

Jamulus for Chamber Musicians

a/k/a Live Music on the internet

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What is Jamulus and Why Do I Want It?

Jamulus. Is it something you can spread on toast, like Marmite?



Mmmm... nothing like some tasty Jamulus!

Is it some exotic cloud formation blended with raspberry purée?



Tomorrow's outlook: thick Jamulus clouds rolling in by afternoon...

No to both! Jamulus is software designed with the aim of allowing musicians to have real-time “jam” sessions over the internet. At chamber music retreats it might be more appropriate to call it Quartetulus, but that’s way too hard to say.

Most conferencing software (like Zoom) concentrates on the video aspect more than the audio. It takes a lot of data to stream video, which only slows things down, so Jamulus is “audio-only”. You won’t be able to see your musician friends, so get ready to give your ears a good workout!

With Jamulus on your computer, you can join a session with other musicians running Jamulus, and play together in nearly-real-time. We say “nearly” because it would be unfair to suggest that there is *no* delay, but with proper setup, it is possible to have delays of about 50 milliseconds (ms), which is 1/20 second. This is good enough for an enjoyable session. With some optimizing (described later) you can probably get your delay even smaller.

What Do I Need to Use Jamulus?

You just need 4 things to get started (well, 5 if you're really counting):

- A computer – laptop or desktop, with a microphone (you probably already have that)
- 2 FREE (!) internet downloads
- Headphones
- An ethernet cord (you actually don't need one to get started, but you will want one eventually for better performance).

That's it!

How Do I Get Jamulus?

These instructions are for a computer running Windows, but Jamulus will also run on a Mac and Linux. The authors of this document are (for good or ill) Windows users; for Mac installation instructions, see

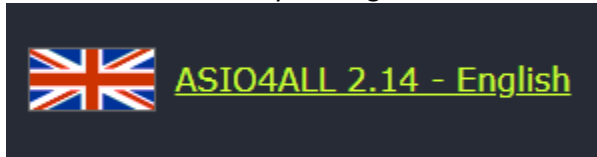
<https://jamulus.io/wiki/Installation-for-Macintosh>

Note that Jamulus will not run on mobile devices or tablets.


You will need two pieces of software (and both are free):

1. An ASIO (Audio Stream Input/Output) driver. This is a piece of software that provides a low-latency high-fidelity interface between a software application (in this case Jamulus) and your computer's sound card. You can get a free universal ASIO driver here: www.asio4all.org

Download the driver by clicking the download link:



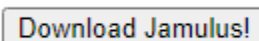
Save the file to your computer.

 ASIO4ALL_2_14_English.exe


Then double click on the file to install the driver. Just take all defaults when asked anything.

2. The Jamulus software. You can get it here: <http://lcon.sourceforge.net/>

Download Jamulus by clicking the download button on the web page:

Download Jamulus!

Save the file to your computer.

 Jamulus-3.5.5-installer.exe

Then double click on the file to install Jamulus.

Running Jamulus

You should now have a Jamulus icon on your desktop (it is just me, or does that icon look an awful lot like Harry Potter's scar? *Wingardium Jamulosa!*):

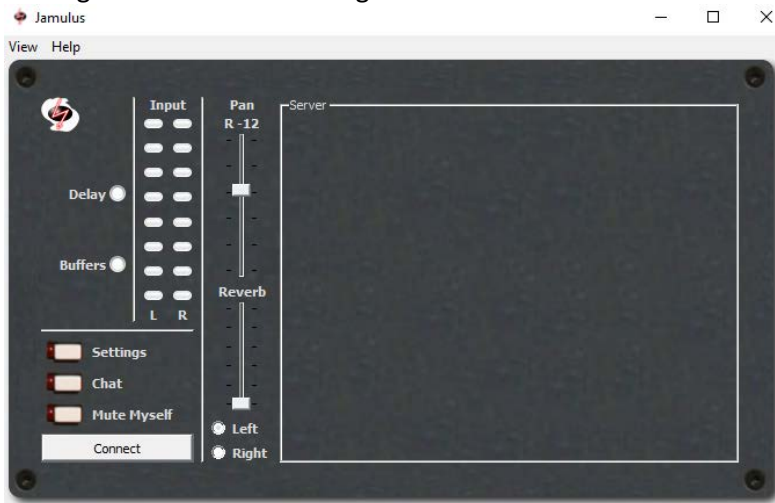


Double click the icon to start.

