

ORS User Guide



Introduction

The ORS (Online Rehearsal Service) provides private virtual rehearsal rooms that allow members of the university to play and rehearse music online. It uses a program called Jamulus, a free and open-source platform, to connect users together with low latency.

The ORS is configured to work best for users located in Oxford, especially those using a wired connection either from accommodation or from university buildings. We recommend a wired connection for the best performance results. While Wi-Fi will still work, it may increase the latency in your session.

Hardware setup (Windows)

You will need the following hardware to use this service:

- A computer with a USB port and a wired internet port (or an adapter)
- An audio interface, for connecting your audio devices
- A microphone
- Wired headphones (not speakers)

We have a list of recommended equipment for different budgets. Of course, you are welcome to look into other options that suit you best.

Suggested audio interfaces

This list assumes that you do not require more than one input. Dual-input options are included if you would like to future-proof your purchase. *E.g. if you wanted to have a microphone and a guitar plugged in at the same time, you would need 2 inputs.*

- Behringer U-Phoria UMC202HD (£52)
- Focusrite Solo (£75) or 2i2 (£110)
- Steinberg UR12 (£75) or UR22 (£100)

Suggested microphones:

- Behringer XM8500 (£15)
- Marantz MPM-1000 (£45)
- Audio-technica AT2020 (£78)

There are a lot more models available, especially above the price points listed. Whatever you choose, remember to check its compatibility with your chosen interface, namely:

1. What connection it uses (three-pin XLR connection or 6.5mm headphone jack). Some interfaces accept both using the same input, although the XLR connection is the most common.
2. Whether the microphone requires 'Phantom power' from the interface. These microphones are called 'Condenser microphones'. For example, all the microphones above except the Behringer all require phantom power. All of the suggested interfaces listed have Phantom power capabilities.

Suggested headphones:

Studio headphones are recommended for rehearsals, as they produce the most realistic sound coming from other musicians.

- Sennheiser HD 206 (£31)
- AKG K240 Studio (£50)
- Status Audio CB-1 (£79)
- Audio-Technica ATH-M50X (£110)

If you have an existing pair of wired headphones, it will plug into the interface just fine. Over-the-ear headphones are preferable to in-ear earphones.

In most cases, depending on your audio interface, you may need a pair with a 6.5mm jack, or an [adapter](#) to convert your 3.5mm headphones into a 6.5mm plug.

Example setup

One Windows setup that has been tested consists of a Steinberg UR22 mkII (£100), a Marantz MPM-1000 (£45), and a pair of Sennheiser HD 598 headphones (£150).

Works but not recommended

- Audio interfaces without ASIO drivers, such as Behringer U-Phoria UM2 (£25) and UMC22 (£33). You will need to use the generic ASIO4ALL driver.
- USB microphones: you can make them work, again with ASIO4ALL drivers, but this is not ideal.
- If you cannot afford extra equipment, you can use ASIO4ALL drivers to connect your computer's built-in mic and a pair of headphones to Jamulus. However, the experience may be subpar, so we cannot recommend this.

If you would prefer higher audio quality and have a larger budget, we recommend looking into higher-end options for each kind of equipment you need. For a *professional* solo setup, you can expect to spend around £200 on each kind of device.

Hardware setup (non-Windows)

The equipment you will need is mostly the same as on Windows, but with fewer restrictions. In particular, you may ignore the warnings related to ASIO and pick any devices suitable for your use case. Nevertheless, we still recommend having an audio interface as it will streamline your experience.

We have yet to test the hardware suggested above with a Mac and will update this guide as soon as we do.

Basic software setup

Preparing to connect

Install [Jamulus](#) on your computer.

Connect your computer to the Internet through a wired connection, if possible or via WI-FI.

If you are not on a university network (either wired or wireless), you **must** connect to the [university's VPN](#).

Try to avoid using video services such as Skype or Teams while using Jamulus, as they can slow down your connection. If you absolutely need to rehearse on a video call, it would best for you to do so on a different device, on a separate network (such as using mobile data, if practical). Note that you will need to mute your microphone on the video call and the video and Jamulus' audio will be out of sync.

