

BURN BABY BURN

Backing up large data files has never been so easy to do, with many CD-RWs costing less than £100, but how do you choose the device that's best for your circumstances? Read on, because we've done all the hard work and tested 18 drives, both EIDE and FireWire, to the limit

CONTENTS**EIDE drives**

- 168 Acer CRW 1208A
AOpen CRW1232A
Creative Blaster32x12x10x
- 169 Hewlett-Packard 9710i
LG CED-8120B
Mirai CRD-BP1500
- 170 Buffer underrun explained
CD media
- 171 Mitsumi CR4808TE-SE
Plextor PX-W1610A
Ricoh MP-7200A
- 172 Samsung SW-212B
Sony CRX200E
TDK Cyclone 24/10/40
- 175 Teac CD-W516EK
Waitec T-Rex 16x10x40x
Yamaha CRW2200E


Firewire drives

- 179 Iomega Predator Firewire
LaCie StudioDrive
Sony LRX1600L-RP
- 180 Performance results
- 182 Table of features
- 184 Editor's Choice

The compact disc has been around for a very long time now, and it's showing little sign of being replaced soon. Of course, there are contenders in the shape of Super Audio CD and DVD Audio, but these are still expensive high-end alternatives and the majority of consumers are quite happy with the quality that CD offers. One of the things that's sure to keep the CD in the mainstream for a long time is the incredible popularity of CD-RW drives. With drives available for well under £100 and blank discs costing as little as 25p it's no wonder so many people are burning their own music compilations. Apple even based its whole advertising campaign for the latest iMac range on the ability to burn music CDs.

There is more to CD-RW drives than making music, though; they're also very handy for archiving and transporting data that can be read in almost any PC on the planet. It's this versatility that has resulted in nearly every PC we see shipping with a CD-RW drive installed.

If, however, you're looking to install a drive in your PC the choice can be quite overwhelming, so we've done the hard work for you and rounded up 18 of the latest drives and run them through our rigorous benchmarks.

So, if you're looking for a CD-RW drive don't part with your hard-earned cash until you've read the following pages. 

GROUP TEST EIDE CD-RWS

Acer CRW1208A

PRICE £86.74 (£73.82 ex VAT) **CONTACT** redstore.com 0870 870 4457 www.redstore.com

PROS Amazingly cheap for a drive with buffer underrun protection **CONS** Slower than most rivals

OVERALL It's hard to fault at this price and if you're after a cheap CD-writer this is a good choice

SCORE ■■■■■■

Acer is one of the world's largest OEM manufacturers and the CRW1208A is currently the fastest CD writer Acer sells under its own name. It can record at 12-speed, rewrite at eight-speed and read CDs at up to 32-speed. This is hardly cutting edge today, though, as there are quite a few 20- and 24-speed drives in this round-up.

However, the price of the Acer – at £86.74 inc VAT it's the second cheapest drive in this test – means that you get a bit of a bargain. You might expect to get a very basic spec for this price, but Acer has added a few extra features that make this drive much better value than the

Samsung SW212B, which comes in at over £6 cheaper.

The most important of these features is the SeamlessLink buffer underrun protection that helps prevent you producing loads of coasters (ruined discs). This technology has only been used by Acer so far but seems to work just as well as the other buffer underrun protection systems here.

The second feature that sets the Acer apart is the play/skip button that lets you play audio CDs without having any software running on your PC.

The CRW1208A is a good value drive for the price and performs in line with its specs.



AOpen CRW1232A

PRICE £115.14 (£98 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Fastest 12-speed drive; good CD-RW performance **CONS** Faster drives available

OVERALL The best 12-speed drive here with fast packet writing specs and buffer underrun protection

SCORE ■■■■■■

We've reviewed several products from AOpen in the past, ranging from motherboards to graphics cards and, of course, CD writers. AOpen might not be the most well-known CD writer manufacturer out there, but it has a wide range of optical drives to complement the rest of the product range.

The CRW1232A is a 12-speed recorder with 10-speed rewrite capability while running CDs at 32-speed. The drive looks identical to the CRW9624 that we tested in last year's CD writer group test, but is faster and includes buffer underrun protection in the form of JustLink support.

This technology was developed by

Ricoh, which claims it is better than Sanyo's BurnProof because it creates smaller gaps on the CDs when activated.

The AOpen is a very good performer – it is the fastest 12-speed recorder here and was one of the fastest in our packet writing tests.

Where the CRW1232A stumbles is in our read tests where it loses out a bit, but it's still more than adequate.

We feel that AOpen has produced a respectable drive with a very reasonable price tag. At just over £115 inc VAT it's very affordable and, although the Creative offers similar features, the AOpen outperforms it with ease.



Creative Blaster 12x10x32x

PRICE £97.95 (£83.36 ex VAT) **CONTACT** Buy.com 0800 376 5959 www.gb.buy.com

PROS Price-performance ratio; buffer underrun protection **CONS** Very basic software; no media

OVERALL One of the cheaper drives on the market but it needs better software and media in the box

SCORE ■■■■■■

Creative is more well known for its sound cards than its CD writers, although it has been making CD-RW drives for quite a while now.

The Blaster 12x10x32x is far from one of the fastest drives in this group test, but it does offer pretty good value for money, as it costs only £97.95 inc VAT. This is not bad for a unit featuring BurnProof buffer underrun protection as this usually adds a premium. However the Acer CRW1208A offers better value for money, being £11 cheaper. The Creative drive is, however, a better performer in most of the tests, even though it's no speed demon.

Our main complaint about the Blaster 12x10x32x is the software that Creative bundles with it, NTI CD Maker 2000 Professional. This is a package that we are unfamiliar with here at PCW and it is very basic compared to some other packages. Although this may be good for the novice, it will frustrate the more experienced user. The packet writing part of the software, NTI FileCD, is even worse, as it doesn't feature a 'send to' option for sending files straight from your directory to the CD-RW.

Although for this price the Creative package seems reasonable, the absence of any blank media lets it down.



Hewlett-Packard 9710i

PRICE £160.97 (£137 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Excellent bundle; reasonable performance **CONS** Expensive; no buffer underrun protection

OVERALL This would have been a serious contender with a lower price and buffer underrun protection

SCORE ■■■■■

Hewlett-Packard's 9710i is one of the latest drives from this world-renowned company. It can write CD-Rs at 16-speed as well as CD-RWs at 10-speed. It also reads CDs at up to 40-speed.

The 9710i produced disappointing results in our packet writing tests, where it was one of the slowest drives in the group. It fared a bit better in the CD-R tests, but the Plextor drive puts in a much more impressive show.

The HP did show some promise when formatting a blank CD-RW disc and it was also one of the better drives in the read tests. Our only major complaint is that HP

hasn't incorporated any buffer underrun protection in this drive, but it does have a massive 8MB buffer, which should go some way to ensuring that you don't ruin discs.

Where HP has outdone all the others is in the bundle it includes with the writer. You get a huge choice of software, as well as a CD labeller and some labels to start you off. We found the HP My CD software a bit too basic at times and it can get very frustrating but, thankfully, HP has also supplied a copy of Easy CD Creator 4 for the more advanced users.

