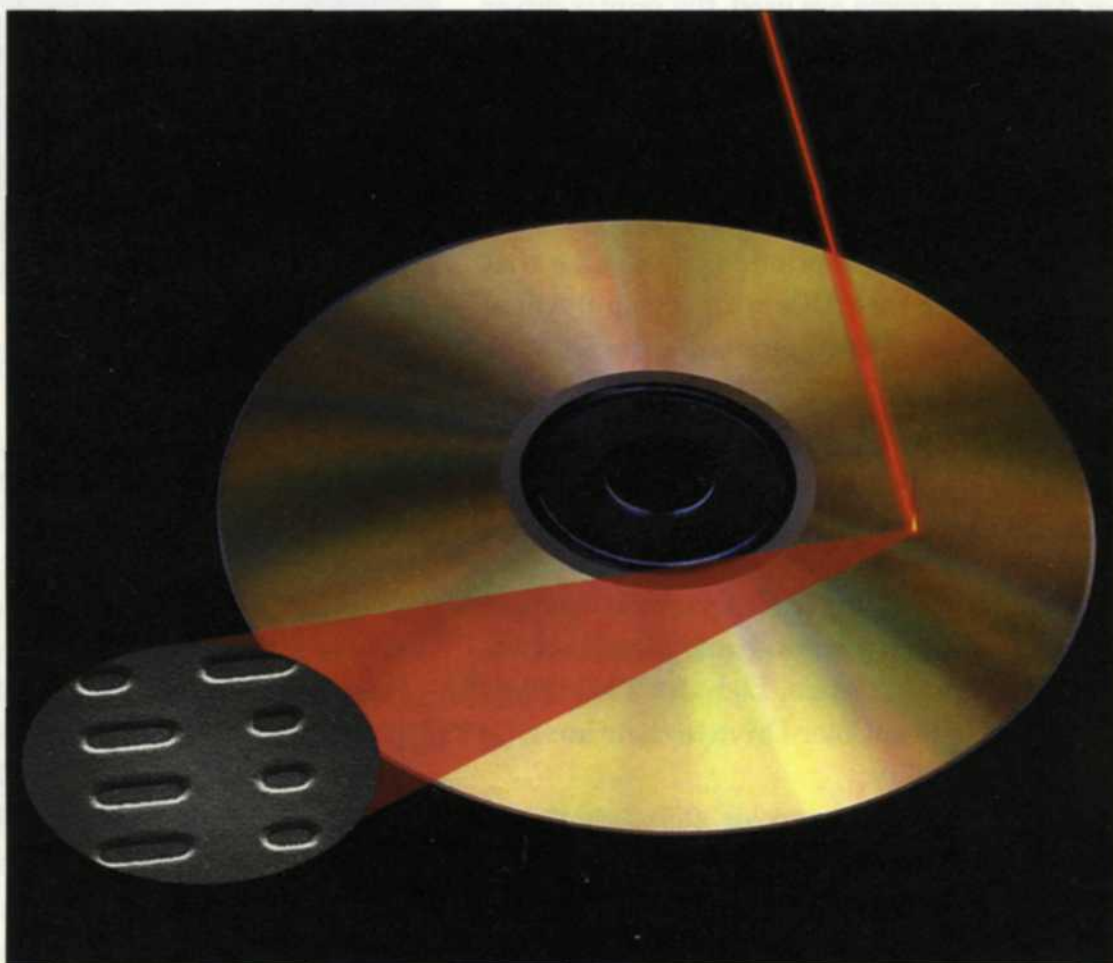# Burned Out on Burning CDs?

Today it seems that computers are the norm rather than the rarity. With this increased usage come problems, as more data is flowing down the information highway. As your data accumulates, and it comes time to park that data in a safe place, you may find that your hard disk is full. You could buy a bigger hard disk, but there is always the chance it will crash.

Jack & Sue Drafahl

As YOU RESEARCH the possible options for storing your precious data, two letters keep surfacing: CD. Everyone has an opinion as to the best storage method, but since momentarily we have the pen in hand, we would like to share our CD ideas.

