

Music-- Capture it, Organize it and Enjoy it

by Phil Sorrentino

Member of the Sarasota Personal Computer Users Group, Inc.

Music in the past was captured and made available on analog sources and played back on analog devices. Those analog sources were tubes (in Thomas Edison's times), record disks (78s, 45s and 33 1/3 vinyl), and finally tapes (reel-to-reel, 8 track, and cassette). And they were played on a phonograph (circa late 1870s), a turntable (spanning the 20th century) or a tape machine (spanning the late 20th century). All those devices were engineered to convert the analog music on the source media to sound that eventually hit our ears. Analog music was the capture of some sort of wiggle, like the wiggle of a turntable needle or stylus, or the wiggle of a magnetic field on a magnetic tape. The quality of the music we experienced improved all along the time that analog music was available, finally culminating in High Fidelity, Stereophonic Sound. Stereophonic because there are two tracks, one for the right and one for the left, to match the hearing mechanisms on our head, one on the right and one on the left. High Fidelity is the property of reproducing all of the music frequencies that were originally produced by the original source, like a singer's voice, or a rock and roll band, or a symphony orchestra. The frequency response of the human ear is about 20 Hz to around 16,000 Hz (although sometimes it is stated as 20 to 20k). These are general ranges and as we age, the lower limit tends to rise and the upper limit tends to be lowered. (By the way, if someone is exposed to very high intensity sounds or noises {measured in decibels}, their hearing range could be affected. In fact, sounds greater than somewhere around 100 decibels {db} can produce permanent damage to ones hearing range.) So, High Fidelity Stereo was developed to deliver two channels, each with about a 20 to 16,000 Hz frequency range. What more could you ask for. (Well, actually now with digital reproduction you can have much more, like 5.1 surround sound, but that is a subject for another time.)

Enough of the past, now on to the digital music age. One of the differences between analog and digital sources of music is the fact that with an analog source, the music quality deteriorates with each play. Each time a record or tape is played, some of the range of the music is lost. But with digital sources (digital files), the quality always remains the same. Go ahead and play away. The reason for this is that the digital representation for music is just a series of ones and zeros (which is reproduced exactly with every Copy). As long as that series is reproduced (and the process that interprets the ones and zeros doesn't change), then the results, the music, will always be the same. So, once we get the music, we have it at that quality, for good. But how is digital music created? What is the source? And what devices are used to reproduce it.

The recording process starts with (analog) microphones which produce a small analog signal. This signal is amplified and then digitized. From this point on everything is digital, therefore perfectly reproducible. Digitization produces a file that has been engineered to contain the complete audible frequency range. This is the .wav file that is on the CD that is purchased. The CD becomes the source for the music. (Today, most music is distributed on CDs, although more and more music is being downloaded to computers for eventual listening.) Typically there are about 15 songs on a CD, but with the capacity of a CD (700 MB) and the average size of a song (35MB), you might get as many as 20 or 21 songs on a CD. So, if CDs are the source of the music, a CD player is the device that is used to reproduce the music. CD

players come in two basic varieties, stereo cabinet type to be used with a stereo system maybe in the family room, and portables for use on the go. Some larger stereo cabinet models can hold as many as 400 CDs and provide a place to store all the CDs (without their cases). Now that's how the digital music is produced, distributed, and played, but what about MP3s? Well, an MP3 file is the result of processing a WAV file with an MP3 conversion program, the product of which is much smaller than the original. (WMA is another file type similar to MP3 that has been introduced and used by Microsoft.) MP3 files are typically one tenth the size of the corresponding WAV file. The resultant file size can vary because there are settings used by the MP3 conversion program. The MP3 conversion process is a "Lossy" conversion, that is, some of the quality can be lost in the conversion. The quality is selected by choosing a bit rate for the conversion. For music this rate typically goes from 128 kbps (considered near CD quality) up to around 320 kbps (for those audiophiles that have very good hearing and reproduction systems). There are also lower qualities for low frequency range (voice only), files which are 32 kbps and 64 kbps. The lower the quality, the smaller the size of the MP3 file, and similarly, the higher the quality, the larger the file size. Some people might be able to detect the difference between a 128 kbps quality and a 320 kbps quality, but if you cannot then the smaller file would be a better choice. (If you're not sure if you can detect the difference, create an MP3 of one of your favorite CDs at two different bit rates and then play each one and see if you can tell the difference. If you can tell the difference, use the higher bit rate as your quality setting.)

So, with that bit of background, we are able to discuss the process of converting songs on a CD to MP3 files. This process is called Ripping a CD. (Don't blame me, I didn't name it.) The process does nothing like its name implies, it simply converts the WAV file on the CD to an MP3 file on the computer, at the chosen quality. Ripping can be done with many programs like Windows Media Player, Musicmatch Jukebox, Audacity, and Winamp. (Windows Media Player (WMP) which comes with all Windows Operating Systems will be used here in examples.) To Rip a CD, place the CD in the CD/DVD reader/writer tray, start WMP, and click Rip on the top Selection Bar. It's that easy. A list of the files on the CD will be shown with a checked check box for each. If you don't want one of the songs, uncheck the box. When the conversion is finished you will have an MP3 file for each of the checked songs. Typically, the MP3 files will be in a Folder with the name of the CD Album, within a Folder for the Artist within the folder that was setup as the Rip Folder. From this folder, you can move or copy the songs to a library folder. Most people will probably use the Music (or My Music) folder that is part of Windows for this.

Next month we'll discuss organizing the Library to take advantage of the fruits of your (possibly) considerable labor in creating the music files. And don't forget: backup all that music regularly, so you don't have to go through that process again. :

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