

Audio Lab Manual

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1. Introduction

The Dimensions Lab Audio Lab is an accessible space and resource that enables the production of podcasts, music recordings, and sound for video. It is advised that you read this document prior to using the Audio Lab and refer to it during your use of the Audio Lab. This manual will evolve over time, but will always contain information you will need to successfully navigate the Audio Lab.

Expectations

The Audio Lab is a professional recording studio available to people with varying levels of skill using audio recording technology. Some users have a background in sound and will have an easy time getting results. Others will find that they may need to devote an entire session to figure out how to route sound in and out of an audio application. We advise you to plan accordingly.

There are many things to learn: audio recording techniques and practices, different types of cables and jacks, sampling rates, bit rates, hardware buffer sizes, plugins, DAWs (Digital Audio Workstation) or software such as Reaper, Adobe Audition, Audacity, Ableton Live, FL Studio and more. To address this, we've done our best to simplify the setup, while providing enough functionality to get professional results. Over time we hope to develop and share learning resources to increase the usability of this resource.

Help

Keep in mind that the Audio Lab is a self-serve resource and that immediate assistance in the Audio Lab is limited. You may ask Dimensions Lab Assistants for help as they have some limited training in the space, but we may or may not have someone on staff to help you during your session. You may also email libraries.helpdesk@wsu.edu for assistance.

If you are new to recording/studio technology, consider coming to a Digital Audio Collective meeting! Find out more here:

<https://wsu.presence.io/organization/digital-audio-collective>

Important Information about using the lab:

The information in this short section has been outlined in the reservation process and the form you will have signed, but it is good to review.

Food and drink are not allowed in the Audio Lab. Users who violate this rule will be banned from reserving the Audio Lab. This rule is in place for the safety of the user and the equipment.

If you need to leave during your session, make sure you bring your ID and proof of your reservation with you, and lock the door behind you. Make sure the door is fully closed and locked. If a Dimensions Lab Assistant is on staff they can let you back in or you may visit the circulation desk to have circulation staff let you back in.

Please remember to give yourself enough time to 'return' or check-in the space before the session end time. This requires that you go to the circulation desk, get in line to wait for staff help and then they will accompany you back to the space to verify the space is in good order before you can leave. In preparation you should do the following:

- Back up your work
- Return the space to its original state
- Sign out of the computer and visit the circulation desk to initiate check-in process.

Again, you will need to accompany the staff back to the Audio Lab before they can remove it from your library account. If the space is returned late, you will be fined \$50 per hour.

Audio Lab

We are excited to offer this resource and hope that it will contribute to your learning experience at WSU.

2. Safety First

To ensure your safety and the proper handling of the technology in the Audio Lab, there are three things you must understand prior to using the equipment: No food or drink, avoid feedback and only enable 48V phantom power for condenser mics.

How to avoid feedback: Headphones or Speakers?

The Audio Lab is equipped with a microphone, speakers, and a set of headphones to accommodate recording and monitoring sound.

When recording, always make sure you are only monitoring from headphones to prevent feedback. Feedback happens when a signal is fed back into itself continuously, resulting in a potentially loud squeal that can cause damage to your ears and to the equipment.

When playing back sound, you may use the speakers. This is useful for audio editing, mixing, or sequencing, and preventing ear fatigue.

The **MOTU 828es Audio Interface** has both headphone jacks for monitoring sound, in addition to providing outputs to the speakers. Press the following buttons to switch between the two modes:

- **Button A: Headphones**
 - Use this setting when Recording
- **Button B: Speakers**
 - Use this setting when playing back. Prevent feedback by ensuring that tracks are not in record-ready.

Phantom Power: 48V power

Only enable 48V phantom power for condenser mics. The Audio Lab is a space used by many different people, so if you find yourself patching into the jacks on the front panel of the 828es, make sure the 48V buttons are not backlit (red). Similarly, if you plug something else into the Art Voice Channel, you'll need to make sure the Phantom Power button is not illuminated. In either case, you may enable 48V phantom power on a condenser mic, but it is advised you do so after plugging it in.

3. Choosing a Computer

Option 1: Audio Lab Computer

The Audio Lab's computer is connected to the music devices by default. This provides a selection of DAWs including Reaper, Ableton Live, Adobe Audition, FL Studio and Audacity. It also includes Native Instruments Komplete 12, a suite of virtual instruments and effects that can be accessed in most DAWs.

Option 2: User Device or Laptop

The Audio Lab allows users to bring their own laptop computer to connect to the built-in hardware. This enables one to access their own hardware, software, preferences, configurations, and operating system. The user must install the associated drivers/software on their own device, connect that device to the USB 2.0 cables provided, and then press the toggle button on the USB switches to select input 2. There are two of these switching devices, one connects to the Motu 828es Audio Interface, the other connects to the Novation MIDI Keyboard. Additionally, you can connect the computer monitors with a USB C cable if desired; these are provided and labelled. You will need to select the USB C input using the puck controller under the monitor.

External links to download software/drivers

Motu 828es Audio Interface driver

<https://motu.com/en-us/download/>

Novation 61SL MKIII MIDI Keyboard

<https://downloads.novationmusic.com/novation/sl-mkiii>

Set the Audio Lab to its Default State prior to departure

If you choose to use your own device, please make sure you allow enough time to set the Audio Lab back to its default state. The computer monitors display inputs must be set to the Audio Lab computer, and the switches must also be set to Audio Lab computer. Failure to do this may cause difficulties for the next user.

4. Audio Input/Output Routing:

Please consult the [Audio Lab Routing Diagram](#) for a visual image of how the studio is set up.

