

Burn, baby, burn

Stephan Somogyi
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Make Your Own CDs in a Flash with These New Recordable and Rewritable CD Drives

COMPACT DISCS WERE ONCE MEANT STRICTLY FOR PLAYBACK. ACTUALLY creating CDs was the province of the big software and record companies. But now all of us have the power to make our own CDs. CD- Recordable drives, or CD-Rs, allow you to create (or burn) both audio and data CDs with a minimum of trouble and expense. And an even newer technology called CD-Rewritable, or CD-RW, adds more versatility and flexibility to the compact-disc world.

Although CD-ROMs were once touted as the next big medium, they've evolved into something more akin to high-capacity, read-only floppy disks. Take Apple's new iMac-that colorful compact consumer computer has a CD-ROM drive and no floppy drive.

The appeal of CDs is clear: they're in many ways more rugged than the removable media used on drives from companies such as Iomega and SyQuest, they're cheaper than magneto-optical cartridges, and just about all computers (not to mention most stereos) can read them. By no means can CDs be considered speed demons, but their versatility, low cost, storage capacity, and physical robustness mark a significant space for them in the world of removable mass storage.

To give you a leg up on deciding which CD-writing drive is right for you, Macworld Lab tested 21 CD-R and CD-RW drives for compatibility, reliability, and performance (see the benchmark, "Feel the Burn: CD-R and CD-RW Drives Compared"). We also investigated the compatibility problems caused by the new rewritable format.

One-Shot Wonders

With a trusty CD-R or CD-RW drive, some blank CD-R media, and the right software, you can create Mac-native CDROMs (even bootable ones) and ISO 9660 CD-ROMs-which are readable by computers running DOS, Windows, Unix, or the Mac OS. You can also create audio CDs that work in any standard CD player. A single, blank CD-R disc costs as little as $2 and holds just as much data-- up to 650MB-as any of the CD-ROMs you get when you buy software.

Slow Going While creating CDs isn't expensive, it can be time-consuming. You usually can't just pop in a blank disc and drag files onto it in the Finder, as you'd do with a floppy. Instead, you

prepare the files that are intended for the CD-R on a hard disk and then burn them to a disc, using an application such as Adaptec's Toast. Depending on how much data needs to be written and how fast the drive is, you might have to wait for more than an hour before the finished CD pops out of the drive. (Some of the drives we tested ship with Adaptec's DirectCD software, which actually does let you mount a blank CD in the Finder. Nevertheless, this approach has shortcomings. Every time the OS needs to update information on the disc, it has to write a whole new copy of the information-plus all sorts of invisible files and other unseen data-to the CD, wasting valuable space. You can't write over what's already been written.)

Aspiring Writers: 21 CD-R and CD-RW Drives

At the standard CD-audio data-- transfer rate, one minute of CD audio takes one minute to write; this works out to approximately 150K per second, meaning that it would take 74 minutes to fill a CD-ROM. The drives we tested are able to burn at speeds up to four times (or 4x) the standard rate, which means that a full CD can be burned in 18.5 minutes at the drives' top speed. Once a CD has been created, it can be played back at any speed.

The Coaster Curse But if something goes wrong while burning-usually caused by too cheap CD-R media or an interruption on the Mac that's controlling the burner-you'll wind up with a round gold or silver coaster instead of a usable disc. That's the one great shortcoming of CD-R. Unlike Iomega Zip disks or floppies, CD-R discs can be filled up only once, although some CD-R formats allow you to fill up a disc gradually over several sessions. But once you've written anything to a CD-R disc, it's there forever.

Typical CD-recording software helps reduce the risk of burning an unusable CD by letting you create an image file of the CD on your local hard disk beforehand. This allows you to check that everything is just so before actually burning the data onto the real disc.

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Another factor that can reduce the chance of burning a bad disc is the amount of cache RAM built into the CD writer. The more cache a drive has, the less likely it is that a hard disk or computer slowdown will cause a fatal interruption in the stream of data the CD-R drive is writing to the CD-R disc.

Rewriting History

A new class of drives has begun to make the pain of failed CD-writing sessions fade away. Roughly a year old, CD-RW technology is similar to CD-R, with one crucial difference: CD-RW discs can be written to over and over-up to 1,000 or so times, according to the media manufacturers. Even better, CD-RW drives aren't limited to writing CD-RW discs-- they can also burn old-fashioned CD-R discs. In fact, all the CD-RW drives we tested were able to burn CD-R discs faster than CD-RW discs.

