Diffusion Mixer Guide

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# Setting Up the Diffusion Desk

## Mixer Settings

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### New Scene Configuration

The items under the New Scene Configuration menu will impact newly created scenes. This will not change previous scene created in an older configuration. The configuration will also change the mixers settings to match new scene files. This setting is meant to be set up long term for a space with a fixed number of inputs and outputs.

1. **Inputs** define the number of maximum number of channels the mixer expects to receive.
2. **Speakers** define the number of outputs that will be used to diffuse sound into the space. These outputs will start at one.
3. **Recording Outputs** define the maximum number of recoding busses to be sent to a separate recording device (i.e. a recording computer). These outputs will start after the last **Speakers** output**.**

### Speaker Settings

Speaker settings define information about the speakers that are connected to the diffusion system. This setting is limited at the moment, but may be improved in the future to allow the definition of speaker groups along with settings for each speaker group.

1. **High Pass Cutoff** defines the frequency where a 3rd order Butterworth filter will be placed on non-subwoofer speakers.
2. **Subwoofers** defines which speakers will be treated as subwoofers in the speaker configuration.

### Level Settings

These are general settings for the mixer as a whole relating to volume.

1. **Sub Attenuation** defines how much quieter unity on the mixing desk will be from actual unity for the subwoofers. Keeping this lower will protect the speakers and can also act as a pseudo eq.
2. **Mixer Attenuation** defines how much quieter unity on the mixing desk will be from actual unity. Keeping this lower will better protect the speakers in the space from overloading, though safeties do exist in the mixer.

### Saving and Recalling Mixer Presets

Simply press buttons to save and load mixer presets. These presets are JavaScript dictionary files and can be edited directly if desired.

## The Mixing Desk

### I/O Faders

This diffusion system was designed with scalability in mind. With a basic knowledge of Max/MSP, anyone should be able to add and remove I/O faders from the mixing desk to fit the needs of a given space.

#### What is an I/O fader

An I/O fader is a Max abstraction called **outputSlider** that allows control over both an input and output channel of the same index (i.e. input 5 and output 5 will be defined under the same I/O fader).

#### Editing I/O Faders

To edit the I/O faders, take the Max patch out of presentation mode (cmd+option+e) and click the “open” message commented with “Mixing Desk / Outputs” and then take that patch out of presentation as well.

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Above is the documentation in the Max patch the explains how to define a new I/O fader. If more clarity is needed, here are the steps:

1. Begin creating a new bpatcher object with the argument **outputSlider**. This tells the bpatcher to reference the **outputSlider.maxpat** file in the project.
2. Type in the **@args** attribute followed by the I/O index and the MCU controller number.
   1. The I/O index is a paired input and output channel like input 2 and output 2
   2. The MCU controller index is how the fader filters midi data from linked Mackie MCU pro devices. Currently, the diffusion system supports up to 4 MCU Pro devices, but will become more flexible in the future.

In the future, this process may be automated based on mixer settings.

### Speaker Groups

In the future, this will be added to mixer settings and will generate buttons for the groups based on those setting, but for now this is a more manual process. To edit this requires a more detailed understanding of dictionaries within max. If desired, the speaker groups can be edited in the [p faderMacros] sub-patch within the mixing desk.

### The Routing GUI

Editing the routing GUI is similar to that of the mixing desk, though this process will likely never be automated due to the more advanced special aspects of the GUI. To edit the routing GUI, open it up by pressing a “Route” button on the mixing desk. You can then unlock the patcher to move any of the GUI elements around.

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#### Creating Speakers

To create a speaker first take the patch out of presentation mode. There is a description of how to create an **inputRouter** bpatcher at the top of the patch. To create and **inputRouter** make a bpatcher with the argument **inputRouter** and the attribute **@args** followed by the channel number (starting at 0) and the MCU number.

### Speaker Groups

In the future, this will be added to mixer settings and will generate buttons for the groups based on those setting, but for now this is a more manual process. To edit this requires a more detailed understanding of dictionaries within max. If desired, the speaker groups can be edited in the [p speakerGroups] sub-patch within the mixing desk.

## Saving Configurations

To save configurations, simply save the bpatchers linked to the input and output routing to a unique file name. After updating the system, you can then load these configurations back into the diffusion system.

# Using the Diffusion System

## Turning the system on

To turn on the diffusion system, open the “MEIT Diffusion System.app” or open the “MEIT Diffusion System” Max project. After opening the app, turn DSP on so that the audio can run through Max.

## Routing inputs

To route inputs either press the record button on the Mackie MCU faders. Each input should correspond

### The routing window

#### Using the keyboard to navigate

### Speaker groups

### Recording busses

## Attenuating Outputs

### Fader groups

### The master fader

### Linking MCU faders

## Preset Lists

### Creating a new scene

### Saving a scene

### Recalling a scene

### Saving and recalling a preset list

## Diffusion Recording

### Saving and recalling recordings

### Speaker View

## Qlab/OSC integration

Scene selection and the master fader are controllable via OSC in the diffusion mixer. This is to allow one person to run when doing lights. The system is set to receive OSC messages on port 4000 and looks to the messages masterFader/{value} and cue/{value}.