The large condenser microphone, an Audio Technica AT4033, is routed through the Art Voice Channel rackmount unit. It provides physical controls for gain, compression, and EQ to improve voice recordings. The AT4033 is a condenser mic, so it requires 48V of power. It is enabled with the Phantom Power button provided by the Art Voice Channel. This is routed to the MOTU 8282es input channel 3, labelled on the patchbay as 828 In 3.

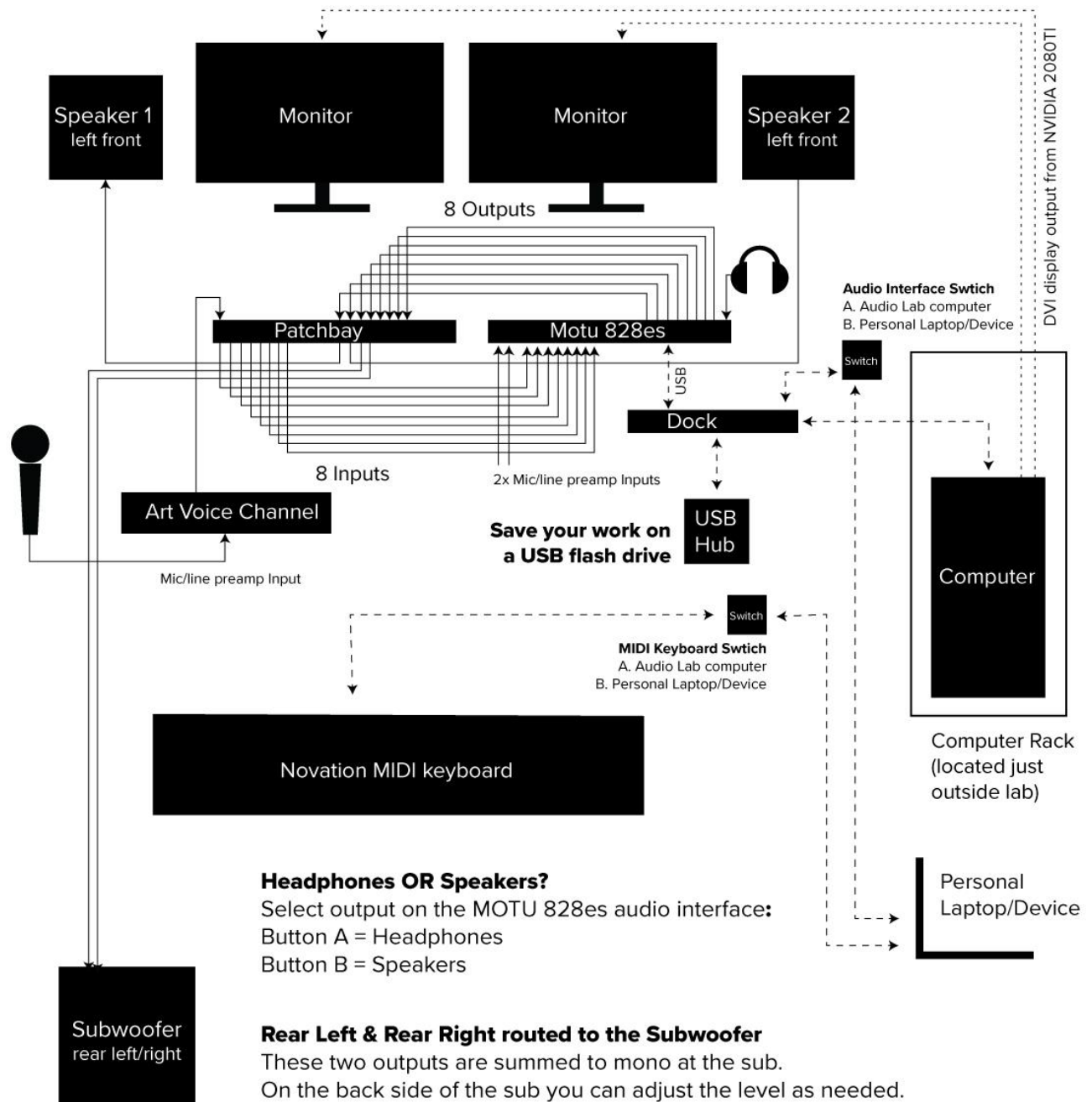
Additional microphones can be patched into In 1 and In 2 on the MOTU 828es. If the microphone is a condenser type microphone, it will likely require 48V which you will need to enable by pushing the 48V button for that input on the 828es. Never enable 48V phantom power for any other type of microphone, line level output or instrument output. Doing so may cause damage to the equipment. Also note that ¼" or XLR connectors may be patched into these inputs. The other 5 inputs are available at the patchbay and do not have preamps. They are labeled as 828 In 4-8.

MOTU 828es output channels 1-4 are routed through the patch bay and normalled to the 2 front speakers. To patch in the subwoofer, use provided patch cables to patch from Motu 828 outs 1 & 2 Rear Right/channel 3 & Rear Left/channel 4. The other 4 Motu 828 outputs are labelled 828 Out 5-8.

Using Your Own Microphones

Microphones that can connect with either ¼" or XLR connectors can be used in the Audio Lab with the Motu 828es Audio Interface. USB Microphones will likely not work with the existing Audio Interface and is not supported. USB Microphones can be used instead of the Audio Interface, but we do not recommend it, as it may cause issues routing sound in/out of the speakers/headphones.

