

Column by Renzo van Riemsdijk (Masterenzo):

The end of 16-bit resolution?

Midway the eighties a revolution took place in the music industry. Digital audio was introduced and by now we've fully adapted to music being digitally recorded and mixed. Analogue techniques like recordings done on tape machines only exist in the far reaches of the audio spectrum. Luckily we still have vinyl and music cassette as completely analogue playback media.

Since digital techniques were still at an early stage back then, we didn't fully comprehend the possibilities of digital audio. A standard had to be made, just like vinyl and music cassette are based on a standard. Standardization is necessary because you don't want to end up with a record player made by a manufacturer who decided that 28 r.p.m. sounds a tad better than 33.

Technicians gathered together to come to a standard for a soon to be launched digital playback medium: compact disc. Based on the knowledge and science of human hearing and sampling (the process to convert analogue music into digital) they chose a sampling frequency of 44.100 samples per second (44.1kHz) with a resolution of 16 bits per sample.

Technical developments are always continuing and since the introduction of digital audio many steps were taken to make it sound better. This also included the use of higher resolution files. 24-bit audio (hi-res) was introduced in studios and soon it became evident that a higher resolution led to an increase of headroom causing music to sound better. Besides, the many D.A.W.'s (software music engineers use) operate at internal resolutions up to 64 bits per sample.

Nowadays we know so much more about digital audio and human hearing. Research led to the conclusion that our ears are able to distinguish higher resolutions than the 16 bits chosen in the eighties. 17 or 18 bits are possibly audible, provided being a relatively young person whose ears did not suffer from loud (il)legal rave parties.

And there's another factor involved why 24-bit resolution is preferable to 16 bits. The technicians who determined the 16-bit standard did this because they knew that every CD that left the factory was to be used as a playback medium only. (Although it's perfectly suitable as a coaster to prevent stains on your brand new table.)

This differs from the studio situation where music is being digitally recorded, mixed and mastered, all with 24-bit resolution. Thus a lot of processing steps before music is actually put out. If you were to apply all that processing on 16-bit files, the end result would probably not sound as good as intended due to a lack of headroom. 24-bit files supply you with enough headroom to comfortably apply the processing you want during mixing or mastering.

So here's the moral of the story: **since the 16-bit standard was made in the early beginnings of digital audio, I'd like to call for the abolishment of 16-bit resolution files.**

Many aggregators (party between the artists and streaming services) already accept 24-bit uploads and slightly larger file sizes don't really matter nowadays. And besides: more streaming services offer lossless streaming at higher sample rates with 24-bit resolution. Getting rid of that old 16-bit standard seems no more than logical to me.

Renzo

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More info about mastering and about Masterenzo can be found on [the web](#).*