



BYO Jamulus Instructions

Updated 03-Oct-20

BYO is using open source Jamulus software to enable ensembles to rehearse live over the internet during the 2020/21 season. These instructions are meant to ensure orchestra members use a relatively standard hardware setup along with the proper Jamulus settings to provide an enriching experience for all ensemble members. Should you have any questions regarding the setup or suggestions for how to improve our virtual rehearsals during the season please contact Chris House at president@byoweb.org.

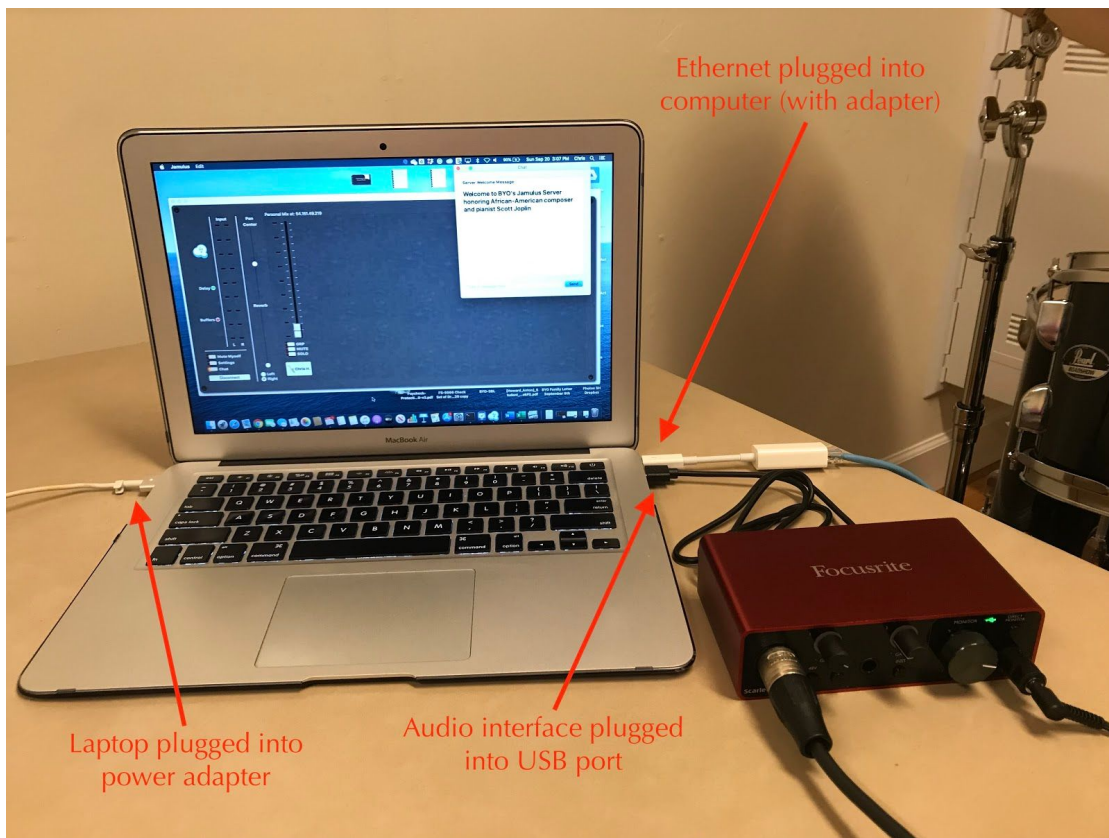
Hardware & Software Requirements

Hardware Required	Comments
Laptop or desktop computer with a minimum 1.5GHz processor	PC or Mac will work. Most modern computers will meet this minimum processing speed.
Ethernet cable (plus a name-brand adapter if your computer doesn't have an Ethernet port)	WiFi adds too much latency so the computer must plug into the router with an Ethernet cable which is long enough to reach a quiet practice location. Any cable length is fine as it won't negatively impact latency.
Internet connection with a minimum of 200 kbps upload and download speed	
USB Audio Interface. Some good picks: <ul style="list-style-type: none"> ● Focusrite Scarlett Solo ● PreSonus Audiobox USB 96 These will have an XLR input for a mic plus another input jack. More expensive models with additional inputs will also work.	Low price audio interfaces are currently in very short supply. BYO is securing (50) Scarlett Solos (~\$100 ea) for families who would like to purchase them at cost. Email Chris at president@byoweb.org to reserve one.
External microphone with XLR output. A condenser mic is great but dynamic or ribbon mics will also work. A few good options: <ul style="list-style-type: none"> ● Audio-Technica AT2020 ● Sterling Audio ST151 ● MXL 990 	One microphone is sufficient for both playing and chatting with the coach and other musicians. If using a small mic that clips onto the instrument then a second mic may be necessary for speaking during the rehearsal.