CD-RW drives, like their CD-R cousins, are slow when compared with other removable-media devices, such as Zip and Jaz drives. But CD-RW technology is an eminently useful backup tool when paired with Dantz

Development's (www.dantz.com) Retrospect or Retrospect Express software (see Reviews, in this issue). Since CD-RW discs can be overwritten with new data, they're a more cost-effective means of backup than the write-once CD-R discs.

As with CD-R, you usually can't write to CD-RW discs by mounting one in the Finder and dragging files to it, unless you've got software such as DirectCD.

The Bad News about CD-RW

The many benefits of CD-RW over CD-R are evident. There are, however, several drawbacks that will make CD-R discs a valuable media format for some time to come.

Pricey Media The first drawback is cost, plain and simple. Currently, the average CD-RW disc costs ten times what a CD-R disc costs. If you're planning on rewriting that disc repeatedly, over time the investment will be worth it. But if you're writing to a large number of discs, the costs of CD-RW will add up.

Incompatibilities The biggest problem with CD-RW discs is that they won't work with most older CD players. (The features required to read all CDs, including CD-RW, are lumped together in a new standard known as Multi-- Read. If you buy a CD-ROM drive or audio CD drive that's Multi-Read capable, that drive will be able to handle CD-RW discs.)

CD-ROM drives that are older than a year are unlikely to be able to read a CDRW disc, since the final version of the Multi-Read specification isn't even a year old. So while being able to reuse CD- RW discs over and over again is quite convenient, you can't pass those discs to your friends unless they've got a Multi-Read capable drive. Using those discs on new systems shouldn't be a problem-the CDROM drive in a Power Mac G3 desktop system we used could read a CD-RW disc without problems, but the older drive in a Performa couldn't.

Real-World Tests The real test for compatibility, however, is consumer audio and video equipment. Since CD-RW technology is an obvious candidate for making audio CDs-play a disc until you're sick of it, and then write over it with some new tunes-we went to a local consumer-electronics store to see how many audio CD players would read our CD-RW audio disc. Adaptec's Toast software was helpful enough to warn us, when we set it up to burn an audio CD-RW disc, that most consumer players cannot read CD-RW audio. It wasn't kidding.

We tried our disc in several car CD players from various companies, ranging in price roughly from $500 to $1,000. Not a single one of these players recognized the CD-RW as a valid audio CD; some flashed error messages on their displays, while others unceremoniously spat the disc back out.

Since DVD players can play audio CDs and are so new, we thought that they stood a good chance of being Multi-Read capable. We tested four players: all three Sony players we tried, priced from $599 to $999, were unable to read the disc. We found only one player that

both recognized our disc and played its music-the newest player in the store, the $599 Panasonic DVD-A310.

Clearly, Multi-Read hasn't been adopted very widely yet, in either the computer or consumer-electronics worlds. Until you and your friends have all converted to Multi-Read-savvy equipment, the appeal of CD-RW discs will be tempered by the currently limited compatibility of the medium. Burning Questions

Since a CD-RW drive does everything a CD-R drive does and more, buying a CD-RW drive would seem to be a better investment than buying one that writes CD-R only. Our lab testing bears out that assumption.

Macworld Lab tested 21 CD-R and CD-RW recorders, but despite different company logos on the outside, inside they were all quite similar. Two mechanisms, one from Teac and one from Panasonic, made up 11 of the 13 CD-R units we looked at, and the same Yamaha mechanism was under the hood of every CDRW drive we tested. As you'd probably expect, our test results show that drives with th e same mechanism do not offer noticeably different performance (see "Feel the Burn: CD-R and CD-RW Drives Compared").

Backup Failures The seven Teac-- based recorders-La Cie's (www.lacie.com) $499 CDR 4x12x, Mediastore's (www .mediastore.com) $519 AVD 4x12, MicroNet's (www.micronet.com) $630 Master CD Plus 4x12, Pinnacle Micro's (www .pinnaclemicro.com) $599 RCD 4x12 Mac, ProDirect's (www.pdisales.com) $449 PowerStore 412 CDR, Smart & Friendly's (www.smartandfriendly.com) $549 CD SpeedWriter, and Smart Storage Solutions' (www .smartstoragesolutions .com) $459 4xl2TMX-- are clearly the fastest of the bunch at burning and verifying (by dint of the Teac mechanism's 12x speed), but they have a significant drawback: they're currently incompatible with Retrospect. For those who care only about burning CD-R discs quickly, the Teac-based drives perform well.