Windows: No usable ASIO audio device (driver) found.

If you have a non-ASIO interface, or if you are using audio devices that plug directly into your computer (such as a USB microphone or your built-in microphone), Jamulus will display a warning and require you connect an ASIO device.

ASIO4ALL is a piece of driver software that ‘masquerades’ your non-ASIO microphones and outputs as ASIO devices, so that Jamulus can successfully communicate with them.

Please follow the instructions on their [official site](#) to install ASIO4ALL.

How to book a rehearsal room

We aim to run 5 virtual spaces in parallel on the server that can be booked for rehearsals at the same time. Each space can accommodate up to 25 individuals.

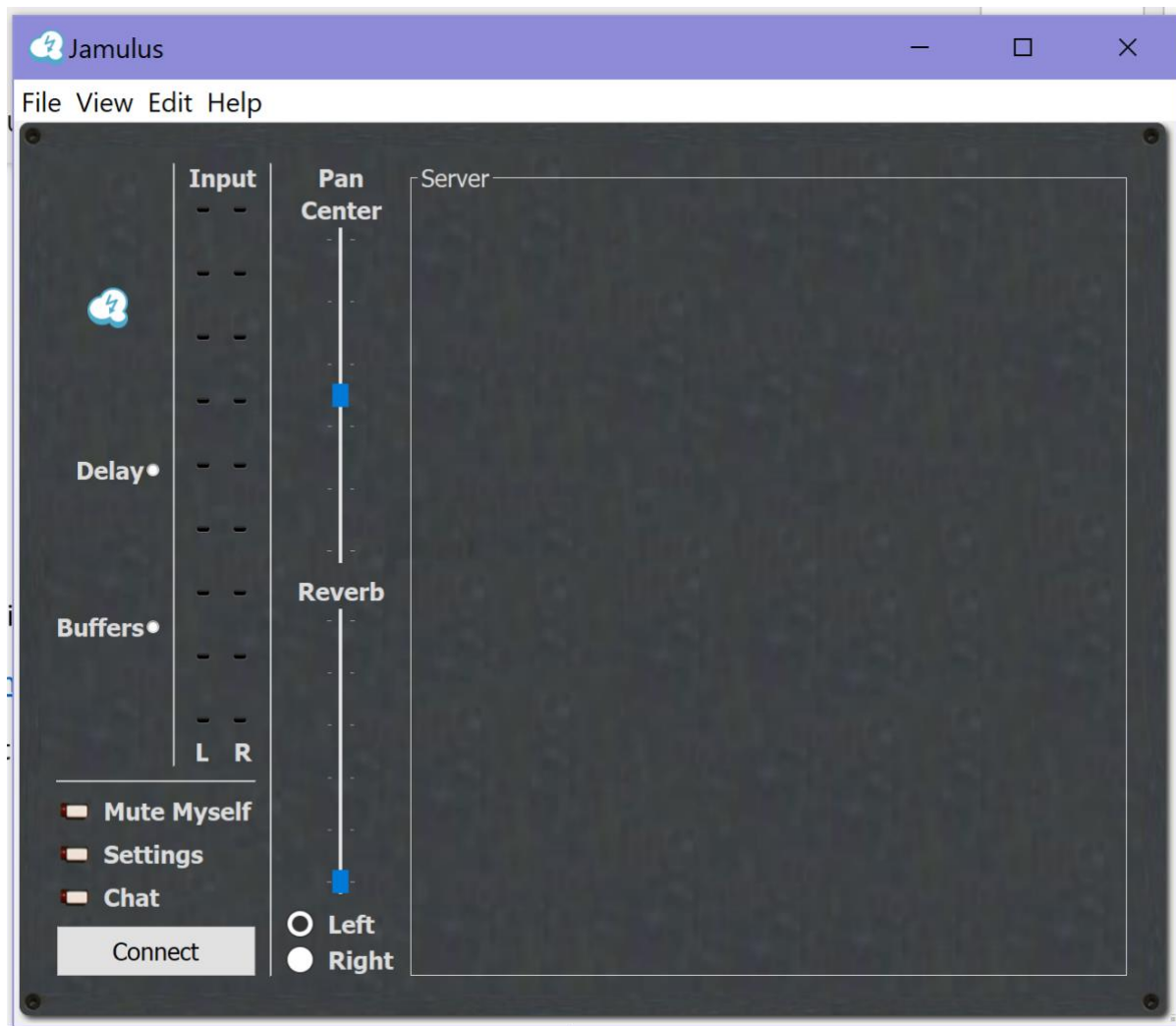
We are allotting booking slots by the hour.

