the trackball.

*The **Signals** display updates with a green line showing the route between your source and destination.*

#### Marginal notes

The following marginal notes are used to draw your attention to:



User tips



Notes

## Action Buttons

We will also be using some conventions to help distinguish explanatory text from the text referring to items on the console:

Silk screened text on the console's front panel is referred to in UPPERCASE and button cap engravings are written in **bold** – for example, press the **INPUT** button located on the ACCESS CHANNEL/ASSIGN control panel in the centre section of the console.

On-screen buttons which action a function and descriptive text on the console displays are both referred to in **bold**. For these, you will be advised when an on-screen button actions a function – for example, select the **Mix minus** box to choose a mix-minus auxiliary.



# Tutorial

## Welcome

Welcome to the **mc<sup>2</sup>66** Broadcast Production Console, Lawo's purpose designed solution for on-air and live-to-tape broadcast operations.

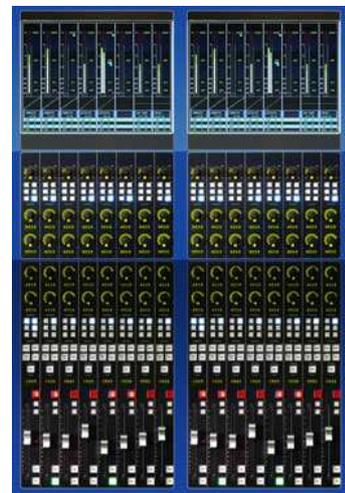
The **mc<sup>2</sup>66** is a very flexible mixing console with the power to deal with a range of production types. This tutorial guides you step-by-step through some of the principal console operations. Each topic is given a reference to more detailed information in the chapters to follow.



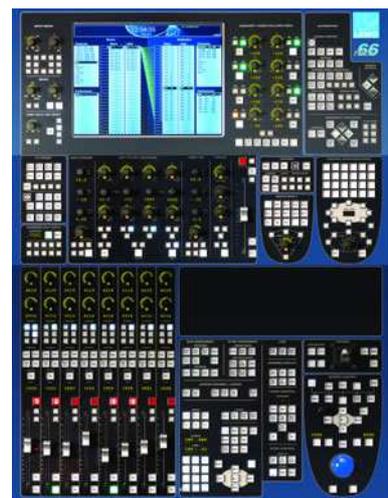
## Control Surface Overview

The **mc<sup>2</sup>66**'s control surface is constructed in 8-fader sections, with typical sizes scaling from 16 channel faders + 8 masters up to 48 channel faders + 8 masters.

Within each channel section, you will find 8 dedicated fader strips providing basic channel controls, such as level, mute and monitoring. Four assignable rotary controllers (free controls) offer additional local channel control. A fifth upper controller is dedicated for input gain. In addition, every 8-fader channel section houses a high resolution TFT display providing feedback on channel metering and bus assignments.



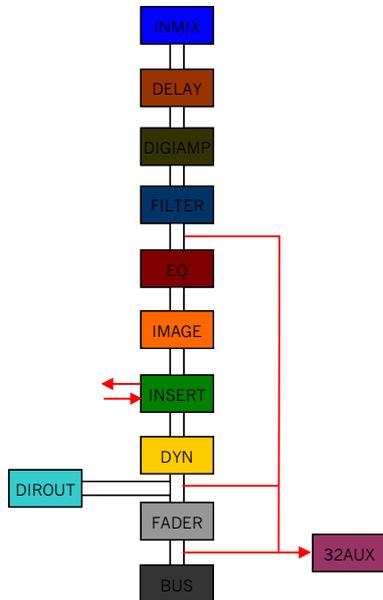
Any DSP channel may be accessed from the Central Control Section offering direct control of *all* settings – input control, signal processing, panning, level, AFL/PFL and auxiliary sends. The **Main** display works in parallel with these controls providing clear visual feedback on the channel's settings as you adjust them. Below the Central Control Section you will find eight additional main fader strips for dedicated masters.



On the right hand side of the centre section are the automation and snapshot/sequence controls; the monitoring control panels; the user panel which may house functions such as communications, machine control, etc.; and the ACCESS CHANNEL/ASSIGN control panel for bus and fader strip assignment, layering access, joystick and centre screen navigation.

## Signal Flow

### Fully Featured Channel Signal Flow:



The **mc<sup>2</sup>66** provides the flexibility to configure as many input channels, monitor return channels, groups, sums (main mix outputs) and auxiliary sends as the production requires. In addition, these resources can be allocated full signal processing or reduced signal processing enabling you to assign EQ, Dynamics, etc. to both inputs and outputs such as groups, sums and auxiliary sends.

For any given hardware specification, you may choose from a variety of DSP configurations designed to meet a variety of on-air, recording and post production needs. Configurations may be changed at any time, making it easy to modify the mix structure if you decide, for example, that the production requires some additional groups. The choice of DSP configuration is stored and recalled in the console production, independently of snapshots. This allows you to use snapshots to recall settings while on-air without re-configuring DSP resources.

The number of full and reduced processing channels, and their configuration, is determined by three factors – the hardware specification of the console, the choice of sampling rate and your choice of DSP configuration.

## The Power of Layering

The console's control surface includes both channel and main fader strips. Any fader strip may control any type of channel - input, monitor return, group, sum, auxiliary or VCA master - allowing you to lay out your source channels and output masters where you want them.

In addition, the physical size of the control surface does not need to restrict the number of processing channels available. Regardless of the size of the control surface, the number of audio processing channels may be scaled by fitting more DSP cards within the HD core. The extra channels are then accessed by paging the console's fader strips using banks and layers:

Up to six control surface banks may be configured; think of each fader bank like a separate console, with fast global switching between banks. They may be used, for example, to access different sets of music channels during a live entertainment show, or to separate different location sources during a sports production.

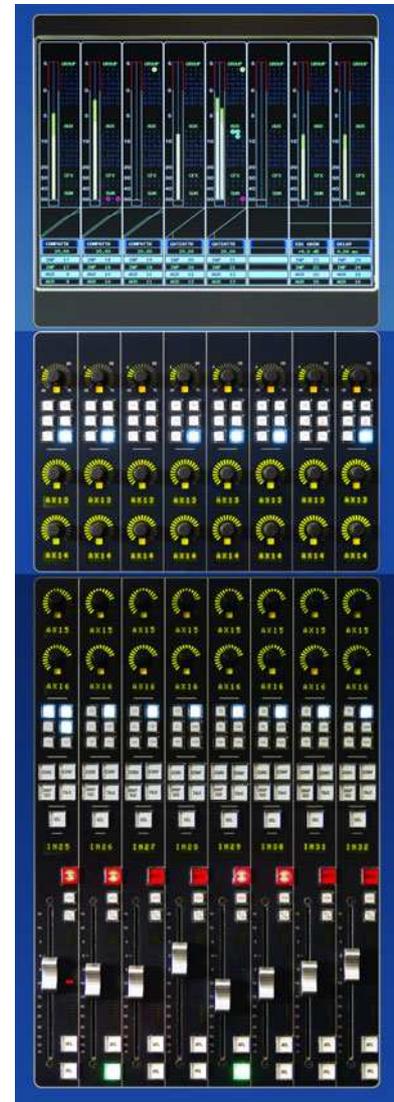
Within each of the six banks, each fader strip has two layers - Layer 1 and Layer 2. Layers can be switched either globally or individually, making them ideal for fast access to related sources. For example, assign a main microphone channel to Layer 1 and a backup microphone channel to Layer 2, or assign your input channels to Layer 1 and monitor return channels to Layer 2.

By isolating fader strips from the bank and layer switching, you can decide which channels require dedicated access (e.g. presenter's microphones) and which can be hidden from view until required (e.g. audience microphones). This enables consoles of a modest size to handle very large productions.

In addition to controlling onboard DSP, fader strips may be assigned to General Purpose Channels (GPCs), allowing control of parameters within external devices via MIDI. For example, to control camera microphone levels using a MIDI to VCA converter or to control faders and other parameters within an external DAW.

Depending on which snapshot is currently loaded, you may be sitting in front of a fully configured control surface with sources and fader strips pre-assigned, or your console may look blank waiting for fader strips to be configured.

### Channel Fader Strips



## Integrated Digital Routing Matrix

In addition to powerful mixing features, the console includes an integrated digital routing matrix:



Any source may be routed to any channel, and any output mix routed to any destination. In addition, you may route sources directly to destinations, for example to feed a Mic/Line input to an AES output for archive recording purposes.

Perhaps the most important feature of the routing matrix is that all routes may be stored and recalled from a snapshot, reducing the amount of manual patching within the installation and saving hours of set up time!



## Timecode Automation

The mc<sup>2</sup>66's automation system provides the ability to automate console settings referenced to timecode. Note that in addition to providing automation of channel parameters such as faders, mutes, aux sends, EQ, etc., the system allows you to automate other settings such as bus routing, channel signal flow, etc. Also note that the channels you automate may be any type of channel – inputs, groups, sums, auxes, VCA masters, GPCs, etc.

Automation data can be written with timecode rolling forwards, backwards and at any speed, providing fast and efficient mixing. The way in which data is written is governed by a number of modes, allowing you to write dynamic or static automation; step in or step out of write to make updates; protect channels to prevent overwriting existing moves; and isolate channels to remove them from the automation system completely.

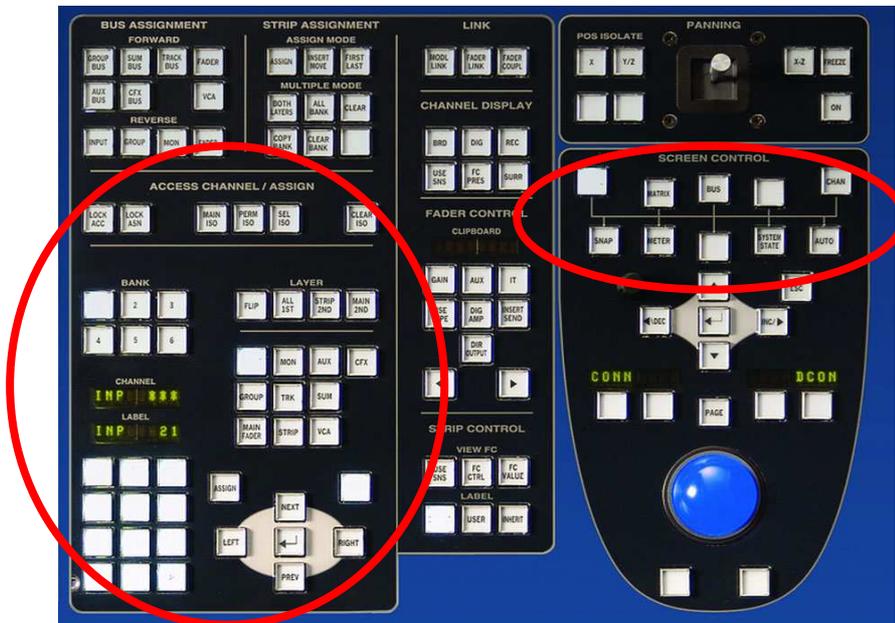
Each stream of automation data is recorded as a 'Pass', and multiple passes are stored within a 'Mix'. The 'Pass Tree' shows the history of the mix and enables you to A/B between different passes:



Multiple mixes may be created for each production and are stored permanently on the system when you update the production.

## ACCESS CHANNEL/ASSIGN and SCREEN CONTROL

Located in the centre section of the console are two very important control areas used throughout the operation of the console:

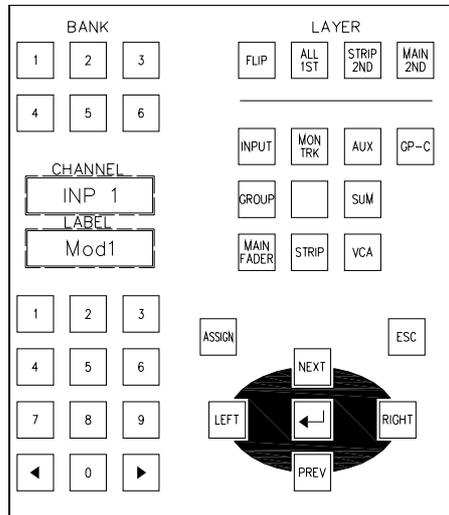


- The ACCESS CHANNEL/ASSIGN control panel is used for a variety of tasks including Central Control Section, bus and fader strip assignments. In each case, the philosophy of operation is to place a channel 'in access' and then assign it directly to a destination. This provides fast configuration of the console without navigating through screen-based displays.
- The SCREEN CONTROL panel interacts with the centre control screen and is used for a variety of screen based tasks. In each case, you 'focus' on an area of the display, and then perform operations from the four soft keys located above the trackball.

Let's look at each of these areas in a little more detail.