5. Audio Lab Routing Diagram



6. Digital Audio Workstation Software:

DAW (Digital Audio Workstation) software comes in many varieties. The Audio Lab has the following DAW software: Reaper, Adobe Audition, Audacity, Ableton Live, FL Studio and Native Instruments Komplete.

Reaper

Reaper is very flexible, has many features and is very customizable. This is the DAW we recommend using in the Audio Lab. It's compatible with Mac/Windows/Linux, and there is an abundance of available online learning resources. Reaper is inexpensive to purchase an individual license should you want to work on projects you've started in the lab on your own computer.

Audacity

Audacity is free and open source. It's compatible with Mac/Windows/Linux and is pretty easy to use. Audacity only supports recording up to two channels at once, but you can layer multiple passes of recorded sounds.

Adobe Audition

Adobe Audition is Adobe software that works well with other Adobe products like After Effects and Premiere, has many features. It works on Windows and Macs and requires a subscription to Adobe Creative Cloud. WSU students have access to Adobe products while on campus when signed in with their NID.

Ableton Live

Ableton Live is DAW software geared towards music production, with an emphasis on electronic music production. It can be used as a live music creation tool and has streamlined much of its functionality to accommodate live music making.

FL Studio

FL Studio is a popular DAW within the realm of hip hop and EDM, formally known as Fruity Loops.

Native Instruments Komplete

Native Instruments Komplete is a suite of synthesis and sampling tools as stand-alone apps and plugins for music and sound design. This is not a DAW but provides other DAWs with plugins and virtual instruments.

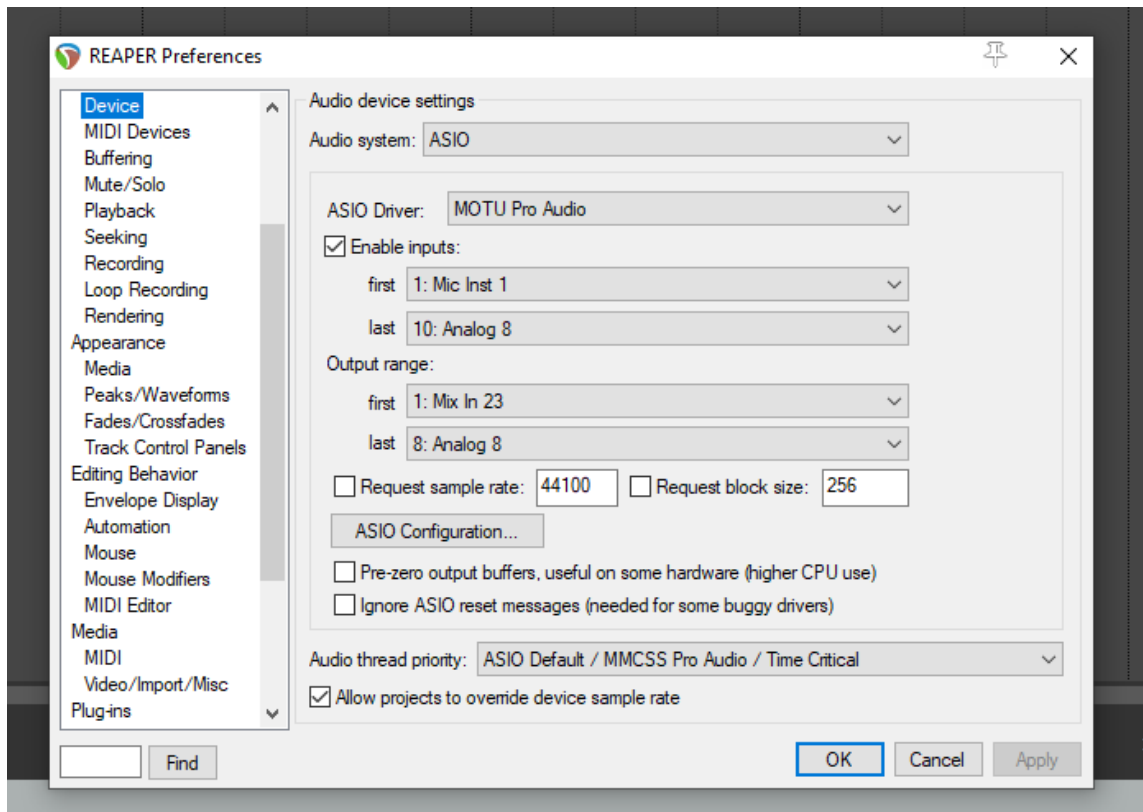
7. Routing Sound In/Out of DAW software:

To route sound in/out of DAW software applications, you must use the MOTU 828es audio interface. The 828 has its own application to adjust routing, sample rate, buffer rates and control gain called Motu Pro Audio Control. This app lives on the 828 itself and is accessed from a web browser when you click the shortcut. On occasion you may find a need to adjust sampling rate or hardware buffer sizes in the app.

See the following pages to understand audio routing in each of the DAW software applications.

Reaper

Reaper tends to save the settings from the last time it was used, but on occasion you may find yourself needing to reselect the MOTU 828es audio interface. To do this within Reaper, you go to Options > Preferences, then under Audio click Device. The following settings will allow you to access the In and Out ports of the 828.



Create a new track, then select which input you are using by viewing the Routing Matrix: View > Routing Matrix. The AT4033 microphone in the Audio Lab is connected to the Art Channel Voice and normalled to the 828 In 3 within the patchbay, but in Reaper it will be labelled Analog 1. When selected, it won't be activated. If you press the button again or put the track in record ready, be sure to be monitoring over headphones to avoid feedback.

