Apogee Symphony | Studio
User's Guide

Version 1.0

APOGEE

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Overview

Introduction

Experience the legendary sound quality of Apogee's flagship Symphony I/O Mk II, now in a compact, single-space rack. The Symphony Studio Series, available in 2x12, 8x8, or 8x16 configurations, empowers your creativity with:

Features:

- **High-Resolution Audio:** Capture every nuance of your sound with crystal-clear AD/DA conversion that supports up to 24-bit/192kHz resolution.
- **Versatile I/O:** Choose from 2x12, 8x8, or 8x16 configurations to suit your specific needs.
- **Input DSP:** Add some flavor to your recordings with EQ, Compression, and Drive thanks to the Symphony Studio Channel Strip.
- **Output DSP:** Create the perfect listening environment with Room EQ, Bass Management, and speaker delay corrections.
- **Monitor Workflows:** Seamlessly switch between different monitoring setups, including stereo, surround, and immersive audio formats.

Whether you're tracking vocals, recording instruments, or mixing your final masterpiece, the Symphony Studio Series provides the tools you need to achieve professional-grade results.

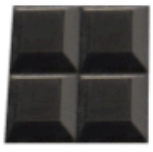
In the Box

IEC Power Cable

USB-C Cable with Locking Screw

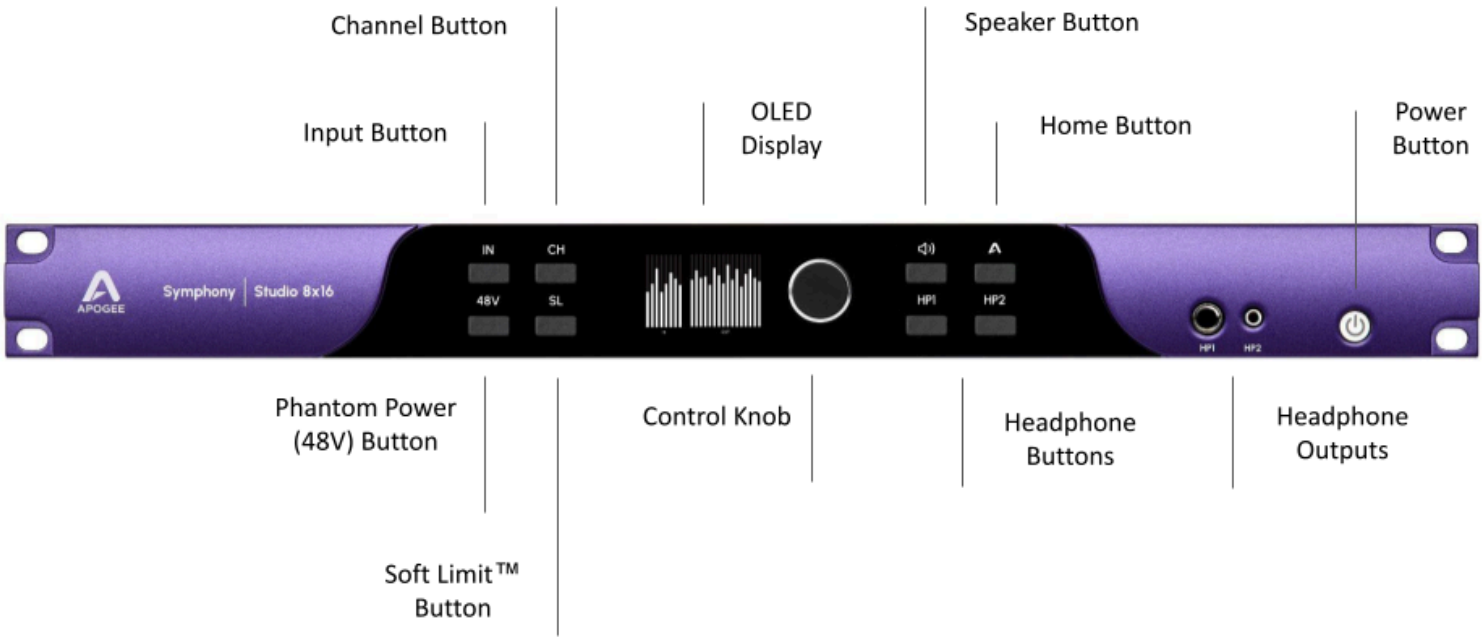
Warranty Booklet

Rubber Feet

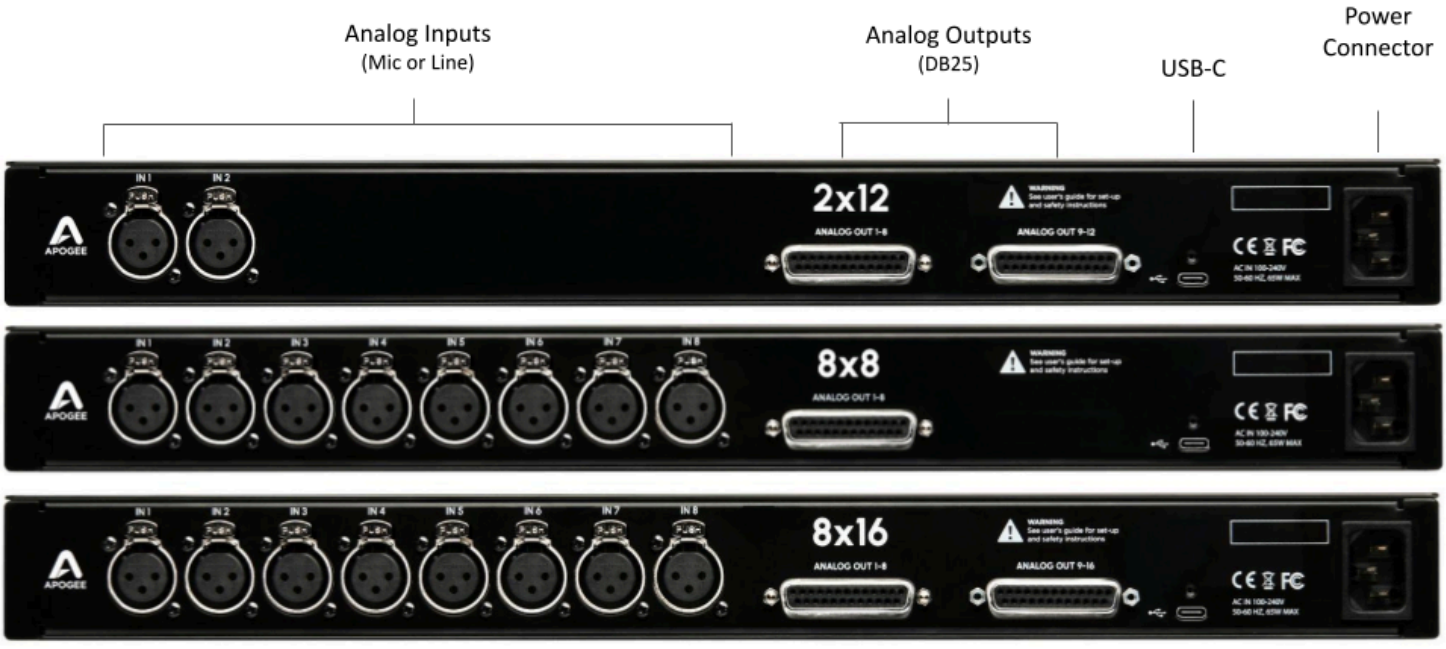


Panel Tour

Front Panel



Rear Panel



Setup

System requirements

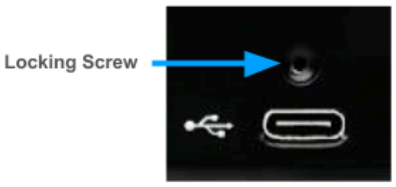
- Mac: macOS 13.6 Ventura or later
- PC: Windows 10 Anniversary update or later

Download & install Symphony Studio Installer

- Download the latest version of Symphony Studio Installer from the Apogee website
- Choose Mac or Windows, then click "Download"
- Unzip or extract the contents of the downloaded file and run the Installer that is inside
- Follow the Installer's prompts to complete the installation

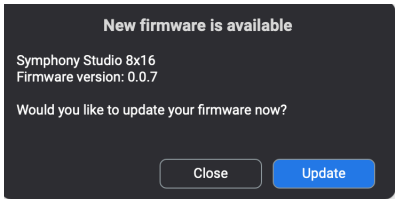
Connect Symphony Studio to your computer

Connect a USB-C cable from Symphony Studio to your computer. Symphony Studio's USB-C port features a locking screw to prevent accidental disconnection. A USB-C cable with this feature is included, but any quality USB 2.0 cable with a USB-C connector or adapter works.



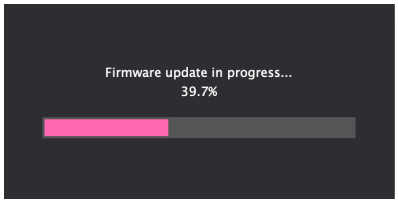
Firmware Update

Upon connecting via USB to your computer, you may be prompted that a "New Firmware update is available"

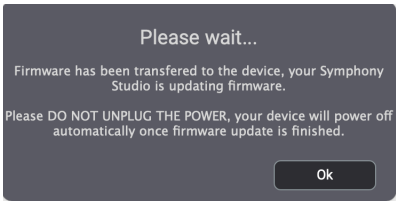


Click Update to Proceed:

When progress has reached 100%, WAIT for the Symphony Studio to power off on it's own.



NOTE: Although it may appear that nothing is happening, the system is internally installing the update. This process may take an additional minute or two to complete before the unit automatically powers off.



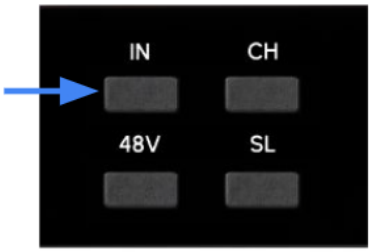
After the unit has powered off on it's own, push the power button to turn it back on. This power-up process may also have a delay before the unit actually powers on.

Quickly Set up an Input Signal

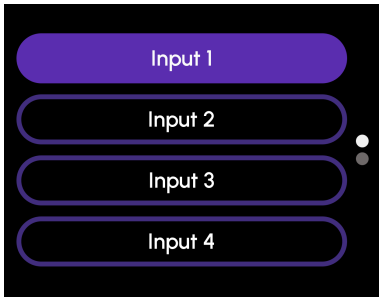
Using the Front Panel Controls

1. Connect a microphone or line-level device to the XLR input on the rear panel.

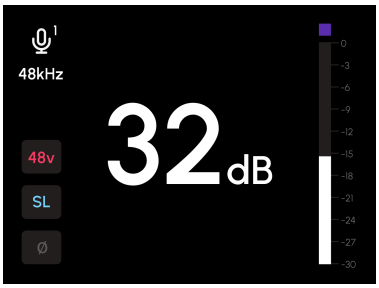
2. On the front panel, press the IN button to show the Channel Select Page.