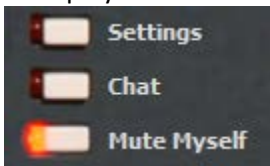
Or you can find Jamulus under "J" in your start menu:



You'll get a window something like this:

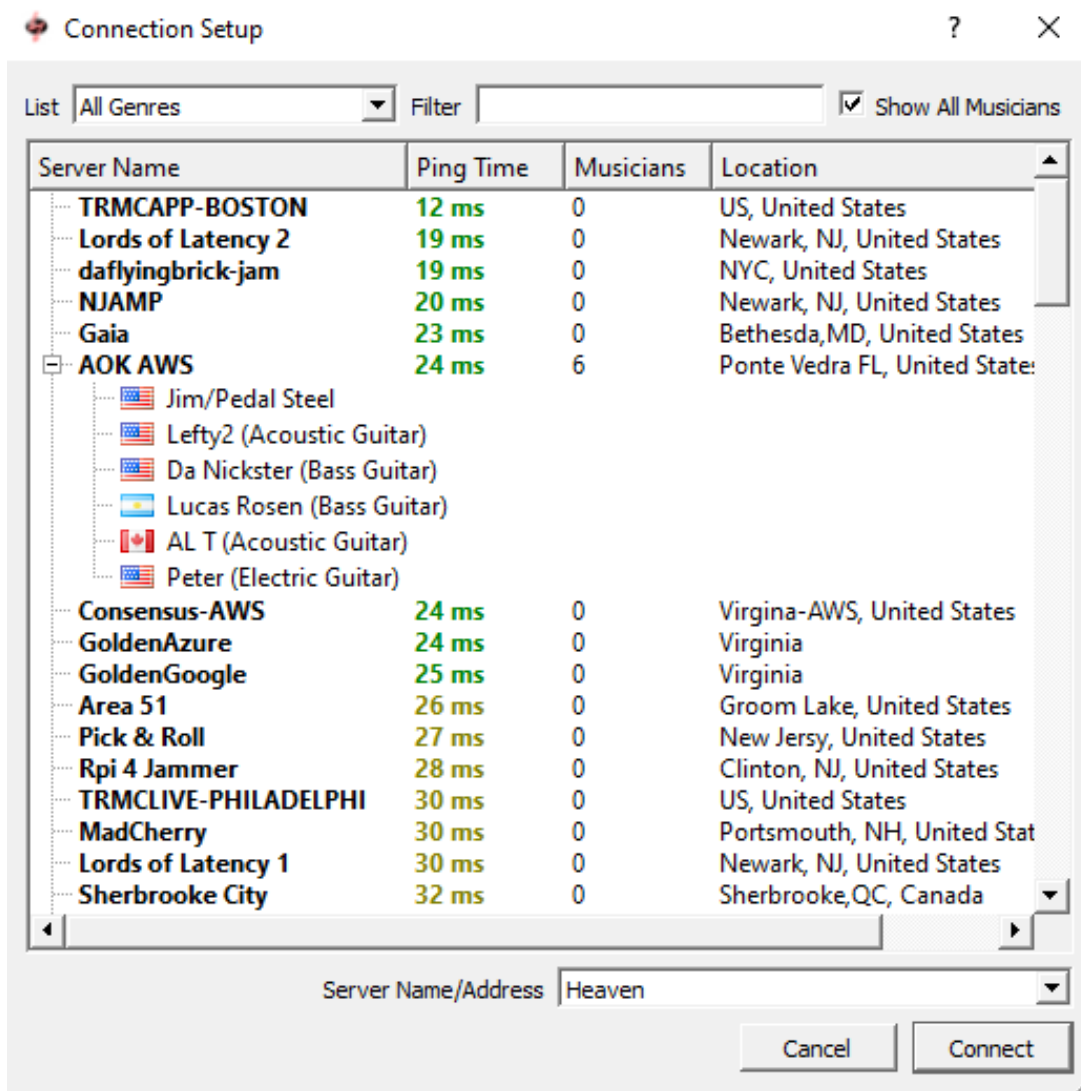


Let's play with the controls a bit. Before you begin, click the "Mute Myself" button. It will light up, like this:



This will prevent audio from your microphone from going out unintentionally. You know, like if you're bad-mouthing your mother-in-law or something.

Next, click on the "Connect" button at the lower left. You'll see a window similar to the one on shown here:



This window shows a list of *Jamulus Servers*. To form a session, several musicians will all connect to the same server. The *ping time* is a measure of how fast you can access the server. The shorter the time, the better, as the goal is to minimize delay. In general, servers that are geographically closer to you will have shorter ping times. When forming a session, you should try to pick a server so that everyone in your session has roughly the same ping time.