### The ACCESS CHANNEL/ASSIGN control panel

The ACCESS CHANNEL/ASSIGN control panel is located in the centre section of the console beneath the BANK and LAYER switching buttons:



The panel consists of:

- Ten channel type selection buttons – **INPUT**, **MON**, **AUX**, **GPC**, **GROUP**, **TRK**, **SUM**, **MAIN FADER**, **STRIP** and **VCA**.
- Two 8-character **CHANNEL** and **LABEL** displays.
- The numeric keypad.
- The **ASSIGN** button – changes the operation of the panel from access to assign
- The **ESC** button which can be used to exit any operation.
- Navigation buttons – **LEFT**, **RIGHT**, **NEXT** and **PREV**.
- The **ENTER** button – for confirmation.

Note that the ACCESS CHANNEL/ASSIGN panel is *always* active, and normally, with **ASSIGN** deselected, selects the channel in access. Note that the channel in access is always the channel assigned to the Central Control Section. The name and label are shown in the CHANNEL and LABEL displays, and in the top left hand corner of the Central Control Screen throughout all displays.



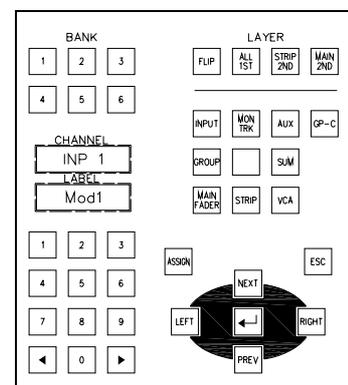
#### Note

There are three ways in which you can modify the channel in access providing that the **LOCK ACC** (lock access) button is not selected:

1. Press the **SEL** button on a channel or main fader strip.

This is the simplest method for accessing channels on the active control surface. However, there are times when you will wish to access channels on an underneath bank or layer of fader strips. In these cases, you may use either method 2 or 3 as follows:

2. Select the channel type and number using the channel type selection buttons and numeric keypad:
  - Select a channel type by pressing one of the following:
    - o **INPUT** – Input channels (up to 384).
    - o **MON** – Monitor channels (up to 96).
    - o **AUX** – Auxiliary masters (up to 32).
    - o **GPC** – General Purpose Channels (up to 256).
    - o **GROUP** – Group masters (up to 48).
    - o **TRK** – Track busses (up to 96).
    - o **SUM** – Sum masters (up to 48).
    - o **VCA** – VCA masters (up to 16).
    - o **MAIN FADER** – selects the channel type as assigned to one of the 8 main fader strips.
    - o **STRIP** – selects the channel type as assigned to one of the channel fader strips.



*The channel type button flashes and buttons on the numeric keypad illuminate; the flashing **TYPE NUM** message is guiding you to enter a number.*

- Enter the channel number by pressing a number on the numeric keypad followed by the Enter button. For example, press **1, 2** and Enter to enter the number twelve.
- Alternatively, enter a three digit number. For example, pressing **0, 1, and 2** will also enter the number twelve.

*Having entered a valid number, the channel type button stops flashing and the displays update to show the name and label for the selected channel.*

If you try and enter an invalid selection, for example GRP 897, the CHANNEL display tells you by flashing the letters **NOTAVAIL** for 'Not Available'. Press the **ESC** button to exit the operation, and start again.

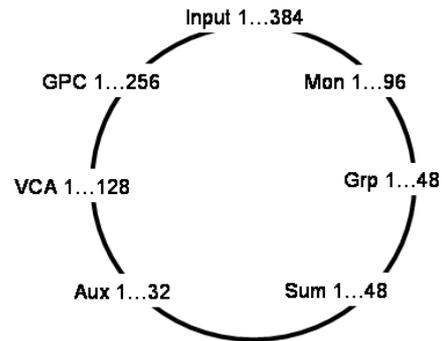


**Note**

## Tutorial

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- The third method of changing the channel in access is to increment or decrement the current channel number:
  - Press the **NEXT** or **PREV** buttons to increment or decrement the channel number by DSP type. For example, to scroll up or down through Input channels 1-192, Monitor channels 1-96, Groups 1-48, Sums 1-48, Auxes 1-32, VCA Masters 1-16 and General Purpose Channels (GPCs) 1-256:



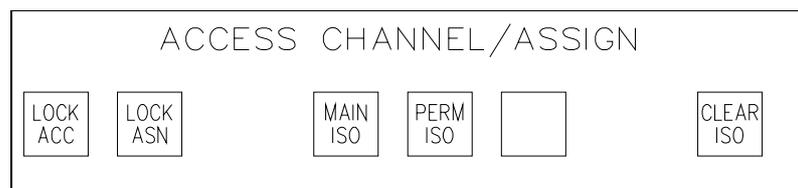
- Alternatively, press the **LEFT** or **RIGHT** buttons to assign the next channel as assigned to the console control surface. For example, if Input channel 8 is currently in access and assigned to channel fader strip 8, pressing the **LEFT** button selects the DSP channel assigned to fader strip 7.

*The name and label for your selected channel are shown in the CHANNEL and LABEL displays.*



### Note

Note that the channel in access may be locked by pressing the **LOCK ACC** button:



For example, you may wish to lock INPUT 24 into access so that it remains accessible from the Central Control Section at all times during the production.

Remember that updating the channel in access is how you assign a channel to the Central Control Section. In addition, you update the channel in access to perform an operation such as assigning a channel to a fader strip or routing a channel to a bus.

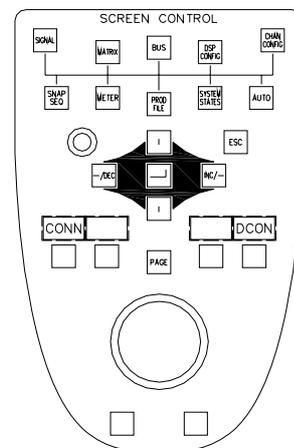
We'll cover these operations later in this tutorial, but first let's look at screen display navigation.

## SCREEN CONTROL

The SCREEN CONTROL panel is located in the centre section of the console beneath the joystick, and works in conjunction with the centre control screen and keyboard, located in the console arm rest or connected to the keyboard USB port, to provide screen-based control for a variety of functions.

The panel consists of:

- Two rows of display selection buttons – **SIGNAL**, **MATRIX**, **BUS**, **DSP CONFIG**, **CHAN/CONFIG**, **SNAP/SEQUENCE**, **METER**, **SYSTEM/STATES** and **AUTO**.
- Rotary control – used for scrolling selections within certain displays.
- The **ESC** button.
- The Left/DEC, Right/INC, Up, Down and Enter navigation buttons.
- Four soft keys, each with its own alphanumeric display.
- The trackball with left and right (blank) select buttons:



One of the displays is *always* active on the central control screen, and some buttons such as **SIGNAL** cycle through multiple pages. For clear feedback of information, there are no pop-ups or windows – every display stands alone with clearly defined control areas.



At the top of every display is a title bar containing some common elements:

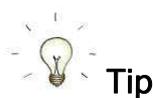
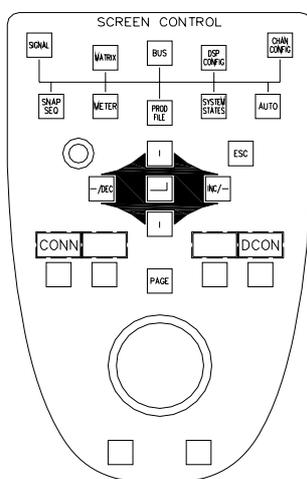
- The name and label of the channel in access (e.g. **INP1**).
- The number of pages available from the SCREEN CONTROL button, and the current selection – for example, 1 of 2.
- The local time – for example, **17:28:02** – or timecode.
- The title of the display – for example, **Channel**.
- The name of the active production – for example, **Formula one 2005** - and the current snapshot if one has been loaded e.g. Imola.
- If applicable, a red hazard warning flag

## Tutorial

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The SCREEN CONTROL buttons provide access to:

1. Press **SIGNAL** to page between two displays:
  - **Signals** - controls signal routing
  - **Settings** - adjusts I/O parameters
2. The **MATRIX** button is reserved for future implementation.
3. Press **BUS** to view the **Bus Assignments** for a channel
4. Press **DSP CONFIG** to view or change the **DSP Configuration**
5. Press **CHAN/CONFIG** to page between two displays:
  - The **Main** display shows channel settings for the channel in access
  - **Channel Config** - sets the channel signal flow
6. Press **SNAP/SEQUENCE** to page between three displays:
  - **Snapshots** - for loading, saving and managing console snapshots
  - **Sequence** – used to create and run real time sequence automation
  - **Edit Sequence** - for offline editing of sequences.
7. Press **METER** to view the four pages of assignable meters within the **Metering** display
8. Press **PROD FILE** to manage the console's productions
9. Press **SYSTEM/STATES** to page between two displays:
  - **System** - for setting console options
  - **States** - provides graphical feedback on the hardware status of the system
10. Press **AUTO** to page between two displays:
  - **Mixes** – lists the automation mixes in the production
  - **Pass Tree** – for managing passes of timecode automation



To page between multiple displays quickly, use the trackball and select button to click directly on the page number in the title bar at the top of each display (e.g. **1**, **2**, **3**, etc.).

The area below the title bar contains the main information for the display and follows a number of conventions:



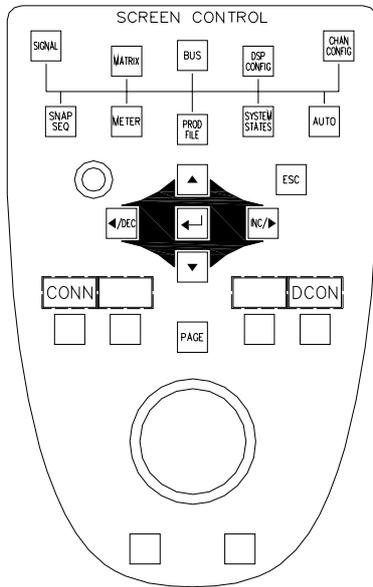
- The area of the display outlined by the dotted black and white line is 'in focus'. By focussing on different sections of the display, you can change the soft key functions, located above the trackball, in order to perform different operations.
- Text within grey boxes may be selected to provide further options – for example, selecting **Digital** updates the **Subdirectories** list on the above display.
- Selected boxes are highlighted in black.

Text or graphics shown within dark grey areas on the display are for information purposes only.

## Tutorial

To make a selection on a display, you may use the trackball, navigation buttons or rotary scroller:

1. To use the trackball, position the cursor above the box you wish to select, and then press either the left or the right select button beneath the trackball:



The display entry, for example *AES3\_003*, highlights in black and is ready for the next operation.

2. Alternatively, use the navigation buttons as follows:
  - Press the **DEC/Left** or **INC/Right** buttons to focus on an area of the display, for example *Source Name* and *Label*:

The focussed area is shown by the dotted black and white outline.

Note that the **INC/Right** button cycles around the display in a clockwise manner, and the **DEC/Left** button navigates in an anti-clockwise manner.

- Now press the up or down arrow buttons to select entries within the focussed area.
- Or, turn the rotary control to scroll through the entries within the focussed area.

The display entry highlights in black and is ready for the next operation.

Having selected an entry on the display, the four soft keys above the trackball are used to action operations. Note that their functions vary depending on the display selection. For example:

1. Select the **Snapshots** display by pressing the **SNAP/SEQUENCE** button.

*The soft keys update to provide **LOAD**, **SAVE** and **UPDT** functions as indicated in the alphanumeric displays.*

2. Select the **Signals** display, by pressing the **SIGNAL** button.

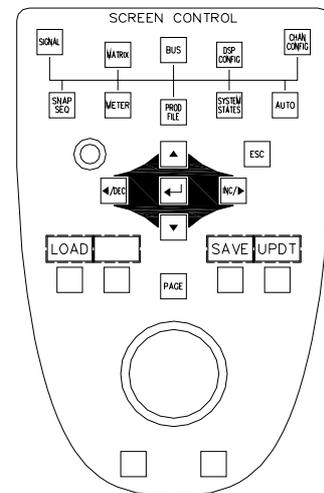
*The soft keys update to provide **CONN** and **DCON** functions.*

3. And so on for the remaining centre screen displays.

4. Press the **PAGE** button to page the four soft keys to a second level of functions.

*Not all displays require second level functionality, and you will be advised when to use the **PAGE** button.*

We will cover more details on specific display operations as we work through this tutorial.