Mic stand, XLR cable to connect the mic to the audio interface, and headphones (with ¼" to 3.5mm jack adapter if necessary)	These items are specific to your setup. Over the ear headphones may work best, especially if there is background noise where you're rehearsing.

Setting up the hardware

1. Plug your power supply into your computer (this helps ensure that your computer's processor runs with full power).
2. Connect your computer to the router with the ethernet cable, turn off WiFi on your computer, and confirm that you are still connected to the internet.
3. Plug the USB cable that came with the audio interface into the port on the back of the interface and into a USB port on the computer (the interface should light up as it receives power from the computer).
4. Plug the microphone into an XLR input on the front of the audio interface and the headphones into the 1/4" jack (using an adapter if necessary) in the monitor section on the front of the interface. **If you are using a condenser microphone be sure the phantom power button on the audio interface is on (the button is typically labeled with '48V' or a similar voltage) as it supplies power to the microphone. If you are using a dynamic microphone it likely does not require phantom power.**
5. Plug the headphones in the monitor jack on the audio interface. This may require an adapter if the interface has a 1/4" jack and the headphones a 3.5mm plug.





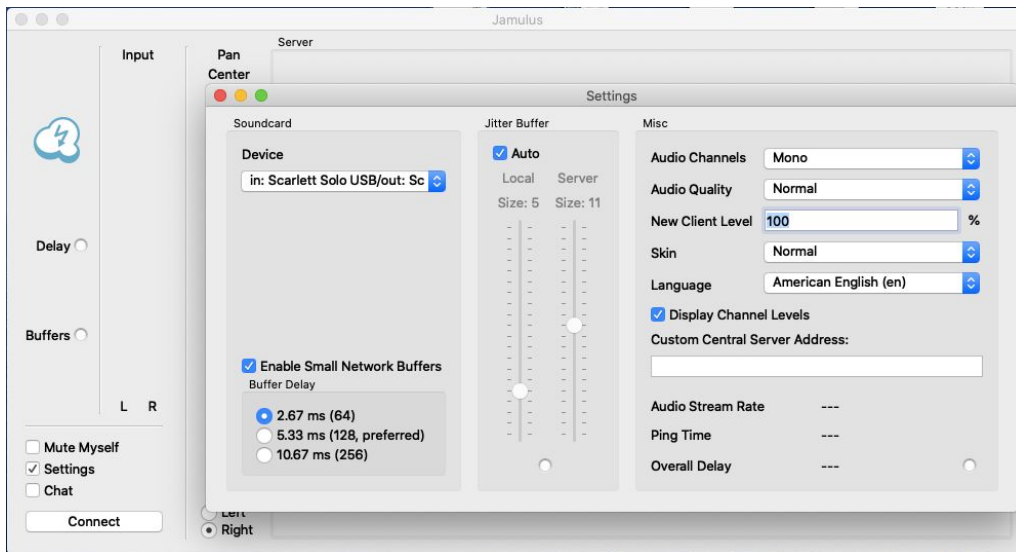
Software Required	Comments
Jamulus client	Download the client software here: http://llcon.sourceforge.net/
Jamulus server (not needed by musicians)	BYO is hosting our server on Amazon Cloud Services so it will be available on-demand throughout the season.
Driver (if needed)	Some audio devices, including the Focusrite Scarlett Solo , are class compliant and don't require a separate driver. Non-compliant interfaces require a specific device driver which you can download from the manufacturer's website. Windows users must use an ASIO driver type with Jamulus. If your audio interface manufacturer's driver doesn't include this driver type you can download a universal one from www.asio4all.org