The screenshot shows the REAPER v6.46 interface with the Routing Matrix window open. The window displays a grid for routing audio sources to destinations. The 'master/parent' column is selected, and the 'Record Input: Analog 1 (stereo/MC)' source is highlighted. The 'Record Input: Analog 1 (stereo/MC)' source is set, Armed, Record: input (audio or MIDI), Monitoring.

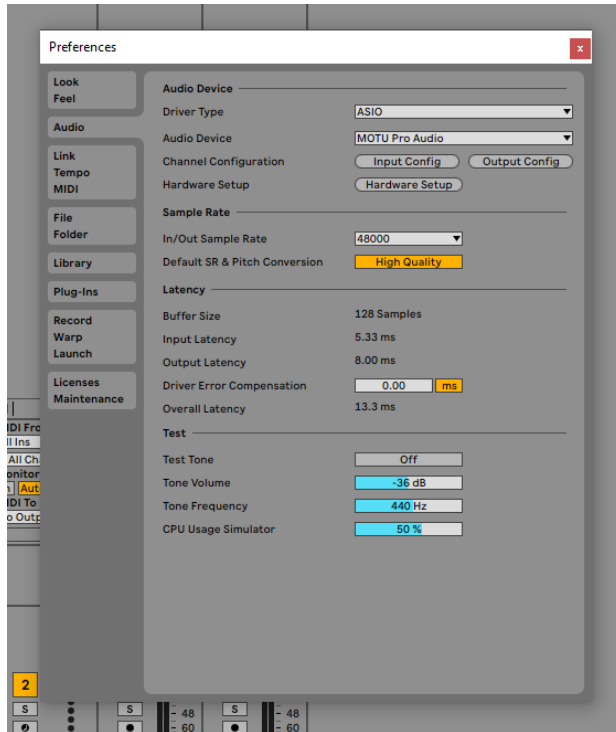
Routing Matrix

source	master/parent	Mix In 23 (stereo/MC)	Mix In 24 (stereo/MC)	Analog 3 (stereo/MC)	Analog 4 (stereo/MC)	Analog 5 (stereo/MC)	Analog 6 (stereo/MC)	Analog 7 (stereo/MC)	Mix In 23	Analog 3	Analog 4	Analog 5	Analog 6	Analog 7	Analog 8
master output 1	☒														
Mic Inst 1	☐														
Mic Inst 2	☐														
Analog 1	☐														
Analog 2	☐														
Analog 3	☐														
Analog 4	☐														
Analog 5	☐														
Analog 6	☐														
Analog 7	☐														
Analog 8	☐														
Mic Inst 1 (stereo/MC)	☐														
Mic Inst 2 (stereo/MC)	☐														
Analog 1 (stereo/MC)	☐														
Analog 2 (stereo/MC)	☐														
Analog 3 (stereo/MC)	☐														
Analog 4 (stereo/MC)	☐														
Analog 5 (stereo/MC)	☐														
Analog 6 (stereo/MC)	☐														
Analog 7 (stereo/MC)	☐														
Virtual MIDI keyboard	☐														
All MIDI Inputs	☐														

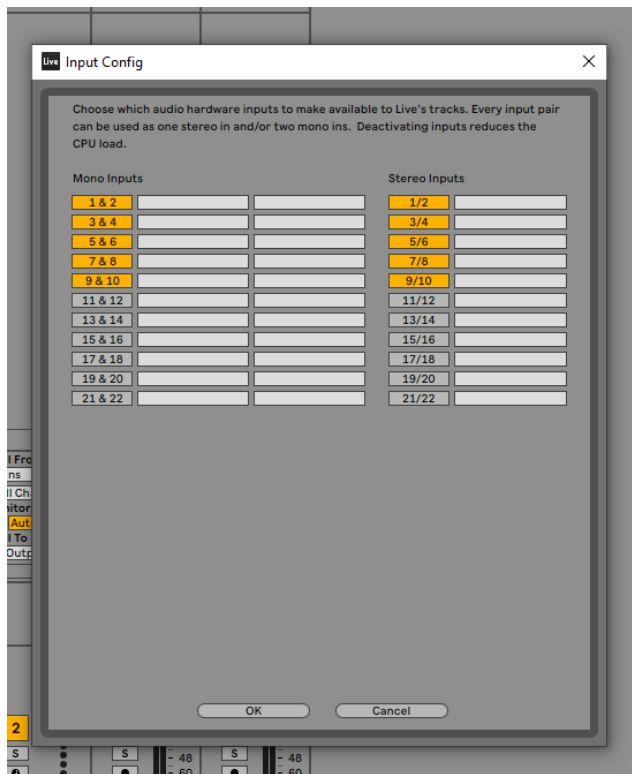
Record Input: Analog 1 (stereo/MC) (set, Armed, Record: input (audio or MIDI), Monitoring)

Ableton Live

Select the MOTU 828es audio interface go to Options > Preferences > Audio. For Driver Type select ASIO. For Audio Device select MOTU Pro Audio. After thinking for a few seconds, it should show you the following options.