Where the HP really loses out is its price which spoils the package somewhat.



LG CED-8120B

PRICE £96.34 (£81.99 ex VAT) **CONTACT** Simply 0870 727 2190 www.simply.co.uk

PROS Price; paper manuals **CONS** Poor performance; no buffer underrun protection

OVERALL A cheap drive that lacks many features that we would expect

SCORE ■■■■■

LG is yet another big manufacturer of computer components and, if you are a regular reader of *PCW*, you should be familiar with both its display products and its CD writers from our PC group tests. The CED-8120B is a pretty standard drive featuring 12-speed write, eight-speed rewrite and 32-speed read performance.

The CED-8120B costs only £96.34 inc VAT, which is not bad value for money, but when you consider that it doesn't feature any kind of buffer underrun protection, you realise that the Acer drive offers much better value for money.

Performance isn't all that good either,

making it quite a mediocre unit compared to the competition.

LG supplies multilingual manuals for both the drive and Easy CD Creator software. We feel this is quite an important feature, especially for users who are new to CD writers, as you don't have to search pdf files for the information you want.

Sadly, the LG drive doesn't perform well enough to make it stand out from the crowd and has little to offer compared to the competition. Although it is one of the cheaper drives, it lacks many features that other manufacturers have supplied with their models for less cash.



Mirai CRD-BP1500

PRICE £178.60 (£152 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Very fast CD-R performance; BurnProof **CONS** Slow CD-RW formatting

OVERALL A very fast drive. If CD-R burning is your thing, you'll want this

SCORE ■■■■■

Mirai is a name that has gained a lot of notoriety in the CD-RW market of late. It was one of the first manufacturers to implement Sanyo's BurnProof technology in a drive and has since produced a succession of high-quality, well-featured and very fast drives.

This model will write CD-Rs at a blistering 24-speed, CD-RWs at 10-speed and read CDs at 40-speed. Unsurprisingly, the Mirai tops the charts for CD-R writing, but this is offset by a disappointing 20 minutes to format a CD-RW disc. The CD-RW writing performance was far better, though.

The front fascia sports a single eject

button, two indicator lights and a headphone socket and volume wheel.

The software bundle consists of Nero 5.5 and InCD 2.11. You also get single CD-R and CD-RW discs, a paper manual and an EIDE cable.

Cutting-edge performance rarely comes cheap and the Mirai is one of the pricier drives on test at £152 ex VAT. That said, if you burn a lot of CD-Rs, that could be money well spent considering how fast the Mirai can burn a disc.

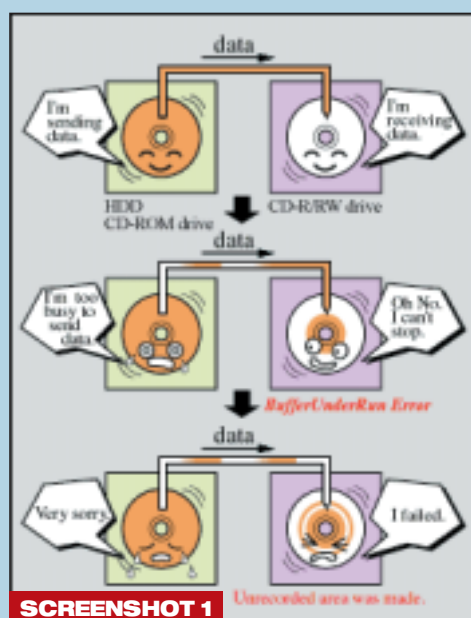
If you're after the fastest CD-R burner around and don't mind paying for the privilege, this is it.



WHAT IS BUFFER UNDERRUN PROTECTION?

The major change to affect the CD writers market recently has been the introduction of buffer underrun protection. This technology was developed to help prevent users creating what are generally known as 'coasters'. When something goes wrong during the write process, resultant discs are useless, apart from as coasters for your coffee.

The first company to offer this kind of technology was Sanyo, with BurnProof (Buffer Under RuN Proof). Although the company doesn't sell any drives under its own name in the UK, many of its products are branded by Mirai, and other companies also re-brand Sanyo drives for the UK market.



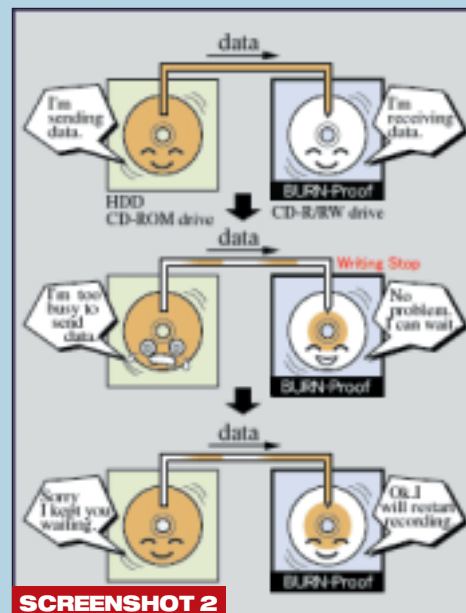
SCREENSHOT 1 The coaster syndrome: the CD writer isn't receiving enough data but...

If you have a drive without any kind of buffer underrun protection you will end up with a coaster if your CD writer doesn't receive enough data from the source drive (see screenshot 1 below), but if, on the other hand, you have a drive that features some kind of buffer underrun protection the CD writer will pause and continue when it receives data again (see screenshot 2). This produces tiny gaps on the CD that you're creating, but they are so small that they are within the error correction system that is built in to all CD-ROM drives.

Sanyo charges a royalty fee for the BurnProof technology, so other manufacturers have decided to produce their own buffer underrun protection systems. First up was Ricoh with JustLink but, as you have probably noticed while reading this group test, several other technologies have recently appeared, such as Yamaha's Safe Burn, Oak's ExaLink (used by Mitsumi) and Acer's SeamlessLink. All these technologies offer the same kind of features as Sanyo's BurnProof but are later developments, some even improving on the original.

Sanyo has revised BurnProof once and made the gap on the finished CDs smaller, although Ricoh claims that its JustLink technology produces virtually no gap at all.

So, is it foolproof? No, you can still get coasters because the buffer underrun protection systems aren't flawless. If the loss of data lasts too long the buffer



SCREENSHOT 2 ...with buffer underrun protection the CD writer will be able to create your discs successfully

underrun protection will finally fail because the general consensus is that they are equal to a physical buffer of about 40-50MB worth of data. Neither does it work if your system blue screens or crashes, but it does allow you to use other applications on your computer at the same time that you are making CDs and this is a big step forward.

If you are interested in more information about BurnProof, take a look at Sanyo's website at www.sannet.ne.jp/BURN-Proof.

When it comes down to brass tacks, buying a drive with no buffer underrun protection these days would be a false economy.

CD MEDIA IN ALL THE COLOURS OF THE RAINBOW

There are several types of CD media to choose from and it's hard to know what to buy. Nowadays you can get media in all the colours of the rainbow with the reflective made out of various different materials, such as gold, silver and aluminium.