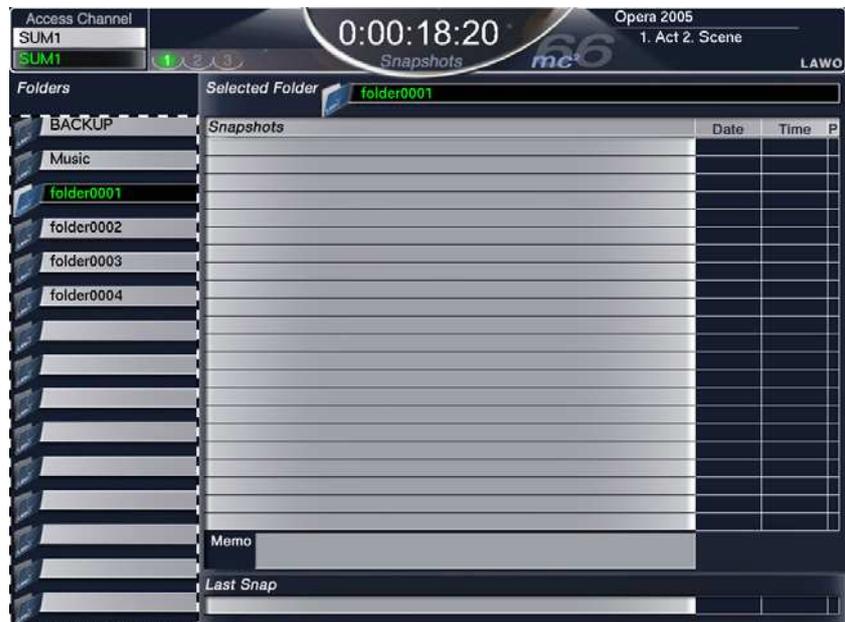
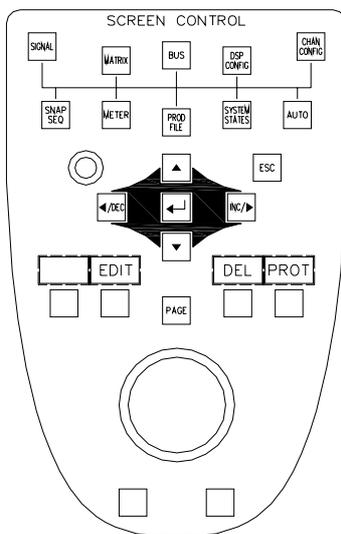


### Entering Names from the Keyboard

The keyboard is used for naming display entries, such as a console snapshot. You may also connect an external keyboard using the USB ports in the front arm rest of the console.

1. Press the SCREEN CONTROL **SNAP/SEQUENCE** button to view the **Snapshots** display and, using either the trackball or navigation buttons, select a snapshot to rename.

*The snapshot name is highlighted in black:*



2. Select the **PAGE** button, located in the middle of the SCREEN CONTROL soft keys.

*The four soft keys update to **PROT**, **EDIT** and **DEL**.*

3. To rename the snapshot, press **EDIT**.

*A green cursor appears highlighting the first letter of the existing name, in this case the letter **s**.*

4. Edit the name by typing a new name on the keyboard. As you type, you overwrite the existing name. Therefore, rather than deleting existing characters, type your new name and press the space bar to remove any remaining characters from the name.
5. When you have finished, press the Enter button on the keyboard to confirm the new name.

6. If you make a mistake or want to exit the naming mode, press the **Esc** button on the keyboard or deselect the **EDIT** button.

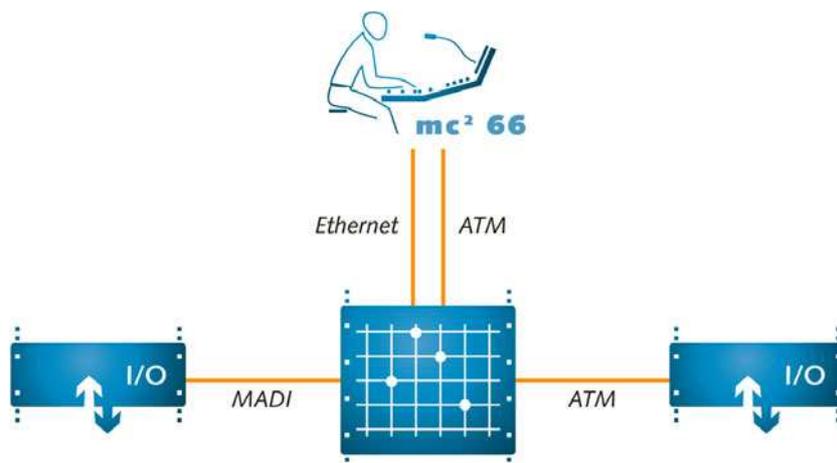
## Getting Started

Having covered some of the concepts behind the **mc<sup>2</sup>66**, let's look at how to get started on the console. We are assuming that your console is fully commissioned such that all of the basic configuration tasks are complete. Your console should also contain a generic setup production which will provide an excellent starting point for new templates you wish to create.

### Switching on the Power

The **mc<sup>2</sup>66** consists of three principal system components:

- Console surface with integrated control system.
- HD Core - DSP and routing matrix core.
- DALLIS I/O interfaces, which may be connected remotely to the system (up to 2km from the core).



The components may be powered in any order, including the option to power the console (including the control system) before I/O interfaces if desired. This enables you to begin setting up the console before remote I/O interfaces have received power.

## Tutorial

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From power on, the console's control system boots in a few seconds; during this time the centre control screen reports back on the boot-up progress.

At the end of boot-up, the control system automatically loads the following:

- Configuration data – these are fixed settings specific to the console. For example, the programming of the CRM 1 and 2 monitor selector panels.
- Warm start data – the complete status of the console as stored when the system was last shut down.

Depending on who was last using the console, you may be sat in front of a fully configured control surface with DSP settings or a series of blank fader strips! In either case, the fastest way to reset the console is to load a production.

### Loading a Setup Production

Productions form the top level for user data storage and store *all* the settings required for a production or type of job. Depending on the installation, you may have a number of setup productions or only one. Each should be clearly labelled – for example, **TV1 Setup**.

All setup productions should *always* be protected and *only* be modified by an authorised member of staff as they provide a common starting point for all users. Use the production to load a starting point; then save a new production to store your own settings.

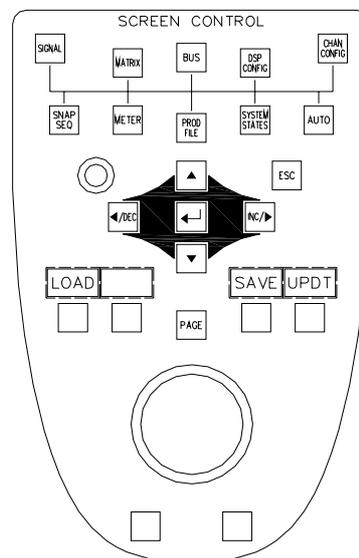
Settings will vary from console to console, but generally a setup production should reset the following console elements:

- DSP configuration to a working default.
- Input and Output sample rate converter settings to match installed equipment.
- **System** page options to a working default.
- **Metering** page setup to a working default.
- The assignment of channels to fader strips to a working default.
- DSP settings to flat.
- Basic signal routing and user labels – for example, routing to output distribution, monitoring and external metering.

To load a production:

1. Press the **PROD FILE** button, located on the SCREEN CONTROL panel in the centre section of the console.

*The Production display appears on the centre control screen:*



The **Production** display is divided into two main areas: at the top of the display you will see the name of the **Active** production; in the lower part of the display are listed all the productions stored on the internal user data flash card.

2. Select the production you wish to load from the lower part of the display using the trackball or navigation controls, for example **Olympic Games 2004**.

*The selected production is highlighted in black.*

3. Press the **LOAD** soft key, above the trackball, to complete the operation.

*The console status will update, and the display now shows that **Olympic Games 2004** is the **Active** production.*

For additional confirmation, watch the top of the display and you will see a red **loading...** message indicating that production data is being loaded.

## Interrogating the Channel Fader Strips



Depending on the settings within the setup production, you may now be able to open the faders and monitor audio! Don't worry if this is not the case as we will look at how to modify the configuration shortly.

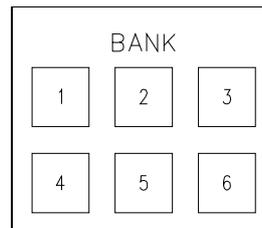
You can interrogate which channels have been assigned to the control surface, their input metering and current bus assignments by looking at the **Channel** displays across the console. Note that the bottom of the **Channel** display tells you which channels you are controlling from each fader strip:

- The two grey boxes display the fixed system names for the DSP channels assigned to the 1<sup>st</sup> and 2<sup>nd</sup> layer fader strips. In our example, input channel 1 is assigned to the active layer (**INP1**) with nothing assigned to the alternate layer.
- The two black boxes display the programmable user labels for these channels. In our example, **INP 1**. Your console will display the user labels which were loaded from the setup snapshot.

## Switching Banks and Layers

To interrogate alternate fader banks:

1. Locate the six **BANK** access buttons, numbered 1 to 6 above the **ACCESS CHANNEL/ASSIGN** control panel in the centre section.



One of these buttons will be illuminated; this is your active fader bank.

2. Press any numbered button to switch to a new bank of channel and main fader strips.

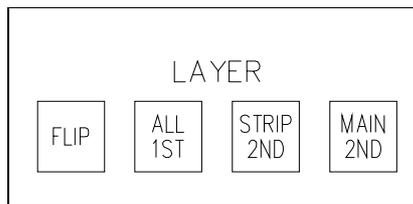
*As you do this, all fader labels, control positions and **Channel** displays update across the console to reflect the new settings. If there are no channels assigned to the bank, then you will switch to a series of blank fader strips.*

To switch between layers within a bank:

1. Press the **2ND** button located on the fader strip to switch an individual strip.

*The fader's label, control positions and **Channel** display update to reflect the settings for the second layer. If there is nothing assigned to this layer, then you will switch to a blank fader strip.*

2. Alternatively, locate the four LAYER access buttons above the ACCESS CHANNEL/ASSIGN control panel in the centre section.



3. Press the **FLIP** button to invert the layer for *all* fader strips - channel and main.

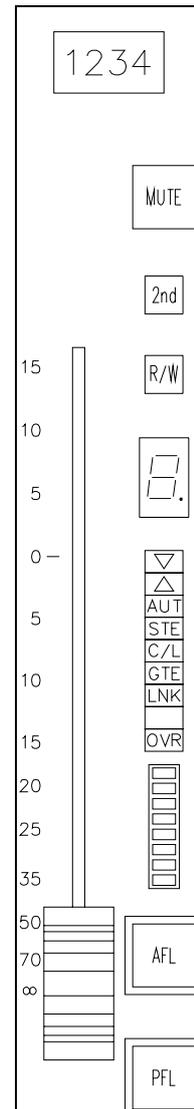
*This inverts the current layer selections allowing you to view all 'hidden' channels on the alternate layer with one button push.*

4. Press the **ALL 1ST** button to reset *all* fader strips - channel and main - to Layer 1.
5. Press **STRP 2ND** to switch the channel fader strips to Layer 2.
6. Press the **MAIN 2nd** button to switch the eight main fader strips to their second layer.

*When you deselect any of these three buttons, the console reverts to its previous layer status.*

Press and hold the **ALL 1ST**, **STRP 2<sup>ND</sup>** or **MAIN 2nd** buttons for more than 3 seconds to reset the layer status to all 1<sup>st</sup> or all 2nd.

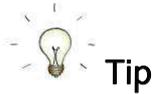
### Fader Strip



Tip

### Creating Your Own Configuration

Having loaded a setup production, you will want to modify the configuration to suit your particular show or mix. You can perform these operations in any order, but the most efficient way is as follows:



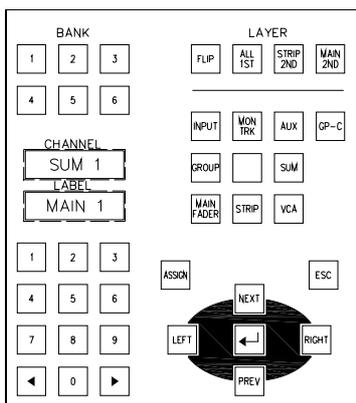
- Select the DSP configuration – this sets the number of input channels, monitor channels, groups, sums, auxes, etc, for the production.
- Set up your signal user labels and routing – by routing sources to channels before you lay out the control surface, you can make decisions such as which input channels, groups, sums, need to be mono, stereo or surround.
- Assign your channels to the fader strips – design your console layout by assigning your input channels, groups, sums, etc. where you want them.

For the purposes of this tutorial, we are going to assume that you have a DSP configuration with some input channels, groups, sums and auxes.

We are also going to assign our channels to the control surface before making any routes so that you can see audio appear as it is routed.

### Assigning Channels to Fader Strips

Let's take an example where we wish to assign input channels 1 to 24 across fader strips 1 to 24, and assign them to a single sum master channel controlled from main fader strip 8:



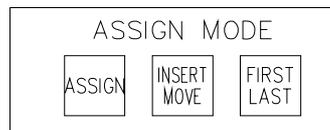
If you want to clear down the fader strip assignments loaded from the setup production to start from a series of blank fader strips, use the **CLEAR BANK** function.