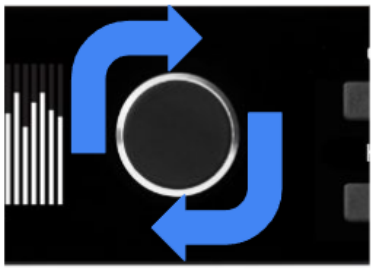
3. Turn the Control knob until the desired input channel is selected.



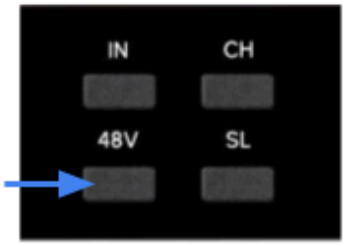
4. Push in the Control knob to select that input and reveal the Input Main Screen.



5. Turn the Control knob to adjust the input gain until the desired recording level is reached.



6. If using a condenser microphone, press the 48V button for phantom power.



Using the Control 2 software:

1. Open the Apogee Control 2 software, then in the Analog IN channel you are using, set the Analog Level setting to Mic.

2. When using condenser microphones, click the 48V button to engage phantom power.

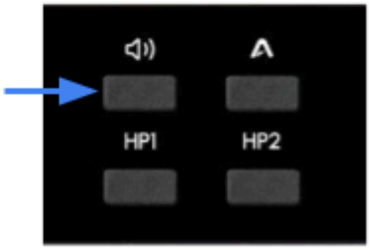
3. Adjust the gain knob to the desired input level strength.

Quickly Getting Output Signal

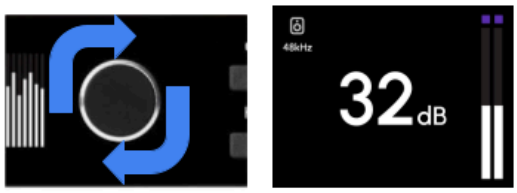
To play sound from your computer through the Symphony Studio, select it as the Sound Output device in the computer's audio settings. Control the levels to speaker or headphones using the front panel buttons:

Speaker Output Level:

1. Press the Speaker Button

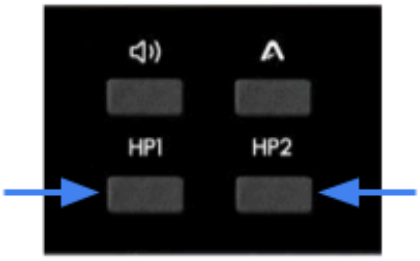


2. Turn the Control Knob to the desired level



Headphone Output Level:

1. Press the HP1 or HP2 Button



2. Turn the Control Knob to the desired listening level

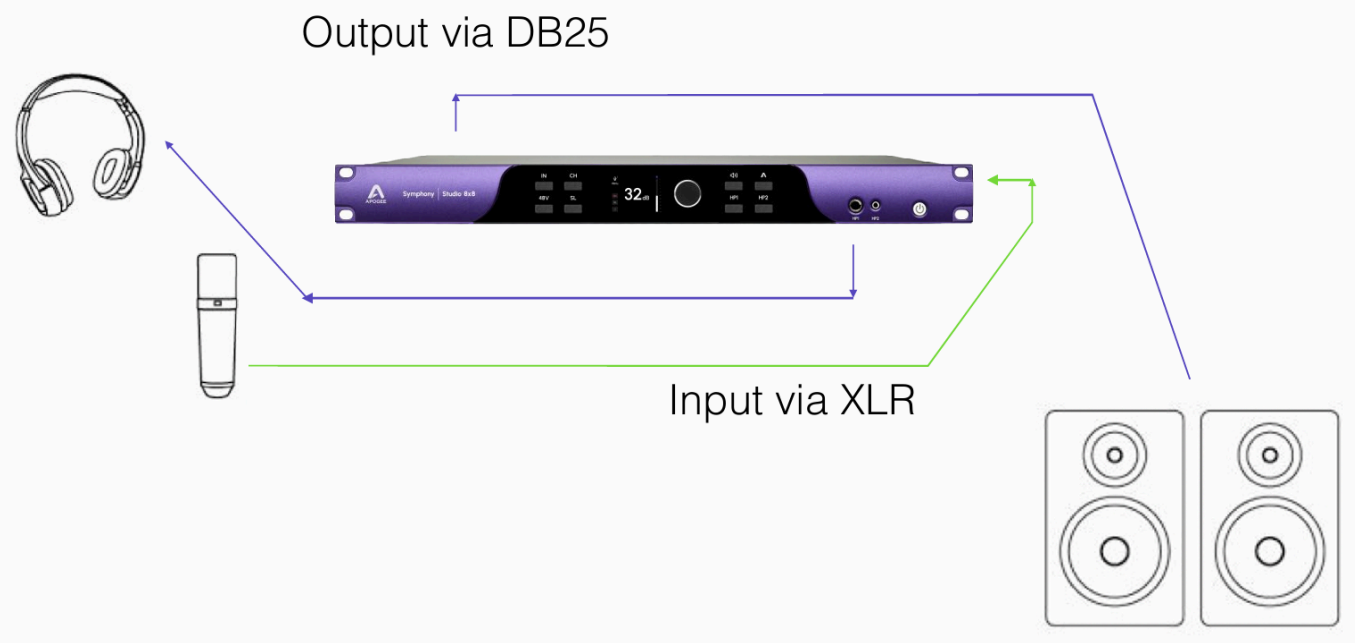
To hear your input signal through the outputs, enable the Low-Latency Mixer in the Apogee Control 2 software.

1. Ensure the mixer fader for the input you want to hear is raised.

2. Change the source for HP1 or HP2 to "Mixer 1".

Operation Examples

Simple Vocal Tracking



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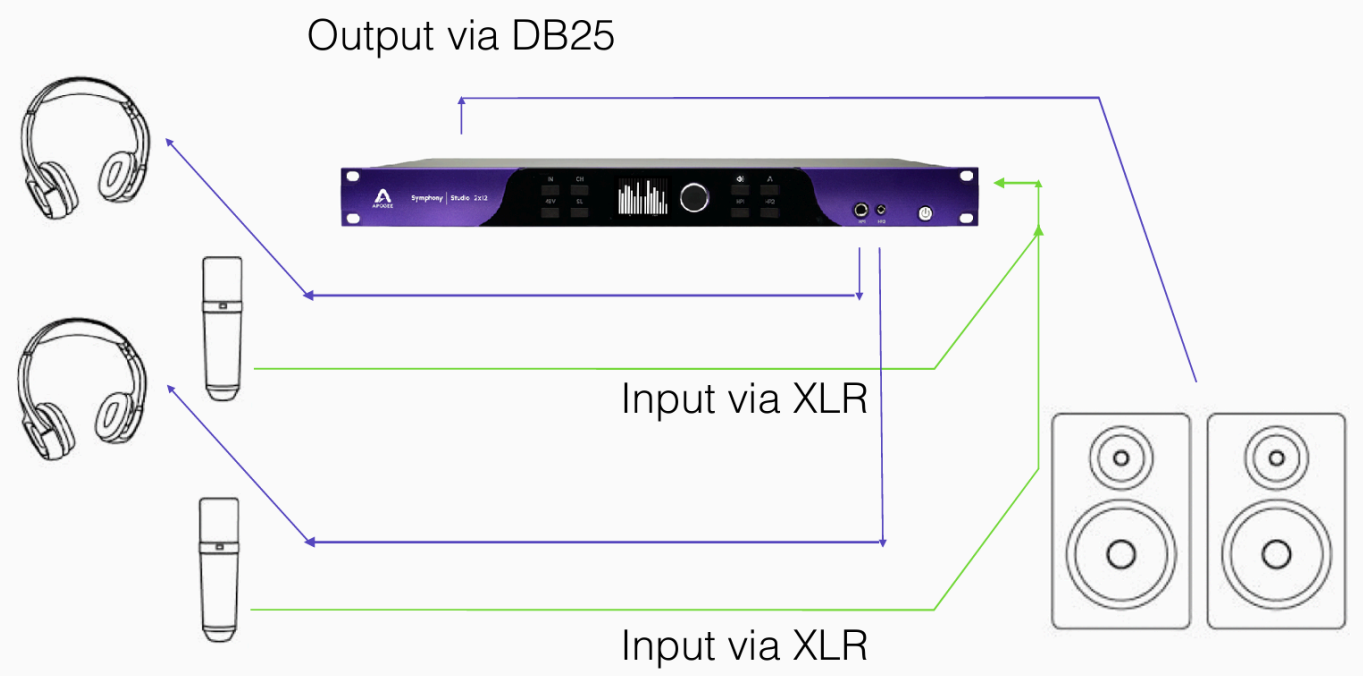
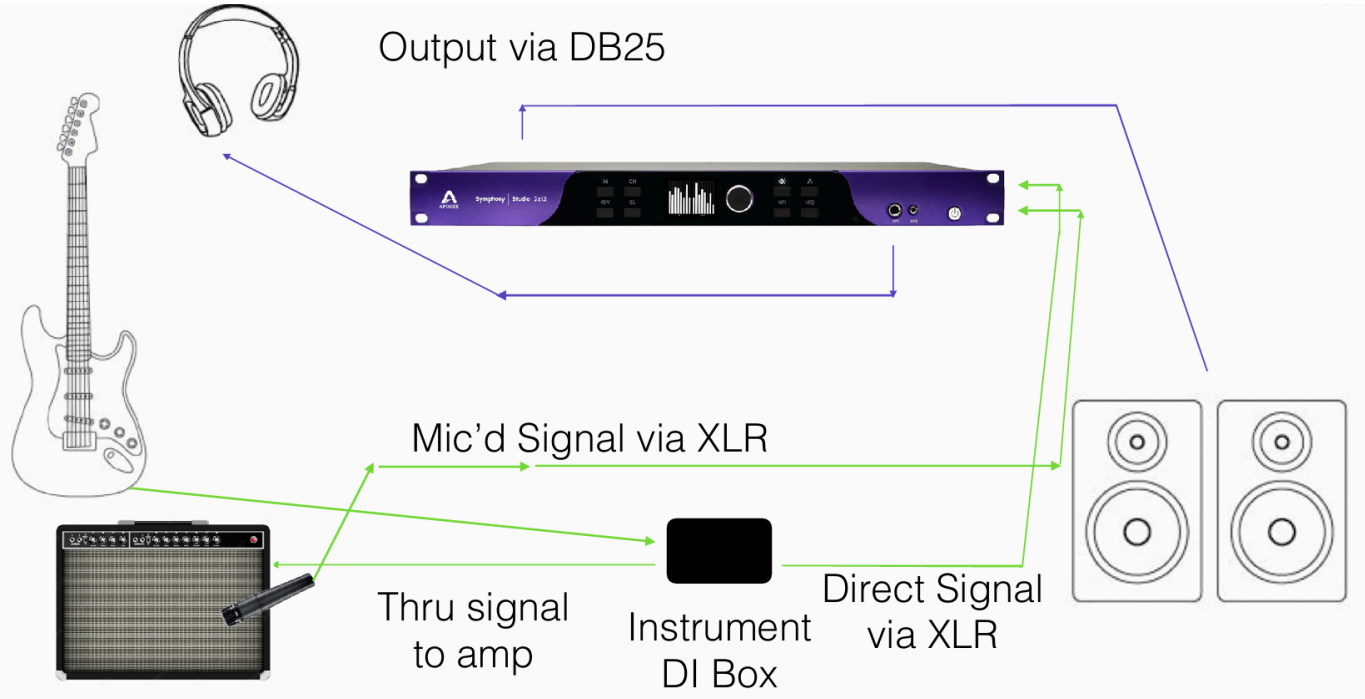
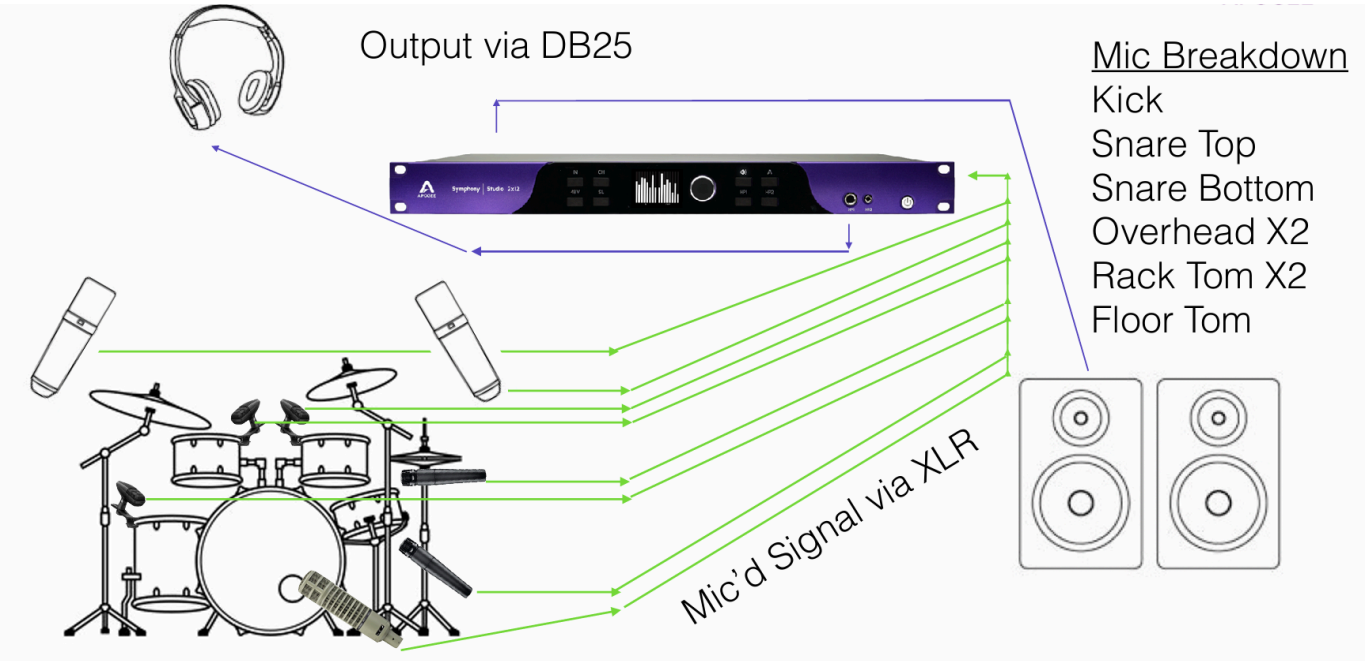
2 Performers



