A journey through the world of HiRes music

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Digital music is digital music, some say. No, there is a very wide spectrum of quality. If you are hearing impaired this article is of no use to you. For me this has been a long journey of dead ends and wrong turns, of wrong assumptions and so many paths.

Back in the olden days of the wild west of Napster and the like the world got flooded with pirate copies of just about every piece of music. But it was very very compressed. Mostly 128 kbps mp3. Yes you could listen to it for free but most of the dynamic range was compromised. Over time we got higher bit rates and other formats like ogg and aac (m4a). The record companies got into the act and started to sell digital music files, first with copy protection and later without. But still compressed music and a long way from CD quality.

A whole generation has grown up accepting compressed music as the norm. “320 kbps is more than good enough and no one can really hear the difference to a CD” has become the accepted wisdom. In parallel we have had the rise of Bluetooth headphones and earphones. Bluetooth has to compress the digital stream to keep up with the data flow. So now the listening public swarm to streaming services like Spotify to be served up compressed music that is further compressed by their Bluetooth devices. So now the current generation listen to double squashed music and think that is the norm. We have gone so far down the hill from the 1990s (audio wise) many people have forgotten what quality music reproduction sounds like. I too embraced digital music and retired my CD player and my three boxes of CDs. But whilst I was never really happy with the quality, I was very happy with the convenience. Tens of thousands of songs at a mouse click, then tens of millions of tracks available via streaming.

Then one day I wondered. “Can I have the best of both worlds?” Yes you can, but you have to have a quality sound system to playback that which it is fed. If you have a plastic portable then there is zero point in playing anything more than Spotify.

I will not go into the specs of my HiFi system (it is good) as that is off topic. Just remember there is no point in pouring Premium 98 into a 1985 Camry.

The lowest common denominator
Mp3 files at 128 kbps

Then better digital music files

OGG and AAC at 250 to 320 kbps

The AAC Bluetooth codec used for streaming by Apple and others is 264 kbps at 44.1 kHz. Android users can go to aptX HD (with the right headphones) and improve that to 576 kbps. There is also a Sony standard called LDAC that is rare, but much better. It goes to 990 kbps and can support 24 bit files at 96 kHz (1).

Then a CD
Digital files that are 16 bit and encoded at 44.1 kHz. A CD streams at 1411 kbps, so straight away we see a much denser amount of data per track that leaves the others well behind.

Equal to a CD (approximately) is a **FLAC** file encoded at the same 16 bit and 44.1 kHz. Lossless compression. If the equipment is up to it then a FLAC encoded CD will match a CDs 1411 kbps.

Here we reach the lowest step of "good" playback. Stream FLAC files encoded at CD quality. Most phones, tablets, computers and reasonable amps/speakers can handle that and it is a step up from compressed and double compressed music. Then you start using wired headphones and leave Bluetooth behind. Streaming services that provide these files include Tidal, Qobuz and Amazon Music. But not Spotify as they appear to not see the value in high quality playback. Apple has a brand new higher tier for their service, at a cost.

Then HiRes Audio

Then I discovered the HiRes Standard, which is not a standard. The next step up.
"High-resolution audio (high-definition audio or HD audio) is a term for audio files with greater than 44.1 kHz sample rate or higher than 16-bit audio bit depth" (2). So not really a standard, more a threshold.

You will find files that are 24 bit at 44.1 kHz that are the bottom of the HiRes audio world.
You will see 24/44.1, 24/88.2, 24/96, 24/192 and all the way up to 32/768. You will actually find music encoded at 32bit 192 kHz on YouTube. But when you play them you get 16 bit at 44.1 kHz – unless you are a YouTube Premium subscriber and you have the gear to decode the stream and play it back.

I have several Digital Analog Converters (DAC). If you have an adapter to use wired headphones on a USB C port or on an Apple phone then so do you. There is a chip inside that does the conversion from digital data to analog for the wired headphones. DACs are everywhere, that is how you playback sound on a computer. Not all DACs are created equal. Most of the cheap ones will go to 24 bit and 96 kHz. There is more to the quality of the sound than just the raw numbers, but we do not need to go into the specifics. I have a few 24/96 adapters and a 32/384 adapter. I also have a Creative 24 bit 96 kHz Play! 4 USB DAC that sounds better than the others, as there is an element of quality involved. Android Phones and Chromebooks have a native limit or 24 bit at 96 kHz. Windows and MacOS can go as far as your hardware can handle but you mostly have to go into the Device settings and select it or load a driver and app to control output. Ah but – you can bypass the limitations of Android by sending the digital stream straight to the external DAC. How? One way is by installing an app called USB Audio Player Pro. It is a wrapper around your music app that bypasses Android audio processing and sends the stream straight to the USB port and thus to an external DAC. For my HiFi I have an SMSL SU9 USB DAC (3), an expensive box, that connects to my Android tablet running USB Audio Player Pro that is in turn wrapped around my account with Qobuz. On the display of the DAC I can see the stats for each track as it plays back. That is a handy way of measuring the veracity of all you fiddling with drivers and config files. I have found that sometimes assumptions can be wrong and you still end up with 16/44.1, but with the DAC I can know what is working. I have played with Windows, Linux, ChromeOS and Android to see what works and where the limits come into play. Surprisingly ChromeOS automatically outputs to a DAC at the best quality of the source file.

Is it all worth it? That depends on how much you value good music reproduction over ordinary music reproduction. I think there is little difference once you go past 24/96 and that is an output that most people can achieve easily and possibly you have that capability already. You just need the music files that

match. The music I play has a bit rate of more than 4000 kbps!!

MP3 < OGG/AAC < CD = 16 bit 44.1 kHz FLAC < 24 bit 96 kHz FLAC < a bridge too far!

Tidal, Qobuz, Amazon Music and others will stream at CD quality. And that is a very good start.

ps if you have an old LG Thinq or V series phone rotting in a draw it is the best HiRes audio streamer you can get for nothing. They were built with a high quality Quad DAC setup that you can activate in the settings. Repurpose it by connecting the headphone jack to your HiFi and set up a CD or better streaming account.

References:

(1) https://www.headphonesty.com/2020/03/bluetooth-audio-codecs-explained/

(2) https://en.wikipedia.org/wiki/High-resolution_audio

(3) https://www.smsl-audio.com/portal/product/detail/id/722.html