

Consider the output level of the mic, the volume of the sound source...

- Dynamic Mics (like the Shure SM57 and SM58) are designed to handle very loud sound sources without distorting. For example, either mic can be placed in front of a guitar or bass amp, and with the mixer set to unity gain (applying no additional gain).
- They're designed to be shouted into without generating a signal that would clip a mic preamp.
- According to the SM58's specs, if a 94dB audio source is placed 1in from the grill, it will register at -54 on a Mic input set to unity gain.

The good news is that the IO|14 and IO|26 have a lower noise floor than many of the most legendary and respected mixers out there, and provide up to 50db of gain. This means that these units can apply more clean gain to a signal than many other devices. As you experienced, however, cranking the mic preamps to their maximum setting often results in unacceptable levels of noise. The reason behind this is that all amps (guitar amps, mic preamps etc) are designed to be quietest when operated within a range of levels. On most mixers, you'll find that beyond 3 O'clock, the preamps get increasingly noisy.

Depending on what you're recording, and how loud it is, you may find yourself in a situation where the mic's positioned properly, the gain is turned up to 3 O'clock or higher, but the level coming into your recording program is nowhere near 0dB.

In this circumstance, it's not usually recommendable to turn the mic preamp up any higher. This would get it into it's least efficient range, and impart more noise into your recording.

If possible, try to improve the level of signal coming into the mic. Turn up the sound source (or sing louder), or move the mic closer to the sound source. Of course, for all sorts of reasons, this may not be possible or desirable.

So, assuming that you've exhausted all the above, the next thing to consider is *what is an acceptable recording level...*

In the digital world, 0dB = a ruined recording, so when recording/tracking, you'll want to leave yourself some headroom. A clearance of -6 to -12 is recommendable. This means that the maximum (not average) level you want to see on the software's input meters is somewhere between -6 and -12dB.

If you're using Cubase LE 4, the mixer window (F3) can numerically display (in the black box below each fader) the maximum signal level that has been registered on any audio track. This can be really useful when setting levels, because it holds the maximum level until you click on it. This allows you to perform test takes, reposition mics, and adjust gains without having to keep a constant eye on the level display.

24 bit recording affords us incredible dynamic range (compared to 16bit or many analog systems). The noise floor is so low, that a cleanly recorded signal can be boosted significantly after being recorded with little or

noticeable addition of noise. Rather than turning up the preamp too high, stop at 3 O'clock or so, and apply any additional gain at mix down.

One situation I've often found folks in is laying down vocals over pre-recorded stereo tracks. Often people will get a song or 'beat' from a producer in a ready-to-go stereo format, and want to lay down vocals on top. The problem is that the track is all ready compressed, limited, mixed etc, and hits hard when you listen to it. It has a consistent level that hovers at or near 0dB. This is almost exactly the opposite of the type of signal captured from a vocalist in front of a mic. A vocal signal (when being recorded) fluctuates from low level to very high level, and needs lots of headroom (clearance) to prevent the loud parts from accidentally clipping (reaching 0db). The first time many people find themselves in this situation, they'll feel like the vocal signal is too weak. In fact, it's the pre-recorded track or 'beat' that is too loud. While recording in this situation, it's necessary to turn the pre-recorded track way down so that the incoming vocal blends well with it during recording. Turn the headphones up if necessary to bring the vocals/instrumental mix up to a good overall level. After recording, you'll turn the instrumental track back up, and begin to apply compression and limiting to the vocal to bring it up to level with the instrumental track.

What makes a track (any track...vocal, drums, bass, final mix etc.) sound loud is not how loudly it is captured during the *recording process*, but the treatment (compression, limiting, eq etc.) that is applied to it during the *mixdown process*. To put this in perspective, consider the following...

During *recording*, the main priorities are to...

1. Accurately capture the performance with a good signal level, but without clipping (reaching 0dB)
2. When recording/overdubbing over pre-recorded material, provide the performer/artist with a headphone mix of the pre-recorded material that is loud enough and is balanced enough to allow them to perform their take well.

After recording, during the *mix-down*, the main priorities are to...

1. Apply volume adjustments, effects, eq, compression and limiting to shape the sound of individual tracks so that they fit well (sonically) with the other tracks.
2. Balance all the elements of the recording (tracks) in relation to one another to get the best possible complete picture.

After the mix-down, during the *mastering* process, the main priorities are to...

1. Apply adjustments to the final mix (stereo or surround sound) including eq compression and limiting to maximize the recordings' overall volume, and ability to play well on a variety of sound systems (car stereo, home stereo etc.).
2. If a complete album is being mastered, each song is also balanced for volume and overall tone in relation to the other songs.

So, while recording, it's typical for the pre-recorded material to be out of balance with the incoming audio being recorded. This can't really be achieved until mix-down anyway, and is especially true if you're recording vocals over a finished or semi-finished instrumental track. You'll want to make some rough adjustments to the pre-recorded material to provide a rough headphone mix that's a comfortable volume for the performer/artist being recorded. Again, since the level of the incoming signal can only be turned up so high, creating the headphone mix usually involves turning the pre-recorded tracks down.

There are two other things to consider... The Mic may not be well matched to the sound source.

If you're recording vocals, and they're not loud rock vocals, you'll probably want a condenser mic. These mics are much more sensitive than dynamic mics, and will help you get much better results with most vocals.

If you're recording acoustic instruments other than a drum kit, you'll also get better results with a condenser mic.

The Mic may not be well matched to the preamp.

Some mics, while revered for their tonal quality, have very low outputs levels. These mics really benefit from specialized ultra-clean, high-gain preamps. Some examples of low output mics are...

- ElectroVoice RE20 – very popular in the radio broadcast industry for speech applications. Also a great mic for kick drum or rock vocals. Stevie Wonder's favorite live vocal mic. You can get right on it and scream, and you'll never distort it. The down side is that it has a very low output. Pretty much any preamp you plug it into will need to be turned up almost all the way. This mic really needs a high-gain, super clean (expensive) preamp.
- Shure SM7B – same uses, pros and cons as the RE20
- Ribbon Mics – Great smooth sound, but very low output. The preamps that are often recommended for these mics are often so specialized (so clean and such high gain) that they're sometimes referred to specifically as *ribbon mic preamps*.