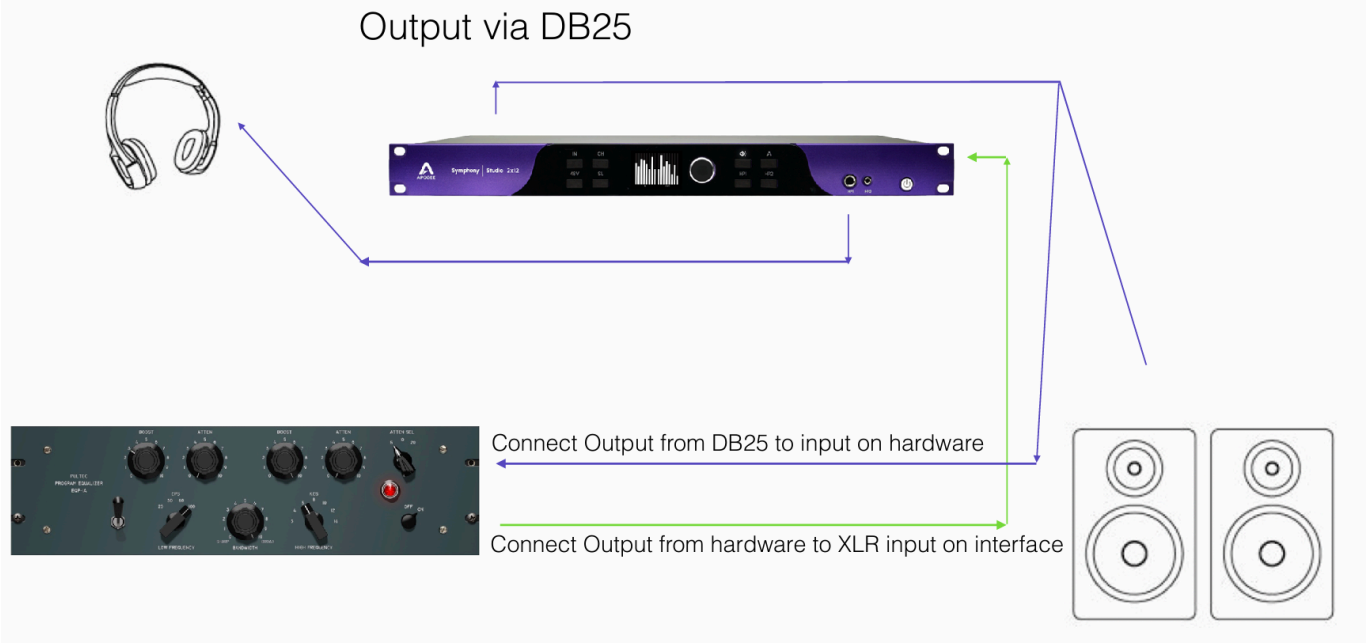
Guitar Tracking: Mic + DI



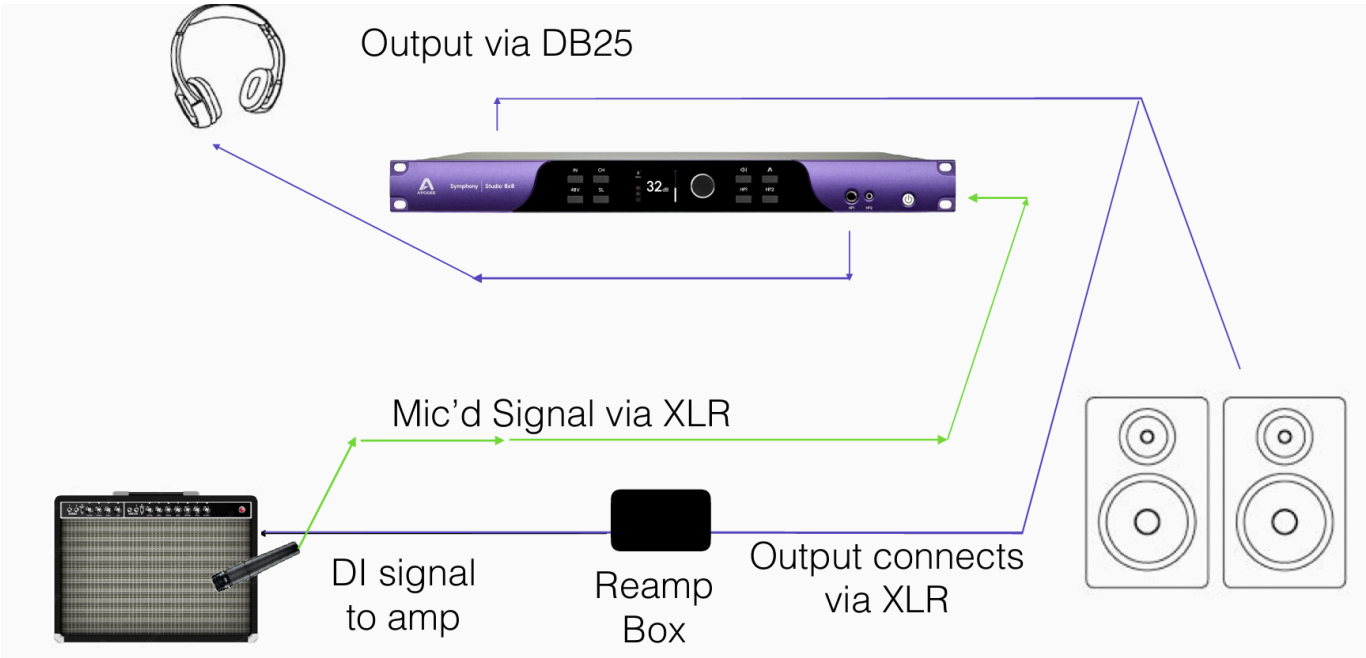
Drum Tracking: 8 Mics



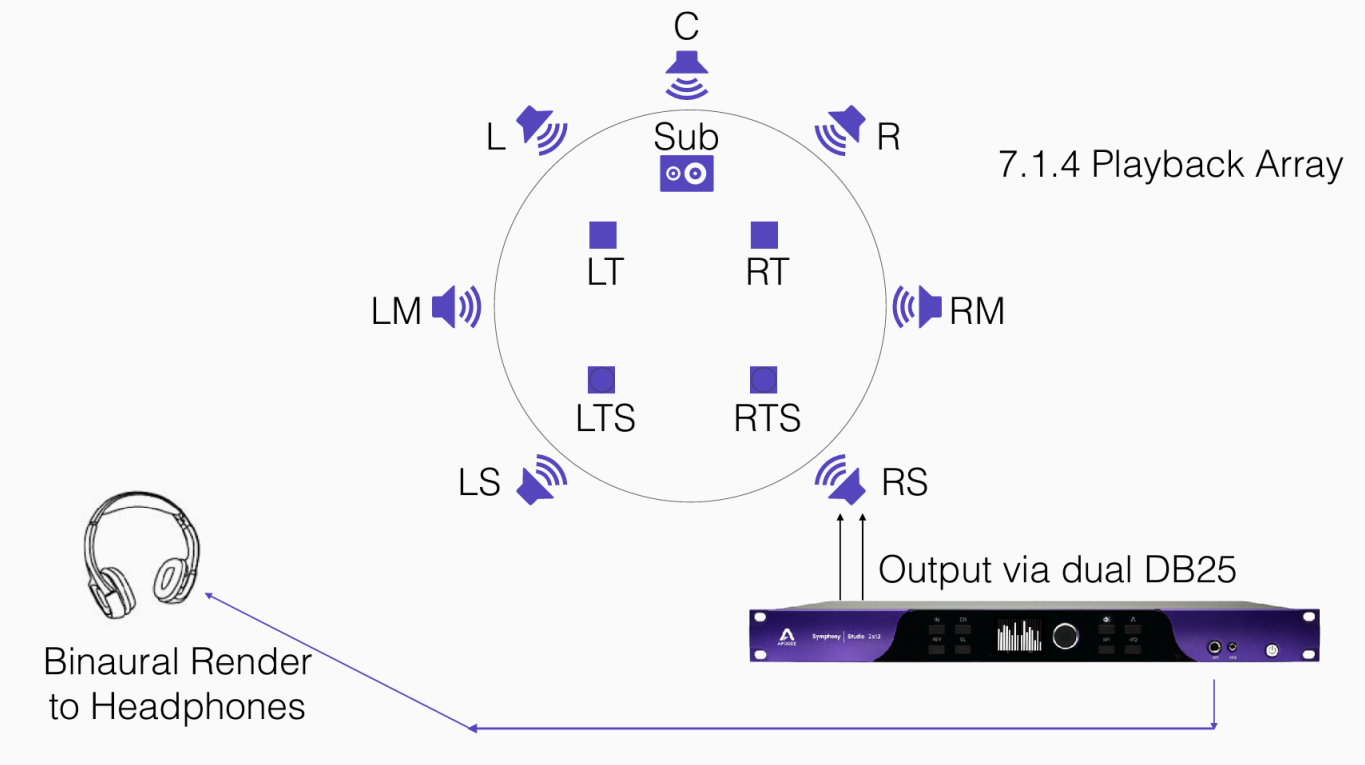
Outboard Gear / Hybrid Mixing



Guitar Reamping



Atmos Playback / Mixing

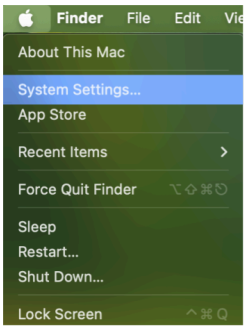


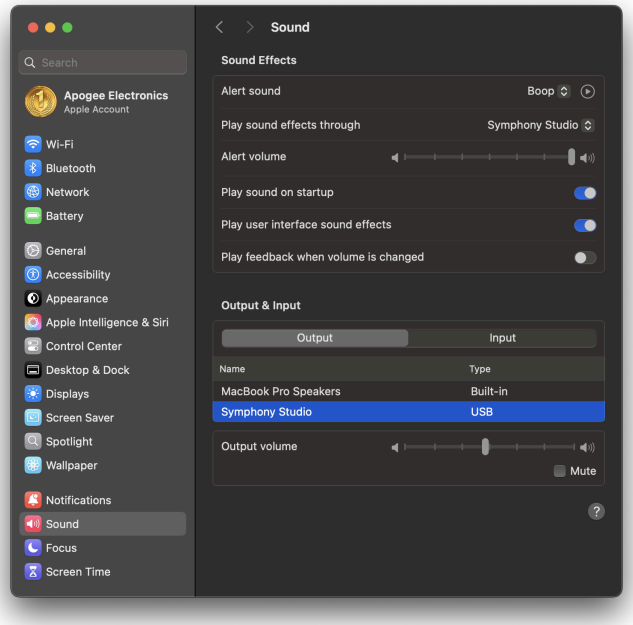
Select Symphony Studio for System Sound Output

MacOS

To choose Symphony Studio as the audio interface for Mac applications that don't have specific audio hardware preferences, such as Safari, Spotify, Voice Memos and others:

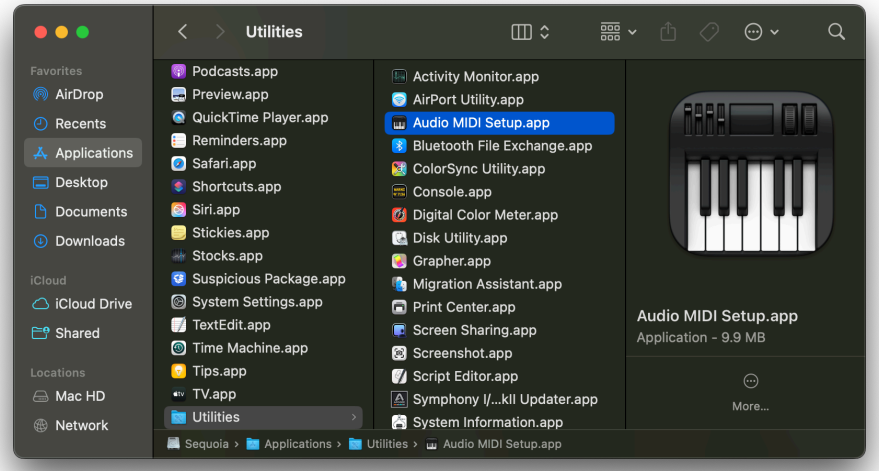
1. Open System Settings by choosing Apple menu > System Settings
2. Select "Sound" from the left sidebar and the sound settings will be shown on the right
3. Click the Output tab, then click Symphony Studio from the devices list
4. Click the Input tab, then click Symphony Studio from the devices list





Route Mac System Sound to Different Outputs

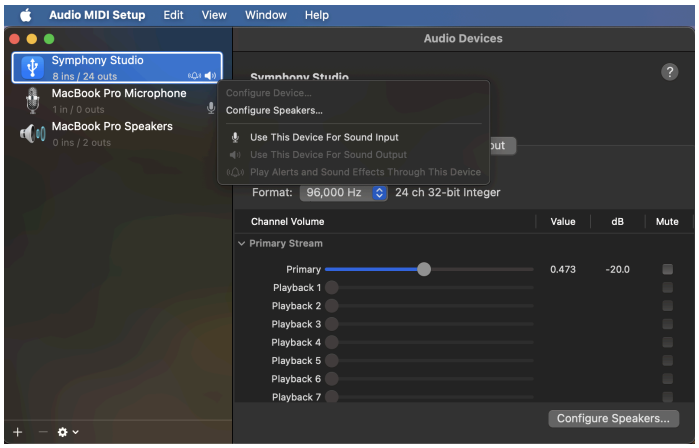