Every manufacturer seems to have its own combination of reflective layers and dye, which is the layer on the disc that you actually make changes to when you 'burn' a CD. There are generally only five different dyes and these consists of Cyanine which is blue, Phthalocyanine which is clear, Metallized Azo is another blue dye (patented by Verbatim), Advanced Phthalocyanine which is clear and, finally, Formazan which is a hybrid Cyanine/Phthalocyanine developed by Kodak.

Kodak also makes a reflective layer out of a gold/silver mix that is meant to be better than using a silver-only reflective layer.

Unlike an ordinary CD, CD-Rs have an organic dye recording layer between the polycarbonate substrate and the light-reflective layer. When you record data to a blank disc the dye is melted by the laser beam and creates a series of pits. The polycarbonate substrate is etched with a spiral pre-groove, which is used for guiding the laser beam when you write to the media so the pits end up in straight lines. The pits contain the data on the disc and since they are extremely stable, CD-R media is ideal for long-term data storage.

So what should you look for when choosing your media? Well, the discs that have a gold

reflective layer combined with Phthalocyanine dye have a quoted archival life of up to 100 years, whereas the Cyanine dye in combination with a reflective layer of silver is only said to have a life span of about 20 to 50 years. Verbatim's Metallized Azo dye, on the other hand, has a quoted lifetime equal to that of gold discs.

The most important thing of all is that the media you choose works well with your CD writer and can be read in as many CD-ROM drives as possible, but there is no easy answer as to what media to choose, because price also has an important part to play.

If you want to know more about CD media, point your web browser at www.cdrfaq.org or www.cdmediaworld.com.

Mitsumi CR4808TE-SE

PRICE £119 (£101.27 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Buffer underrun protection; price **CONS** Slow rewrite speed

OVERALL A massive step forward, this is the best Mitsumi drive we've seen

SCORE ■■■■■

Mitsumi doesn't have the best reputation when it comes to CD writers, but we were quite impressed with the 4808TE. Mitsumi has bumped up the speed of its drives quite a bit recently and this one boasts 16-speed write, eight-speed rewrite and 40-speed read. We find it a bit odd that Mitsumi has gone for eight-speed rewrite performance rather than 10-speed, as this does have an impact on results of the packet writing tests.

Write performance is above average for a 16-speed model, but the packet writing tests are not as impressive, although it is the fastest of the eight-speed drives here. It

also performs quite well in our read test where it is among the top three.

Mitsumi has included ExaLink, a buffer underrun prevention technology from Oak Technologies. What is interesting is that the Special Edition version of the drive that we got for review features an additional 8MB buffer. This was an early sample and we were told that a future firmware upgrade will make the drive UltraDMA33 compliant.

Our only real complaint is that the Mitsumi would not write to our Sony test media and we were forced to use different media.

Overall not bad going by Mitsumi and this is definitely a step in the right direction.



Plextor PX-W1610A

PRICE £153.92 (£131 ex VAT) **CONTACT** Dabs.com 0870 4229 3120 www.dabs.com

PROS Great build quality; fast for a 16-speed **CONS** Not as fast as the 24-speed drives

OVERALL A high-quality fast drive at a very reasonable price

SCORE ■■■■■

Plextor has a well deserved reputation for producing high-quality optical drives with impressive build quality and speedy performance and this unit is no exception. The other thing that's always been synonymous with Plextor is the price premium you pay for all this high quality, but in this case, with a price of only £131 ex VAT, the PlexWriter is cheaper than much of the competition.

Compared to the 24-speed drives on test, the Plextor impresses with its 16-speed CD-R writing performance, pushing the drive towards the top of the pile in all the tests. The drive also boasts Sanyo's BurnProof technology.

Plextor made its name producing SCSI drives and the EIDE models do resemble the poor relations of the SCSI range. Missing are the multiple indicator lights and CD play control buttons. What you do get is a single eject button, an indicator light plus a headphone socket and volume wheel.

In the box you get single CD-R and CD-RW discs along with an EIDE cable, mounting screws and a manual eject pin. Software comes in the form of WinOnCD 3.8, DirectCD 5.0 and a Plectools utility disc.

The Plextor may not be cutting edge, but it is still a great drive with commendable performance.



Ricoh MP-7200A

PRICE £157.44 (£134 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Fast CD-RW writes; very fast reads **CONS** Very slow at CD-RW format

OVERALL If you can live with the slow CD-RW formatting the Ricoh is worth a look

SCORE ■■■■■

Ricoh is a big name in the CD drive arena and other manufacturers often rebadge units that are originally made by Ricoh.

The MP-7200A will write CD-R media at 20-speed and CD-RW media at 10-speed, while CDs are read at 40-speed. This places it between the 24-speed and 16-speed drives, but the 16-speed Plextor manages to outperform the Ricoh in the cover write test, and comes in only three seconds behind it in the VideoCD write test.

Where the Ricoh drive falls down is in formatting CD-RW discs, where it took an incredible 39 minutes to perform the format. When it came to writing to CD-RW

media, however, the Ricoh was one of the best on test. The Ricoh was also the fastest drive in two of the read tests, while turning in a respectable fourth in the third test.

On the front fascia you'll find a round eject button, an indicator light, a headphone jack and a volume wheel.

Burning duties are done by the popular Nero, while InCD handles packet writing.

Deciding against BurnProof technology for buffer underrun protection, Ricoh has gone with its own JustLink instead.

With a price of £134 ex VAT the Ricoh is a good drive that is only let down by its CD-RW format time.



GROUP TEST EIDE CD-RWS

Samsung SW-212B

PRICE £80.03 (£68.11 ex VAT) **CONTACT** redstore.com 0870 870 4457 www.redstore.com

PROS Cheapest on test **CONS** Poor performance; no buffer underrun protection

OVERALL A cheap drive, but you're better off saving a bit more for the Acer

SCORE ■■■■■

Samsung has been trying hard to shake off its 'low-cost option' mantle. With millions being spent on advertising and a massive sponsorship deal at the Sydney Olympics, chances are that more people have heard of this Korean company than ever before.

The SW-212B had a tough time against the competition, being out-gunned on many levels. The drive will write CD-Rs at 12-speed, CD-RWs at 10-speed and read CDs at 32-speed. This kind of specification is far from cutting edge and, to add to the problems, the Samsung doesn't have any form of buffer underrun prevention. This means that you'll have to stop working at

your PC when burning a disc in case the buffer runs dry and the disc is ruined.

That said, the Samsung does have one thing in its favour; price. At only £68.11 ex VAT, this is the cheapest drive on test, which makes us a little bit more forgiving.

In the box are copies of Adaptec's Easy CD Creator 4 and DirectCD 3, an EIDE cable, fixing screws, audio cable and manual.

On the surface it looks like you're getting a lot for your money, despite the poor performance. But when you consider that the similarly performing Acer drive is only a bit more expensive and has buffer underrun protection, it's hard to recommend the SW-212B.



Sony CRX200E

PRICE £189 (£160.85 ex VAT) **CONTACT** Sony 00800 262 37669 www.sony-cp.com

PROS High-density writing; black fascia **CONS** Low specification; lacklustre performance; black fascia

OVERALL A unique drive for a unique market

SCORE ■■■■■



There are two things that set this Sony apart from the competition. The first is that it has a black fascia which looks good until you put it into a beige PC.

