

The Ripping World of CD and MP3

Now that the issues of copyright protection appear to have finally been put to rest, the MP3 world is moving faster than the average music lover can keep up.

Whether you're a serious music collector, are looking for a new genre of music to enjoy, or just want to see if you can catch a musician before he or she hits stardom, the Web is the place to visit. Thanks to the technology of audio compression, the global reach of the Internet and the rapid growth of on-line music sites, it's now possible to preview a wide range of music and select the songs you enjoy.

With new on-line tools, new audio-enhancement recording software and low-cost, easy-to-use CD-RW drives; it's possible to record your own music CDs. It all started with the introduction of a music delivery mechanism called MP3.

MP3 is the compression software that has enabled CD-quality music to be sent over the Internet. Today, within a few minutes, you can download players such as Real-Audio, Media Player (Microsoft) or WinAmp and no we didn't forget the ever popular iPod player. After surfing a few MP3 web sites, you can select the music of your choice and play it through your computer.

This is fine if you never leave your computer. Once you determine that life in front of a PC is a little sterile, portability becomes an issue. It is at that point that you need a method of recording the MP3s onto a CD for playback on your home, portable or car CD player. When recording MP3 music to disc, there are really three components: the CD-RW drive itself, the software and the media to record it on.

The Hardware

Recordable CDs (CD-R) became available in 1996. When CD-RW (re-writable CDs) became widely available over a year ago, the distribution of MP3 audio was also gaining momentum.

First-generation CD-RW drives were expensive and the software was difficult to use. As a result, early adopters found themselves with unusable CDs instead of the promise of high-capacity storage to replace floppies.

Today's CD-Rewritable (CD-RW) drives and the robust software make creating CDs as effortless as copying to a floppy disc. Now that prices have also dropped, CDs offer plenty of practical value, including the ability to harness the high-capacity discs for write-once and rewritable mass storage, copying CD-ROMs, and even compiling customized audio CDs.

With 8X and 12X write and rewrite speeds, these CD-RW drives allow you to write a complete CD-R or CD-RW disc in about 5 minutes. The speed and versatility of the drives makes them one of the first truly multi-purpose storage products.

According to IDC, the installed base CD-RWs worldwide jumped more than 700% this year to more than 9.5 million units. The Massachusetts-based research firm projects that sales will more than triple next year to an estimated 20.5 million drives.

The ability to randomly erase and rewrite data to the same disc as many as 1,000 times makes CD-RW considerably more appealing for music CD development

than CD-R, which is a write-once format. Many people use the CD-RW media to “lay out” their discs and mix the sequence of songs, play the CDs a few times to see if they like the sequences and rearrange the sequence until they are satisfied with all 650MB of music.

When they feel the mix is exactly right, the users again upload the music to their hard drives and use even lower-cost CD-R discs to produce their own custom masters. Once the write-once CD is complete, the user can play the music on the home system, in the car or in any of the excellent portable players that are available.

Improvements in recording software have made archiving files as easy as dragging and dropping them onto the CD-RW drive icon.

Offering broad media interchange, CD-RW drives can read nearly all the existing flavors of CD-ROMs and can also write to inexpensive CD-R discs. Because of the design of CD-R media, it can be played in almost all of the more than 160 million CD drives or players that are in use around the globe. CD-RW discs, on the other hand can only be read by Multi-Read CD-ROM drives. MultiRead capabilities haven't been designed into CD players but the media can be read by DVD drives and players.

2x, 4x, 8x Speed Comparison Generally, for high-quality audio playback, the lower the recording speed the more certain you'll be that the MP3 CD-R you produce will play on any CD player. Also, the majority of the 2X systems can be used with a 386 30 MHz computer or, in a shared environment. By contrast, 4X, 8X and higher recorders need a high-performance, dedicated system (Pentium or RISC) to deliver data flawlessly to the recorder.

The most popular CD-RW drives available today record to both CD-RW and CD-R discs at up to 8x speed, rewrite CD-RW discs at 4x speed and provide 32X read performance for CD-ROM, CD-R and CD-RW media.

The Software

Bundled software, which generally comes with the drive you've purchased, can range from adequate to awful.

The problem is that the most common CD-recording programs - with titles like toast, Easy CD Creator, HotBurn and DiscRibe are geared toward CD-R media and using them on a CD-RW disc creates what is read as multiple “sessions” of data.