1. Open the Audio/MIDI Setup Utility, found in the Applications > Utilities folder of your Mac.



2. In the Audio Devices window, [Control+clock] on Symphony Studio.

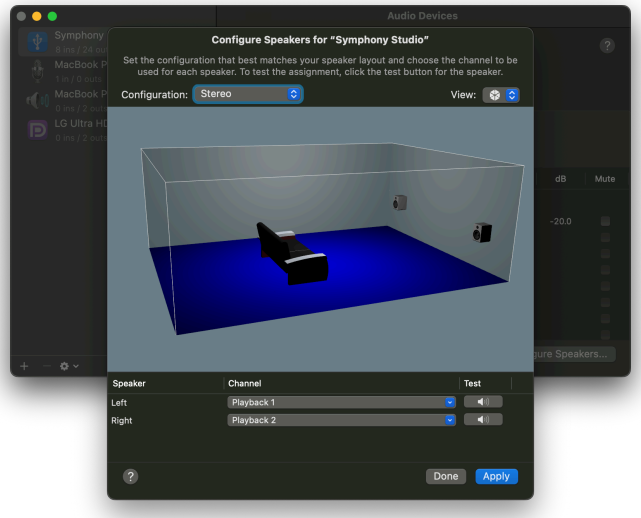
3. In the menu that appears, select "Configure Speakers".

4. If playing a stereo audio file, select the Stereo Configuration.
   If playing a surround source, select the Surround or Atmos setting for the speaker configuration.



5. Select the desired Symphony Studio output channel for each speaker assignment
   - For example, if you want Apple Music to play out of Symphony Studio channels 3 & 4, set Left Front to "Playback 3" and Right Front to "Playback 4".

6. Select the Apply button.



Windows 11

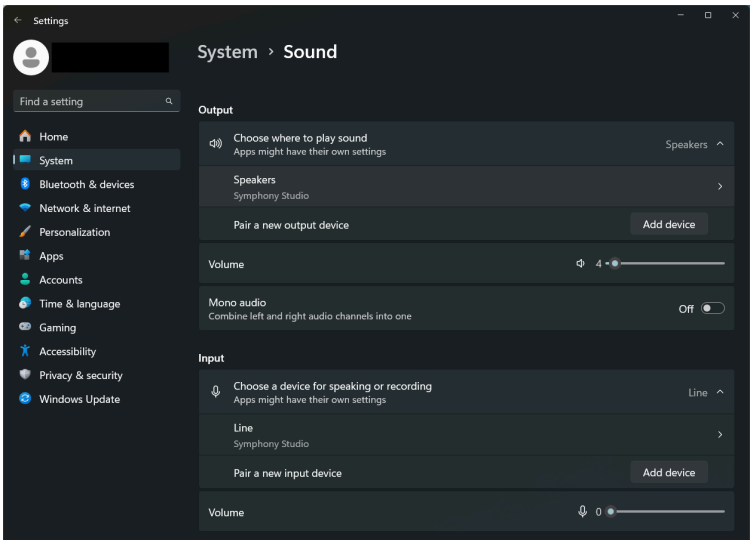
To choose Symphony Studio as the audio interface for Windows applications that don't have specific audio hardware preferences, such as Google Chrome, Spotify, and others:

1. In the Windows Start menu, search for Settings and select the System Settings icon to open the Settings Control Panel.