To assign the sum master channel (SUM 1) to main fader strip 8:

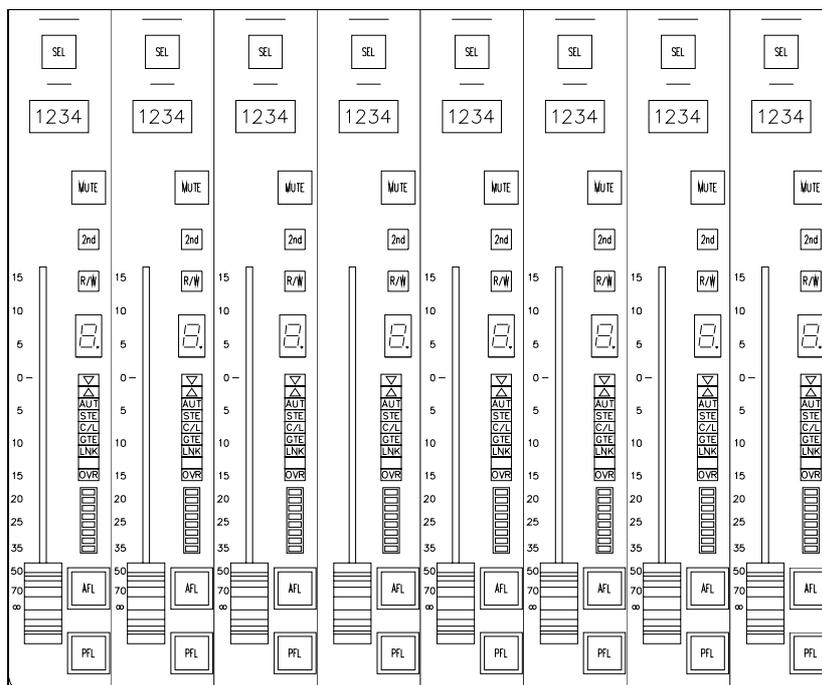
1. Select **SUM 1** from the ACCESS CHANNEL/ASSIGN control panel, by pressing **SUM**, the number **1** and the Enter button.

*This puts SUM 1 into access; the CHANNEL and LABEL displays show the name and label for sum master channel 1.*

- Now press the global **ASSIGN** button, located on the STRIP ASSIGNMENT: ASSIGN MODES panel:



The **ASSIGN** button flashes, and across the console the fader **SEL** buttons flash, in green, to indicate possible destinations for your selected channel:



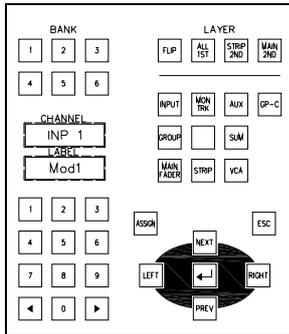
- Press the fader **SEL** button on main fader strip 8 to complete the assignment.

The fader **SEL** button stops flashing and changes colour, from green to red, to indicate the assignment. In addition, the Fader Label display updates to show the new system name for the fader strip - **SUM 1**.

## Tutorial

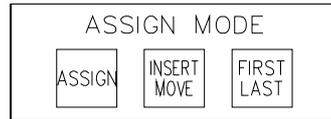
---

With the **ASSIGN** mode still active, now assign input channels 1-24 onto the control surface:



1. Select **INP 1** from the ACCESS CHANNEL/ASSIGN control panel by pressing **INPUT**, the number **1** and the Enter button.

*This puts input channel 1 into access; the CHANNEL and LABEL displays show the name and label for input channel 1.*



2. Select the **FIRST LAST** button, located on the STRIP ASSIGNMENT: ASSIGN MODES panel:
3. Press the fader **SEL** button on channel fader strip 1 followed by the fader **SEL** button on channel fader strip 24.

*The console incrementally assigns input channels 1 to 24 from the first selection (channel fader strip 1) to the last selection (channel fader strip 24).*

4. Deselect the global **ASSIGN** button or press **ESC**, on the ACCESS CHANNEL/ASSIGN control panel, to exit the assign mode

## Source Routing

Now let's route a new audio source, for example a CD player, into input channels 23 and 24.

1. Press the **SIGNAL** button, located on the SCREEN CONTROL panel, to view the **Signals** display:



Note that each time you press the **SIGNAL** button you toggle between two pages – **Signals** and **Settings**. The current page is always highlighted at the top of the display – in our example, page 1 of 2.



Note

In our example, the CD player is connected to AES inputs 01 and 02.

2. Using the trackball or navigation buttons, select the source directory (e.g. **Digital**) and sub-directory (e.g. **HD AES IN 1-24**) on the left of the display.

*Your selections are highlighted in black and the **Source Name** and **Label** columns update to show all available sources.*

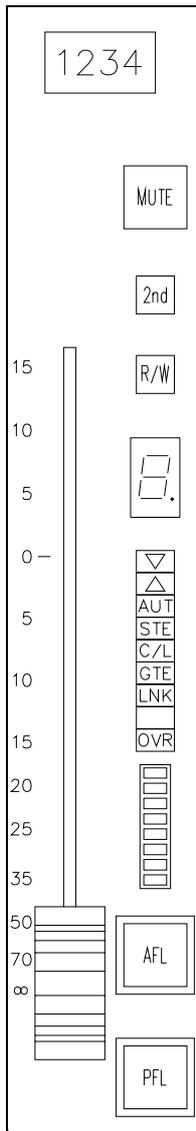
3. Now select either the **Name** or **Label** for the source you wish to route (e.g. **HD AES301**).

*Your selected source is highlighted in black.*

4. Next, select the destination in a similar fashion. For example, select **Inputs/Mon** as your directory, **INP 1-24** as the sub-directory followed by **INP23** from the Name and Label list.

*Your selected destination is highlighted in black.*

Fader Strip



- To make the route press the **CONN** (Connection) soft key located above the trackball.

The *Signals* display updates with a green line showing the route between **AES301** and **INP23**.

Look at fader strip 23 on the control surface; the fader strip and **Channel** display name and labels update and hopefully you are metering some audio:



- Repeat steps 3 to 5 to route the right hand side of the CD player (**AES302**) to input channel 24 (**INP24**).

The *Signals* display updates with a green line showing the route between **AES3 02** and **INP24**.

## Bus Assignments

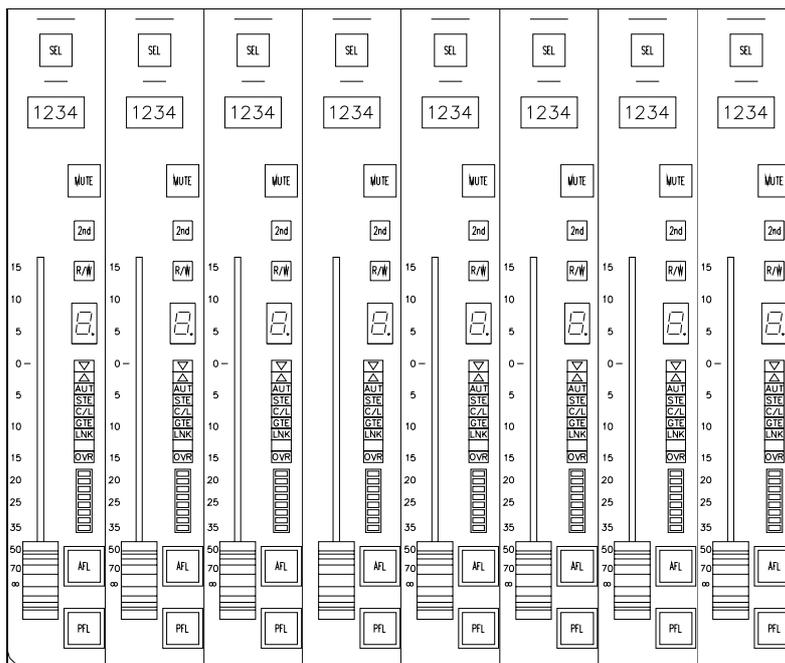
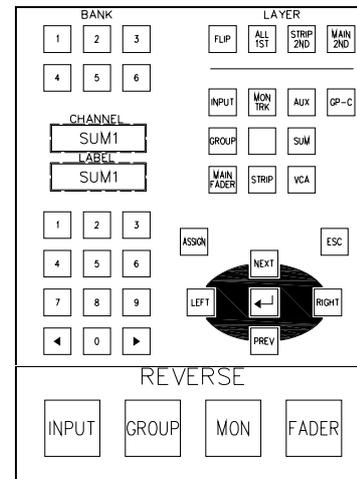
Next we need to assign input channels 23 and 24 onto our main output (SUM 1). We may use either forward or reverse bus assign to perform this operation; let's use reverse bus assign:

1. First select the destination (Sum 1) by pressing the **SEL** button on the main fader strip controlling SUM 1 – main fader strip eight:

*This puts SUM 1 into access as indicated on the ACCESS CHANNEL/ASSIGN control panel's displays.*

2. Now press the **INPUT** button, located on the BUS ASSIGNMENT: REVERSE panel.

*The INPUT button flashes, and across the console the fader SEL buttons on fader strips which are controlling input channels (INP 1-24) flash, in green, to indicate possible sources for the chosen destination:*



3. Press the fader **SEL** buttons on the fader strips controlling IN23 and IN24 to complete the assignment.

*The fader SEL buttons stop flashing and change colour from green to red to indicate that the channels are assigned to the selected destination. Note also that the Channel display above fader strips 23 and 24 shows the bus assignments onto sum 1.*

4. Deselect the **INPUT** button or press **ESC**, on the ACCESS CHANNEL/ASSIGN control panel, to exit the assign mode.

### Control Room Monitoring

The final step before we can hear our audio is to look at the control room monitoring. Both main and alternate monitor outputs are controlled from the CONTROL ROOM MONITORING panel:



1. Press one of the 24 pre-programmed buttons to select **SUM 1** as your monitor source.
2. Use the CRM 1 rotary control to set the main monitor level.
3. Press the **ALT** button to switch the CRM 1 output to an alternate set of speakers.
4. To listen to the output of an external source, press a different button from the source selector panel.

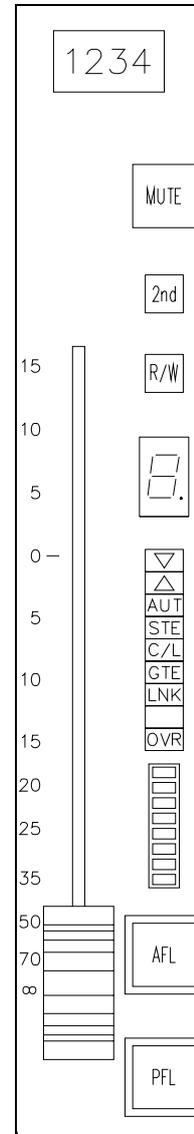
These buttons are programmed within the low level system configuration; please refer to the **mc<sup>2</sup>66** Installation Manual for full details.

## AFL & PFL Monitoring

At any stage, you may listen to the output of a channel using the AFL and PFL buttons:

1. To monitor the channel post fader, press the **AFL** button located on the fader strip.
2. To listen to the channel pre fader, press **PFL**.
3. Press the **CLEAR AFL/PFL** button, located on the Control Room Monitoring panel, to clear all current AFL and PFL selections.

Note that depending on your monitoring configuration, AFL and PFL signals may appear on the Control Room 1, Control Room 2 or external monitor speakers. In addition, you may have access to **AFL to Mains** and **PFL to Mains** switching from the 24 programmable Control Room Monitoring panel buttons. These settings are programmed within the low level system configuration; please refer to the **mc<sup>2</sup>66** Installation Manual for full details.



## Routing Sources to Multiple Channels

Next let's assign some microphone sources to more of our input channels. For example, mic/line sources 1-8 to input channels 1-8.

1. Press the **SIGNAL** button, located on the SCREEN CONTROL panel, to view the **Signals** display:



2. Using the trackball or navigation buttons, select the source directory (e.g. **Stagebox**) and sub-directory (e.g. **Mics**) on the left of the display.

*Your selections are highlighted in black and the **Source Name** and **Label** columns update to show all available sources.*

3. Now select either the **Name** or **Label** for the first source you wish to route (e.g. **Mic\_06.1**)

*Your selected source is highlighted in black.*

4. Next, select the destination in a similar fashion. For example, select **Inputs/Mon** as your directory, **INP 1-24** as the sub-directory followed by **INP1** from the Name and Label list.

*Your selected destination is highlighted in black.*

- Now press the **PAGE** button, located above the trackball, to access the second page of soft key functions.

The displays above the four soft keys update to show **EDIT** and **STEP** functions.

- Press the **STEP** button to activate the step forward mode.
- Now deselect **PAGE** and press the **CONN** soft key to make the first route.



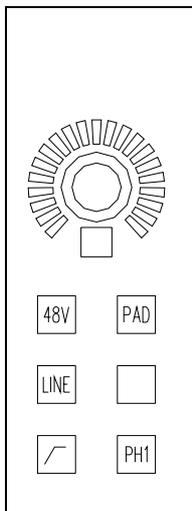
The **Signals** display updates with a green line showing the route between **Mic\_06.1** and **Inp 1**. In addition, the source and destination selections automatically step down to the next entries in the list.

- Continue pressing the **CONN** button until all eight microphone sources are connected to input channels 1 to 8.