The second, and far more important, is that it's a high-density CD-R drive. A normal CD-R disc can store between 650 and 700MB, but the CRX200E can use special high-density discs that can store up to 1.3GB of data. At first glance this looks like a great feature, and almost justifies purchase by itself, until you realise that the high-density discs can only be read in a high-density drive. One of the best things about CD-R media is that it can be read in

any PC with a CD-ROM drive, which is just about any PC you're likely to come across, but this inter-compatibility is lost with the high-density discs. That said, if you do a lot of high-capacity data archiving it could be very useful.

Specification of the Sony is a little below par, with CD-R and CD-RW write performance of 12- and eight-speed respectively. Write performance was understandably uninspiring, but the CRX200E did perform all the read tests.

If you really need the high-density feature the Sony's worth considering. If not, there are better units on test.

TDK Cyclone 24/10/40

PRICE £192.69 (£164 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Very fast write speeds; buffer underrun protection **CONS** Pricey

OVERALL Different looks and good performance, but the TDK loses out against the cheaper Mirai

SCORE ■■■■■

TDK has only recently started producing CD writers, but has so far done quite well.

All TDK drives are based on Sanyo mechanisms and because of this they all feature BurnProof buffer underrun prevention technology. This was the first commercially available buffer underrun technology and the TDK Cyclone features the second generation of BurnProof.

As you can tell from the model name this is a 24-speed writer with 10-speed rewrite and 40-speed read capability. This makes it one of the fastest drives in this round-up, at least on paper. In our write tests it comes second only to the Mirai drive, but we're

talking seconds rather than minutes. It did not do quite as well in the packet writing tests but it still performed above average.

One thing worthy of mention is that the trays on the Cyclone range of drives are made out of see-through blue plastic rather than the more conventional grey colour.

We did experience some problems in our read tests with the TDK drive but, as explained in the 'how we test' section on page 183, this seems to be more down the systems we used than the drive itself.

Where the TDK ultimately loses the battle is price. It is £14 more expensive than the faster Mirai.



Teac CD-W516EK

PRICE £159.99 (£136.16 ex VAT) **CONTACT** Microwarehouse 0870 555 000 www.microwarehouse.com

PROS BurnProof; manual **CONS** Low specification; relatively expensive

OVERALL There are better drives on test for less

SCORE ■■■■

Teac is probably better known as a manufacturer of high-end hi-fi products, but it's also been a regular contributor to the PC optical drive market for some time.

Compared to the rest of the group test, the CD-W516EK is hardly what you'd call cutting edge, with write speeds of 12-speed for CD-R and 10-speed for CD-RW media, while CDs are read at 32-speed. Unfortunately the price doesn't reflect the specification, with the Teac costing more than some of the 16- and 20-speed drives here. That said, performance was reasonable with the Teac sitting mid-table in the CD-R tests and clawing its way close to the

top in the VideoCD CD-RW write test. We did have compatibility problems with our test rigs, though, which meant that the Teac wouldn't perform two of the read tests.

Like most on test, this drive is fairly unremarkable to look at. There's an eject button, two indicator lights, a headphone jack and a volume wheel. There's an impressive printed manual in eight different languages, while burning duties are taken care of by Nero and packet writing handled by InCD. BurnProof looks after buffer underrun problems.

This isn't a bad drive, but it's eclipsed by the stronger competition.



Waitec T-Rex 16x10x40x

PRICE £179.78 (£153 ex VAT) **CONTACT** Avalon IT Supplies 01582 404 443 www.avaloneuro.co.uk

PROS Buffer underrun protection **CONS** Software package; performance; price

OVERALL A poor show from Waitec and it's expensive, but it does offer buffer underrun protection

SCORE ■■■

Waitec is a new name to us here at *PCW*, but it has been making CD writers for quite some time and the company offers a wide range of drives. The T-Rex is one of the most recent models, which features BurnProof technology to prevent buffer underruns.

You might recognise the T-Rex, as it is very similar to the Mirai. This is because Sanyo makes both of these drives. Sadly, aside from looks, the T-Rex was nothing like the Mirai, as it was the worst performing 16-speed writer of the lot and the only drive that had problems with the packet writing tests.

However, it is worth pointing out that it was the fastest drive at formatting CD-RW media. It was also one of the slowest drives in our read test.

Both software packages that come with the T-Rex – Prassi's PrimoCD Plus and abCD for packet writing – were also unfamiliar to the *PCW* team. PrimoCD Plus is awkward to use and abCD doesn't support the 'send to' option in Windows that most other packet writing software packages support.

Sadly, Waitec has not impressed us and, with a price of £179.78 inc VAT, it is the worst value for money of all the drives on test.



Yamaha CRW2200E

PRICE £172.72 (£147 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Consistently good performance; 8MB buffer **CONS** Not as fast as 24-speed drives

OVERALL A great all-round CD writer

SCORE ■■■■■

Yamaha makes everything from motor-bikes to pianos, but still has time to dabble in the PC optical media market.

The Japanese company is usually at the cutting edge of CD-RW performance, but this drive is one step behind some of the competition sporting 20-speed CD-R performance rather than the 24-speed seen elsewhere. It also writes CD-RWs at 10-speed and reads CDs at 40-speed.

In every write test, the Yamaha placed in the top three, while topping the charts in the two CD-RW drag-and-drop writes. This is an impressively consistent performance, but it did fail to perform one of the read tests.

Yamaha has implemented Safe Burn, which does much the same job as BurnProof by preventing buffer underruns. To make sure a steady stream of data reaches the write head, there's also an 8MB buffer.

In the box you'll find an in-depth paper manual and copies of Nero 5.5, InCD 2.11 and NeroMix 1.2.

Like most drives these days, this one doesn't have CD controls on the front, sporting only an eject button, indicator light, volume wheel and headphone jack.

At £147 ex VAT the Yamaha isn't cheap, but it is the most consistent performer of all those on test, making it an attractive choice.



lomega Predator Firewire

PRICE £250.21 (£212.94 ex VAT) **CONTACT** Buy.com 0800 376 5959 www.gb.buy.com

PROS Portable; small **CONS** Price; slow

OVERALL If you're after a portable drive that can connect to almost anything this is worth a look

SCORE ■■■■

lomega is usually associated with Zip and Jaz drives, but it has been making USB CD writers for some time now.

The Predator, the first of our FireWire drives, is based on a laptop drive rather than an internal unit in an external box. It looks snazzy compared to the drives from LaCie and Sony and is about half the size. This is partly because it uses an external power supply rather than a built-in power unit, but this makes it much more portable.

lomega also provides an optional USB adaptor that replaces the FireWire adaptor on the back of the drive, but this slows down performance to 4x 4x 6x.

When the Predator is connected through the FireWire interface it can write CDs at eight-speed and read them at 32-speed, but the rewrite performance is still only four-speed. This makes the Predator the slowest drive in this month's group, but the portability just might make up for this.

The FireWire interface makes the Predator Mac compatible and lomega supplies a copy of Toast CD writing software. The performance is a bit lacklustre, but we can forgive this to an extent as the Predator is in a different league. What we can't forgive is the high price. At a massive £250.21 inc VAT it is hard to recommend.