Installing & Configuring Jamulus Client

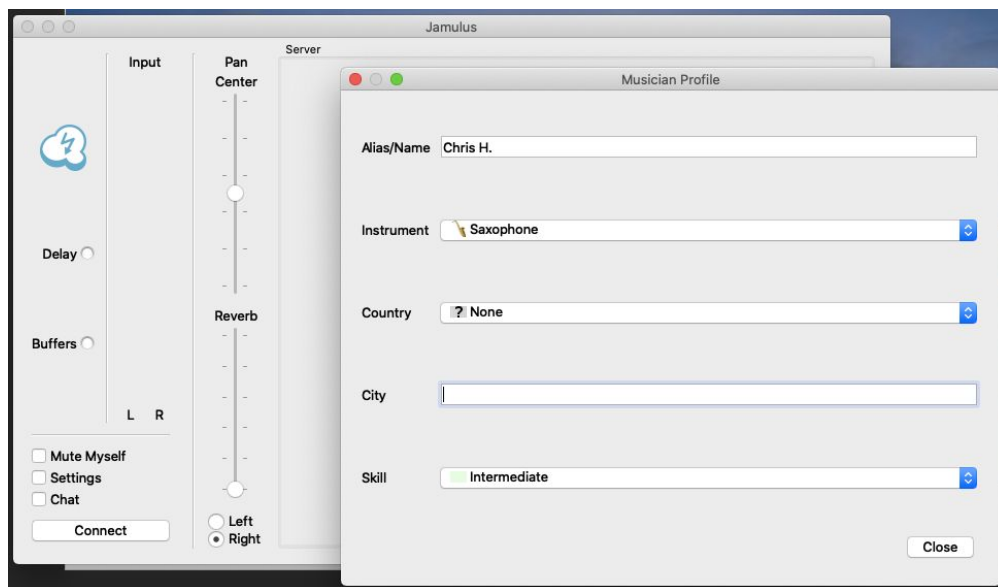
1. Download the installer from <http://lcon.sourceforge.net/> (the proper version for your operating system will be automatically downloaded upon clicking the **Download Jamulus!** button). See screenshot below.



2. Run the installer and only install 'Jamulus' (there is no need to install 'Jamulus Server' as BYO will be running the server that you'll be connecting to)
3. Confirm that the audio interface is connected to the computer (so Jamulus will recognize it when launched) and then run the application:
 - o Mac users may get an error message indicating that Jamulus can't be run because it's from an unidentified developer. If this happens, cancel out of the error message and then right-click on the application in Finder and select 'Open'. This will result in another warning message, but you'll be able to bypass this one by clicking 'Open'. Your Mac will remember your selection and won't prevent you from running it again.
4. Once Jamulus is open click on the 'Settings' button located above the Connect button.
 - o Using the drop-down window under 'Device' select your audio interface as the in/out device. If you are using the Focusrite Scarlett Solo USB audio interface with a Mac select **in: Scarlett Solo USB/out: Scarlett Solo USB** and with a PC select **Focusrite USB ASIO**.
 - o Click to select 'Enable Small Network Buffers'
 - o Click on the radio button next to 2.67ms (64) under Buffer Delay
 - o Ensure that Jitter Buffer is set to 'Auto'
 - o Confirm the rest of the settings are as shown below and then close the settings window