2. On the left side-bar, select System. Then on the right select Sound.

3. In the Output section, select Symphony Studio from the devices list.

4. In the Input section, select Symphony Studio from the devices list.

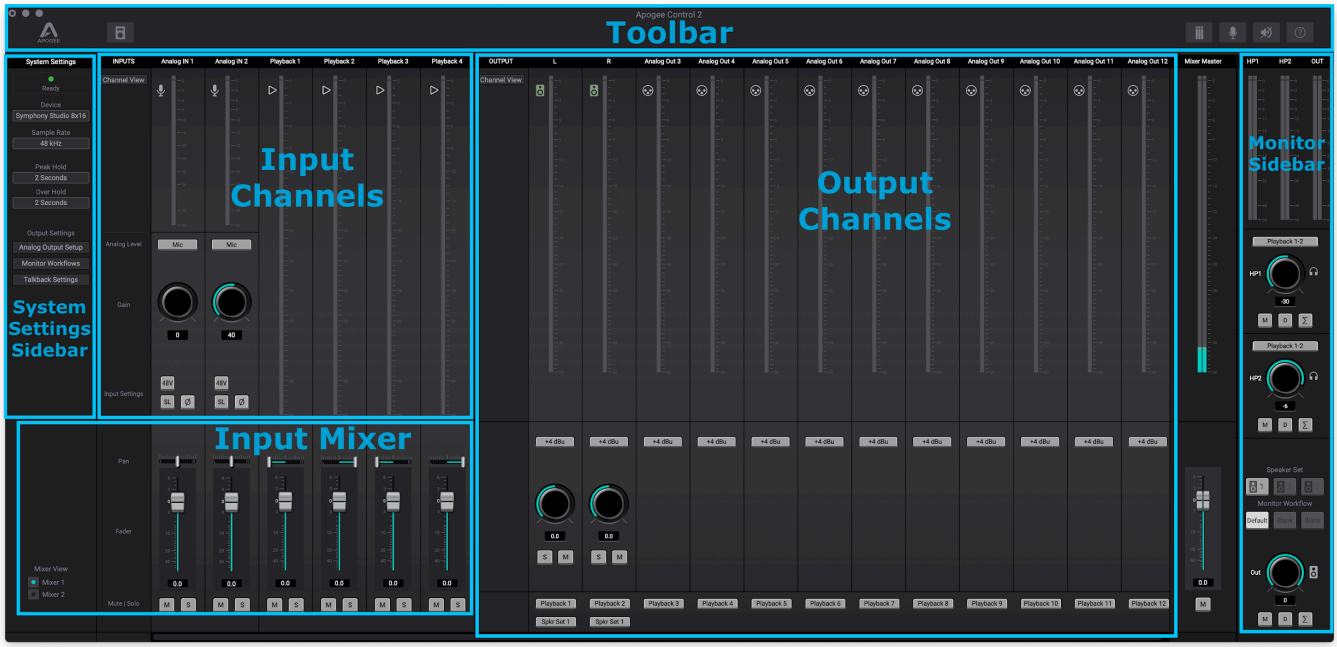


Apogee Control 2 Software

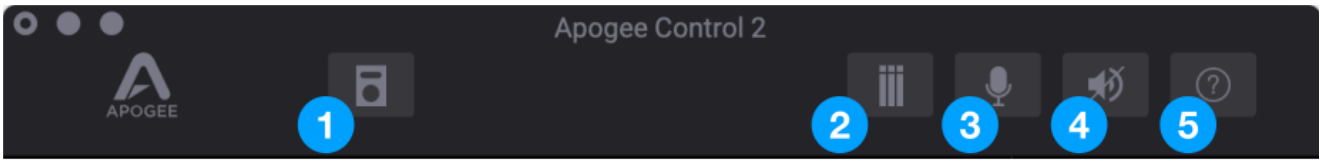
The Apogee Control 2 application provides access to all settings, including System setup, direct monitor mixing, hardware DSP and Monitor controller functionality.

Main Window

The Apogee Control 2 software interface consists of the following sections:



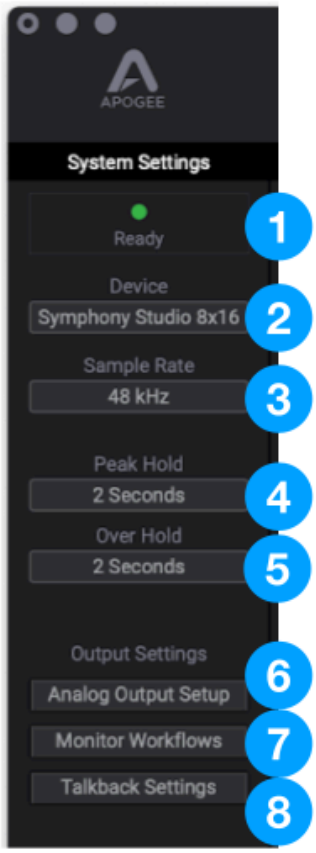
Toolbar



1. Open the Remote Assign Window
2. Clear Meters
3. Talkback
4. Mute All Outputs
5. Open the Hover Help window

System Settings Sidebar

Provides System-wide settings that apply to your recording system as a whole.



1. **System Status Display** - Displays the status of the connected hardware.
   - Green - System is ready: Hardware is connected and Clock locked.
   - Red - System is not ready: The system is not locked to the Clock Source

2. **Device** - The Control software shows settings and features of the listed device.
   When multiple Apogee devices are connected to the same host, click to select that other device and display it's settings in the Main Window.

3. **Sample Rate** - Displays current sample rate. Click to change to a different sample rate.
   Note: In some cases this setting may be overridden by software running on the computer (e.g. when a DAW session is open).

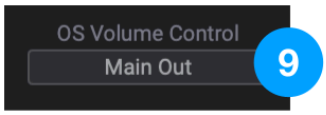
4. **Peak Hold** - Set the time that peak indications are held on the level meters.

5. **Over Hold** - Set the time that over indicators are held on the level meters.

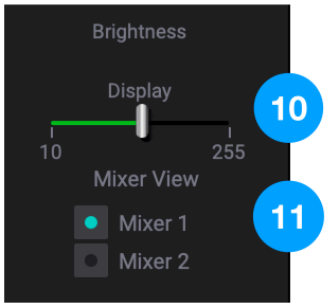
6. **Analog Output Setup** - Opens the Analog Output Configuration window.
   Select which analog outputs should be used for speakers, and which for fixed line-outputs.

7. **Monitor Workflows** - Opens the Monitor Workflows Window.
   Configure and save various workflows, Output Speaker Trim, Bass Management, and EQ Room Calibration. See the "Monitor Workflows" chapter below for more details.

8. **Talkback Settings** - Opens the Talkback Settings Window.
   Select your talkback source and destination here.



9. **OS Volume Control** - Selects which Apogee output is adjusted by the Apple System Volume controls, such as the Apple keyboard volume buttons. The options are:
   - Main Out
   - Headphone 1
   - Headphone 2



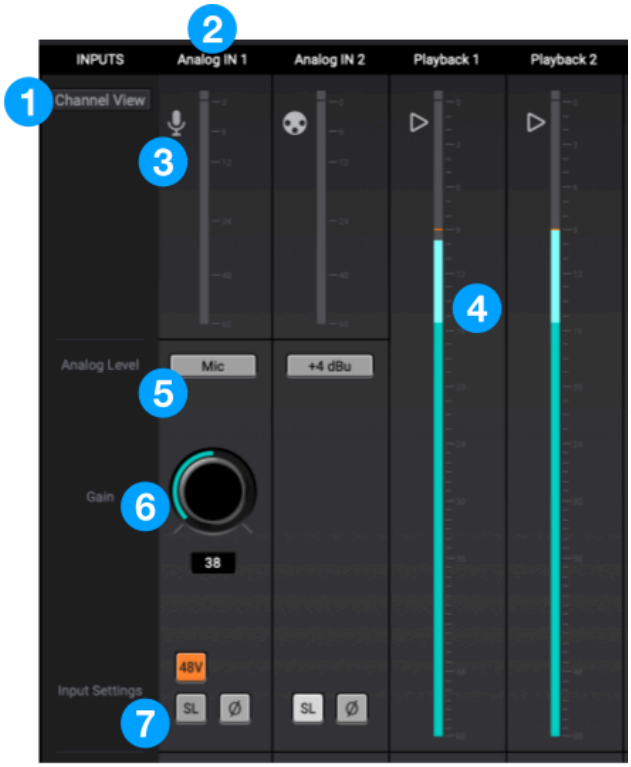
10. **Brightness** - Adjust the Brightness of the OLED Display.

11. **Mixer View** - The Control 2 main window displays faders and controls for the selected Low-Latency Mixer.

Channel Section

This portion of the Primary window displays channels for Analog and Playback inputs.

General Settings



1. **Channel View Button** - Click to show/hide Analog In and Playback channels.

2. **Channel Label** - Indicates the channel type
   - Analog In or Playback.

3. **Channel Icon** - Displays the channel type.
   Icons for Analog In channels display the input type selected from the Analog Level drop-down.

Analog IN Channels

4. **Input Channel Level Meter** - displays the digital signal level of the channel.
   The Analog IN channel levels are post A/D conversion.

5. **Analog Level** - choose the analog reference level for Analog inputs
   - Choose Mic when connecting microphones to the XLR input. Also use this setting when using a direct box (DI) to convert a guitar or keyboard or other high impedance (Hi-Z) instrument ¼" plug.
   - Choose +4dBu when connecting "pro" gear with a nominal +4 dBu output level (such as an external mic pre, compressor, or EQ) to the XLR input. This bypassed the preamp circuit.
   - Choose -10dBV when connecting "semi-pro", hi-fi, or musical instrument gear with a nominal -10dBV dBu output level to the XLR input. This bypassed the preamp circuit.

6. **Gain** - Adjust the gain of the preamp.
   Gain Control is hidden when Analog Level is set to +4dBu or -10 dBV line input.

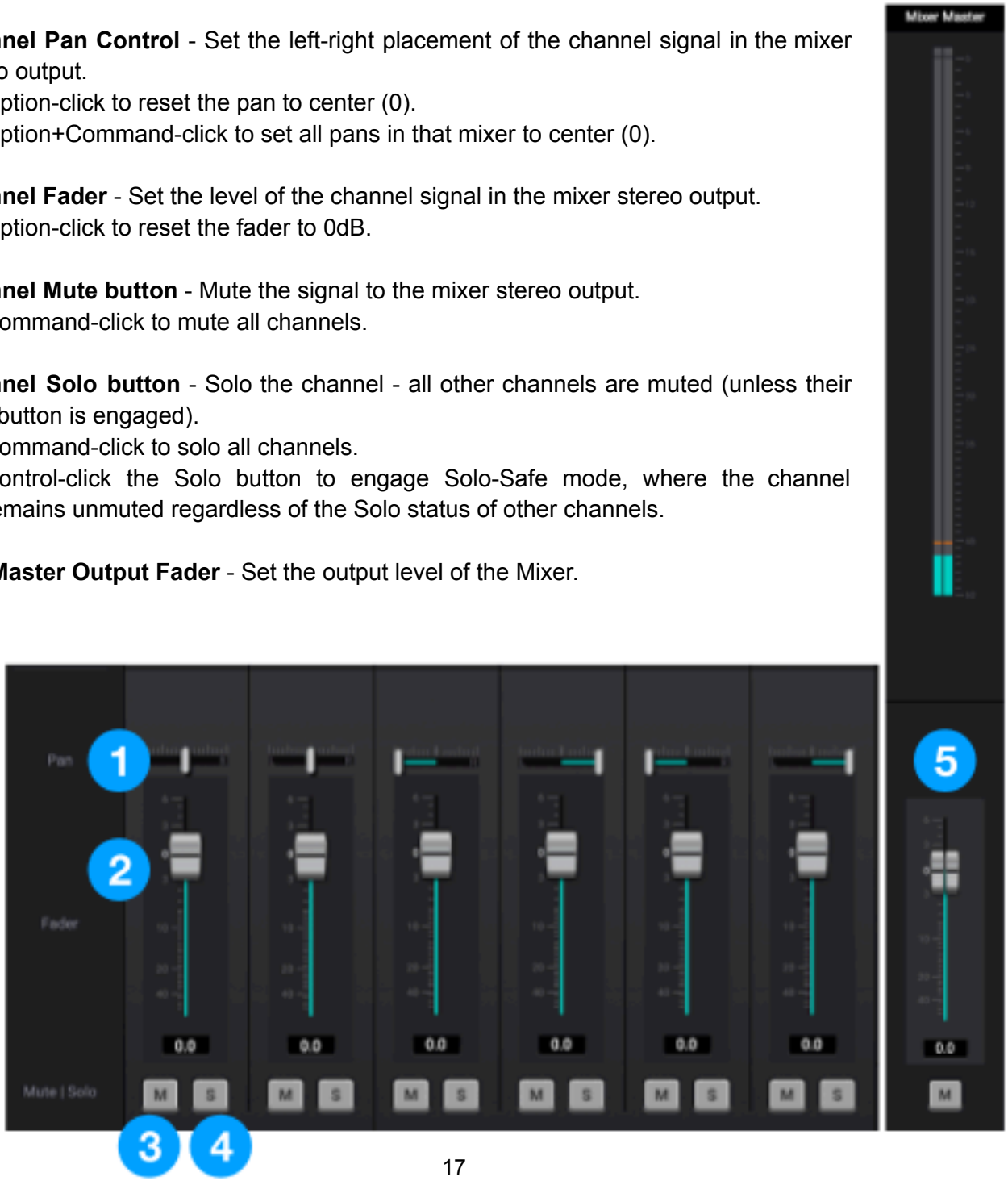
7. **Input Settings** - Provides options for the various inputs:
   - 48V - Enable 48 volt phantom power on each individual Analog In channel. Visible only when Analog Level is set to Mic. Most condenser mics require 48 volt phantom power to operate.
   - Soft Limit - engage Soft Limit on each analog input. Soft Limit is an analog circuit that begins to attenuate transient peaks at a threshold of -4dBfs, replicating the transient softening of analog tape.
   - Polarity Invert - Invert the polarity of the analog input signal. When a single sound source is picked up with 2 transducers, inverting the polarity of one transducer results in a fuller sound.
     For example, if a drum is captured with a mic on each drumhead, inverting the polarity of one mic results in a fuller sound with more low end. The same principle applies when capturing an electric instrument with a miked amp and a direct injection feed.