LaCie StudioDrive

PRICE £292.57 (£249 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Both FireWire and USB; PC and Mac compatible **CONS** Price; not as fast as expected

OVERALL A versatile drive but at a very high price, putting it out of the reach of many users

SCORE ■■■■

LaCie is the only company in this round-up that only produces external drives – and it shows. The StudioDrive FireWire is the only external drive to feature both FireWire and USB interfaces, which makes it the most versatile drive out of the external units, although you can get the optional USB connector for the lomega.

The casing is the same as the one Sony used for its external drives in our last CD writer group test, but in a different colour scheme. The drive itself comes from Yamaha and is a 16x 10x 40x model, the fastest external model on test.

There is an 8MB buffer but, sadly, no

buffer underrun protection, however none of the other external drives have this feature, which levels the playing field.

The write performance is not quite up to the speed of the internal 16-speed writers and the Sony CRX1600L-RP was a good bit faster in our packet writing test.

The software bundle features both Easy CD Creator 4 and Toast for Mac, making the LaCie an excellent choice if you own both a PC and a Mac.

We were impressed with the StudioDrive but it comes at a very high cost. The extra speed the StudioDrive gives you doesn't warrant the extra cost over the Sony.



Sony LRX1600L-RP

PRICE £226.77 (£193 ex VAT) **CONTACT** Dabs.com 0870 429 3120 www.dabs.com

PROS Price; rewrite performance **CONS** No USB option

OVERALL A very impressive unit from Sony that offers better value than the competition

SCORE ■■■■■■

Sony has been producing FireWire drives for quite a while now, although it prefers to call the technology i.LINK. We saw the first Sony FireWire drive in our last CD writer group test back in June 2000, in the shape of the CRX120Ei-DV.

Since then, Sony has redesigned the whole package and now uses a better casing as well as a much faster drive.

The CRX1600L-RP features a 12x 8x 32x drive which, on paper, makes it the second fastest of the external models. It is interesting to note that the Sony was faster than the LaCie in our packet writing test, even though it has a slower rewrite spec of

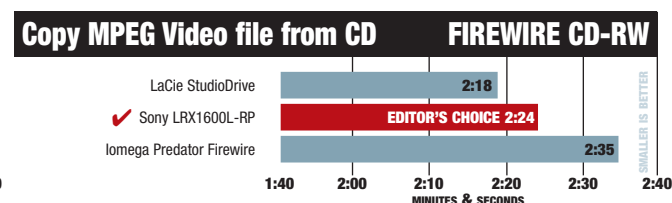
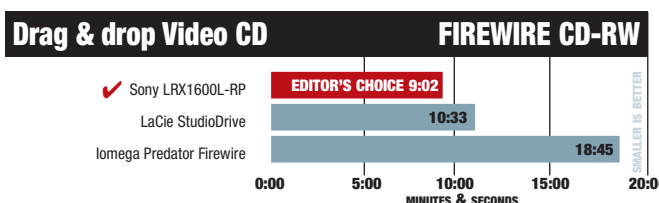
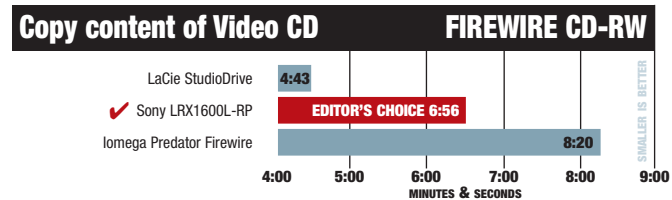
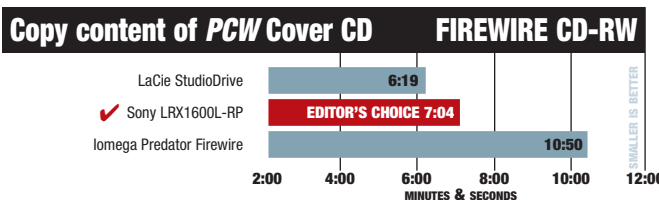
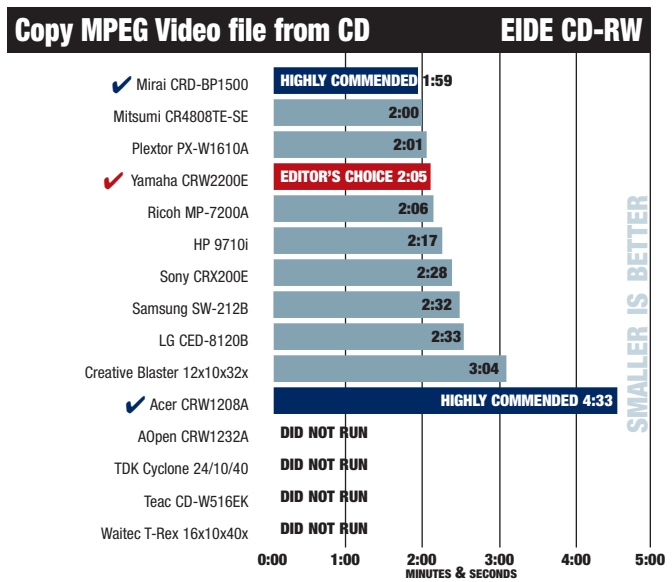
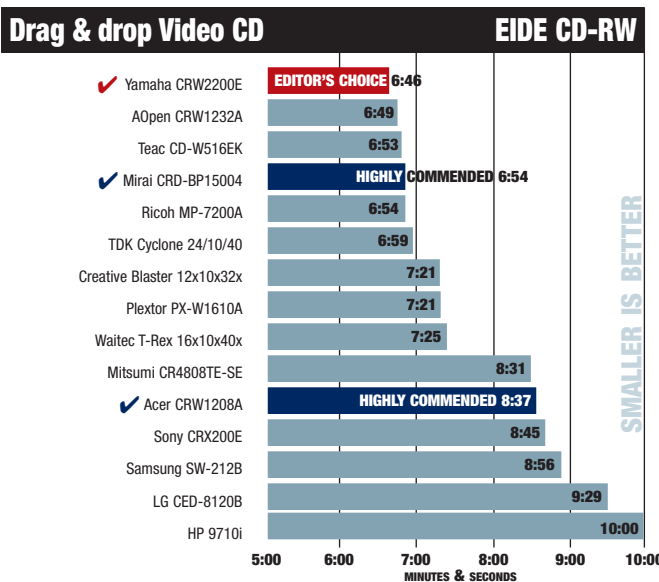
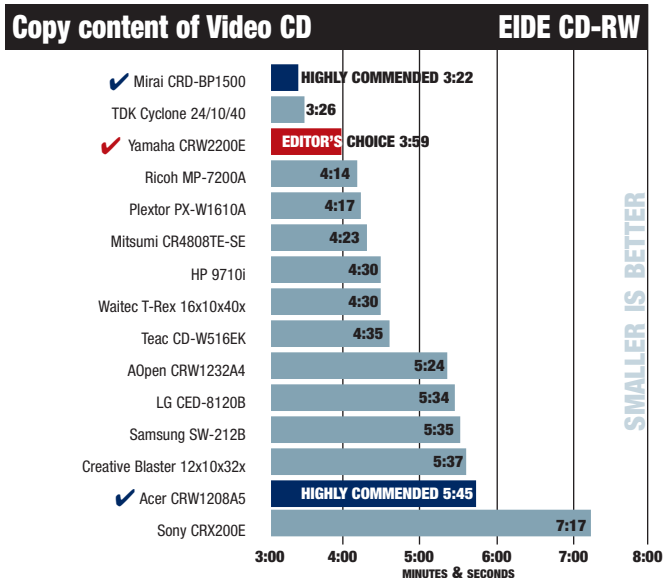
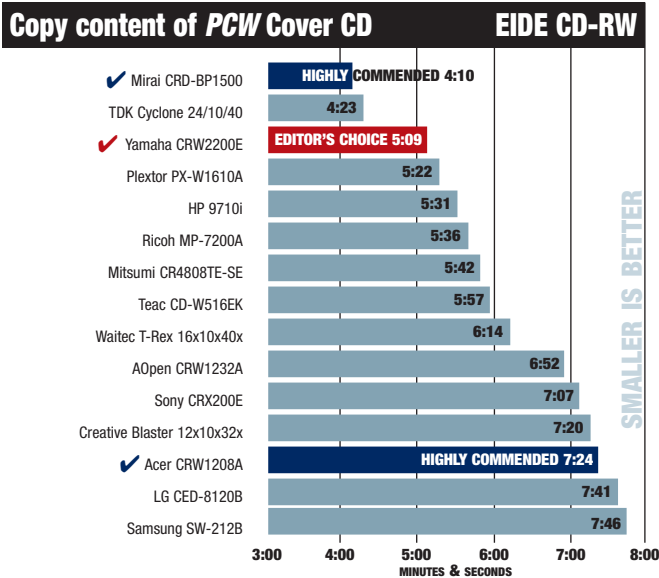
eight-speed compared to LaCie's 10-speed. It even outperforms most of the 12-speed internal drives in the cover disc write test, which is very impressive

