USB vs. XLR Guide

Foreword

This guide is probably going to change a lot as more people comment and discuss the points that follow. If you find any information here to be factually incorrect, please let us know and we'll fix it as soon as possible.

Mindset

Before going into this guide, you as the reader need to decide where you stand in your recording career.

Are you someone who does this just for fun?
OR
Are you someone who wants to make a living doing this?

If you fall into the former camp (hobbyist), then you might want to skip to the opinion pieces down towards the bottom and see what the authors have to say. If you're not a hobbyist, or you're just really interested please continue to read.

Introduction

A lot of people often get intimidated by technology, especially audio technology, and that leads them to start making quick and hasty decisions that they often regret later down the line. Buying the right recording equipment is a really important choice when recording *anything*, and there's so much misinformation that it can be difficult to see what the right decision to make would be. So the hope is through a lot of collaboration, this can be the one definitive guide on one aspect of buying recording gear, USB vs. XLR.

In order to properly compare what the difference is between USB and XLR, we'll need to go over every part of the mic so we can compare them at a basic level instead of just broad overviews.

Things that make a mic work

Mic

Surprisingly, you need a mic in order to record audio. This is where the signal chain starts so naturally it's going to be a huge part in the recording process. There are three main types of mics that you'll be working with:

- **Condenser**
- **Dynamic**
- Ribbon

Condenser mics have a capsule that has a membrane inside that vibrates back and forth to produce an electrical signal. These types of mics are **used primarily for** vocals, stringed instruments, and drum overhead/room mics, and other **softer sounds that need accurate detail**.

Dynamic mics have wire wrapped around a coil that vibrates back and forth to produce an electrical signal. These types of mics are **used for louder instruments** like drums, guitar cabs, and mostly for live performances.

Ribbon mics have a metal ribbon in between two magnets that vibrates back and forth to produce an electrical signal. These are **for very delicate and soft sounds**, such as soft speaking, or room mics. Typically, these aren't as common as the other two types of mics but you should still be aware of their existence.

Why do I bring this up?

Well, when purchasing a mic you're buying it because it has a certain sound or characteristic to it that would match whatever you're recording. All three of those mics sound different and have their own unique characteristics that play into specific strengths. It's important to differentiate these types of mics and know what you want to buy and what limitations there are between USB and XLR. Typically, you'll have limited options as to what kind of mic you can buy if you're choosing USB, as opposed to XLR.

USB

The most common type of USB mic you'll find will be a condenser mic. There are ribbon and dynamic mics out there, however they're few and far between. Overall, the choices you'll have with mics are going to be fairly limited. The main ones being the Blue Snowball, Blue Yeti, AT2020 USB+, RODE NT-USB, Samson C01U and the Apogee MiC.

You do have dynamic and ribbon USB mics as well, however they are even more limited in their options to choose from.

XLR

Almost every USB mic has an XLR equivalent. This means that if you really really really like the sound of a USB mic that you have, chances are you'll be able to find an XLR mic that's the same. In addition to this, the sky's the limit with choices. You have a super wide range of mics to choose from, be it condenser, dynamic, ribbon, contact, piezo, and so on. With all these choices, you can go further in terms of quality than you can with USB microphones and you'll have the final say as to how you want to sound in your recordings.

Preamp

So a preamp in its most basic sense is supposed to **amplify the signal's volume to be "readable" by other pieces of gear**, for example a guitar amp. So it's the amplifier, before the amplifier, a preamplifier. There are 3 levels of volume you should really care about:

1) **Mic level**- Really quiet, level outputted by the mic.
2) Instrument level - Kinda quiet, level outputted by something like an electric bass or guitar.
3) **Line level** - Kinda loud, level outputted by the aux on your phone, or the outputs on your interface.

So let's say you're using a mic and you're plugging it straight into your **interface**. You connect it to the mic input on the interface, which is typically connected to a preamp. This preamp raises the voltage from **mic level** (somewhere from .001v to .01v) to **line level** (Somewhere around 1.22v). This is then "readable" by the **analog to digital converter** (mentioned later) which turns it into 1s and 0s and gives the data to your computer.

Preamps are a necessary step in the process of getting your sound into the computer and should be considered when purchasing interfaces or other gear.

All audio interfaces come with a preamp built it so you don't have to worry about it, or you can go out and buy yourself an external preamp.

But why would you want a separate preamp?