Playback Channels

Playback channels represent the playback signal from your computer software. These channels can be fed into the Low-Latency Control mixer to combine with Mic and Instrument direct input signals when tracking so the artist hears a near zero latency monitor signal.

Mixer Section

The mixer section provides a mixer for blending Analog and Playback inputs. Route mixer outputs to headphones or analog output pair for low latency direct monitoring while recording.



1. **Channel Pan Control** - Set the left-right placement of the channel signal in the mixer stereo output.
   - Option-click to reset the pan to center (0).
   - Option+Command-click to set all pans in that mixer to center (0).

2. **Channel Fader** - Set the level of the channel signal in the mixer stereo output.
   - Option-click to reset the fader to 0dB.

3. **Channel Mute button** - Mute the signal to the mixer stereo output.
   - Command-click to mute all channels.

4. **Channel Solo button** - Solo the channel - all other channels are muted (unless their Solo button is engaged).
   - Command-click to solo all channels.
   - Control-click the Solo button to engage Solo-Safe mode, where the channel remains unmuted regardless of the Solo status of other channels.

5. **Mix Master Output Fader** - Set the output level of the Mixer.

Monitor Section

In the Monitor/Output Section, select the signals to be routed to the Main and Headphone outputs, then control their volume. Output Level Meters display the presence of signal at the outputs, useful as a diagnostic tool.

1. **Output Level Meters** - Displays the level of the Main or HP outputs' digital source.

2. **Source** - choose the signal source for the Headphones output.
   - SW Playback - route the selected stereo Playback signal from audio software to the HP output.
   - Direct Mixers - route the stereo signal from the selected mixer to the HP output.
   - HW:Inputs - route the selected mono or stereo signal from the selected hardware input(s) to the HP output.

The Mute, Dim, and Sum to Mono buttons apply to HP1, HP2, and main OUT controls:

3. **Mute** - mute the output.

4. **Dim** - dim (reduce) the output by 15 dB.

5. **Sum to Mono** - Collapse left and right signals to mono at the output. This combined signal is sent through both Left and Right Outputs and is useful for verifying the mono-compatibility of a stereo mix.

6. **Output Level Control** - Set the listening level of the output.

Output Channels Section

1. **Channel View Button** - Click to show/hide Analog Output channels.
2. **Channel Icon** - Displays the channel type. Speaker icons indicate the main OUT volume control will adjust the level of this output. XLR plug icons indicate this output will not be affected by the main OUT volume control, and will instead send the full line-level reference signal.
3. **Line-Level reference** - Choose +4dB or -10dBV. Set this according to the gear to which you are connecting this output.
4. **TRIM** - Fine-tune the output level in 0.1dB increments. Use this to adjust for slight differences in level between your speakers.
5. **Solo** - Solo the channel - all other channels are muted (unless their Solo button is engaged).
6. **Mute** - Mute this output.
7. **Output Source** - Choose the source of audio that will be sent to this output
   - SW: Playbacks - route the selected Playback signal from audio software to this output.
   - Direct: Mixers - route the signal from the selected mixer to this output.
   - Direct: HW Inputs - route the selected hardware input to this output.
8. **Speaker Set** - Assign this output to a speaker set number. No audio will output from this channel until this speaker set number is selected in the Monitor section.

Apogee Control USB Remote

Options with Reach

The Apogee Control USB Remote provides quickly accessible tactile buttons that can be programmed to perform functions that are normally only available via the Control 2 software or hardware front panel.

Basics

To connect Control Remote to your computer, first make sure the Apogee Control 2 software for Symphony Studio is already installed.

Connect the remote to your computer using the included USB C or USB A cable.

- If no compatible interface is connected to your computer, only one light will illuminate on the Control Remote.
- When a compatible interface is connected, all the relevant lights on Control Remote will illuminate.

~ Up to four Apogee Control remotes can be connected to the same computer allowing for different parameters and assignments on each.

Access the Remote Assign window by clicking the Remote Icon in the Toolbar at the top of the Control 2 software window.

The factory default assignments are:

1 - Clear Meters
2 - Dim Speakers
3 - Toggle Speaker Sets
4 - Toggle Main Source
A - Launch Control 2
B - Mono Speakers
C - Set Main Out to Reference
D - Momentary Talkback

1) Microphone button - One push focuses the knob on adjusting the input gain level - Multiple presses cycles through the input channels
2) Headphone button - One push focuses the knob on adjusting the headphones volume level - Multiple presses cycles through the headphone outputs
3) Speaker button - Focuses the knob on adjusting the speaker volume level
4) Control Knob -Turn to adjust settings, Push down to mute all outputs
The push button can be assigned to another function via the Remote window in the Control 2 software

Button Assignment Examples

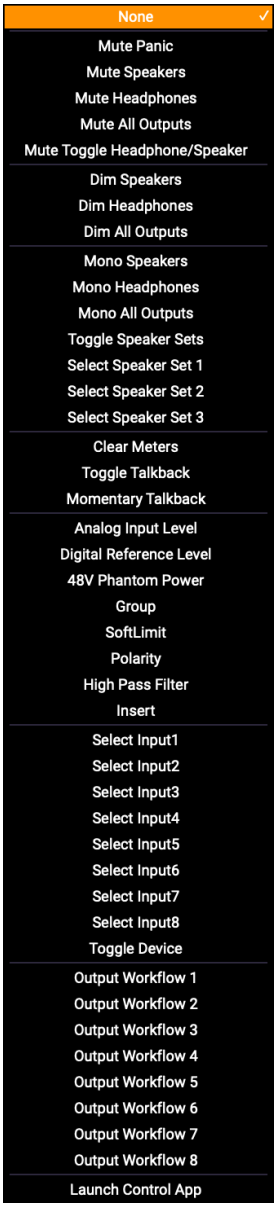
Switch to specific Workflows

Map a specific Monitor Workflow to each user assignable button

You may have previously programmed several Workflows for 5.1 and Atmos, one for Stereo, one for multiple sets of stereo monitor speakers, or other combinations.

Tracking: Switch to different input gain controls

In a tracking focused workflow, instead of toggling through each input in sequence with the dedicated mic button, you quickly jump to a specific input with the assignable buttons.



There are many features which can also be mapped to these user assignable buttons.

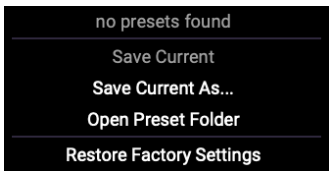
Save/Recall Remote Presets

Your Control Remote settings can be saved and recalled as presets.

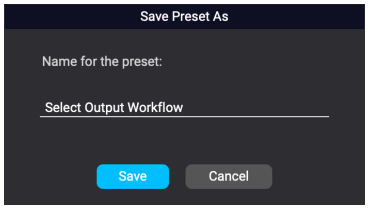
To Save:

1. Click the Preset button

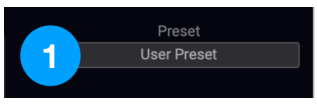
2. Choose "Save Current" or "Save Current As"



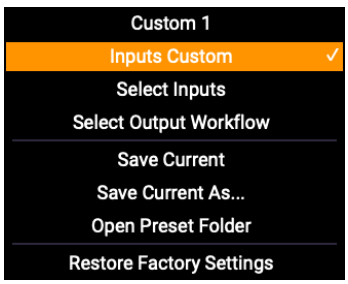
3. Name your preset and click Save



To Recall:



1. Click the Preset button.



2. Select your desired preset directly from the top of the Preset menu

Monitor Workflows

Introduction

Mixing for Dolby Atmos and other immersive 3D formats is rapidly becoming an essential skill for the modern creator and engineer.

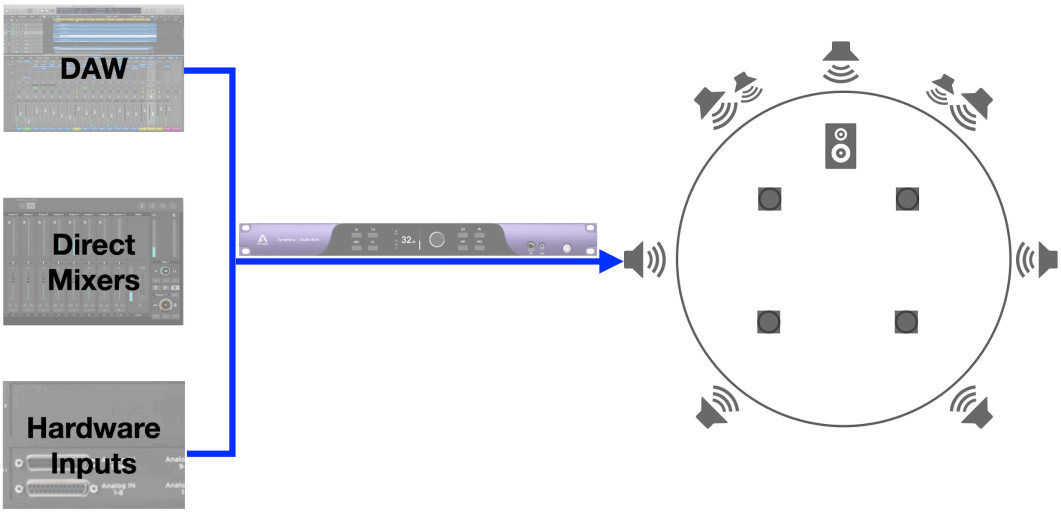
With the Symphony Studio Series Monitor Workflows, you'll effortlessly configure and operate your monitoring system for Dolby Atmos, Sony 360 Reality Audio and other immersive audio systems with control of your Symphony Studio's speaker outputs.