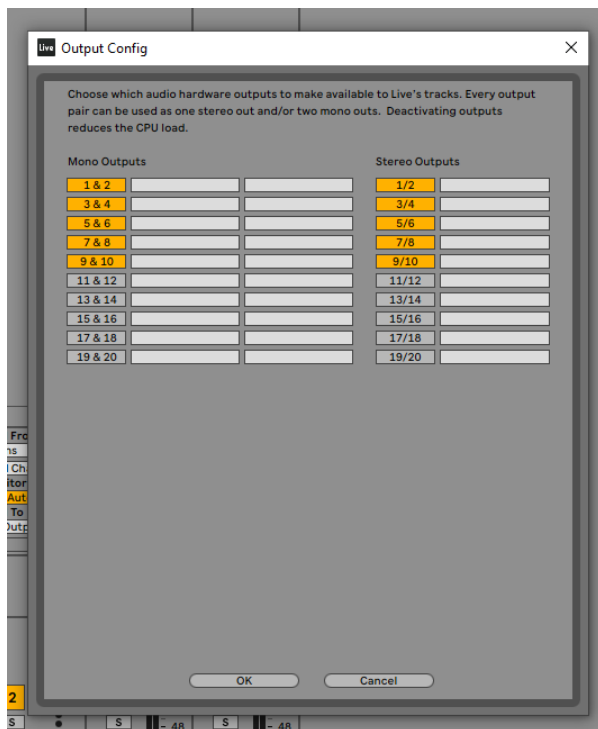


To use all the inputs and outputs of the MOTU 828es you must enable them. Click Input Config and select the following:

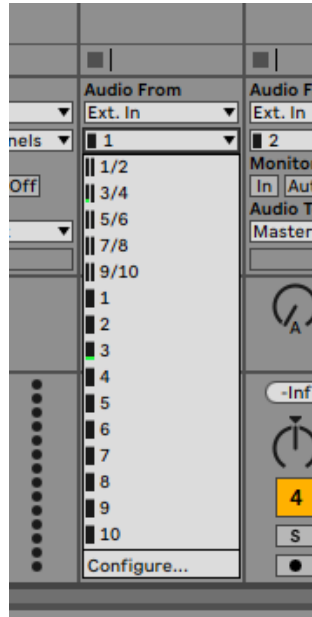
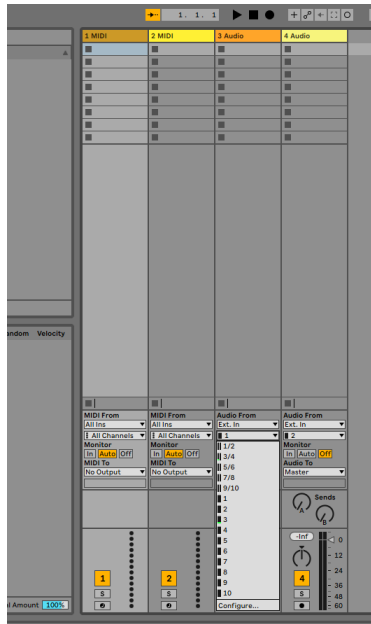


Press OK.

Then select Output Config and select the following:



Press OK and close the Preferences dialog box. At this point an individual Audio Track can be configured to the desired input. Select input 3 for the AT4033 studio mic.



Ableton Live will automatically mute the track but display the level meters. To hear the track, press A on the 828 to monitor from headphones, then select the Auto button for that track. Now you should both hear and see the level meters from the mic signal.

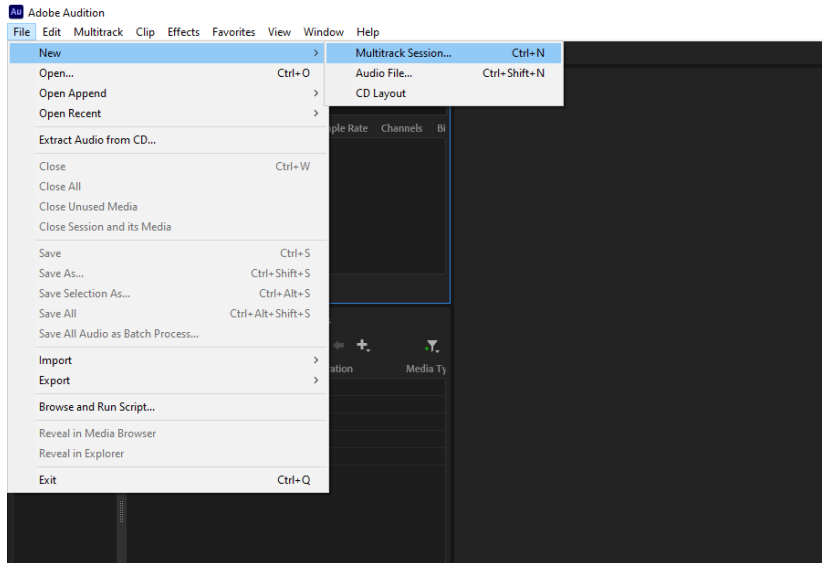
To enable Native Instrument plugins in Ableton Live you must manually go to Options > Plug-Ins, then click the “Off” button next to Use VST3 Plug-In System Folders to toggle to “On”. Now you can use an amazing suite of software instruments in Ableton!

Adobe Audition

First create a new Multitrack session.

