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# Annex to Instructions for installing, testing and using Jamulus



## Handy Hints on Hardware for Singers

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“Jamulus” is software designed to allow musicians to play and sing together remotely via the Internet. It is audio only, but does not suffer from the latency (lag, delay) associated with traditional video conference systems (such as Zoom). This allows musicians to play/sing together as if they were in the same room.

This Annex discusses hardware that users might find appropriate in order to use Jamulus for singing. Your group (choir) may have some “Technical Friends” available for advice and guidance, but please try DIY first.

Only “wired” equipment is mentioned – Bluetooth (even the very latest) adds significant delay to the audio path.

No responsibility is taken for the suitability of any piece of equipment for anyone’s system & needs! Equipment and Suppliers are mentioned as examples only – everything is available from several suppliers! Please do your own research! Exclamation mark!

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1. Introduction

1.1. General Definitions:

- 3.5mm Jack
 - Most modern computers and phones have a 3.5mm jack socket, usually for connecting either headphones or a headset with a 3.5mm jack plug
- Tip-Ring-Sleeve (TRS)
 - Plain headphones often use a 3.5mm jack plug with three electrical connections, at the tip, on a ring, and the sleeve (TRS), giving stereo capability:



- Tip-Ring-Ring-Sleeve (TRRS)
 - Headsets often use a 3.5mm jack with four electrical connections, at the tip, on a ring, a second ring, and the sleeve (TRRS), giving stereo headphone and mono microphone capability:



- Headset
 - A combination of headphones and microphone in one device, some with single-ear ear piece; may use a TRRS jack plug, two TRS jack plugs, or a USB connector, and may have some kind of inline volume control:



- Ear Buds are a type of headset, often provided with a mobile phone, usually with TRRS jack plug:



- Headphones are just for Good Listening, and can be single ear.



- Microphones come in a million different varieties, qualities and prices, including
 - Dynamic: For solo stage singing, sometimes known as a “chewing” mic, because you practically have to chew it to be heard
 - Condenser: Will pick up sound from defined directions, and is very sensitive
 - Built-in: Many laptops, all phones, most tablets have built-in mics of one sort or another
- USB connectivity: Microphones, Headsets & Headphones can come complete with USB connection built-in to the wire. Alternatively, a “USB Soundcard” can be used as an interface between traditional analogue devices and the USB capability on a computer – this is a small USB device that allows you to plug in “normal” (3.5mm jack plug) microphones, headphones and headsets. Some have two 3.5mm TRS ports (one headphone, one microphone) and some add a third headset port (3.5mm TRRS):



- An “Audio Interface” is a piece of external (USB/FireWire connected) hardware that can handle audio better than your built-in sound card. It’s effectively an up-market USB Sound Card, with price tag to match. This is more important for instrumentalists, as a way to connect their instrument to the computer. It is not necessary for a singer to have an audio interface, but having one can reduce latency, and can make it easier to connect a separate external (quality/expensive) mic. Examples of Audio Interface manufacturers are Audient, Focusrite, Behringer, Steinberg, and many others. These specialist devices are not considered further in this document.

2. For Jamulus

YOU MUST USE HEADPHONES OR HEADSET FOR JAMULUS!

Many people may already own good headphones, microphones or headsets that they'd like to use with Jamulus, rather than buying new stuff. If you have "analogue" 3.5mm jack connection type of equipment, a cheap USB Soundcard will probably do very nicely as the "easy to connect and use" interface, such as the following which have been successfully used in the past (but no guarantees that they'd work with your specific system!):

<https://www.amazon.co.uk/TechRise-External-Adapter-Splitter-Converter/dp/B01J3QGU50>

<https://www.amazon.co.uk/Sabrent-External-Adapter-Windows-AU-MMSA/dp/B00IRVQ0F8/>

The choice might depend on whether you have separate headphones & mic, each with TRS jack plugs (use the Sabrent offering), or a headset with a single TRRS jack plug (use the TechRise device).

If you already have USB connectivity then great, use that. You can mix 'n match within Jamulus, for instance selecting an analogue output (headphones) and USB input (mic), although getting a built-in microphone to work can sometimes be tricky.

If you want an easy ride, get a "USB Headset"!

If you want more than one person to use Jamulus on the same computer at the same time, then a headphone splitter might help, e.g. <https://www.amazon.co.uk/AKORD%C2%AE-Headphone-Splitter-Female-Y-SPLITTER-Gold/dp/B00JSS8NR2>

2.1. Headsets

Choose USB connection if you can. "Gaming" headsets work quite well – they are not optimised for singing, but they sure are easy to configure! Note that headsets often have inline controls, though, which have to be factored in to your configuration, i.e. if the inline volume control is turned down you surely won't hear much...

The "ear bud" headsets (with mic) that often come with a mobile phone can work, but (a) they are 3.5mm TRRS (Tip-Ring-Ring-Sleeve) jack rather than USB, and (b) the mic is fine for speaking, but often cannot cope well with singing.

2.2. Headphones

Any headphone set is better than none – even the cheap affairs that airlines hand out have been successfully used. They usually have TRS jack plugs. You'd be wise to use a USB Sound Card (see above) for connectivity to Jamulus.

2.3. Microphones

The most difficult area... If you don't go for the "headset" idea, and would like a "proper" microphone, then you might wish to go for something that comes with USB connectivity. Note that some USB mics allow you to connect your analogue headphones to the mic itself, with software sending the audio back out to it – this arrangement may work well in Jamulus. Some come as

analogue devices with their own USB Sound Card, others are more plug 'n play USB mics. If you already have an external mic try that first!

2.4. Ethernet Adapters

Too much stutter on your Wi-Fi, but no Ethernet port? Search for “usb ethernet adapter” at your favourite online shop. Adapters are plug-and-play (usually...)

2.5. Ethernet Cables

Router not close to your computer? Search for “Ethernet cable” at your favourite online shop, and buy the length you need (“Cat5e” is fine, Cat6/7/8 are just more up-market).