Since Retrospect is a widely used and ideal piece of software for backing up and archiving data, a drive that does not support it has significantly less value to the Macintosh owner. The Teac-based drives are technically flash-upgradable, but unlike Panasonic, Teac has not made a Macintosh flash utility available; unless you have a PC with a SCSI card, you cannot flash-upgrade your Teac mechanism.

Feel the Burn: CD-R and CD-RW Drives Compared

Burning Love APS Technologies' CDRW Pro is a solid drive, although its power supply is ungainly.

The Panasonic mechanism-at the heart of APS Technologies' (www.apstech.com) $500 CDR 4x8, La Cie's $479 CDR 4x8x, Mediastore's $449 AVD 4x8, and Smart Storage Solutions' $399 4x8MMX-has limited support for Retrospect, but at least it's just functional enough to work. We were able to run our full suite of tests with these drives, but the drives performed so poorly with Retrospect as to make them unsuitable for backup purposes. And when it came to non-Retrospect CD-R burning and verifying with Toast, the Teac-based recorders consistently outperformed the Panasonic-based ones, which can read only at 8x.

Smart Storage Solutions' $579 4xl2PMX and Optima Technology's (www.optimatech.com) $669 DisKovery 1300CDR use Plextor and Sony mechanisms, respectively, but both are slower than the Teac mechanisms.

Rewrite Might The CD-RW recorders we tested-APS's $600 CDRW Pro, EZQuest's (www.ezq.com) $1,199 Anaboa Jaz 2GB/Y2x4x6, EZQuest's $599 Boa Y-CRW 4x2x6, Mediastore's $549 AVD 4x2x6 ReWriteable, Optima Technology's $799 CDWriter, ProDirect's $559 PowerStore 4260 CDRW, Smart & Friendly's $699 CD-RW 426, and Smart Storage Solutions' $589 4x2x6YMX-performed roughly equally. We were particularly pleased with how easy it was to upgrade the Yamaha mechanism's firmware with the Macbased flash utility available on the Yamaha Systems Technology Web site (www .yamahayst.com), since not all the drives we tested shipped from the vendors with the latest firmware.

The CD-RW drives we tested can burn CD-R discs at speeds up to 4x, the same speed as the CD-R drives we tested. However, the CD-RW drives we tested can read only at 6x, while the CD-R drives can read at speeds up to 12x. The result is that while these CDRW drives can write to a disc as fast as a CD-R drive can, it takes the CD-RW drives longer to verify what they've written. On average, the Teac-based drives were able to burn and verify our 320MB test archive 19 percent faster than the Yamaha-based drives.

Macworld's Buying Advice

Our all-around favorite drives and Editors' Choice picks are APS's CDRW Pro and Mediastore's AVD 4x2x6 ReWriteable. The CDRW Pro has built-in active SCSI termination, and its fan, while audible, is quieter than a typical computer fan. This drive's most serious shortcoming is its external power supply; the brick and attendant cable aren't a particularly elegant solution.

The AVD 4x2x6 ReWriteable's case is solid and stackable, but it lacks built-in termination and has a very poorly placed power button that all but invites you to power cycle the drive when all you really mean to do is eject the disc. However, the AVD 4x2x6 ReWriteable is $50 less than the CDRW Pro. In deciding which drive is for you, you need to weigh the value of the CDRW Pro design against the lower cost, lack of termination, and danger of inadvertent power-downs of the AVD 4x2x6 ReWriteable.

While both the APS and Mediastore drives' Yamaha mechanism isn't as fast at burning CD-Rs as the Teac mechanism is, the Yamaha is adequately quick and fully compatible with Retrospect. Most important, it supports CD-RW, which is already useful for backups and should become significantly more useful for many other applications in the future.

CD-RW is certainly a very young technology with its share of hang-ups. But even setting aside CD-RW features, the CD-RW drives we tested are comparable in terms of writing (but not reading) speed with similarly priced CD-R-only drives. Factor in the potential of CD-RW technology, and it's clear: if you're ready to make the move from compact-disc consumer to compact-disc creator, buying a CD-RW drive is indisputably the path to take.

STEPHAN SOMOGYI is a veteran breaker of technology products. He finds writing about the results of such exploits strangely cathartic.

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