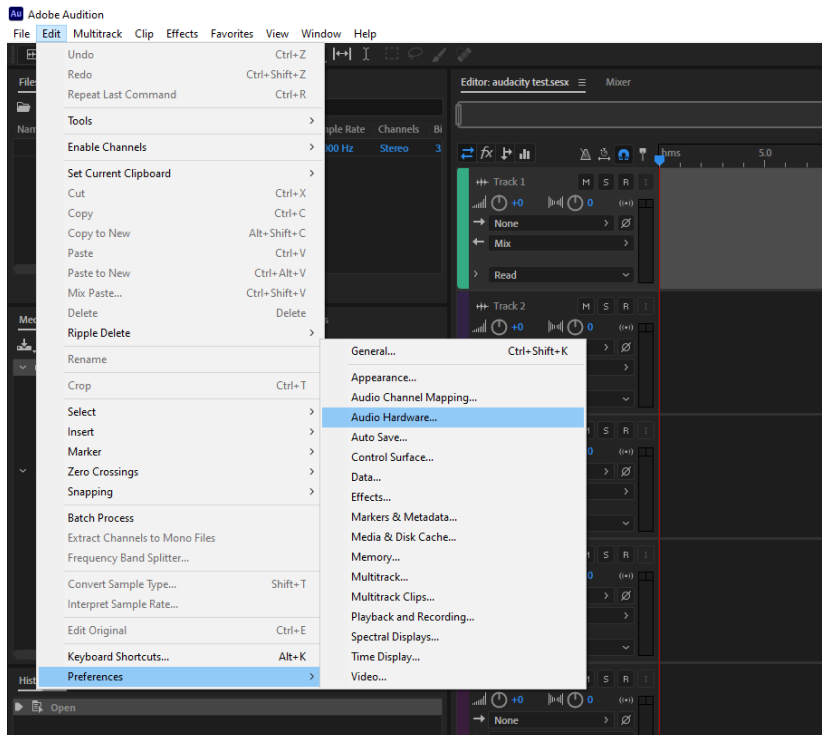
File > New > Multitrack Session

Name the session and save the file to a location you can easily find.



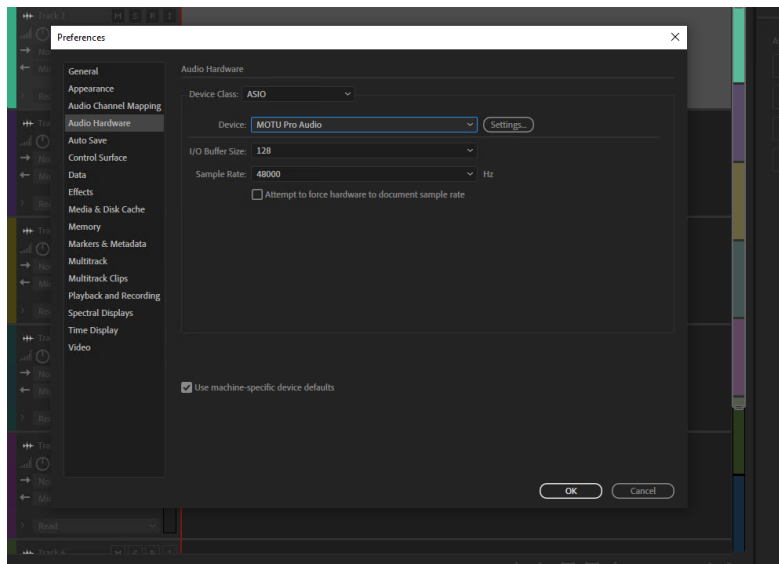
Now select the audio hardware

Edit > Preferences > Audio Hardware

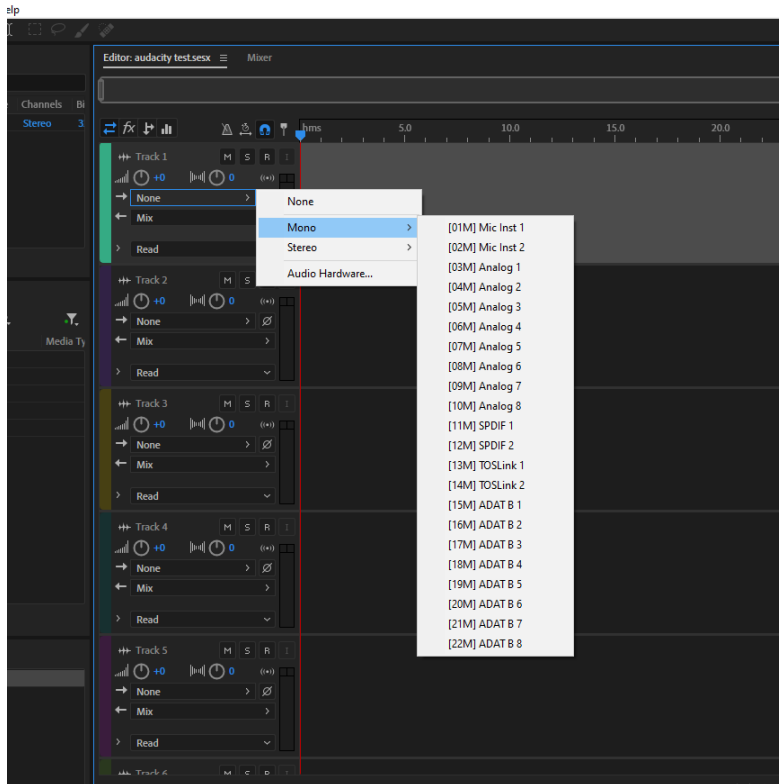


Device Class: ASIO

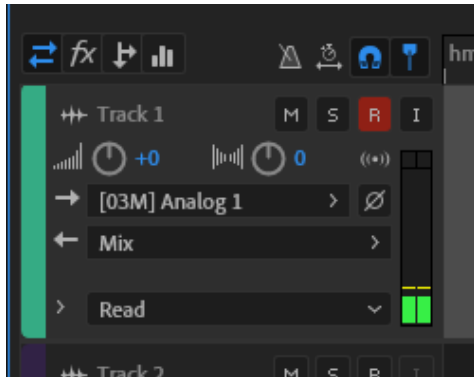
Device: Motu Pro Audio



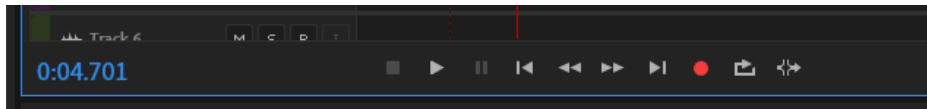
On individual tracks, inputs will default to None. To set the correct input channel, click None > Mono > [03M] Analog 1