As you step down through the list, note the red and white crosses which appear to indicate routes are made to or from sources and destinations within the list.

- Now repeat the reverse bus assign operation, as described on Page 37, to assign all eight input channels onto Sum 1 for monitoring.

### Controlling Microphone Pre-amplifier Settings



Each microphone pre-amplifier may be remotely controlled in order to set input gain, phantom power, etc. prior to analogue-to-digital conversion. These settings may be controlled either from the fader strip or the Central Control Section. Let's use the dedicated controls on the channel fader strip:

1. Use the GAIN control to remotely set the microphone preamplifier gain.

*The gain range is normally adjusted from 0dB to 70dB, although this may vary depending on your hardware configuration. Please refer to the DALLIS I/O technical data for details.*

2. Press the **48V** button to select 48V phantom power.
3. Press the high pass filter button to insert an analogue subsonic filter prior to the A-D conversion.
4. Toggle this button to cycle through the filter roll-off frequency options: Off, 40Hz, 80Hz and 140Hz.

*The button changes colour to indicate the selected frequency - green (40Hz); yellow (80Hz); red (140Hz).*

5. Press **PAD** to insert the 20dB PAD.

## Saving Your Settings

Console settings are saved within productions onto the internal user data flash card. Each time you update a production you store a one-shot memory of the current console status, including low level settings such as DSP configuration, and high level settings such as your mix and console layout.

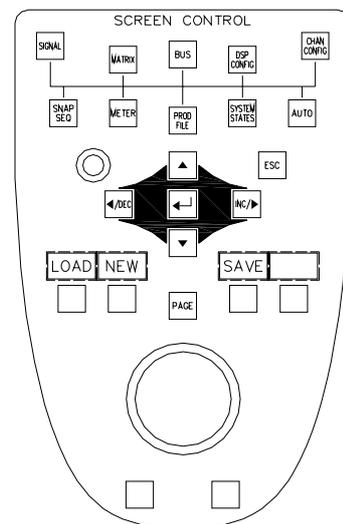
It is a good idea to save and organise your productions early on. Don't overwrite your studio's setup production with your own settings! Instead, save a new production for each of your own templates or for a particular show.

Note that within each production, you may create folders to store snapshots. Snapshots store high level settings and provide the ability to store different mixes/setups within the production. For example, you may use snapshots to recall a different mix or console layout for each band appearing in a live entertainment show. Or, snapshots may be used to recall scene changes during a live theatre production.

## Saving a New Production

To avoid overwriting existing settings, we are going to save the current status of the console into a new production:

1. Press the **PROD FILE SCREEN CONTROL** button to access the **Production** display:



The last production loaded was **DTM 2004**, therefore this is the **Active** production.

## Tutorial

- Using the trackball or navigation buttons focus on the list of productions in the lower part of the display.

The four soft key functions update to show **LOAD**, **NEW** and **SAVE**.

- Press the **SAVE** soft key to save the current console settings into a new production:



A new entry appears in the productions list with a default name (e.g. **production 0009**). This entry contains all the settings of the console and is time and date stamped. The new production automatically becomes the **Active** production as shown on the display.

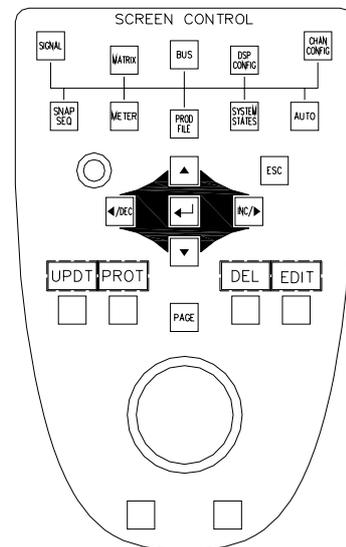
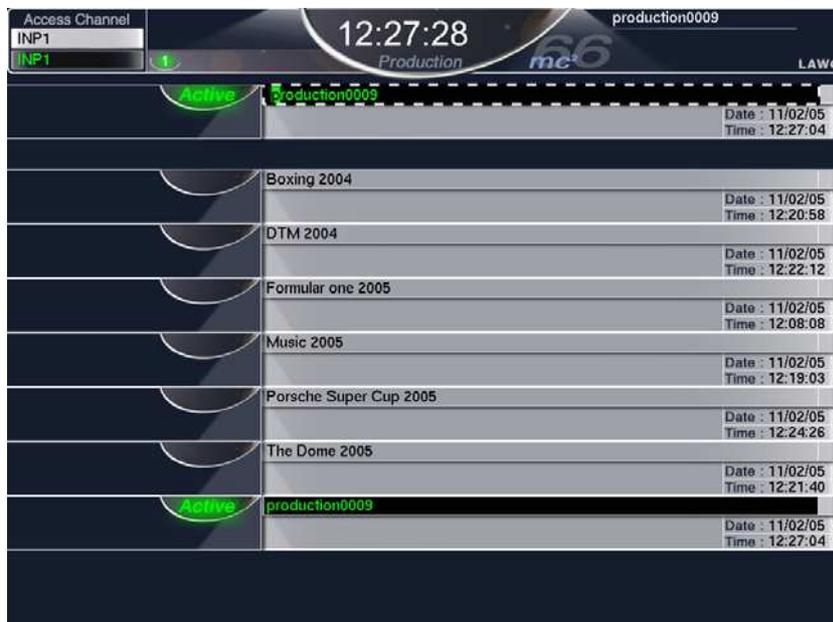
## Renaming the Production

To rename the production:

1. Using the trackball or navigation buttons focus on the Active production name at the top of the display.
2. Press the **PAGE** button, located in the middle of the SCREEN CONTROL soft keys, to access the second level of soft key functions.

*The four soft key functions update to show **UPDT**, **PROT**, **DEL** and **EDIT**.*

3. Press **EDIT**:



*A green cursor appears highlighting the first letter of the existing name, in this case the letter **p**.*

4. Edit the name by typing a new name on the keyboard. Note that as you type, you overwrite the existing name. Therefore, rather than worrying about deleting existing characters, type your new name and then press the space bar to remove any remaining characters from the name.
5. When you have finished, press the Enter button on the keyboard to confirm the new name.

*This completes the naming operation.*

6. If you make a mistake or want to exit the naming mode, press the **Esc** button on the keyboard or deselect the **EDIT** button.

### Updating the Production

You should save your settings regularly as you work by updating the **Active** production.

Note that updating overwrites the production data. Therefore, make sure that you have selected the correct production to update. To avoid accidental updates, always protect setup or template productions.

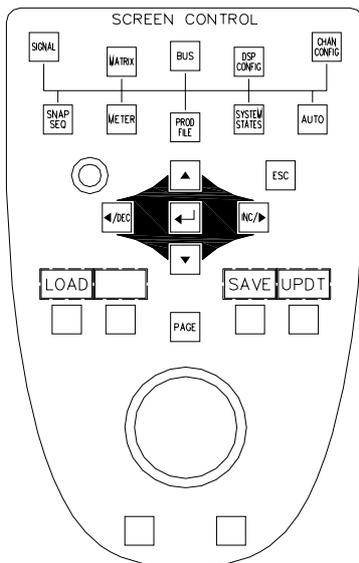
Note that you can also undo accidental mistakes by loading a backup production.

To update a production:

1. Select the production by focussing on its name either using the trackball or navigation buttons. Note that the **Active** production, **production0009**, is selected by default.



#### Note



2. Press the **UPDT** (Update) soft key, located above the trackball.

*The selected production is overwritten with the current console settings. You can confirm this by looking at the new date and time stamp.*



#### Tip

For additional confirmation, watch the top of the production display and you will see a red **saving...** message indicating that the production data is being saved.

Note that a protected production cannot be updated.

## Configuring Audio Sub Group Masters

So far, we've routed our input channels directly to a main sum output. However, for many productions, you will want to use groups either to create independent mixes, like an international version, or to provide greater control over separate elements of the mix, for example to compress all of the music channels separately to the main presenter's microphones.

The number of groups is determined by your choice of DSP configuration; note that not all DSP configurations support groups.



### Note

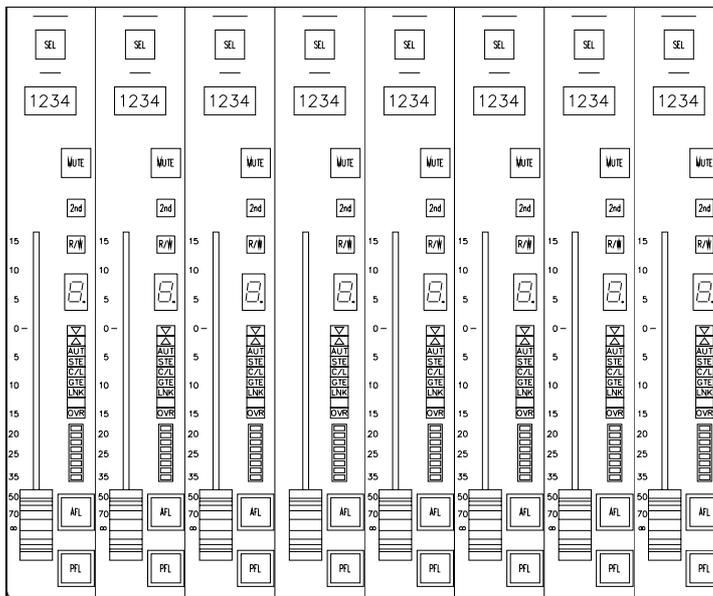
Providing groups are available, they are assigned to the control surface in exactly the same way we assigned our input and sum channels. Repeat the fader strip assignment operation, described on Page 32, to assign GROUPS 1 to 4 onto main fader strips 1 to 4 now.

## Re-assigning Channels to Groups

At the moment we have our input channels assigned directly to the sum master (SUM 1). To modify this routing so that our microphone channels are routed via a sub group, let's use reverse bus assign.

First remove input channels 1-8 from SUM 1 as follows:

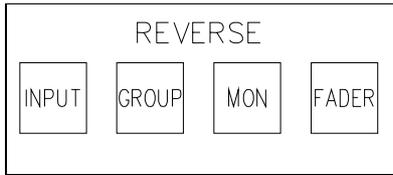
1. Select the destination (Sum 1) by pressing the **SEL** button on the main fader strip controlling SUM 1:



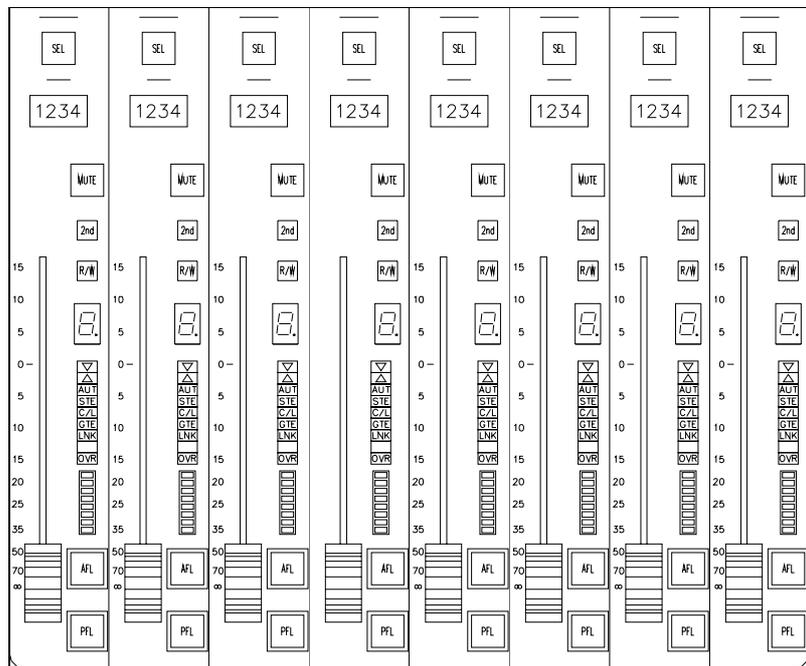
*This puts SUM 1 into access as indicated on the ACCESS CHANNEL/ASSIGN control panel.*

2. Now press the **FADER** button, located on the BUS ASSIGNMENT: REVERSE panel.

## Tutorial



The **FADER** button flashes, and across the console the fader **SEL** buttons flash, in green, to indicate possible sources for the chosen destination:



Note that the **SEL** buttons on the first eight faders strips (INP 1 to INP 8) are illuminated in red showing that they are already assigned to the selected sum master.

3. Press the **SEL** buttons on the fader strips controlling INP 1 to INP 8 to undo the bus assignments.

The fader **SEL** buttons change colour from red to green, and the **Channel** display indicates the updated bus assignments.