To book one of these spaces, go to: <http://link.music.ox.ac.uk/jamulusbooking>

Connecting to a server

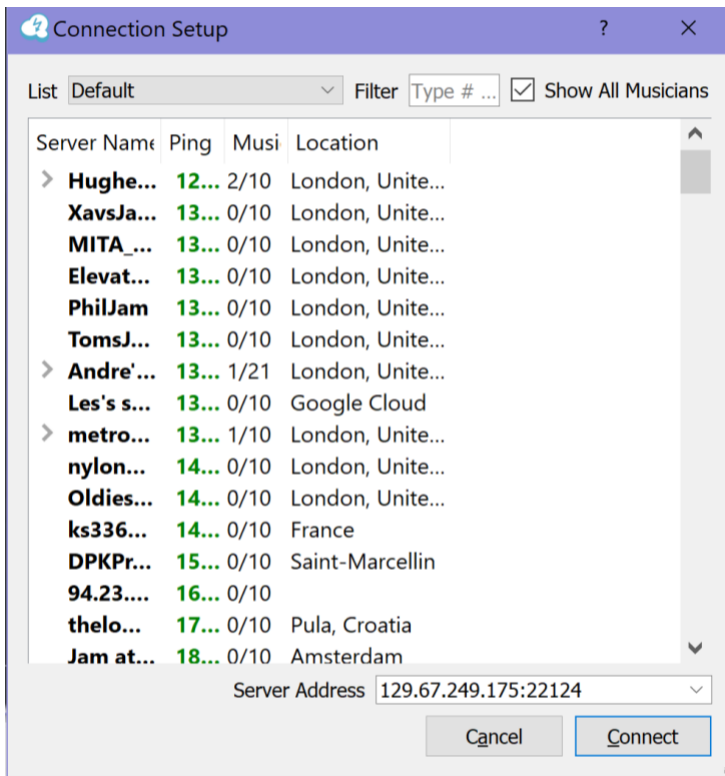
Connect your audio interface to your computer and open Jamulus.

You should be able to hear yourself through your headphones.



Open **View > Connection Setup** to see a list of servers.

You will see a list of public servers, sorted by the delay between each server and your device. More details on public servers are available at the end of the guide.



In 'Server Address', enter the address of the room you have booked:

- Room 1 - 129.67.249.175:22124
- Room 2 - 129.67.249.175:22125
- Room 3 - 129.67.249.175:22126
- Room 4 - 129.67.249.175:22127
- Room 5 - 129.67.249.175:22128

Click **Connect**.

Next time, if you want to connect to the same room, you can simply click **Connect** on the main page.

If you have successfully connected, you should be able to see your fellow musicians on the main page.

Select **View > My Profile** to edit your details in order to help your fellow musicians identify you in the software interface.

Optimising the delay

The total delay or latency, in milliseconds (ms), is the amount of time it takes for your audio signal to reach the Jamulus software and the time for the data to reach the server.

Ideally, the overall delay should be less than 30ms for a smooth music-making experience.

Network delay (ping time)

Use a wired connection when possible.