Arm track with the R record ready button. Make sure you are monitoring over headphones when recording from the mic (A button on the Motu 828es audio interface)



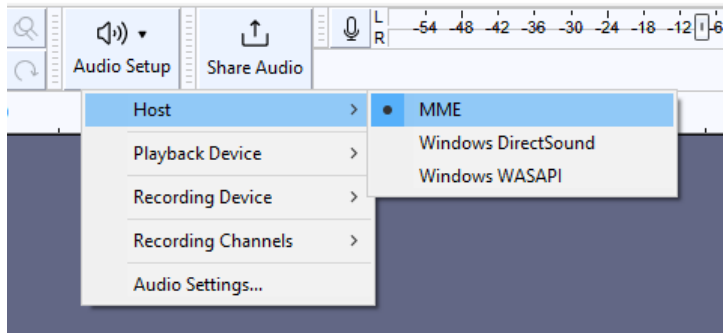
Press the round, red circle button on the transport panel to begin recording.



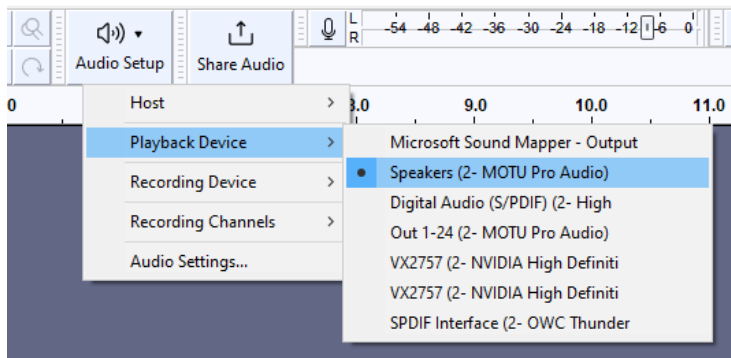
Audacity

Click Audio Setup in top toolbar.

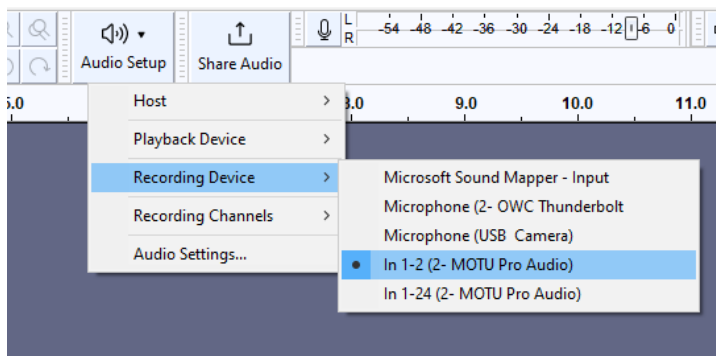
Set Host to MME.



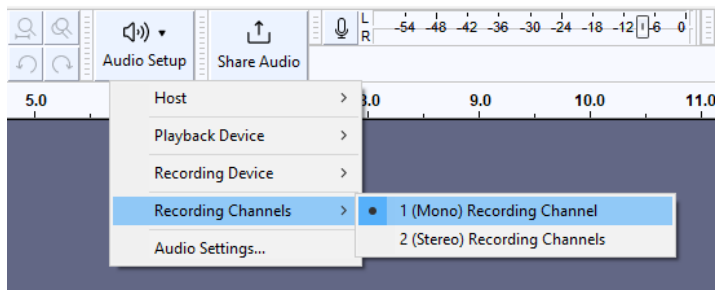
Set Playback device to Motu 828 1-2 for two channels. Sometimes this is listed as Speakers.



Set Recording device to Motu 828 1-2 for two channel inputs.

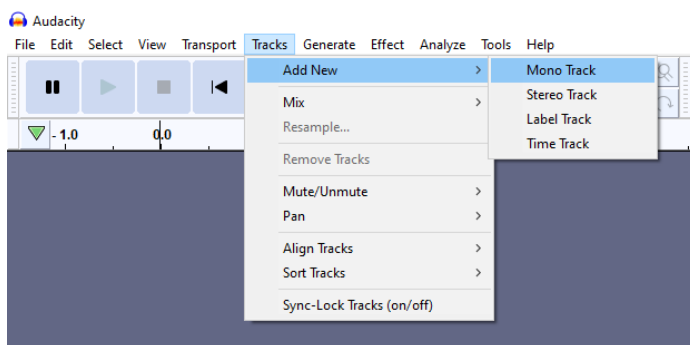


For recordings made from the microphone, set Recording Channels > 1 (Mono) Recording Channel.



