

Digital Sound Formats

Windows-compatible personal computers (PCs) generally did not offer sound capabilities in the early 1990s. To play sound, users could purchase and install a sound card and speakers.

Add the proper software, and the computer could then play sounds.

In most cases, the software only provided the capability to play back sound in the .WAV, MIDI, and CD audio formats. Today, sound cards, speakers, and software come standard on most PCs, including notebooks.

SOUND FORMATS

Sound formats have proliferated as well, as the technology industry searches for a format that's efficient to transfer over the Internet. While .WAV, MIDI, and CD audio have been commonplace for years, sound files in these formats can be rather large. For example, a single minute of music can take 10M (10 megabytes) of space or more. While it is possible to download such a large file from a location on the Internet, downloading such large files generally takes too much time to be practical. A number of software companies have worked for years to create a more compact digital sound format.

MPEG

MPEG layer 3—or MP3, for short—finally offers the promise of Internet- and PC-friendly sound. MP3 compression squeezes audio files by 11-to-1, so a three-minute song that previously occupied 33M only uses about 3M in the MP3 format.

Songs in the MP3 format sound just as great as CD-quality sound files in other formats. The MP3 format achieves this blend of small size and high quality by leaving out sounds that humans can't actually hear. This includes sounds in very high and low frequencies, as well as quieter frequencies hidden by louder frequencies in the song.

MP3 is a new technology using MPEG compression, shrinking down data by a factor of 12 and still retaining CD-like quality. Factors of up to 24 and more still allow for a quality significantly better than just reducing linearly the sampling frequency and the number of bits. This is realized by "perceptual coding" techniques taking into account the limited resolution of the human ear. Maybe you already heard about MP3. As interest in audio over the Internet increased, MPEG Layer-3 files, music files that are capable of storing long audio tracks with CD quality sound in a fraction of the space, appeared. With this ease of piracy, it's a shock to the entire music industry.

MP3 Legal information - MP3s can be owned legally, providing the following: you encode songs off of your own CDs and keep them for yourself, obtain written permission from the copyright holder of the music, or the music is available with the copyright owner's consent. It is Illegal to encode MP3 files and share them with any other entity unless you have written permission of the copyright holder of the music. It is also Illegal to download any songs or music off of the

Internet for CDs you do not have in your own possession and rightfully own or have no copyright holders consent.¹

ADVANTAGES

Here are a few of the advantages the MP3 format offers:

1. Songs download faster.
2. You can purchase and download a single song for about a dollar rather than downloading and buying an entire CD.
3. You can create your own CD-Recordable (CD-R) full of favorites.
4. Downloaded songs can be stored indefinitely on a hard disk, Zip disk, or CD-R disk.
5. You can buy a special player to play the downloaded songs independent of your computer.

DISADVANTAGES

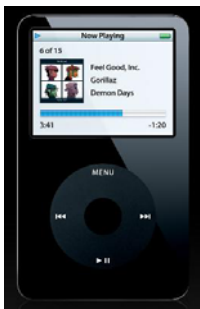
- Before you begin purchasing MP3 software or downloading songs, you should understand these drawbacks and controversies:
- Recording companies have expressed concerns that MP3 encourages piracy (illegal copying). Software for converting CD-audio songs to MP3 doesn't cost much and the process doesn't take long.
- If a song becomes corrupted, you have to download and purchase it again.
- Existing audio CD players cannot play the MP3 format.
- The sound quality for MP3 files differs slightly from the original CD-quality sound.

¹ <http://www.computerhope.com/mp3.htm>, March 4, 2008

NEWEST TRENDS

iPods are probably the greatest invention of the 21st Century so far. 60 bazillion songs all sitting in your back pocket. What with the current age of on demand media, anything you want is easily available - be it photos, music or film - and that's exactly what the iPod's designed for. So if you want to take you entire digital photography collection to show to your grandma, or you want to watch films on the way to work, or you just want to listen to music on the move, then an iPod is for you.

Of course there are plenty of other digital media players on the market. There's the iRiver - it



plays a much wider range of media, but is far less user friendly. A lot of people complain that its navigation is hard to use, although I have a techie friend that says it's pretty intuitive providing you've got a basic grasp of computers. You've also got the Creative range of media players, and the new Walkman. I decided to opt for an

iPod - mainly because they've now got a proven track record in mp3 players, but also

because they're pretty stylish, and tiny for the disk space you get. If I hadn't have got the iPod, then I almost certainly would've gone for the iRiver.

So once you've got an iPod, you want to know how it all works. Let's start with music. iPods play mp3s. These are digitally compressed audio files. If you have a CD, it's possible to rip the data into mp3 format, so that you're PC or mp3 player no longer needs the CD disk to play the music. As the data is compressed, it takes up much less space on your computer. You can modify the bit rate that you rip the mp3 at. The bit rate is the amount of bytes per second, and a byte is a

measure of data. Obviously the lower the bit rate, the lower the sound quality is, but so is the amount of disk space required. It's good to choose a bit rate that allows good enough sound quality, but that also that meets your storage requirements. 128 kbps is a standard high quality bit rate used to rip CDs.²

² <http://www.jonathanstewart.co.uk/video-ipod.asp>, March 4, 2008

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DIGITAL SOUND MUSIC

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Computer applications

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