Sony has included both a 6pin-to-6pin FireWire cable and a 4pin-to-6pin cable that allows you to use the drive with most notebooks that feature the smaller FireWire connector. Sony has also supplied Mac software for Apple's latest babies.

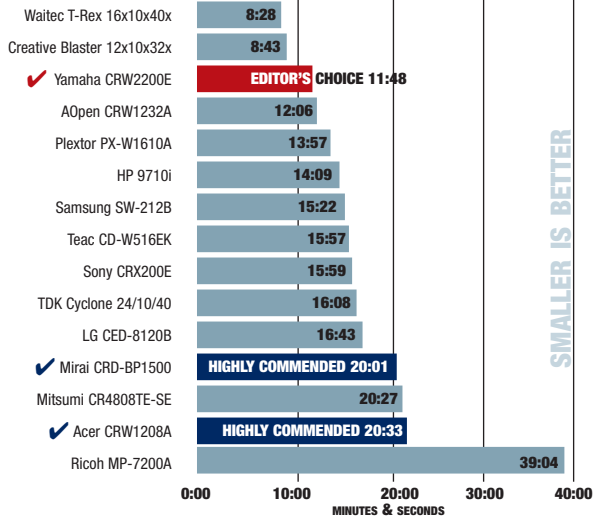
When you consider that the Sony CRX1600L-RP is the cheapest of the FireWire drives on test here, it makes it a very tempting proposition if you want an external or transportable model.