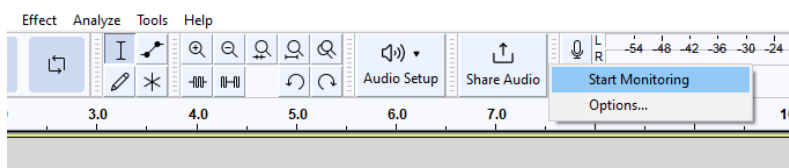
Create a new track:

Tracks > Add New > Mono Track

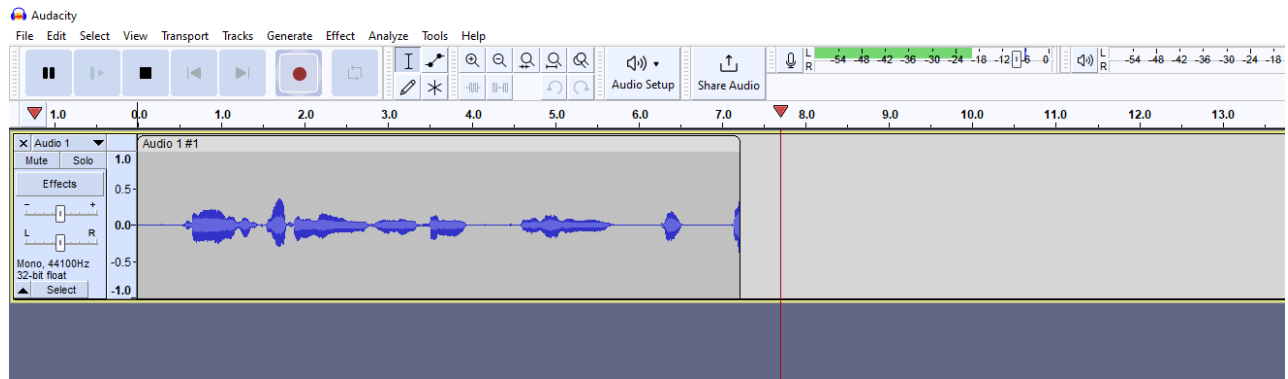


Due to Audacity's limited capability of recording only 2 tracks at once, you can only record from Mic/Line In 1 or Mic/Line In 2. This means you will need to reroute the physical microphone cable. First, disable the Phantom Power button by pressing it (the light will go out). Then pull the XLR cable connected to the Mic from the Voice Channel input and plug it into In 1 on the front of the Motu 828es. Press the 48V button to power the mic. Set the Preamp Gain for Channel 1.

To monitor the microphone level in Audacity, click the Mic button and select start monitoring. You should see levels from the mic. Set a level so that the voice peaks between -12 and -6. This will help you avoid digital distortion.



Press the red circle Record button to begin recording.



When finished, you must return the studio to its original configuration. Turn off the 48V button for the mic. Unplug the XLR cable connected to the mic from the Motu 828es In 1. Plug this cable back into the Voice Channel Input and reengage the Phantom Power button to power the mic.

FL Studio

Select an audio device.

- Click Options in the Toolbar and select Audio Settings.
- In the window that appears, use the Device dropdown box to select your primary audio device.
- Underneath the Device dropdown box, click Show ASIO panel and adjust the buffer length and sample rate that is most applicable to your project.

Record audio tracks in FL Studio

- If it isn't opened already, open the Mixer window by going to the View menu and clicking on Mixer. Alternatively, you can also press the F9 button on your keyboard to open it.
- Select the track (Insert) you want to record your audio and select the Input channel by going to the top-right side of the Mixer and clicking the drop-down.
- Press the Record button. A window will appear asking if you want to record Audio, into the Edison audio editor/recorder or Audio, into the playlist as an audio clip.

8. Getting VST Plugins to show up

Reaper will show Native Instrument VST & VST3 plugins by default. Audacity will also attempt to import some plugins, but some are incompatible.

VSTs in Ableton Live

In **Ableton Live**, to have these plugins show up you will have to set the VST plugin folder to its location on the hard drive. Go to Options > Preferences > Plug-Ins. Set 'Use VST2 Plug-In Custom Folder' to 'On'. Click browse and set that location to C:\Program Files\Native Instruments\VSTPlugins 64 bit\ Set 'Use VST3 Plug-In System Folders' to 'On'. Then click 'Rescan' to 'Rescan Plug-Ins'. After some time you should have VST and VST3 plugins available.

VSTs in Adobe Audition

In **Adobe Audition**, to have these plugins show up you will have to set the VST plugin folder to its location on the hard drive. Go to Effects > Audio Plug-In Manager... Click Add... to add C:\Program Files\VstPlugins and Select Folder. Then click add again to add C:\Program Files\Native Instruments\VSTPlugins 64bit and Select Folder. Then click Scan for Plug-Ins. You will see the plugins populate as it scans. Click OK and now you should have VST and VST3 plugins available.

9. Continuing your work Outside the Audio Lab:

In the Dimensions Lab

The Dimensions Lab currently contains one Audio Workstation. This workstation includes a MIDI keyboard and an iD4 Audio Interface (with 2 channels in/out), and has all the same software the Audio Lab.

All of the other Dimensions Lab stations have the Native Instruments Suite and Reaper and the other Windows PC workstations have an iD4 audio interface.

Make a Plan: DAWs & Plugins

Whichever DAW you choose, if you plan to continue your work on a different computer and/or DAW, plan accordingly. For example, you won't be able to open a Reaper session in Audacity, but you could import the audio files you recorded in Reaper into Audacity. If you use plugins in the Audio Lab, you may not have access to those on another computer. Some plugins are free and can be found online. Others must be purchased and can be expensive like the Native Instruments Komplete suite. If you know you don't have access to specific plugins on another computer and want to continue what you've started in the lab, export the sounds to audio files that can be imported into the DAW you'll be using outside the lab.

10. Equipment Links:

Motu 828es Audio Interface:

<https://s3.amazonaws.com/motu-www-data/manuals/proaudio/828es User Guide.pdf>

Art Voice Channel:

https://artproaudio.com/framework/uploads/2018/06/om_voicechannel.pdf

Novation 61SL MkIII Midi Keyboard:

<https://fael-downloads-prod.focusrite.com/customer/prod/s3fs-public/downloads/SL%20MkIII%20User%20Guide%20V2%20English.pdf>