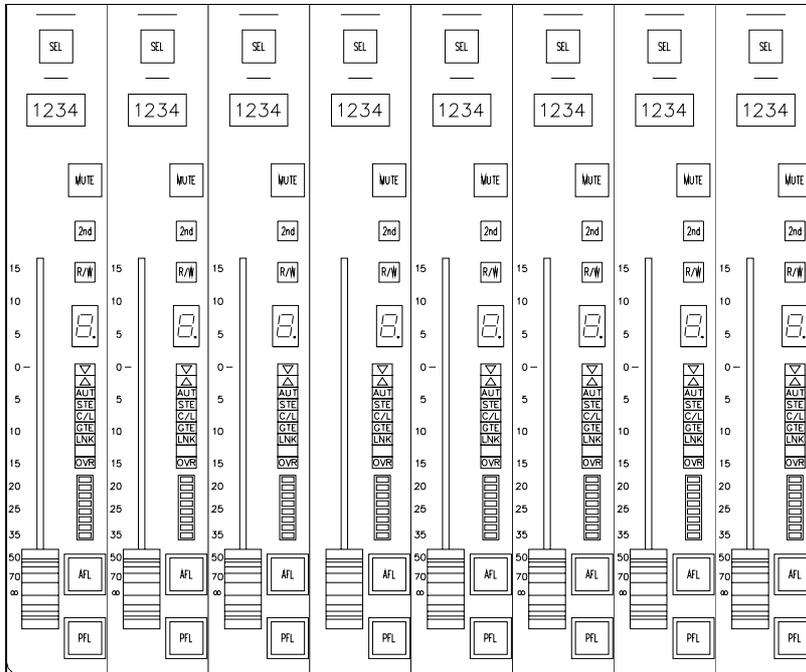
4. With **FADER** still selected, now press the fader **SEL** buttons on the fader strips controlling GRP 1 to GRP 4 to assign the group master channels to Sum 1.

The fader **SEL** buttons stop flashing and change colour from green to red to indicate that the channels are assigned to the selected destination.

5. Deselect the **FADER** button to complete the operation.

Now, we need to assign input channels 1-8 to one of the groups – let's use Group 1:

1. Select the destination (Group 1) by pressing the **SEL** button on the main fader strip controlling GRP 1:



*This puts GRP 1 into access as indicated on the ACCESS CHANNEL/ASSIGN control panel's CHANNEL and LABEL displays.*

2. Now press the **INPUT** button, located on the BUS ASSIGNMENT: REVERSE panel.

*The **INPUT** button flashes, and across the console the fader **SEL** buttons on fader strips which are controlling input channels (INP 1-24) flash, in green, to indicate possible sources for the chosen destination:*

3. Press the fader **SEL** buttons on the fader strips controlling INP 1 to INP 8 to complete the assignment.

*The fader **SEL** buttons stop flashing and change colour from green to red to indicate that the channels are assigned to the selected destination. Note also that the Channel display above fader strips 1 to 8 shows the bus assignments onto group 1.*

4. Deselect the **INPUT** button or press **ESC**, on the ACCESS CHANNEL/ASSIGN control panel, to exit the bus assign mode.

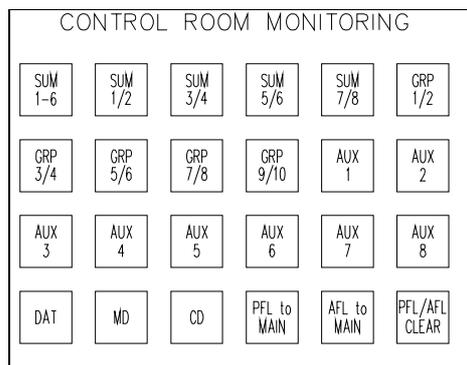
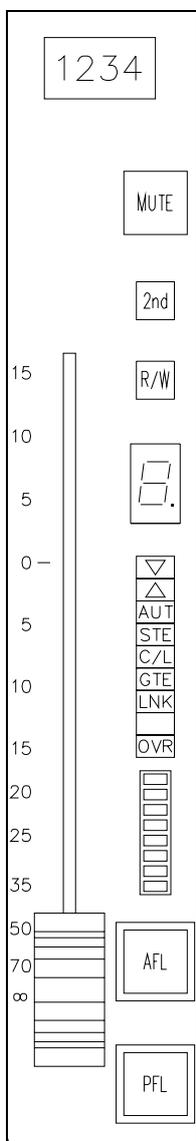
## Monitoring the Group Output

Your Control Room Monitor output should still be selected to SUM 1, so push open all the faders and you will be hearing a mix of your microphone channels (input channels 1 to 8) and the CD player (input channels 23 & 24), with the overall level of all eight microphone channels controlled by Group master 1.

To monitor just the group output, you may either:

1. Press one of the pre-programmed monitor selector buttons to monitor GRP 1, if available:

Fader Strip



2. Press the **AFL** button located on the fader strip controlling GRP 1 to listen to the group output post fader.
3. Press the **PFL** button located on the fader strip controlling GRP 1 to listen to the group output pre fader.

Note that depending on your monitoring configuration, AFL and PFL signals may appear on the Control Room 1, Control Room 2 or external monitor speakers. In addition, you may have access to **AFL to Main** and **PFL to Main** switching from the 24 programmable Control Room Monitoring panel buttons. These settings are programmed within the system configuration; please refer to the **mc<sup>2</sup>66** Installation Manual for full details.

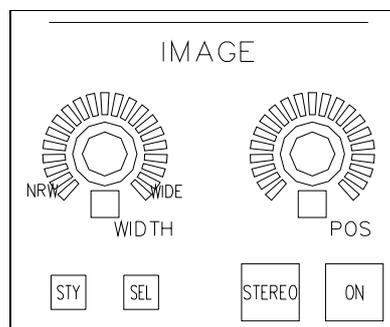
## Creating Stereo Channels or Masters

Up until now, we have been dealing with mono input channels, mono groups and a mono sum. However, any of these channels may easily be changed from mono to stereo either from the Central Control Section or **Signals** display.

For example, to change SUM 1 from mono to stereo:

1. Press the **SEL** button on the main fader strip controlling SUM 1 to assign it to the Central Control Section.

*The CHANNEL and LABEL displays update to show the system name and label for SUM 1.*



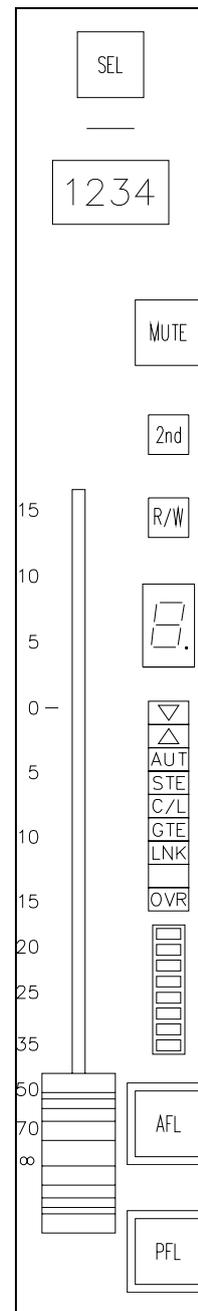
2. Locate the IMAGE controls on the Central Control Section:
3. Press the **STE** button.

*This links SUM 1 to its adjacent DSP channel (SUM 2) to create the stereo channel.*

*To indicate that the channel is now stereo, you have stereo metering, a **STE** LED on the fader strip, a stereo indicator on the **Main** display and the Image section becomes active.*

Note that if SUM 2 was assigned to the control surface, then the SUM 2 mono channel disappears leaving a blank fader strip.

4. Repeat steps 1 to 3 to change any of your groups or input channels from mono to stereo.



## Routing Masters to Output Destinations

So far we have looked at how to route sources into channels, assign channels to group and sum masters, and monitor the various paths. Next let's look at how to assign your groups and sum output to new destinations, for example to feed a recorder or distribution chain. The operation is very similar to routing a new source to a channel, only this time we are going to select the bus master channel as our source (e.g. SUM 1) and a physical output (e.g. AES output 1) as our destination:

1. Press the **SIGNAL** button, located on the SCREEN CONTROL panel, to view the **Signals** display:



2. Using the trackball or navigation buttons, select the source directory (e.g. **Bus Out**) and sub-directory (e.g. **DOut Sum 1-28**) on the left of the display.

*Your selections are highlighted in black and the **Source Name** and **Label** columns update to show all available sources.*

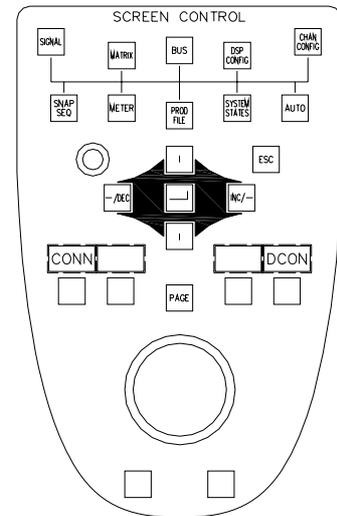
3. Now select either the **Name** or **Label** for the source you wish to route (e.g. **SUM1**).

*Your selected source is highlighted in black.*

4. Next, select the destination in a similar fashion. For example, select **Digital** as your directory; **HD AES 1-24** as the sub-directory followed by **AES3\_001** from the Name and Label list.

*Your selected destination is highlighted in black.*

- To make the route press the **CONN** (Connection) soft key located above the trackball.



The **Signals** display updates with a green line showing the route between **SUM1** and **AES3\_001**.

- Repeat steps 3 to 5 to route the right hand side of the stereo sum master (**SUM2**) to **AES3\_002**.

The **Signals** display updates with a green line showing the route between **SUM 2** and **AES3\_002**.

## Using Auxiliary Sends

Auxiliary sends may be used for a variety of applications such as cue feeds, effects sends, mix minus (N-1) sends, etc. Depending on your choice of DSP configuration, each channel may access up to 32 sends.

Send controls are paged onto the eight rotary encoders within the Central Control Section. For example, to open an auxiliary send from input channel 23:

1. Press the **SEL** button on the fader strip controlling INP 23 to assign it to the Central Control Section.

*The name and label for channel in access updates in the CHANNEL and LABEL displays, and the Central Control Section panels update to show the current settings for the sum master.*

2. Locate the AUXILIARY/ AUDIO FOLLOWS VIDEO controls on the Central Control Section.
3. Press **AUX 1..8** to assign the first eight auxiliary sends onto the rotary controls.

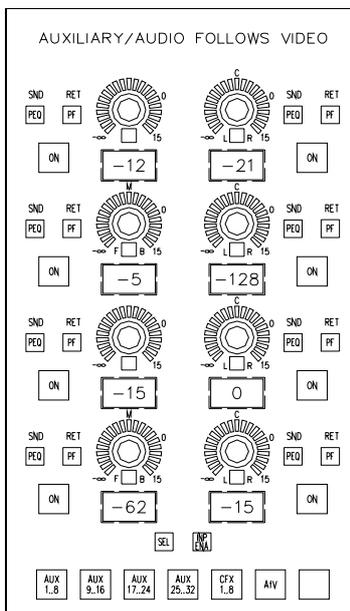
*The names **AUX 1** to **AUX 8** appear in the alphanumeric displays showing which send is allocated to each control.*

4. Press the **ON** button to activate the auxiliary send.
5. Now use the rotary control to adjust the send level.

*The send level may be adjusted from -128dB to +15dB.*

Note that auxiliary send levels may also be controlled from faders using the FADER CONTROL feature

Auxiliary masters are assigned onto fader strips in the same way we assigned the input channels, groups and sum master earlier.



## Creating a Mix Minus (N-1)

One of the most common functions required during a live production is the mix minus, or N-1, output. The **mc<sup>2</sup>66** may use any of its 32 auxiliary sends to create mix minus feeds. Let's take an example where we wish to create separate mix minus feeds for the first four microphone inputs we assigned to fader strips 1 through 4 earlier.

### Configuring the Mix Minus Auxiliary Sends

The first step is to configure the auxiliary sends to be used for each mix minus feed. This is done from the signal **Settings** display by linking the auxiliary you wish to use to the input source. To keep things simple let's use auxiliary sends 1 to 4 for our configuration:

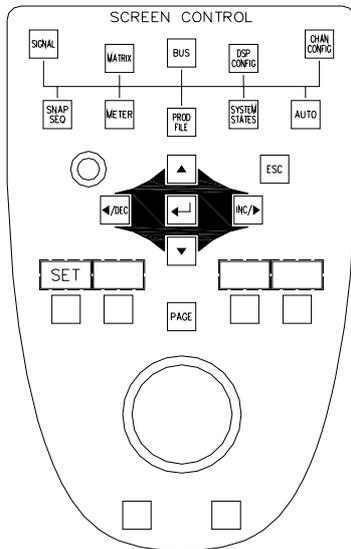
1. Press the **SIGNAL** button, located on the SCREEN CONTROL panel, to view the **Signals** display.
2. Using the trackball or navigation buttons, select the directory (e.g. **Stagebox**), sub-directory (e.g. **Mics**) and the first source (e.g. **MIC\_06.3**) you wish to assign a mix minus send:



*The selected **Source Name** and **Label** are highlighted on the display.*

## Tutorial

- Now press the **SCREEN CONTROL SIGNAL** button again to switch to the **Settings** display:



The screenshot shows the 'Settings' display on a control console. At the top, it displays 'Access Channel INP1', '12:50:45', 'Formular 1 Startup', and 'LAWO'. The main display is divided into several sections:

- Selection:** MIC\_06.3 Guest.
- Source:** A table with columns 'Name' and 'Label'. The selected source is MIC\_06.3 Guest.
- Destinations:** A table with columns 'Name' and 'Label'. The selected destination is INP1.
- Mix-minus:** A box showing 'AUX 1' and 'AUX 1'.
- I/O-DSP:** off.
- Level:** +0.0 dB.
- SRC:** off.
- TG:** Level and Freq.