As discussed, preamps will increase the voltage of a signal, but no two preamps will do that the same way. They all have their flaws, defects, and **distortion** that they introduce when increasing the volume. Some might think this is bad, but it's quite the opposite

sometimes. Introducing distortion in a good way can shape your audio in ways that EQ can't, hence why different people get different preamps. The most famous preamp of all time, the **Neve 1073**, is probably the most **distorting/coloring** preamp there is; but everyone loves it because it introduces low end harmonics in such a nice way that bring out the bass in the recording and introduce some clarity.

At the end of the day, it depends on what kind of tone you want from your voice when recording. There are ultra-linear preamps out there that will introduce little to no distortion/coloration and there are preamps that can completely change the way your mic sounds. Picking the right voice/mic/preamp combination will be so helpful to getting the best quality that you can out of your recordings.

Note from Sensy: If you are interested in buying a preamp or an interface, I've compiled a couple of spreadsheets with good interfaces and preamps.

Interface List

Preamp List

And for more information on what an audio interface is check out this link.

USB

The mic comes included with a stock preamp on board so the signal will already be amplified. You do not have a choice in what preamp you get with a USB mic, and without some serious modding, you won't be able to change it out at all. This also means that you may not be able to control the gain settings and it might result in clipping.

XLR

No XLR mic has a preamp built in, you'll always have to consider getting a preamp or an interface along with it in order for the XLR mic to function. If you are purchasing a condenser mic, then make sure that the preamp or interface that you're getting has phantom power built in.

AD/DA Converter

Another often overlooked aspect of digital recording are AD/DA Converters (also sometimes referred to as **"ADC"** and **"DAC"**). This is the second "big part" of the process that makes your voice go from your vocal chords into the recording software in your computer. The AD/DA converter **transforms the electrical signal generated by your microphone-preamp combo**

into a digital signal (1's and 0's) that your computer or workstation can then understand and is able to work with.

This process happens both ways: Going from your mic-preamp combo into the computer, and back from the computer into your headphones or monitors, so you can hear how your recording turned out (hence the AD/DA in the name: **Analog to Digital,** and **Digital to Analog**).

Most audio interfaces already come bundled with their own converter(s), and they don't add much in terms of colouring and distortion to your sound, rather than some offering a cleaner and more precise conversion of signal than others, so you don't have to worry about an external AD/DA.

The biggest advantage of an external AD/DA would be for a proper recording studio scenario: An AD/DA converter with plenty of inputs can handle many different sound sources, such as vocals and instruments from a band, all properly managed and mixed via the converter's systems, something most regular audio interfaces cannot handle.

USB

Every USB microphone, instead of relying on an external AD/DA converter, has that function built in, the same way it comes with a bundled preamp, onboard. And, much like with the built in preamp, you are stuck with the one your mic came with, unless you decide to strip apart the components and do some modifications into it.

XLR

An XLR mic is simply that. The same way it doesn't come with an internal preamp, no internal converters to be found in there.

Things that make a mic not work

Quality of the parts

USB

These are okay mics, but for the price you're paying you're going to missing out on a lot of quality that other mics have. A USB mic comes with all three parts that you need to digitally record, a mic, a preamp, and a converter. This is very convenient but you're not going to get the

best quality out of these parts. Often times, the preamps and the converters on board are going to be cheap, and as mentioned before you won't be able to change them out.

XLR
You're going to be purchasing every part individually, and so the quality of the parts comes down to your own budget. If you are going to buy each part individually, most of the time you're going to get decent parts that sound good, and you'll be able to customize the combinations to your liking.

Noise

The noise we're going to be talking about is not background noise, but rather electrical noise. If you're dealing with background noise issues, then there's nothing that can help other than addressing those issues with sound proofing/treatment or by moving away from the background noise source.

USB

There are sometimes issues with the USB connection on these mics where you'll get a nasty -60 to -50db constant white noise which can show up very prominently in recordings. This is a result of the USB connection not being the greatest or the USB connection failing.

XLR

There are many more stages that noise could come from to consider when choosing an XLR mic. It could be the preamp, it could be the interface, it could be the XLR cable, it could even be an issue with the mic itself. Debugging where the noise is coming from gets a little more difficult the more parts that you have. If in your signal path you choose to use something like a compressor, EQ, mixing console, or a tape machine then you'll have more issues with noise. However, on average, you'll encounter electrical noise issues much less than USB.

Repairability

What happens when a part fails? It's always good to keep in mind a plan B or know how to fix your problems.

USB

Unless you know how to replace the circuitry inside, once a single part breaks your whole unit is pretty much toast. The burden of keeping everything in one package is that they all rely on each

other to work, and in the off chance you drop your USB mic and you damage the capsule then you need to get a whole new USB mic. Let's say you destroy your preamp inside, well then you need to get a whole new USB mic. Any small part malfunctions? That's right, you need to get a whole new USB mic.