Caution!

Monitor Workflows are powerful and flexible, but without a proper understanding of the functionality, audio signals may be inadvertently sent to speakers at Line level (i.e. maximum volume), resulting in speaker damage and, potentially, hearing loss. To avoid this situation, ensure that ALL Symphony Studio Analog outputs connected to a speaker or amp are set to "Speaker" in the Analog Output Setup window, as described below. Be sure to set Symphony Studio's output to a very low volume during initial system verification.

What is a Monitor Workflow?

A Monitor Workflow is a snapshot of the Source routing and Speaker Set settings for all Symphony Studio analog outputs set to Speaker. With these settings, you configure how signal flows from sources like your DAW, Symphony's internal mixers, or hardware inputs through to Symphony Studio analog outputs.



You can create up to 8 Monitor Workflows to fulfill all your monitoring use cases, then toggle between them using the Apogee Control 2 software, or the Apogee Hardware Remote.

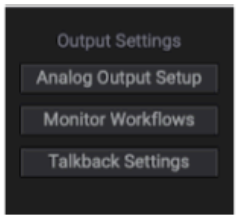
Output DSP

The Symphony Studio has additional output DSP processing for calibrating your speakers to the room. Calibration involves adjusting each speaker with EQ, delay, trim, and Bass Management functions such as crossover frequencies and slope.

Working with Monitor Workflows

In this section, we'll go through each of the Monitor Workflows panels and explain the process of setting up your studio speakers and the features and options available.

To open the Monitor Workflows window, go to the Control 2 software's System Settings Sidebar, in the Output Settings section, and click the Monitor Workflows button. The Monitor Workflows Window is separated into four main panels:



- Main
- In/Out
- Bass Management
- Room Correction

Presets Sidebar

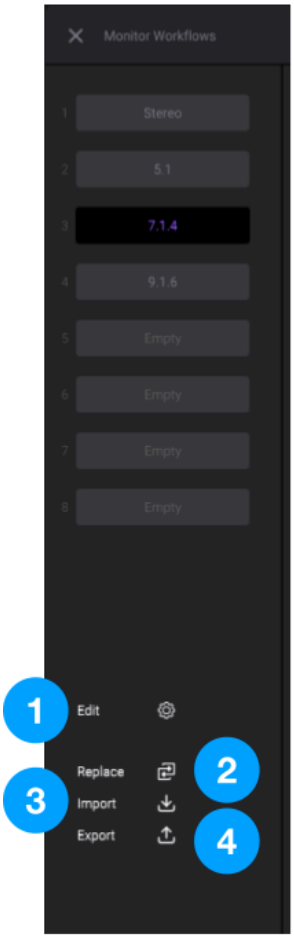
On the left of the Monitor Workflows window is the Presets Sidebar. This sidebar is present in every panel and provides quick access to changing your speaker configuration.

The first four Workflow Presets come preconfigured with standard speaker setups, depending on the model Symphony Studio connected:

- Stereo
- 5.1
- 7.1.4
- 9.1.6

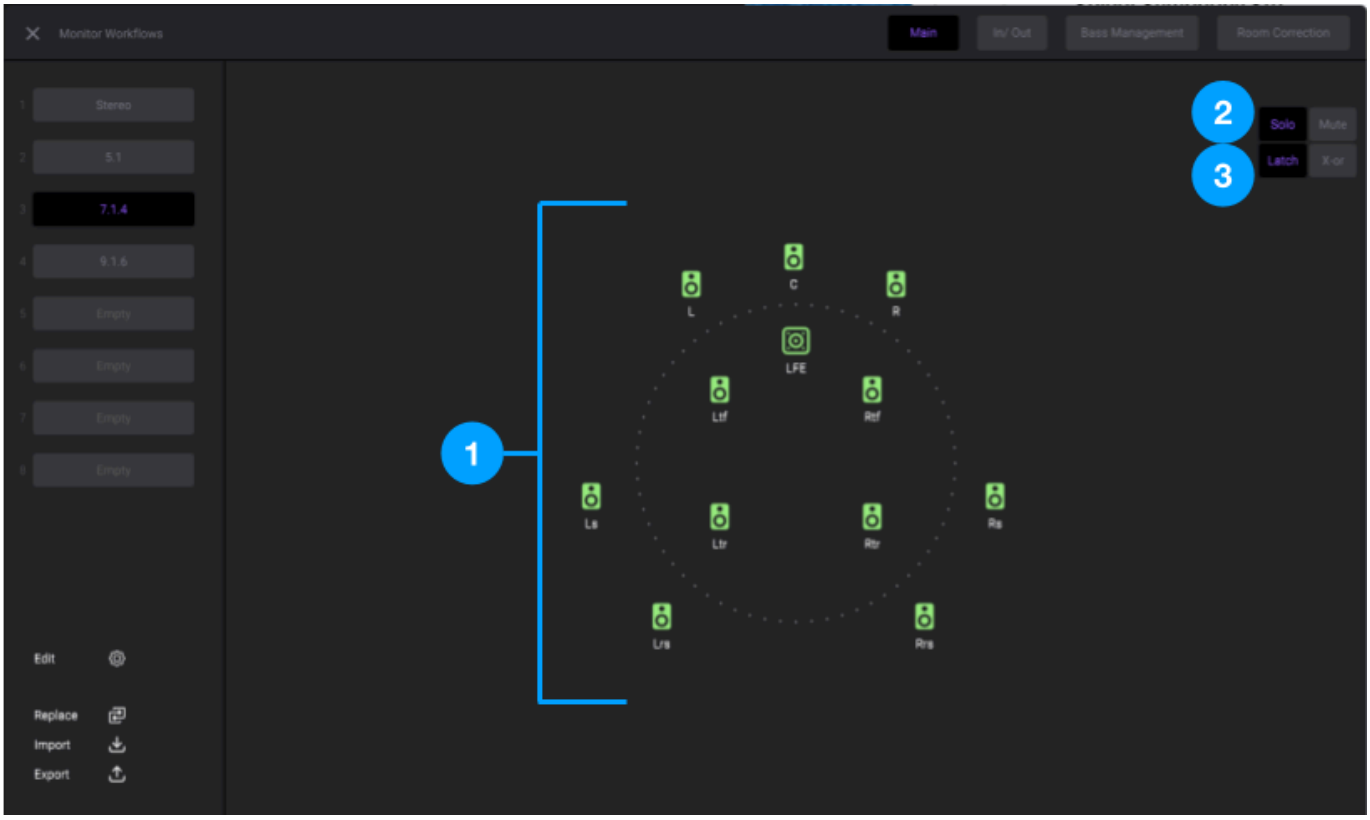
There are four additional presets available for creating your own custom configurations.

1. **Edit** - Create, Delete, Rename, or change the order of a preset.
2. **Replace** - Replaces the current preset.
3. **Import** - Load a custom workflow file into the currently selected workflow preset.
4. **Export** - Save the currently selected workflow preset to a file.



Main

The Main panel displays the current speaker configuration. It features the ability to Mute and Solo individual speakers or groups of speakers to evaluate your mix or assist in room correction.



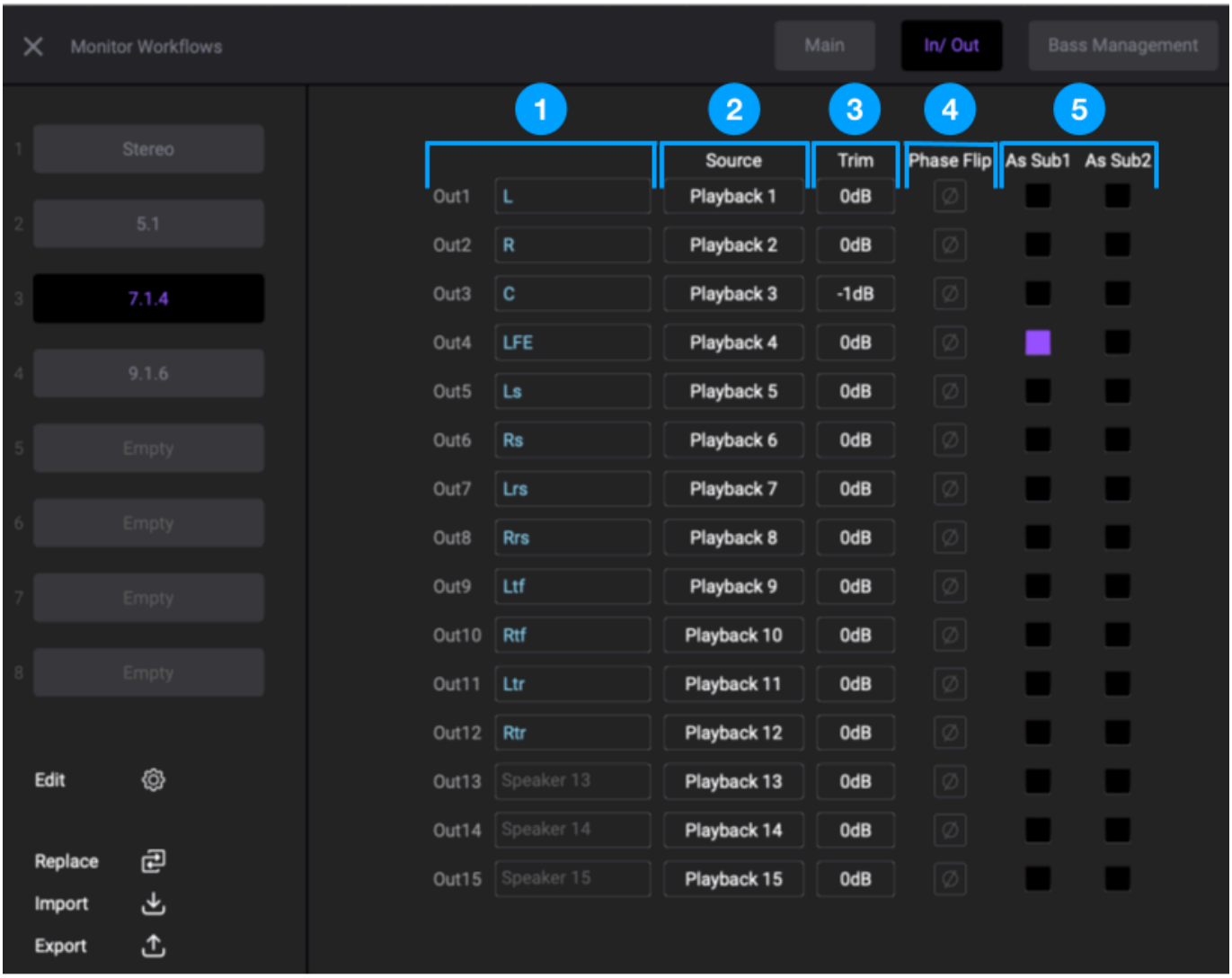
1. **Speaker Icons** - Click a speaker icon to Solo or Mute that speaker.

2. **Solo** / **Mute** - Determines if clicking a speaker will perform a Mute or Solo function.

3. **Latch** / **X-or** - When set to Latch, multiple speakers can be muted or soloed simultaneously. When set to X-or, selecting a speaker will de-select other speakers.