Source		Destination	
Name	Label	Name	Label
MIC_06.1	Tape L	INP1	INP1
MIC_06.2	Tape R	INP2	INP2
MIC_06.3	Guest	INP3	INP3
MIC_06.4	CD L	INP4	INP4
MIC_06.5	CD R	INP5	INP5
MIC_06.6	TEL 1	INP6	INP6
MIC_06.7	TEL 2	INP7	INP7
MIC_06.8	MD L	INP8	INP8
		INP9	INP9
		IN10	IN10
		IN11	IN11
		IN12	IN12
		IN13	IN13
		IN14	IN14
		IN15	IN15
		IN16	IN16
		IN17	IN17
		IN18	IN18
		IN19	IN19
		IN20	IN20
		IN21	IN21
		IN22	IN22
		IN23	IN23
		IN24	IN24
		IN25	IN25
		IN26	IN26
		IN27	IN27
		IN28	IN28

Your selected source name and label (e.g. **MIC\_06.3**) are shown in the **Selection** box at the top left of the display, and a list of the current destinations for this source in the **Destinations** list below. This display is used to configure a number of source and destination settings. We are interested in the **Mix-minus** box at the bottom left of the display.

- Select the **Mix-minus** box, either using the trackball or navigation buttons, and use the rotary control located above the trackball to scroll through the auxiliary sends 1 to 32. For our example, select **AUX 1**.
- Press the **SET** soft key to confirm the selection.

The name and label boxes beneath **Mix-minus** update to show the name and label of the selected aux.

- Repeat steps 1 to 4 to configure auxiliaries 2, 3 and 4 as the Mix-minus sends for mic inputs 2, 3 and 4.

- Having configured a link between the input sources and mix minus auxiliary sends, now return to the **Signals** display by pressing the **SIGNAL** button again.

The next step is to route the output of the auxiliary sends to the relevant mix minus destinations. In this example, we want to route auxiliary 1, 2, 3 and 4 to the ear piece feeds for our guest channels (e.g. four Stagebox analogue outputs).

- Using the trackball or navigation buttons, select the source directory (e.g. **BUS Out**), sub-directory (e.g. **DirOut AUX X 1-16**) and **Name** or **Label** for the source you wish to route (e.g. **AX 1**):



Your selected source is highlighted in black.

- Next, select the destination, for example **Stagebox** as your directory, **Analog 2** as the sub-directory followed by **ANA\_13.1** from the **Name** and **Label** list.

Your selected destination is highlighted in black.

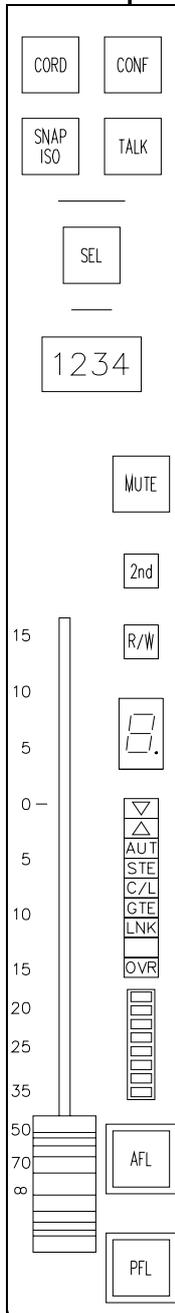
- To make the route press the **CONN** (Connection) soft key located above the trackball.

The **Signals** display updates with a green line showing the route between **AX 1** and **ANA\_13.1**.

- Repeat steps 8 to 10 to route all four auxiliary send masters to the corresponding analogue outputs for the mix minus feeds.

### Activating the Mix Minus Sends

#### Fader Strip



Having configured auxiliary sends 1, 2, 3 and 4 to provide mix minus feeds for Microphone Inputs 1 to 4:

1. Go to the fader strips controlling MIC 1 to 4 and press the **CONF** buttons on all four channels.

*The mix minus is automatically activated for each of the four channels.*

2. Depending on your talkback configuration, the **TALK** button on each fader strip may be used to talk to the mix minus.
3. To add channels not within the coordination group to the mix minus, press their **CONF** buttons. For example, you may wish to send the output of several replay machines to all the mix minus recipients.

*The channels are routed onto the mix minus bus; therefore feed all mix minus sends.*

The **CORD** button changes the mix minus from an N-1 into a pre-talk auxiliary send. Use this mode to generate a conference-style feed for your guests and presenters. This allows members of the conference group to talk to each other pre-fader while they are off-air. However, as soon as their channel fader is opened and they are on-air, their conference auxiliary feed is muted.

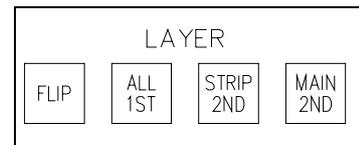
Note that each mix minus is linked to the input source, rather than the DSP channel. This means that if you route the input source (e.g. MIC 4) elsewhere, the mix minus controls automatically follow.

## Using VCA Grouping

A common application for the eight main fader strips is to use them as VCA group masters. The console supports up to 16 dedicated VCA masters and you may assign any number of fader strips to a dedicated VCA. This provides the ability not only to control input and monitor channels but also groups, sums and auxiliary masters.

### Assigning VCA Masters to the Control Surface

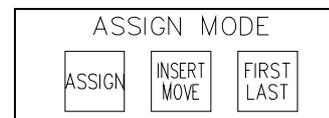
As we have already assigned groups 1 to 4 and sum 1 onto the first layer of our eight main fader strips, let's use the second layer to create eight VCA masters:



1. Bring the second layer of main fader strip onto the active surface, by pressing the **MAIN 2ND** button, located on the LAYER access panel.
2. Now select VCA master 1 from the ACCESS CHANNEL/ASSIGN control panel, by pressing **VCA**, the number **1** and the Enter button.

*The CHANNEL and LABEL displays show the name (VCA 1) and user label for the master.*

3. Select the **FIRST LAST** button, located on the STRIP ASSIGNMENT: ASSIGN MODES panel.



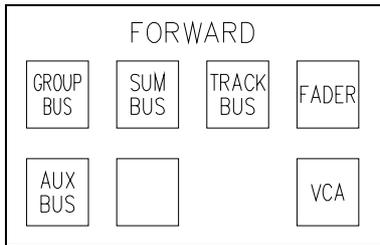
*This automatically selects the global **ASSIGN** button, and across the console the fader **SEL** buttons flash, in green, to indicate possible destinations for your selected channel.*

4. Press the fader **SEL** button on the first main fader strip followed by fader **SEL** on the last main fader strip.

*The console assigns VCA masters 1 to 8 to main strips 1 to 8.*

5. Deselect the global **ASSIGN** button or press **ESC**, on the ACCESS CHANNEL/ASSIGN control panel, to exit the assign mode.

## Assigning Channels to a VCA Master

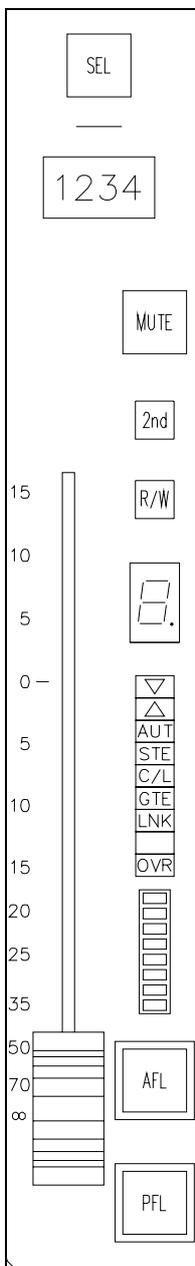


Let's assign our CD player, on input channels 23 and 24 to VCA master 1:

1. Press the fader **SEL** button on the fader strip controlling VCA 1.

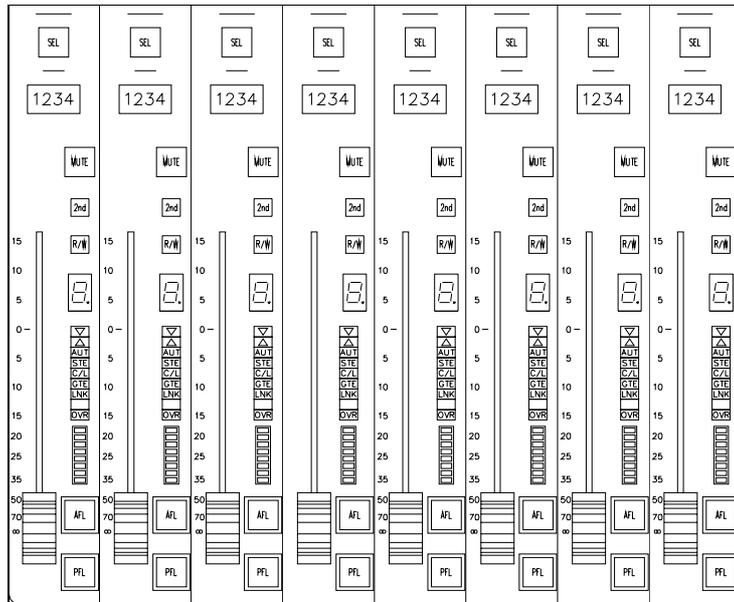
*This puts VCA 1 into access as indicated on the ACCESS CHANNEL/ASSIGN control panel's CHANNEL and LABEL displays.*

### Fader Strip



2. Now press the **VCA** button, located on the BUS ASSIGNMENT panel.

*The VCA button flashes to indicate that it is active, and across the console the fader SEL buttons flash, in green, to indicate possible sources for your chosen master:*



3. Now press the **SEL** buttons on the fader strips controlling input channels 23 and 24.

*The fader SEL buttons stop flashing and change colour from green to red to indicate that the channels are assigned to the selected VCA master. On each assigned channel, the VCA master number is shown in the figure of eight display.*

4. Deselect **VCA**, on the BUS ASSIGNMENT, panel or press **ESC**, on the ACCESS CHANNEL/ASSIGN control panel, to exit the VCA set up mode.

## Applying Signal Processing

Depending on your choice of DSP configuration, full signal processing may be available on your input channels, monitor return channels, groups, sums and/or auxiliary masters. This allows you to compress a group output or EQ an auxiliary master in the same way you would apply signal processing to an input channel. Please see Chapter 3 for more details on Signal Flow and DSP configurations.

The following provides a step-by-step guide to some of the signal processing sections within the Central Control Section.

1. Press the **SEL** button on a fader strip to assign it to the Central Control Section:

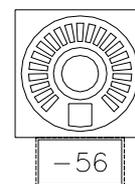


*The controls update to show the current settings for the assigned channel.*

When controlling processing, note that all rotary controls on the **mc<sup>2</sup>66** are touch sensitive encoders with the following features:

- The dedicated alphanumeric display shows either the parameter name or value which is being adjusted.
- The ring of LEDs indicates the current position of the control. Note that for levels, a corona appears around the control indicating the amount of deviation from the default value.
- The LED square beneath each control changes from green to yellow when a parameter is not set to its default value.

The controls default to provide fine parameter adjustment. For coarse adjustment (5 times faster), push down on the control as you adjust the parameter.



## Tutorial

2. If not already selected, press the **CHAN/CONFIG** button, located on the centre section SCREEN CONTROL panel, to view the **Main** display:



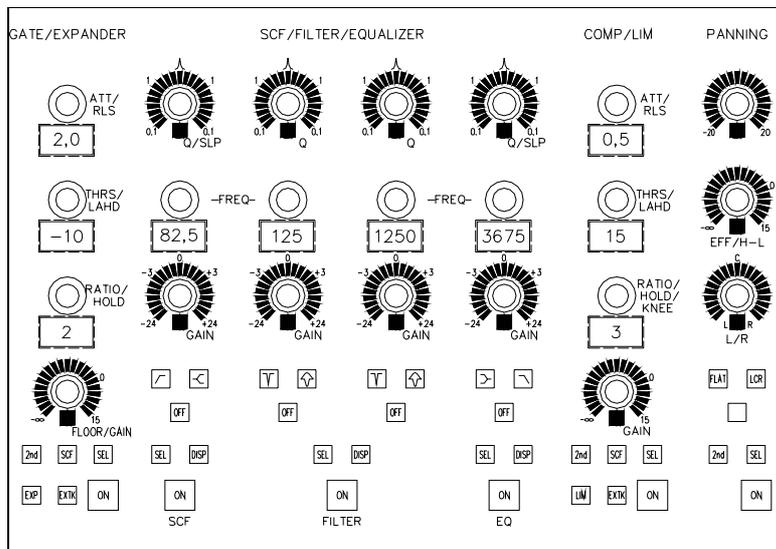
The **Main** display is divided into the same sub sections as the Central Control Section front panel. As you adjust controls, the display updates to reflect your settings.