The solution is a “packet writing” ability, such as Roxio's DirectCD, which lets you treat an RW disc just like a hard drive, dragging files to and from it in Windows Explorer or the Mac Finder. Take note: Not all drives include a packet-writing program; you can buy one separately but make sure it supports your drive.

In addition, you'll need a “UDF (Universal Disc Format) reader” utility. Now all you need is 45 minutes to format the disc for packet writing, and you're all set.

Venturing into what was once primarily the turf of hard drives, CD-RW drives can write fixed-length data packets, thereby permitting random, direct overwriting of any area of the disc.

Digital Topography

Like other CD media, CD-RW storage is based on the concept of “pits” and “lands.” In CD-ROM discs, microscopic structures are physically imprinted on one layer of the disc when it is created (illus-

tration). As the disc is spun in a CD-ROM drive, the lands reflect the laser beam and the pits scatter it, sending a stream of Morse-code-like pulses to the drive's optical sensor.

While a CD-RW disc looks and behaves much like its CD-R or CD-ROM counterparts, it exhibits much lower reflectivity. And that means that the signal is too weak for today's conventional CD-ROM and CD-R drives to read. CD-RW drives as well as MultiRead CD-ROM and newer DVD drives have a simple circuit called an Automatic Gain Control that amplifies this weaker signal and enables the devices to read discs with low reflectance.

Packet Power

Though advances in engineering have brought CD-RW drives to the market, the technology wouldn't be half as useful if not for several notable software achievements. Chief among them is packet writing, which lets the CD-RW drive write small portions of data to a disc over a period of time, rather than in one session.

Fortunately, a number of free UDF drivers are available that enable Windows 98, Me and NT 4.0 machines to read native-format CD-R and CD-RW discs.

Considering the improvements in software and usability, and the huge installed base of CD-ROM playback devices, CD-RW could become the data-archiving device of choice for the next few years.

There's burning and ripping

Online audio can be distributed in two ways: through streaming technology, which allows users to listen to a file as it's being downloaded, or by saving the entire file to disc for listening to later. Until recently, the latter method was problematic

for anyone who didn't have a super fast Internet connection, because downloading large audio files required too much time and hard drive space. Compression saves download time a bit, but it also causes data to be dropped, reducing sound quality.

Making MP3 files from audio CDs is a three-step process that involves "ripping" the audio track from the CD, saving it as a WAV file, and then encoding it into an MP3 file.

The Media

CD-RW media now costs as little as \$.50 - \$1 per disc for 700MB of storage. They're durable and almost all current computers can read them. However, older CD-ROM drives, as well as almost all audio CD players, lack the circuitry required to read CD-ReWritable discs.

Once you've spent the money for the recorder, figured out and conquered the software - resist the natural temptation to save money and time by grabbing the first, low priced CD-RW disc that you see.

You should purchase the best CD/DVD drive or recorder you can afford. Choosing one of the superior name brand products not only gives you the high quality you want, but also comes with its own software to further ensure high performance and flexibility.

Then, use optimum software (assuming it isn't already bundled with your system). Finally, you need to purchase the best media possible to improve your chances of getting the highest-quality recording possible.

Industry standard media is available from multiple sources resulting in the significant price reductions. Ranging in recordable times from 74 minutes to almost 80, prices run under \$1 each.

Legalities

Readily available shareware and commercial software has made it almost as easy for consumers to create MP3 files as it is to listen to them. The result has been an atmosphere in which recordings are digitized and then traded freely ... and often illegally.

Members of the Recording Industry Association of America (RIAA) went to court for a solution. First, they sued Diamond Multimedia to try and prevent the sales of the Rio player. They did. Next, they decided to try fight fire with fire, and formed the Secure Digital Music Initiative (SDMI) group, dedicated to researching and establishing a secure format.

What the Future Holds

On the horizon is the MPEG-2 Advanced Audio Coding (AAC) - the next step in the MPEG lineup that can compress music at ratios of up to 20-to-1 and improve audio quality. Also, the next generation of DVDs (high definition support) will include rewritability.

Finally, the issue of copyright protection will be bandied back and forth. Already there are third parties selling Anti-Piracy technology and the SDMI will surely be issuing some response to runaway MP3 distribution - its not likely to affect the general consumer.

The final word? Watch the news carefully, as it seems many new products are set for Christmas introductions, but don't be afraid to jump in and get in on the CD-RW bandwagon. The industry is sure to shake out all the bugs and you'll be listening to your favorite music while it is.

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