In/Out

Use this panel to route computer audio to the desired speaker, as well as to fine-tune any level differences between speakers. If you will be needing Bass Management functions, you can designate which output will be used for this purpose.



1. **Out 1-16**: Name of the speaker connected to the Analog Output channel of Symphony Studio. *IMPORTANT: If you wish to change a speaker name, leave the factory prefix part of the name in place. For example, if you want to rename L or genelec Left, name it "L: Genelec Left". NOTE: This is especially important for LFE. This is so the Control 2 software applies Bass Management algorithms properly.*
2. **Source** - Assign the playback channel from computer audio output to the desired speaker.
3. **Trim** - Adjust the level of the output channel.
   - Single mouse click and drag up/down, or….
   - Double-click and type the desired value into the box.
4. **Phase Flip** - Inverts the phase of the output channel.
5. **As Sub1** & **As Sub2** - Designates the output channel that will be used as a subwoofer for Bass Management.
   - If your system has two subwoofers, designate one "As Sub1" and the other "As Sub 2"

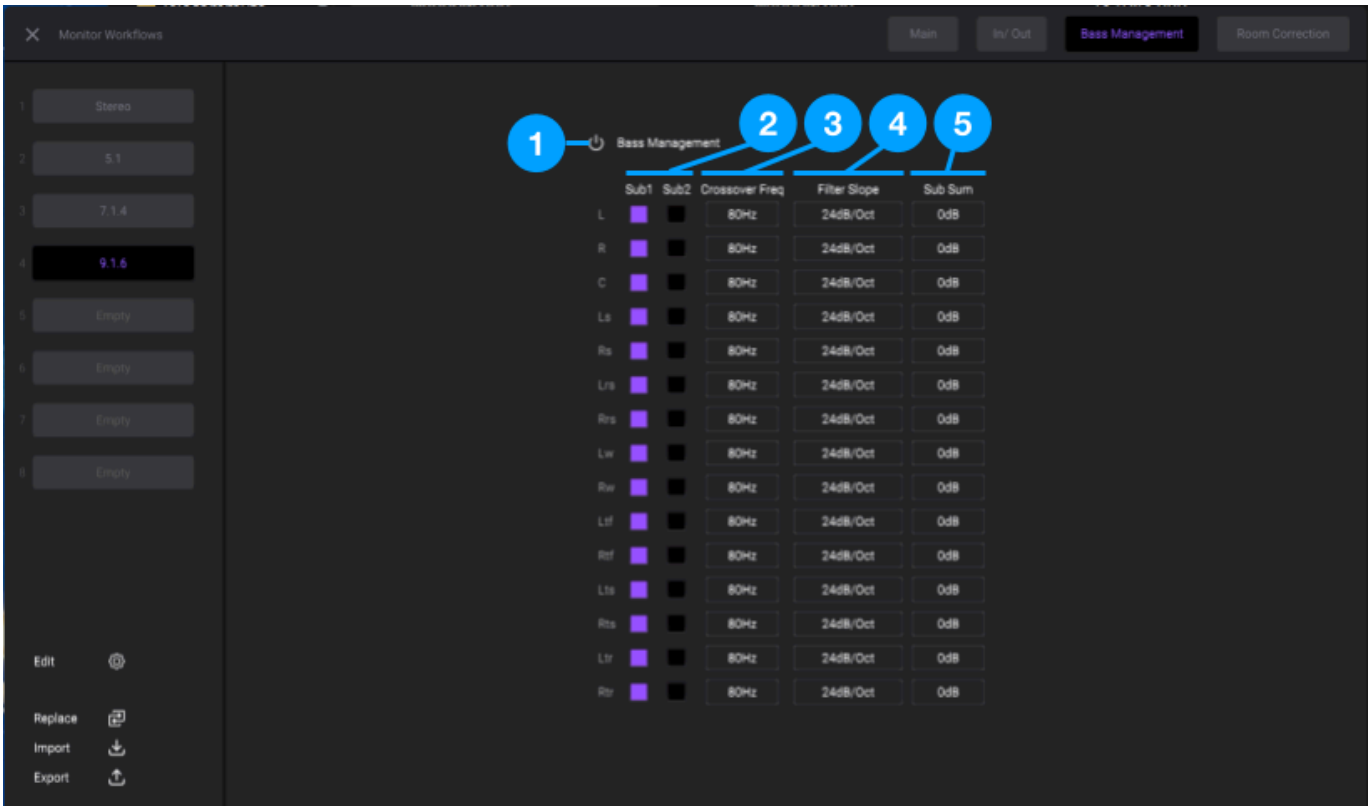
Bass Management

What is Bass Management?

In a perfect world, each of your speakers will be capable of reproducing all frequencies evenly. Such a full-range system usually requires large expensive speakers for each position. This is not practical in the regular world as most audio engineers and musicians do not have the budget or space for such a setup. Thus smaller speakers that are not as good at reproducing lower frequencies are used.

This is where Bass Management becomes useful.

Bass Management enhances your speaker system by redirecting low-frequency sounds—those that regular speakers struggle to reproduce—to the subwoofer used for the LFE (Low-Frequency Effects) channel. This results in clearer, more powerful sound across your entire setup. The Control 2 software offers adjustable crossover frequencies and filters, allowing you to fine-tune the bass management for your specific speaker configuration.



1. **Bass Management On/Off** - Toggle the Bass Management feature on/off.
   Note: If your speaker system has it's own bass management function, turn off the Control 2's Bass Management feature so it does not interfere.
2. **Sub1 & Sub2**- Send low frequencies from the selected channel to the subwoofer.
3. **Crossover Freq** - Sound below this frequency will be sent to the subwoofer.
4. **Filter Slope** - Selects how sharply the crossover frequency is applied.
   - 12dB/Oct - A gentle Crossover Frequency.
   - 24dB/Oct - A sharper Crossover Frequency.
5. **Sub Sum** - A Trim for the amount of Bass Management signal sent to the subwoofer.

Room Correction

The Room Correction panel contains settings for EQ & Delay for each output channel.

1. EQ On/Off - Toggle the Equalizer function on/off.
2. Channel selector - Select the speaker output for which you want to adjust the EQ settings.
3. Copy EQ & Paste EQ buttons - Easily copy EQ settings from one channel to another.
4. Type - Select the EQ curve type. The options are:
    a. Peaking - Boosts or cuts around a central frequency
    b. LoPass - Frequencies below the cutoff are allowed to pass.
    c. HiPass - Frequencies above the cutoff are allowed to pass
    d. LoShelf - Boosts or cuts all frequencies uniformly below the cutoff frequency
    e. HiShelf - Boosts or cuts all frequencies uniformly above the cutoff frequency
5. Cutoff - The frequency at which the EQ band is centered
6. Gain - Amount of boost or attenuation applied to the frequency.
7. Q - The bandwidth affected by the EQ band. A higher Q value affects a narrow frequency band, and a lower Q widens the band affected.

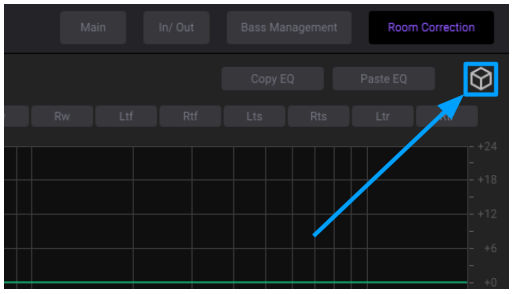
8. Delay On/Off - Toggle the Delay function on/off
9. Delay amount - The amount of delay applied to each speaker output

Automated Room Tuning

The calibration process has a learning curve to become proficient. Before getting into the Room Correction window functions, it may be worthwhile for those who are new to room tuning, or as a starting point for more experienced users, to start with the Room Simulator function. This is a basic algorithm that derives estimated EQ settings based on your room's measurements and materials. Here's how to get started:

Before beginning, measure your room's length, width and height. Then…

1. Click the "Room Correction" panel button, then click the Cube Icon on the right.



2. Enter your room's measurements, as well as what material from which the walls, floor, and ceiling are made.

3. Click the "Run Simulation" button. A list of EQ frequencies and gain settings are displayed.

4. Click the Apply button and these EQ settings will be applied to the speakers.
   Note: The simulator applies the same eq curve settings to all speakers, with a different eq curve for the LFE channel.

5. You may further tweak the EQ and Delay settings of each speaker if needed from the main Room Correction panel.

Regarding 3rd-party Calibration Software

You may wish to use a 3rd-party calibration software to replace or assist with the Symphony Studio's output DSP calibration features. At the time of this writing there are many available such as Room EQ Wizard, Smaart, Sonarworks SoundID, Ginger Audio Sphere, Anthem Room Correction, etc.

Some of these softwares utilize their own EQ and/or Delay correction that is applied to the audio signal outside of the Apogee Control 2 software. For these systems, turn off the Symphony Studio's output DSP EQ and Delay and Bass Management so it doesn't interfere.

For others such as Room EQ Wizard, these result in a set of recommended EQ and Delay settings for each speaker. For these systems, manually enter the recommended values into the Control 2 software.

A Note About Acoustics Issues

It may seem like the goal is to completely flatten the curve, but even well treated rooms won't get a perfect flat line after applying corrective EQ. This is totally normal. The goal is to improve within a reasonable range, not to get bogged down by tiny changes that don't make a big difference.

Other ways to correct issues such as large peaks and valleys in the frequency response curve may be to adjust speaker placement, adding acoustic treatments like bass traps, or strategically applying absorption or diffusion materials to your walls. While EQ can help, extreme corrections (especially those below 300 Hz) may create phase issues, so experimentation and ear-judgment are recommended. Apogee's Dealer Network has a great many options for those seeking professional advice and insights on acoustic treatment or design in relation to Symphony Studio.

Technical Details

Technical Specification	
A/D Conversion	Max input level (+4dBu ref/Mic): +20dBu Max input level (-10dBV ref): +6dBV Input impedance: 4KOhm Freq resp 10 Hz -20Khz: > +/-0.2dB (@44.1Khz) Rel. THD + N: -113dB Dyn. Range: 121dB (A-weighted)
D/A Conversion	Max output level (+4dBu ref): +20dBu Max output level (-10dBV ref): +6dBV Line output impedance: 50 Ohm Freq resp 10Hz -20 Khz: > +/- 0.05dB (@44.1Khz) Rel. THD+N : -114dB Dyn Range: 124dB (A-weighted)
Mic Preamps	Gain: up to 75 dB advanced stepped gain circuit design Selectable per channel: 48V phantom power, Soft Limit, and polarity invert EIN: 129 dB (un-weighted) @60 dB, 150 Ohm Max input level: +20dBu Input Impedance: 150 - 4K Ohm (default)
Headphones	Max Output Level: ● 250mW into 30 Ohm ● 90mW into 600 Ohm Rel THD+N: -110 dB with 600 Ohm load Dynamic Range: 124dB (A-weighted) Impedance: <0.5 Ohm

General	
Dimensions	19” x 12.125” x 1.73”
Weight	10 lbs
Power	AC IN 90-240VAC, 50-60 Hz