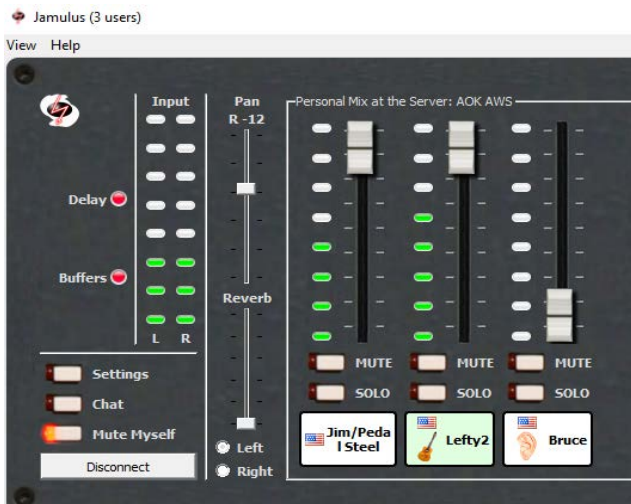
Servers are categorized into several lists. The “List” selector at the upper left lets you choose among the different lists. Most servers are shown under “Default” or “All Genres”.

The Musicians column shows the number of musicians connected to that server. Above you can see that 6 musicians are connected to a server called “AOK AWS”, and they are listed below it.

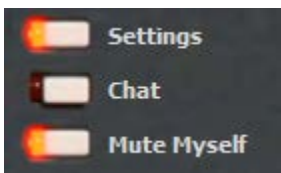
CAUTION: Before connecting to a server, make sure you are using headphones (or turn your speaker volume down fairly low, say 10%, as severe feedback is a possibility with speakers.

In general it is best to always use headphones, as that will avoid any feedback, and you will need to use headphones if you join a session as a participating player. But if you are using speakers to just listen in, gradually turn up your volume to hear the session. If you start to hear feedback, turn your volume back down immediately.

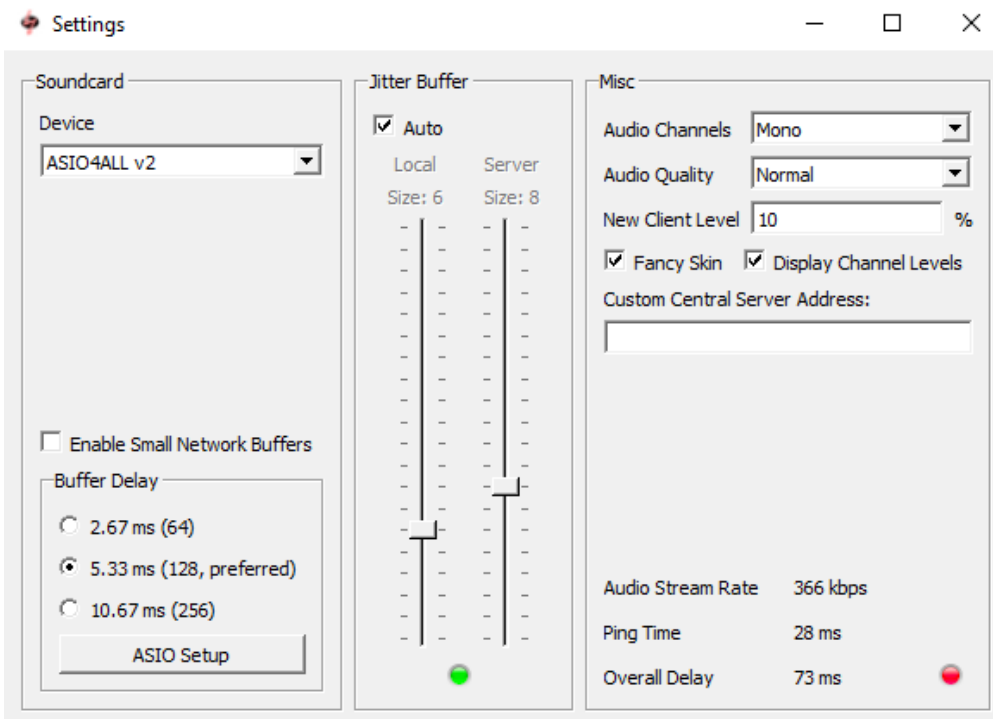
If you see a server with some musicians on it, you can connect to that server and listen in. For example, if AOK AWS is selected, and the Connect button at the lower right is pressed, you will see something like this:



Try connecting to a server. Pick one, even an empty one. Then click on the "Settings" button so that it lights up:

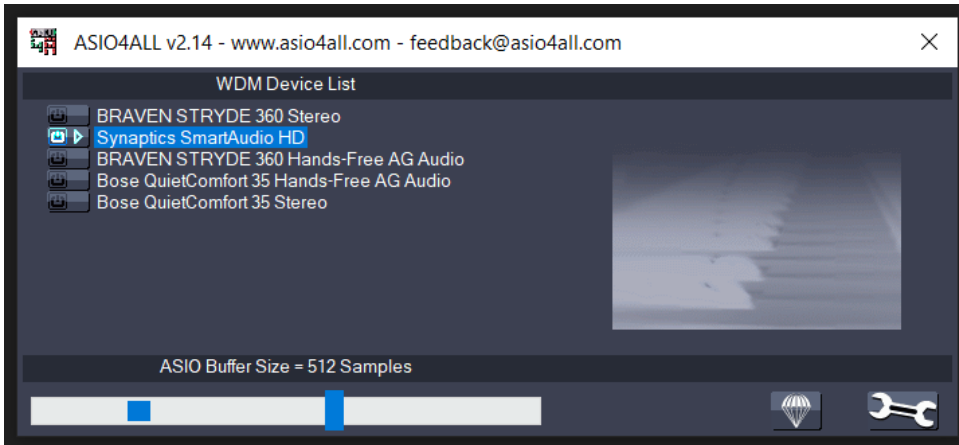


You'll see the Settings dialog:

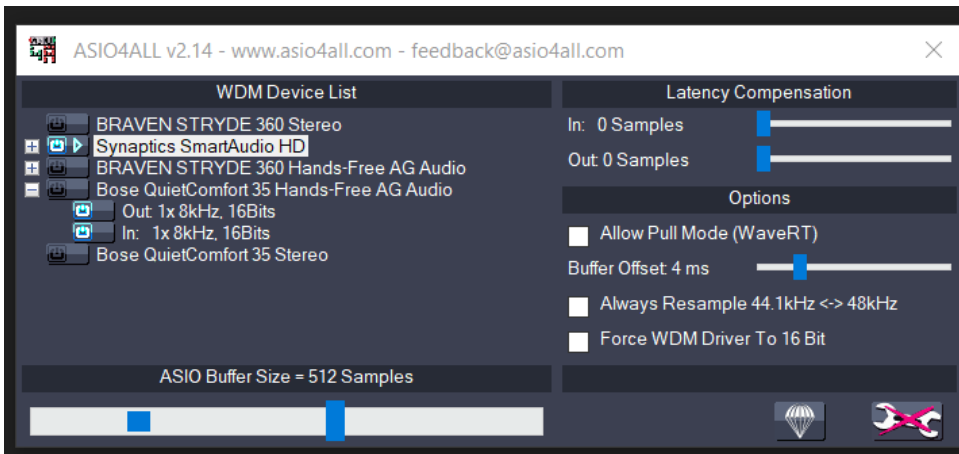


Some important numbers appear at the lower right, the ping time, and the overall delay. You want the numbers to be as small as possible. The "Overall Delay" is the most important number. This is basically the amount of delay that others will hear from your microphone. The smaller the better, and it should be under 50ms to be useable. Of course if you are just listening in on a session, your delay won't matter, since you are not contributing to the session. It's fine to listen in on a session in Italy even if your overall delay is 200ms.

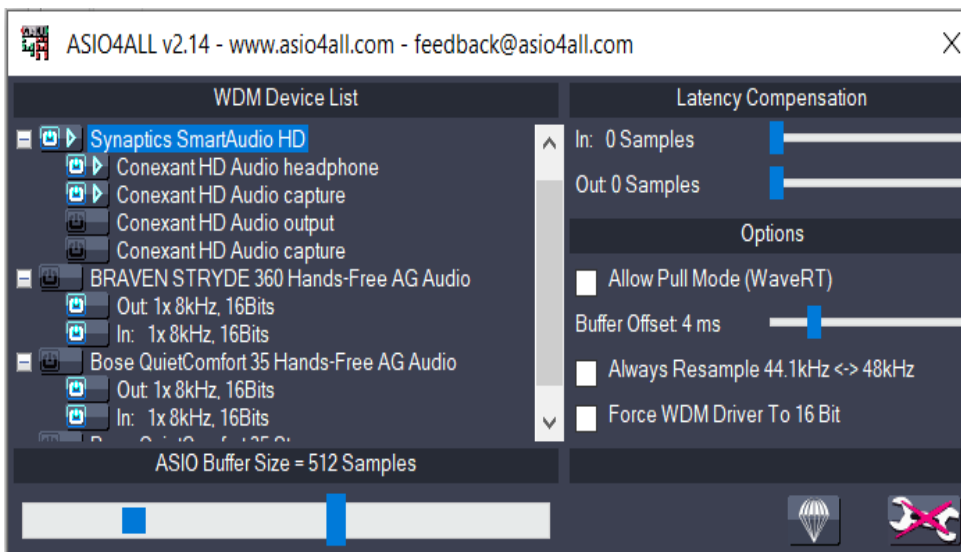
If you can't hear anyone else – or can't hear yourself – you will probably have to make adjustments in the ASIO options window. If you click on "ASIO Setup" at lower-left in the Settings window, you will see this window:



Click on the wrench at lower right to enable (fear not) "advanced view". Now you will see something like this:



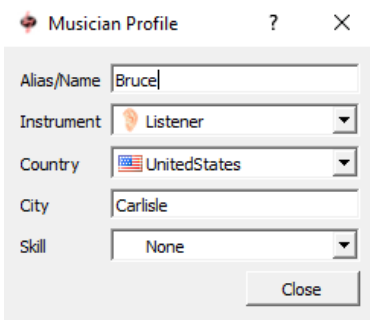
You will want to expand all listings on the left. Click on all the plus signs. They will change to minus signs, and you will see more detail:



Select the input and output options that you are currently using. (If you’re not sure, you may have to experiment for a while.) You will want the little triangular arrowheads next to the desirable options.

Forming A Jamulus Session

Contact the people you want to play with. They will all need to have Jamulus installed on their computers. Start up Jamulus. The first time you use Jamulus, you should set your profile. Go to the View menu in the upper left, and pick “My Profile...”. You’ll see a dialog like this:



Fill in the fields. I see in this example, user “Bruce” is shown with “Skill: None”. Uh huh. That’s about right...

Once your profile is set, click the “Connect” button in the lower left. In the Connection Setup dialog, find an unused server (a server with 0 musicians). You should use one that has a low ping time for all participants. The servers are listed in order, with the fastest ping times first. Remember that the lowest ping time for you may not be the lowest for everyone else. Pick a server that has a pretty good ping time for everyone. All participants then select that server, and connect to it by clicking “Connect” in the lower right.

As participants join, you will see each name appear underneath a slider bar. You can use the sliders to adjust the volume of each individual. This is your “personal mix” ... i.e. these are the volumes on *your* computer. Other participants can adjust the volumes differently on *their* computers, to their liking.



Optimizing For Smaller Delay

So far we have set up the most basic Jamulus session possible. You can listen in to other sessions, and you could even form your own session (just pick an empty server) and chat with people. But if your overall delay is greater than 50 or 60 ms, it might not be useable for music.

The first optimization to make is to use a hard-wire internet connection. Most of us are using Wi-Fi these days, but Wi-Fi will be slower than a hard-wired ethernet connection. If your computer has an ethernet port, use it, and plug your ethernet cable directly into your router. Then be sure to turn off your Wi-Fi. Many recent computers no longer come with an ethernet port. You can get a usb 3.0-ethernet or usb C-ethernet adapter like the ones pictured here:



USB 3.0 to ethernet



USB C to ethernet

Using an adapter, you plug the USB end into your computer. Then plug your ethernet cable into the other end.

Another optimization you can make is to use an audio interface (AI). Many popular digital recorders, such as the Zoom H1N or H4N, can be used as an AI. The AI will provide better quality microphones than those found in a laptop, and can also reduce delay time (I believe this is because the work of digitizing the audio signal from the microphone is offloaded from your computer to the AI).

There are also other commercially-available AI devices that will reduce delay times even further. There's an online Jamulus user forum which has some very useful information on AI devices and other hardware-related questions:

<https://sourceforge.net/p/llcon/discussion/hardware/>

<https://github.com/corrados/jamulus/wiki/Sound-Devices>

Yet another optimization: use wired headphones as opposed to wireless or Bluetooth. Hard-wired is always faster than wireless.

Topics for Future Discussion

The goal of this document was to provide enough basics to get you going, but there are other topics we could go into if there is interest.

- More Jamulus details
 - What do all those other buttons do?
- Jamulus servers
 - Public vs. private
 - Running your own server
- Additional hardware for better performance
 - Audio interfaces. What are people using? Where to buy?
 - Headphone recommendations
 - Microphone recommendations
- Troubleshooting tips