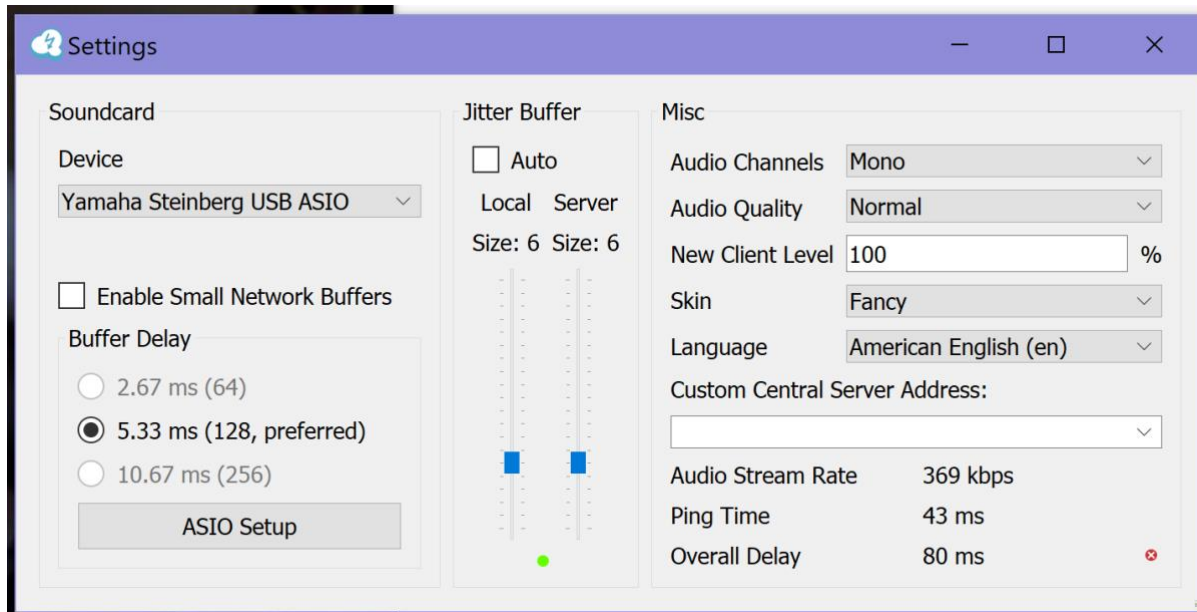
Close other software on your computer that might be taking up bandwidth, or stop other devices in your local network from using the connection.

Sound delay

The higher the quality of your audio signal, the more time it takes for your audio interface to relay it to the software. There are a few settings you can try in order to find the perfect compromise between quality and low latency.

First and foremost, untick 'Auto' under Jitter Buffer, and try lowering the sliders while speaking into your microphone.

If the Jitter Buffer or the Buffer Delay is too low, you will hear a robotic sound coming from your headphones.



You can also click ASIO Setup and edit the settings on your audio interface. However, the options available will depend on your hardware manufacturer. For example, there may be a low-latency mode. Remember that a smaller buffer means a lower audio quality and a smaller delay.

Our testing found that **Enable Small Network Buffers** and **Audio Quality** have a minimal impact on the overall delay, but you are welcome to try changing them.

On the main Jamulus page and in the settings, there are two dots indicating your connection's usability, by flashing green, yellow, or red.

The dot for buffers tells you whether the audio quality is too low.

The dot for delay tells you if the delay between you and the server is short enough for jamming.

If the delay is still too severe...

Your connection to the university's Jamulus servers may still be unusable if you are too far from Oxford or if your connection is severely impacted by the VPN.

In this case, there are other servers you can try.

For example, the Connection Setup in Jamulus provides a list of free, public servers that you can try. Depending on your location, you may need to disconnect from the VPN in order to see and access the public servers. You might find some with very low latency. However, these servers are prone to interruption by strangers, as they are open to all.

For increased privacy, especially for ensembles with funding, we can recommend services such as melomax.live. You can book up to one hour per day for free and pay for more.

For any questions or enquiries regarding this service, please send an email to online-rehearsals@music.ox.ac.uk