Note that the name and label for the channel you are adjusting is always shown at the top left of the display.

Also note that the heading above each area of the display, for example **EQ**, **GATE**, etc, changes colour from grey to green when that section is switched into circuit.

The **Main** display also includes a meter, which follows the same metering options as set for the **Channel** display.

## Using the 4-band Equaliser



1. Locate the SCF/FILTER/EQUALIZER panel on the Central Control Section:
2. At the bottom of the panel, press the EQ **DISP** button to display the 4-band equaliser on the four sets of GAIN, FREQ and Q controls.
3. Turn on the master EQ **ON** button.

*From left to right, the controls default to provide low shelf, constant Q, constant Q and high shelf equaliser bands.*

4. Use the GAIN, FREQ and Q or Q/SLP rotary controls to set the gain, frequency or Q for each of the 4 bands:

*Frequency may be set from 20Hz to 20kHz, and the value is shown beneath the front panel control, and in the **FREQ** box on the **Main** display.*

*Gain may be set from -24dB to +24dB.*

*Q may be set from 0.1 to 80dB for the Constant Q sections, and the slope of the shelving bands may be set to 6dB per octave, 12 dB per octave or 18dB per octave.*

5. Use any of the four **OFF** buttons to switch an individual band out of circuit.
6. Use the two EQ type buttons to switch between bell, shelf and pass band filters for the high and low bands, and bell, constant Q and notch for the middle bands.

*The **TYPE** boxes on the **Main** display update to show the new selection.*

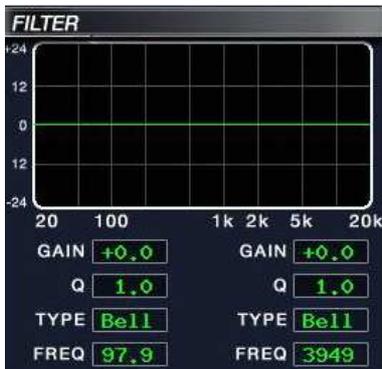
### Using the High and Low Pass Filters

1. At the bottom of the SCF/FILTER/EQUALIZER panel, press the FILTER DISP button to switch the four sets of GAIN, FREQ and Q controls to the 2-band filter section.

*Controls on the left side of the panel now adjust the high pass filter, and controls on the right side adjust the low pass filter. The two bands default to provide constant Q equalisation.*

2. Turn on the master FILTER ON button.
3. To change the two bands to high and low pass filters, use the EQ type buttons.

*The TYPE boxes on the Main display update to show Hi-P or Lo-P respectively.*



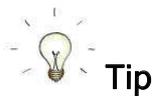
4. Use the FREQ rotary control to set the roll-off frequency for the filter.

*Frequency may be set from 20Hz to 20kHz, and the value is shown beneath the front panel control and in the FREQ box on the Main display.*

5. Use the Q/SLP rotary control to set the slope of the filter.

*The slope may be set to 6dB per octave, 12 dB per octave or 18dB per octave and is shown in the Q box on the Main display.*

6. Press either of the two OFF buttons to switch the individual filters out of circuit.



The two filter bands may be used for filtering, shelving EQ or constant Q operation by adjusting the EQ type selection buttons. You can also set each band independently. For example, to keep your high pass filter, but use the other filter band as an extra band of EQ.

## Setting a Compressor

The console provides four independent blocks of dynamics processing (Gate, Expander, Compressor and Limiter). Any of the four sections may be placed anywhere within the channel signal flow. For example, to gate pre EQ and compress post EQ, or to limit the channel signal post fader while compressing the feed to the direct output. In addition a dedicated 2-band filter section may be inserted into the sidechain of the gate or compressor. Let's look at how to set a compressor:

1. Locate the COMP/LIM panel on the Central Control Section.
2. Check that the LIM button is turned off.
3. Press the ON button to switch on the Compressor.
4. Check that the 2nd button is off and use the four rotary controls to set the compressor attack time (ATT/RLS), threshold level (THRS/LAHD), ratio (RATIO/HOLD/KNEE) and output gain (GAIN).
5. Now turn on the 2nd button and use the two upper controls to set the release time (ATT/RLS) and look ahead delay.

*The front panel displays, and boxes on the Main display update to show the relevant settings*

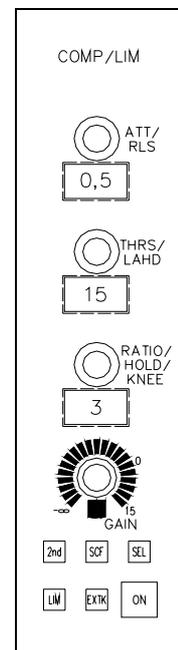
The action of the compressor is best described by looking at the Compressor graph on the **Main** display. Note that as you adjust your settings, the bouncing ball shows the position of the signal level relative to the threshold and ratio you have set. In addition, the vertical **GAIN** meter displays the amount of gain reduction being applied to the signal. Finally, the two meters below the graph show the input (**IN**) and output (**OUT**) levels to and from the section.

The Compressor parameters may be set as follows:

- o Threshold Level – from -40dB to +20dB.
- o Ratio – from 1:1 to 10:1.
- o Attack Time – from 0.3ms to 250ms.
- o Release Time – from 0.04secs to 10secs.
- o Look Ahead Delay – from 0ms to 10ms.
- o Gain – from -20dB to +20dB.

For a smoother compressor, insert the 2-band sidechain filter and set -10dB gain for an 18dB/octave low shelf at around 125Hz to remove unwanted low frequencies.

### Central Control Section

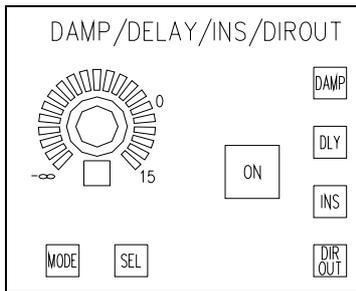


### Main Display



Tip

### Central Control Section



### Main Display



## Inserting Channel Delay

To apply delay to a channel, for example to compensate for video processing delays:

1. Locate the DAMP/DELAY/INS/DIROUT panel on the Central Control Section.
2. Press the **DLY** button to assign the controls to the channel delay audio module.
3. Press the **ON** button to switch the delay into circuit.
4. Toggle the **MODE** button to cycle around the channel delay unit options – milliseconds (ms), frames (frms) or meters (m).

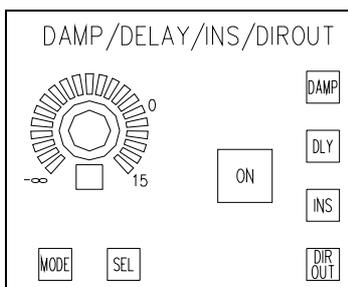
*The **TIME** box on the **Main** display updates to show your chosen units.*

5. Move the rotary control to adjust the delay value.

*The amount of delay is displayed in the **TIME** box on the **Main** display. Channel delay may be set from 0 to 1800ms (or 612m or 45 frames).*

## Inserting Outboard Processing

### Central Control Section



### Main Display



To insert an outboard piece of equipment into the channel path, for example to apply external compression:

1. Press the **INS** button on the DAMP/DELAY/INS/DIROUT panel to assign the controls to the channel insert module.
2. Press the **ON** button to switch the insert return into circuit.

*If an insert return is not assigned, you will get silence when you switch the insert into circuit.*

3. With the insert **ON**, adjust the rotary control to set the level of the insert send.

*The **SEND** level is shown on the **Main** display and may be adjusted from -128dB to +15dB.*

The insert send and return assignments are made from the **Signals** display:

1. Press the **SIGNAL** button, located on the SCREEN CONTROL panel, to view the **Signals** display.



2. Using the trackball or navigation buttons, select the source directory (e.g. **Insert Send**), sub-directory (e.g. **InsSnd Inp 1-24**) and source (e.g. **INP1i**) on the left of the display.

*Your selected source is highlighted in black.*

3. Next, select the destination in a similar fashion. For example, select **Stagebox** as your directory, **Analog 1** as the sub-directory followed by **ANA\_11.7** from the **Name** and **Label** list.

*Your selected destination is highlighted in black.*

4. To make the route press the **CONN** (Connection) soft key located above the trackball.

*The **Signals** display updates with a green line showing the route between the source and destination.*

## Tutorial

- Repeat steps 2 to 4 to route the line input from the compressor (e.g. ANA13.1) to the insert return (INP1i):

The screenshot shows a broadcast control interface with a central display showing the time 12:52:45 and the word 'Signals'. The interface is divided into several sections:

- Access Channel:** INP1
- Formular 1:** Startup
- Source Table:**

Name	Label
ANA_13.1	ANA_13.1
ANA_13.2	ANA_13.2
ANA_13.3	ANA_13.3
ANA_13.4	ANA_13.4
ANA_13.5	ANA_13.5
ANA_13.6	ANA_13.6
ANA_13.7	ANA_13.7
ANA_13.8	ANA_13.8
- Destination Table:**

Name	Label
INP1	INP1
INP2	INP2
INP3	INP3
INP4	INP4
INP5	INP5
INP6	INP6
INP7	INP7
INP8	INP8
INP9	INP9
IN10	IN10
IN11	IN11
IN12	IN12
IN13	IN13
IN14	IN14
IN15	IN15
IN16	IN16
IN17	IN17
IN18	IN18
IN19	IN19
IN20	IN20
IN21	IN21
IN22	IN22
IN23	IN23
IN24	IN24
IN25	IN25
IN26	IN26
IN27	IN27
IN28	IN28
- Directories:** Bus Out, Direct Out, Insert Send, Players, Stagebox, Digital, Madi, Mono Summing, Test, Monitoring, Generator.
- Subdirectories:** Digital 1, Digital 2, Mics, Analog 2.
- Right Directory:** Input/Mon, Insert Return, Monitoring, Metering, Stagebox, Digital, Madi, Mono Summing, Monitoring, I/Os.
- Subdirectories (Right):** Ret. Inp 1-28, Ret. Inp 29-56, Ret. Inp 57-84, Ret. Inp 85-112, Ret. Mon 1-28, Ret. Mon 29-56, Ret. Mon 57-84, Ret. Mon 85-96, Ret. Sum 1-28, Ret. Sum 29-48, Ret. Grp 1-28, Ret. Grp 29-48, Ret. Aux 1-28, Ret. Aux 29-32.

A green line connects the 'ANA\_13.1' source to the 'INP1' destination.

The *Signals* display updates with a green line showing the route between the source and destination.

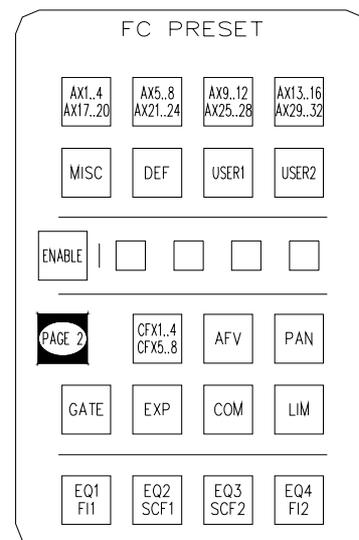
## Assigning the Fader Strip Free Controls

On each channel fader strip are four, and on each main fader strip two, assignable Free Controls. These provide local channel access to settings such as EQ, Panning, Dynamics, Auxiliary Sends, etc.

Each control is touch sensitive and when turned provides fine control. Push down and rotate the control for coarse adjustment of a parameter value.

Each control also has its own dedicated 4-character alphanumeric display. The normal mode shows the parameter function (e.g. **EQ1G** – EQ Band 1 Gain) until the control is touched, when the display then updates to show the parameter value (e.g. **+12**).

There are three ways you may assign parameters onto the free controls, but to get you started let's use the global FC PRESET buttons located to the left of the Central Control Section.



1. Check that the **Page 2** button is turned off.
2. Press the **EQ 1/FI 1** button.

*Working up the channel, the four free controls are now assigned to On/Off, Gain, Frequency and Q for band 1 of the Equaliser section. The value of the parameter is shown in the 4-character display below the control as it is adjusted.*

If a control is assigned to a switched function, such as EQ On/Off, turn the rotary control clockwise to activate the function (EQ On) and anticlockwise to deactivate the function (EQ Off).

3. To access the second level of functions, for example, the Filter controls, press the **PAGE 2** button.

Congratulations on completing this tutorial! Hopefully, we have given you enough information to being working with the console immediately. If you need more assistance, use the Index Directory located at the back of the manual to locate information on a particular topic. Otherwise keep reading to learn more about each area of the console's operation.