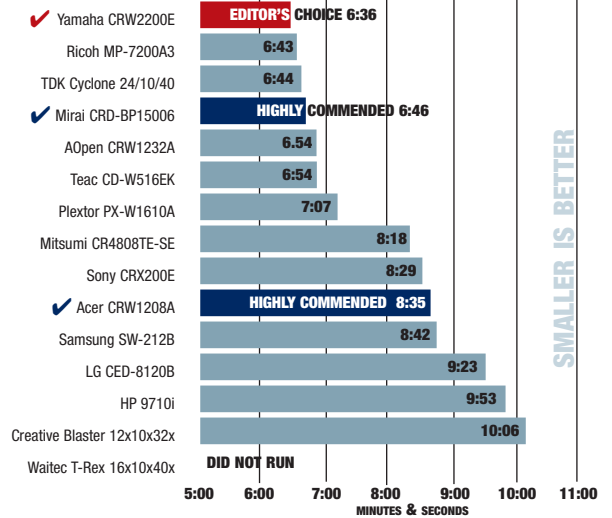
LAB RESULTS



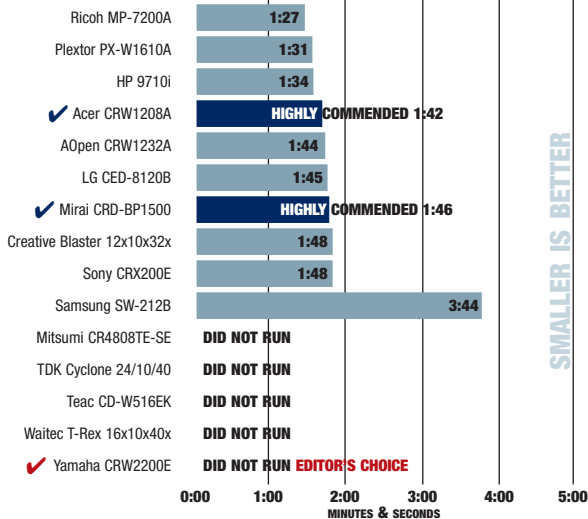
Format CD-RW media EIDE CD-RW



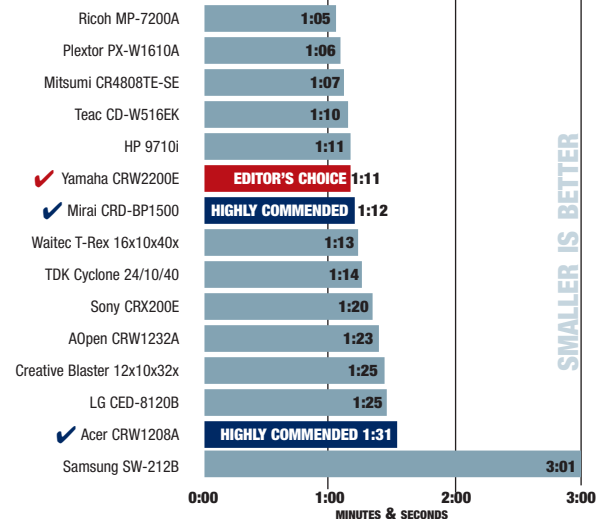
Drag & drop PCW Cover CD EIDE CD-RW



Copy mixed files CD to hard drive EIDE CD-RW



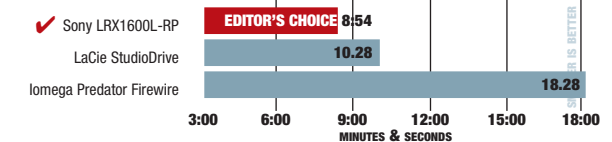
PaintShop Pro browse of tifs EIDE CD-RW



Format CD-RW media FIREWIRE CD-RW



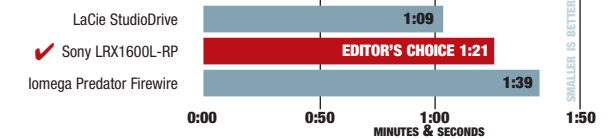
Drag & drop PCW Cover CD FIREWIRE CD-RW



Copy mixed files CD to hard drive FIREWIRE CD-RW




PaintShop Pro browse of tifs FIREWIRE CD-RW



Please see page 183 for an explanation of how we tested the CD-RWs



TABLE OF FEATURES



MANUFACTURER	ACER	AOPEN	CREATIVE	HP	LG
MODEL NAME	CRW1208A	CRW1232A	BLASTER 32X12X10X	9710I	CED-8120B
Price inc VAT (ex VAT)	£86.74 (£73.82)	£115.14 (£98)	£97.95 (£83.36)	£160.97 (£137)	£96.34 (£81.99)
Manufacturer URL	www.acer.com/uk	www.aopen.nl	www.creative.com	www.hp.co.uk	www.lg.co.kr
Supplier	redstore.com	Dabs.com	Buy.com	Dabs.com	Simply
Telephone	0870 870 4457	0870 429 3120	0800 376 5959	0870 429 3120	0870 727 2190
Supplier URL	www.redstore.com	www.dabs.com	www.gb.buy.com	www.dabs.com	www.simply.co.uk
HARDWARE SPECS					
CD-R write/CD-RW write/CD read speeds	12x/8x/32x	12x/10x/32x	12x/10x/32x	16x/10x/40x	12x/8x/32x
Buffer size	4MB	2MB	2MB	8MB	2MB
Buffer underrun protection/type	✓/SeamlessLink	✓/JustLink	✓/BurnProof	x/N/A	x/N/A
Interface	EIDE	EIDE	EIDE	EIDE	EIDE
Front panel controls	Eject, Play/Skip, Volume	Eject, Volume	Eject, Volume	Eject, Volume	Eject, Play/Skip, Volume
Front panel sockets	Headphones	Headphones	Headphones	Headphones	Headphones
Analog audio out/digital audio out	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
Cables supplied	Audio	Audio, EIDE	Audio, EIDE	Audio, EIDE	Audio, EIDE
SOFTWARE					
CD-R authoring software	Nero 5.0.4.1	Nero 5.0.3.6	NTI CD Maker 2000 Professional	HP MyCD 2.61 & Easy CD Creator 4.02c	Easy CD Creator 4.02c
CD-RW packet writing software	InCD 1.6	InCD 1.6	NTI FileCD 1.7.2	DirectCD 3.01d	DirectCD 3.01c

* Firmware upgrade will add UltraDMA33

TABLE OF FEATURES

MANUFACTURER	TEAC	WAITEC	YAMAHA	IOMEGA	LACIE	SONY
MODEL NAME	CD-W516EK	T-REX 16X10X40X	CRW2200E	PREDATOR FIREWIRE	STUDIODRIVE CD-RW FIREWIRE	SONY CDRX1600L-RP
Price inc VAT (ex VAT)	£159.99 (136.16)	£179.78 (£153)	£172.72 (£147)	£250.21 (£212.94)	£292.57 (£249)	£226.77 (£193)
Manufacturer URL	www.teac.co.uk	www.waitec.com	www.yamaha.co.uk	www.iomega.co.uk	www.lacie.co.uk	www.sony.co.uk
Supplier	Microwarehouse	Avalon IT Supplies	Dabs.com	Buy.com	Dabs.com	Dabs.com
Telephone	0870 555 000	01582 404 443	0870 429 3120	0800 376 5959	0870 429 3120	0870 429 3120
Supplier URL	www.microwarehouse.com	www.avaloneuro.co.uk	www.dabs.com	www.gb.buy.com	www.dabs.com	www.dabs.com
HARDWARE SPECS						
CD-R write/CD-RW write/CD read speeds	12x/10x/32x	16x/10x/40x	20x/10x/40x	8x/4x/32x	16x/10x/40x	12x/8x/32x
Buffer size	2MB	2MB	8MB	2MB	8MB	4MB
Buffer underrun protection/type	✓/BurnProof	✓/BurnProof	✓/Safe Burn	x/N/A	x/N/A	x/N/A
Interface	EIDE	EIDE	EIDE	FireWire	FireWire	FireWire
Front panel controls	Eject, Volume	Eject, Volume	Eject, Volume	Eject, Volume	Eject (Volume behind flap)	Eject, Volume
Front panel sockets	Headphones	Headphones	Headphones	Headphones	Headphones behind flap	Headphones
Analog audio out/digital audio out	✓/✓	✓/x	✓/✓	✓/x	✓/x	✓/x
Cables supplied	Audio, EIDE	Audio, EIDE	Audio, EIDE	1 x FireWire, Audio	1 x FireWire, 1 x USB, Audio	2 x FireWire, Audio
SOFTWARE						
CD-R authoring software	Nero 5.5.0.4	Prassi PrimoCD Plus 2.0726	Nero 5.5.1.8	Easy CD Creator 4.02d	Easy CD Creator 4.02e/Toast	WinOnCD 3.7
CD-RW packet writing software	InCD 2.11	Prassi abCD	InCD 2.11	InCD 3.02d	Direct CD 3.02e	Direct CD 3.01c



MIRAI	MITSUMI	PLEXTOR	RICOH	SAMSUNG	SONY	TDK
CRD-BP1500	CR4808TE-SE	PX-W1610A	MP-7200A	SW-212B	CRX200E	CYCLONE 24/10/40
£178.60 (€152)	£119.99 (€101.27)	£153.92 (€131)	£157.44 (€134)	£80.03 (€68.11)	£189 (€160.85)	£192.69 (€164)
www.mirai-technologies.com	www.mitsumi.de	www.plextor.be	www.ricoh.co.uk	www.samsung-europe.com	www.sony-cp.com	www.tdk-europe.com
Dabs.com	Dabs.com	Dabs.com	Dabs.com	redstore.com	Sony	Dabs.com
0870 429 3120	0870 429 3120	0870 429 3120	0870 429 3120	0870 870 4457	00800 262 37669	0870 429 3120
www.dabs.com	www.dabs.com	www.dabs.com	www.dabs.com	www.redstore.com	www.sony-cp.com	www.dabs.com
24x/10x/40x	16x/8x/40x	16x/10x/40x	20x/10x/40x	12x/10x/32x	12x/8x/32x	24x/10x/40x
2MB	8MB	2MB	2MB	2MB	8MB	2MB
✓/BurnProof	✓/Exaclink	✓/BurnProof	✓/JustLink	x/NA	x	✓/BurnProof
EIDE	EIDE*	EIDE	EIDE	EIDE	EIDE	EIDE
Eject, Volume	Eject, Volume	Eject, Volume	Eject, Volume	Eject, Volume	Eject, Volume	Eject, Volume
Headphones	Headphones	Headphones	Headphones	Headphones	Headphones	Headphones
✓/✓	✓/x	✓/✓	✓/✓	✓/x	✓/x	✓/✓
Audio, EIDE	Audio, EIDE	Audio, EIDE	Audio, EIDE	Audio, EIDE	Audio, EIDE	Audio, EIDE
Nero 5.5.1.6	Nero 5.5.2.4	WinOnCD 3.8	Nero 5.0.4.1	Easy CD Creator 4.02e	WinOnCD 3.8	Nero 5.5.2.4
InCD 2.11	InCD 2.11	DirectCD 5.0	InCD 1.6	DirectCD 3.01e	DirectCD 5	InCD 2.2.4.4

HOW WE TEST

CD-RWs need to be speedy at writing, formatting and reading, and here's how we tested this bunch

The technology behind CD-RW drives hasn't changed much since the last time we did a group test, so we decided to use the same tests we employed last year, although we made one change. In the CD copy test (see below) we decided to use a much newer *PCW* cover disc as this allows readers to have a go at home and see how well their systems compare. As always, these results are not comparable to any other tests run on a different platform.