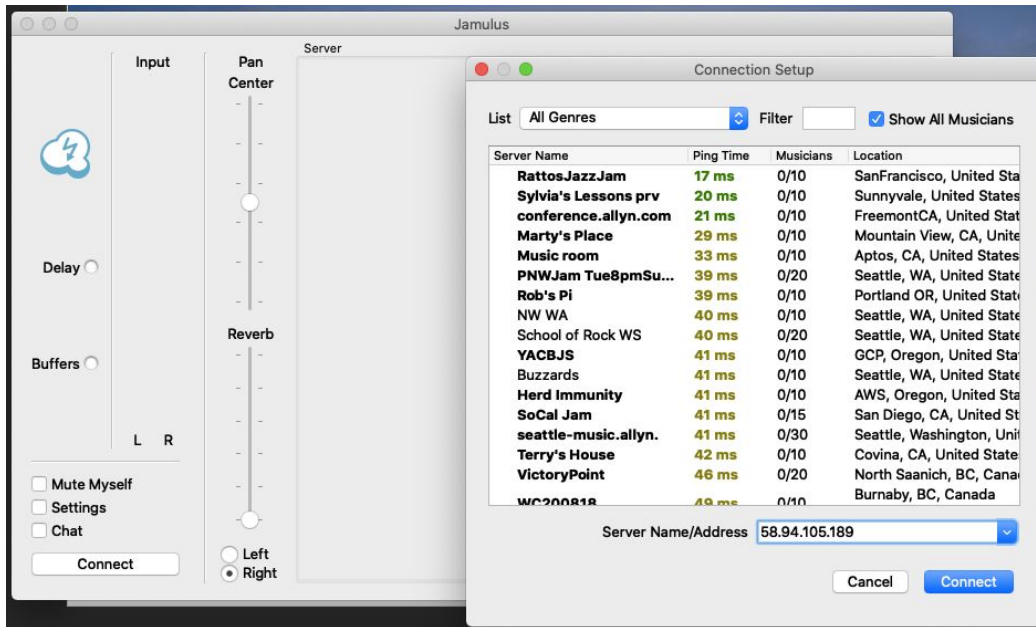


5. On the Jamulus toolbar click 'View' then select 'My Profile'
 - Enter your name in the Alias/Name field. It's ok to use your preferred name here but please also include at least the first initial of your last name to make it easier for coaches to identify you.
 - Select your instrument from the instrument dropdown menu
 - The city and skill fields aren't required as we'll be playing on a private server
 - Click 'Close'



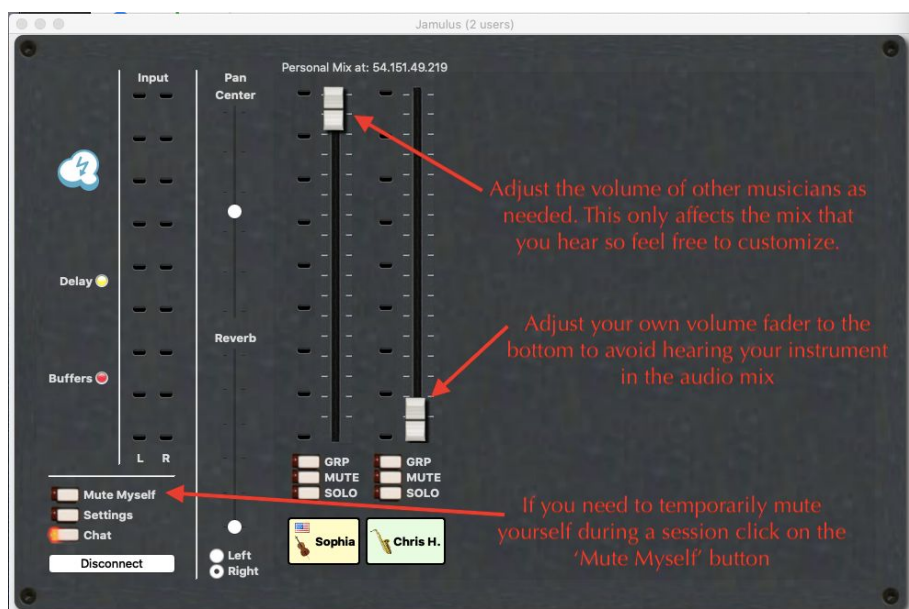
6. Click the 'Connect' button in the main Jamulus window
 - The list that appears contains public servers that any musician can join. BYO is using private servers that are not listed in the registry so you'll have to enter the IP address (not the server name) in the Server Name/Address field then click 'Connect'
 - Once connected to the server a welcome message will appear. Please confirm that you're connected to the right server for your rehearsal. Your name and