XLR

Splitting up the components makes it very easy to see what's broken and what's not. In the case that some part fails, then you're able to quickly replace that unit and continue recording without having to rebuy all of your gear, since most everything in the audio world is compatible. Replacing and fixing parts is usually a breeze and doesn't take much of your time.

Upgradability

Now you're getting a bit serious about your audio quality and you want to spend some more money. How easy is it to transition to better equipment?

USB

When you have a USB mic, that's pretty much it. If you want to upgrade you'll have to buy a whole 'nother mic. This leads to a bit of problems down the line because you can't reliably invest into USB and be confident that it'll last you for the rest of your life. If you do decide that one day you want to upgrade your old mic will be sitting on a shelf not doing anything other than collecting dust.

XLR

Like a custom built PC, you're able to build your recording chain from the ground up. This means that if any point you deem a part of your recording chain to be inadequate for your needs, then you're able to replace it or swap it out without a problem. Just like what we mentioned in the repairability section, splitting your equipment up into parts makes it easier to replace, and you won't be left with something that you can't use ever again as is the case with USB.

Final thoughts/opinions from authors

Sensy

For hobbyists

Well at the end of the day, you're doing this just for fun and I completely understand that. A lot of people will tell you:

"Oh you use USB? Disgusting. Gross. Eugh. Get good kid"

But frankly, that's just a toxic attitude to have. Using a USB mic is absolutely fine, because it'll get the job done and you won't have to worry about all the different parts you need. Like I mentioned before with the building a computer analogy, getting a really expensive custom built water-cooled computer isn't going to do you much good when you just want to watch youtube videos and browse twitter. Same concept with mics, you don't want to ball out on a mic when you're doing what you're doing just for fun.

So if you're willing to spend the money to make your audio sound great, go for it. There are a lot of equipment guides out there. However, if you don't want to, then don't sweat it.

For non-hobbyists

So now that you're getting serious about recording, it's pretty much necessary that you go out and buy an XLR. Main reasons that I stated above:

Quality: There is a ceiling to how good a USB mics can be, and that ceiling is hit around the $200 price point. If you want more quality then buy an XLR, because those are the only mics that can offer you the option of studio quality sound.

Upgradability: You want to be able to expand your recording quality and space when you get the money and XLR is the only way you're able to do that.

Compatibility: Do you like your mic? Did you spend a lot of money on it? Well great news is that you can carry it everywhere and plug it into whatever interface, console, or handheld recorder you find. A lot of folks have their one microphone that they've chosen for life and that's the one they carry around to record on. Most likely you'll be going into home studios and if they have a multi-channel interface then you're pretty much set. Multiple USB mics can't be hooked up all that easy so it'll be a pain to stick with a USB mic as your go to.

Taneko

For hobbyists / entry level people

I share **Sensy**'s opinion on this. You absolutely do not need to spend hundreds or even thousands of dollars on high-end equipment if:

1 - You're just starting out or don't even know if this field of work is for you;
2 - You've never wanted to go pro and this is quite literally just a hobby for you.

If any of those apply to you, by all means, grab a Blue Yeti, grab a Blue Snowball, grab the AT2020 USB+. Heck, record with your **phone** even, but get work done, dedicate yourself and, most importantly, learn about yourself and if this is really what you want to do (or if you feel like progressing in).

If people put you down for the equipment you have, no matter how cheap or how expensive it is, they're not really worth the time.

That's not to say you should see USB mics as the **end-all, be-all, golden horse from the heavens** piece of gear as many companies tout them to be. They are perfectly fine for people at this level, however…

For non-hobbyists

… If you want to:

1 - Have a solid setup for auditioning from home while working under agencies or studios;
2 - Work directly from home, and become a "home studio" owner.

You should consider going into XLR. Unfortunately, very much like other crafts, voice acting, especially from home, requires some monetary investment. However, fortunately, this investment **does** pay off, and nicely, in the form of a steep increase in the overall quality of your recordings. Topple that with proper acoustic treatment and you've got yourself a solid recording place.

It'll fulfill your voice acting needs and increase your chances of netting paid work.

There really isn't much else to be said that hasn't been already, up above. This document is a gold mine of information that you can make a lot of use for, so, please, cherish it!

Overall

There is a setup for everyone, you just need to know what’s the right one for you! Follow the information provided in this guide, and, hopefully, you will do so.