We used a Systemax 1.3GHz PC with an Ultra 160 Adaptec SCSI card and 9.1GB Seagate Cheetah hard drive to prevent any bottlenecks as far as file transfers were concerned.

Each drive was tested with the software supplied by the manufacturer. We wanted to test the package out of the box, since this is how most users will be doing it.

The media we used was supplied by first4media (www.first4media.com) as it is one of the first companies to offer 24-speed certified media.

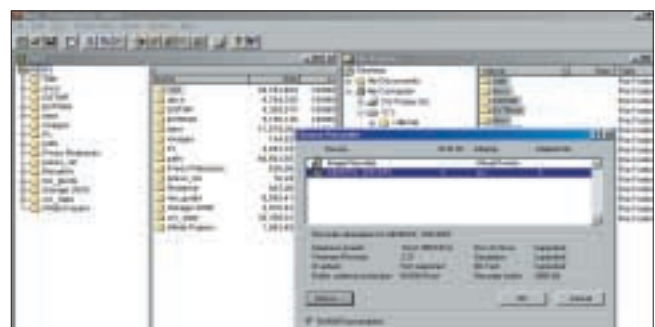
Our initial tests measured the performance of the drives when they were writing CD-Rs. We used the June issue's cover disc, which totalled 646MB of data consisting of multiple files and folders. We also used a Video CD (505MB of data) which tested the drives' ability to write a single very large file. We timed how long it took each CD-R to write the two sets of data to CD (see the graphs on page 180 for the results).

These two tests pretty much evaluate the bread and butter work these drives will have to do, whether burning digital music or data files.

Our next test concerned rewrite ability and was in three parts.

First, we wanted to see how long it took to format a CD-RW disc for packet writing. This has to be done before a CD-RW disc can be used. If you're in a hurry and don't have a formatted disc, a quick format time could be invaluable.

Next, we tested how good the drives were at packet writing by first



Nero 5.5 in action

copying a *PCW* cover CD (491MB of data) and then again the Video CD (505MB). These two tasks show how fast the drives can deal with a large amount of data split into multiple files and folders, as well as how quickly they can write a very large single file.

Most CD-RWs are used as a primary read drive, so, our final three tests concerned read speeds.

We first copied an MPEG file from the Video CD on to the hard disk to see how well the drives coped with

copying a single 495MB file. We did the same with 214MB of mixed files.

For the final test we used a CD consisting of 44 tif files (203MB) then used PaintShop Pro to browse the images, timing the operation. Unfortunately many of the drives would not run some of the read tests. This could be caused by compatibility problems with our test systems rather than the drives themselves, since many different makes and models stumbled at this hurdle.

Editor's Choice

Today almost every PC ships with a CD writer as standard and the humble CD has become the *de facto* storage standard as the size of software and files keeps getting bigger. But you can do so much more with a CD writer than just storing files; you can make your own music compilations, you can use it for system backups and you can even put your home videos on CD and play them back in your DVD player.

Things have changed quite a bit since last year's group test and this time around there are no SCSI or combo (CD-RW/DVD) drives. Although both are still available, neither seems to be popular any more. What we are starting to see is more of is FireWire drives as they are easier to install than USB drives and offer far better performance.

The second big change since our last round-up is the inclusion of buffer underrun protection in most of the drives. Take a closer look at the box on page 170 to find out more about how buffer underrun protection works. All in all it's one of the best additions to CD writer technology, as it almost eliminates 'coasters' (useless discs).

Another trend is faster drives and this is a fact of life when you deal with anything computer related. We've seen speeds double since our last CD writer group test in June 2000, where the fastest drive on test was a 12-speed writer from Plextor, although this drive only supported rewrite speeds of four-times. The fastest drives this time around feature 24-speed write and 10-speed rewrite performance, which is a significant jump, especially if you use the packet writing feature of the drives a lot. Most of these drives are excellent units and price is more of an issue now than it was a year ago, as the performance of even the slowest drives is still acceptable for most uses.

The winners

Our first **Editor's Choice** goes to the **Yamaha CRW2200E**, which was a consistently good performer no matter what we threw at it. Yamaha is also a well-known brand with a strong reputation for quality components. The drive features both an 8MB buffer as well as Yamaha's Safe Burn technology to help prevent buffer underruns. It is not

the cheapest drive on test, but we still feel that it offers good value and solid performance. Yamaha supplies a copy of Nero 5.5 for creating CDs as well as InCD for packet writing. As an added bonus you also get a copy of Nero Mix 1.2. The CRW2200E is a solid performer with excellent build quality, making it an all-round winner.

Our second **Editor's Choice** goes to the **Sony CRX1600E-RP**, which is an external FireWire drive. Sony offers this unit at a much more attractive price than the competition and this, together with good performance, makes the Sony the most attractive of the FireWire models. On the down side the CRX1600E doesn't feature USB, which is something LaCie has as standard and Iomega offers as an option, but this is only important if you intend to use the drive on a non FireWire system.

Sony has bundled two FireWire cables, one of which features the smaller connector that Sony uses on its laptops. Our only complaint about the CRX1600E is that it lacks any kind of buffer underrun protection, but then none of the external units offered this feature.

The first **Highly Commended** award goes to **Acer** and its **CRW1208A** as this drive offers unbelievable value for money at £86.74 inc VAT. The performance of the CRW1208A might not compete with the likes of the Yamaha and Mirai but it is still more than adequate for the average home user. It does also feature Acer's SeamlessLink buffer underrun protection system together with a 4MB buffer. If you are after a good drive for under £100 the CRW1208A is an excellent choice.

Finally our last **Highly Commended** award goes to the **Mirai CRD-BP1500**. This drive produced the fastest times in our write tests and, together with the TDK it's one of the first 24-speed drives to grace the *PCW* offices. Sadly it didn't top the charts in the rest of our tests but still performed well. It is slightly more expensive than the Yamaha and this together with the slower packet writing performance lost Mirai the Editor's Choice award, but it's still worthy of a Highly Commended badge.

Also worth a mention is Mitsumi, which, contrary to expectations, submitted a respectable drive at a great price.



Yamaha CRW2200E



Sony CRX1600E-RP



Acer CRW1208A



Mirai CRD-BP1500

It was a good performer no matter what we threw at it