Just in the last year the CD writer, called a burner, dropped in price from thousands to under $300. Besides the price advantage, the new machines offer higher speeds and a higher reliability factor. Earlier versions of CD burners took a vast amount of programming setup just to create one CD.

Terms like *White book*, *Orange book*, *buffer underrun* and *ISO 9660 image* were enough to confuse even computer nerds. Software and hardware manufacturers soon realized that they had to make it simple if it was going to fly.

Thankfully, today's CD burner is as easy to use as copying files from your hard disk to a floppy. Even so, we find many people still reluctant to try the CD.

The idea of a laser burning millions of small holes in a piece of sheet metal sounds crazy to some, but that's how a CD burner works. When you think about it, the CD burner is extremely primitive on one hand, and leading-edge technology on the other.

CD 101

We know that computer data is made up of bits of data represented by 0s and 1s called the binary system. When you burn data onto a CD, a very tiny laser beam fires at extremely high speed down at the wafer thin metal surface. Holes are burned into the surface in special combinations that can be read back as 0s and 1s.

On a single CD, 650 million bytes of data can be burned into the surface of a dirt-cheap blank CD. The etched holes are so small that the only way you can see them is with an electron microscope. As with any part of the computer

process, no matter how simple you make it, someone out there will have trouble making it work properly.

We feel we have a pretty good handle on the process after burning several hundred CDs, so we have compiled some tips in three sections—hardware, software, and the CD burning process.

CD-R Drives

When you go shopping for a CD burner, you will probably see two terms: CD-R and CD-RW. The CD-RW is like a hard disk because you can read and write data a thousand times to the same disk. The drawback is that the drive and the blanks are more expensive, and the chances of accidentally losing data is the same as with a hard disk.

A CD-R writes data once and cannot be changed. In essence it is chiseled in metal, forever, or at least 50 years, whichever comes first. If you store your CDs properly, you should feel confident that your data is safe.

CD-R drives can be either IDE or SCSI, and we see little difference between them. Most CD-R units are at least 2X write, and 8X read. If your computer has the space and the drive connector, we recommend a second CD ROM drive as a reader. Writers don't read as well as readers and you can now find readers with speeds over 48X. Most CD ROMs cost about $75, and will cut down on the wear and tear on your writer.

Eventually DVD writers will compete with CD writers, but at present they are cost prohibitive. The manufacturers are still trying to determine a DVD standard. Not to worry, because the DVD writers will be able to read a data CD that you make, so it makes no sense to wait.

If you have set up your computer properly, you should have at least one

separate program drive and a very fast data drive. The reason for the second data drive is that temporary data is written, deleted, and rewritten over and over. There is always the chance that this constant data writing will eventually cross into the programs.

The second reason for the fast data drive is so you can quickly transfer data to the CD burner. CD burners require a constant flow of data at a specific speed without interruptions. A 2x writer requires 300K bytes per second.

Most of the new CD burners have extra RAM built in to compensate for lags in the data stream. You should also purge your data drive periodically, so that it does not get too fragmented and slow down the data transfer process.

Software

This part of the process is easy. We have looked at several types but the most dominate one is from Adaptec. Easy CD Creator comes in a full blown stand-alone package that includes writing music CDs, duplications, Picture CD creator, VC creator, and a session selector. The program also comes in a lite, or short version, bundled with many of the popular CD burners on the market.

Operating the program is simple; just place a blank CD into the burner, and start the program. You can select either music or data CD and begin adding files from the data directories. You have the choice of performing a test session or writing direct.

If you are writing a CD for the very first time or have encountered problems, then use the test function. Otherwise you don't really need it. Once the CD is written, the program will eject the CD. To guarantee that it has written correctly, you should try to load a couple of the files from the CD.