instrument icon will appear in the session along with any other musicians who are also connected.



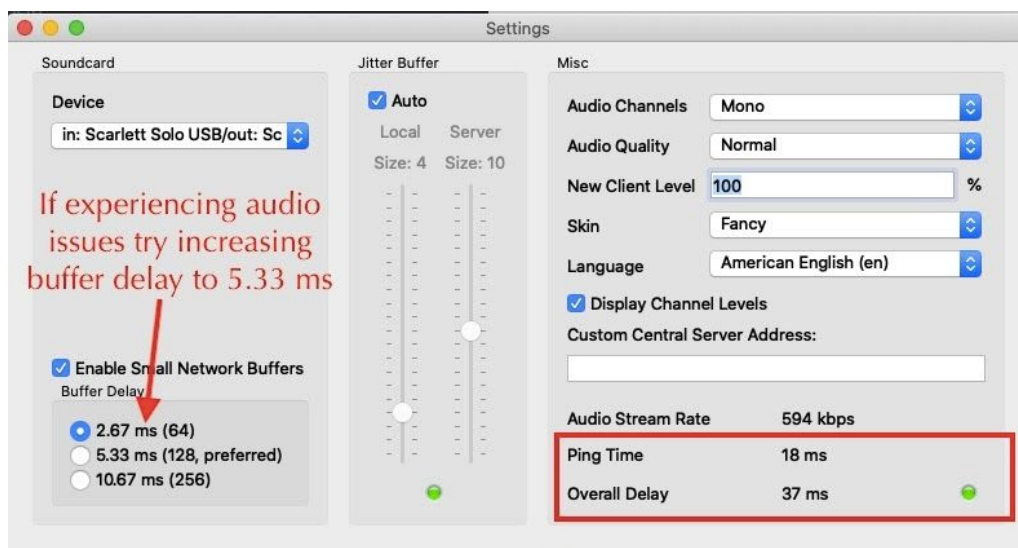
Jamulus Controls

When connected to a server, the main Jamulus screen shows digital faders (the sliding knob) above each musician's name. These faders control the audio mix that you will hear through your headphones. **Click and drag the slider above your name to the bottom (zero) as it can be distracting to hear your own voice/instrument through the audio mix of the whole ensemble.** You can also adjust the volume of the other musicians as needed, but remember this only affects what you hear and not what they are hearing.



The dots next to each slider indicate the strength of the musician's microphone volume and should remain green rising to an occasional yellow level when playing. If the signal is sustained in the yellow level or hits red then reduce the microphone gain on the audio interface a bit until the level remains mostly green when playing.

Clicking on the Settings button in the lower left corner of the main Jamulus window will open the settings window which contains two important latency indicators: Ping Time and Overall Delay. Ping should fluctuate in the mid-teens to low 20s and Overall Delay should be in the mid-30s to low 40s. If during the session the audio cuts in and out, flutters, or pops, try increasing the buffer delay to 5.33 ms. This will increase the ping and overall delay but should resolve the audio issues.



Jamulus also includes a chat feature that can be accessed with the Chat button in the lower left corner of the main Jamulus screen. Chat should be used for communicating with the ensemble coach if you experience a microphone or headphone issue. Please refrain from using it for chatting with other musicians during the rehearsal as it can be distracting.