If the data did not completely fill the

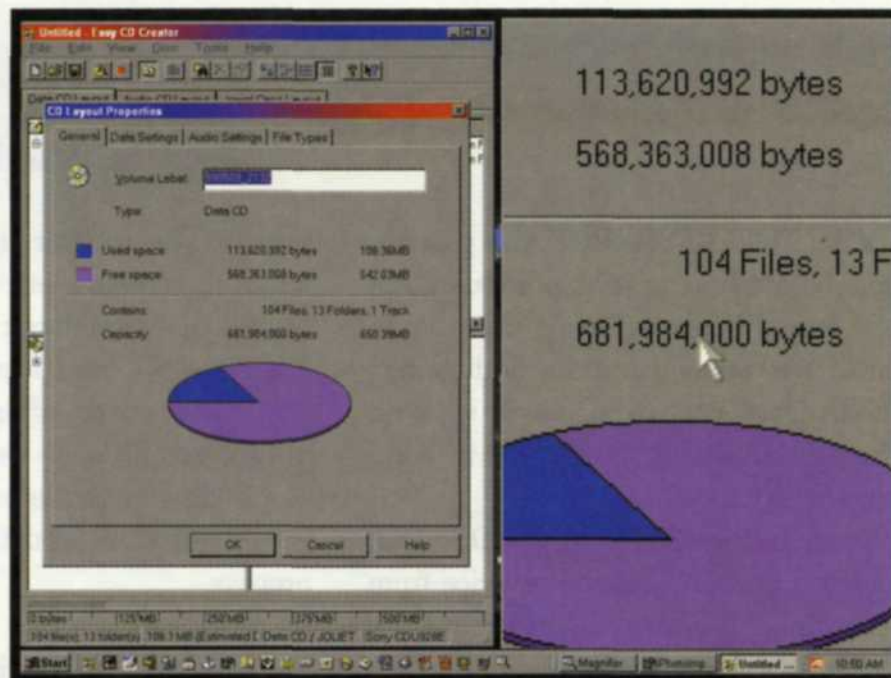Screen shot showing how much has been written.

Photo database of burned CDs using Photo Impact 4.

CD, you can continue writing additional data at a later date. The program indicates when you have filled the CD. A nice feature of the Adaptec program is its methods for naming the CD. If you don't give it a name, it will use a numbering system that corresponds to the date and clock. For example, CD number 990518-1415 was burned on May 18, 1999 at 2:15 p.m. This number will appear as the title of the CD in Windows Explorer.

Another nice feature is that it automatically organizes your CDs in chronological order when you file them away on the shelf. Adaptec has recently created a special software called DirectCD. When you place a blank CD in the burner, the program prepares it to simulate a hard disk.

You can drag files from any hard disk, CD drive or floppy drive and drop them on the CD burner. They are automatically added to the drive. You can even delete files (well not really, but they are marked in the table of contents as no longer in use).

DirectCDs can only be read on machines that have this program loaded. If it needs to be read on any CD ROM drive, you can tell DirectCD to add a table of contents and it converts it to a standard CD. Later you can change it back to a DirectCD drive until the CD is full.

Making the Process Reliable

In every computer process there is a weak link. With CD burners it comes under the heading multi-session. When you write a session on a CD, the

burner writes all the files and then makes a table of contents to tell the CD reader the file location.

When you write a second or third session, the burner picks up the table of contents, adds new files and writes a new table of contents at the end of that session. If for any reason the session you are writing crashes, the data in all previous sessions may also be lost. If you are paranoid about data loss, there are a couple of solutions to ease your mind.

Remember that blank CDs now cost less than $2 each to store 650 megs of data, so you can afford to not fill them completely. We highly recommend writing only one session. Most hard disks today hold gigabytes of data, so wait unit you have almost 650 meg and then write it to the CD.

If you must write a second session to a CD and are worried about losing the data in the first session, simply copy it to a backup directory on your hard disk.

If you use your reader CD ROM to copy the data to the hard disk, it should only take a few minutes. If indeed there is a problem, you will have the backup. As soon as the second session is written and verified, simply delete the backup directory.

We verify the contents of CDs using a photo database program called Photo Impact by Ulead Systems. It only takes a few minutes of cataloging, and we can look at thumbnails to see if everything looks okay. Then we delete the backup files. We rarely write multi-sessions and find the single session the most reliable method for archiving data files.

The best way to get started and feel comfortable with CD burners is to buy a half dozen blanks and practice. Write a full session of 650 megs, then write several multi-sessions. Copy a lot of small files and then try several large ones. When you feel comfortable, start burning CDs for real. Don't wait, jump in and start burning those CDs now. It's a great way to store data!

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