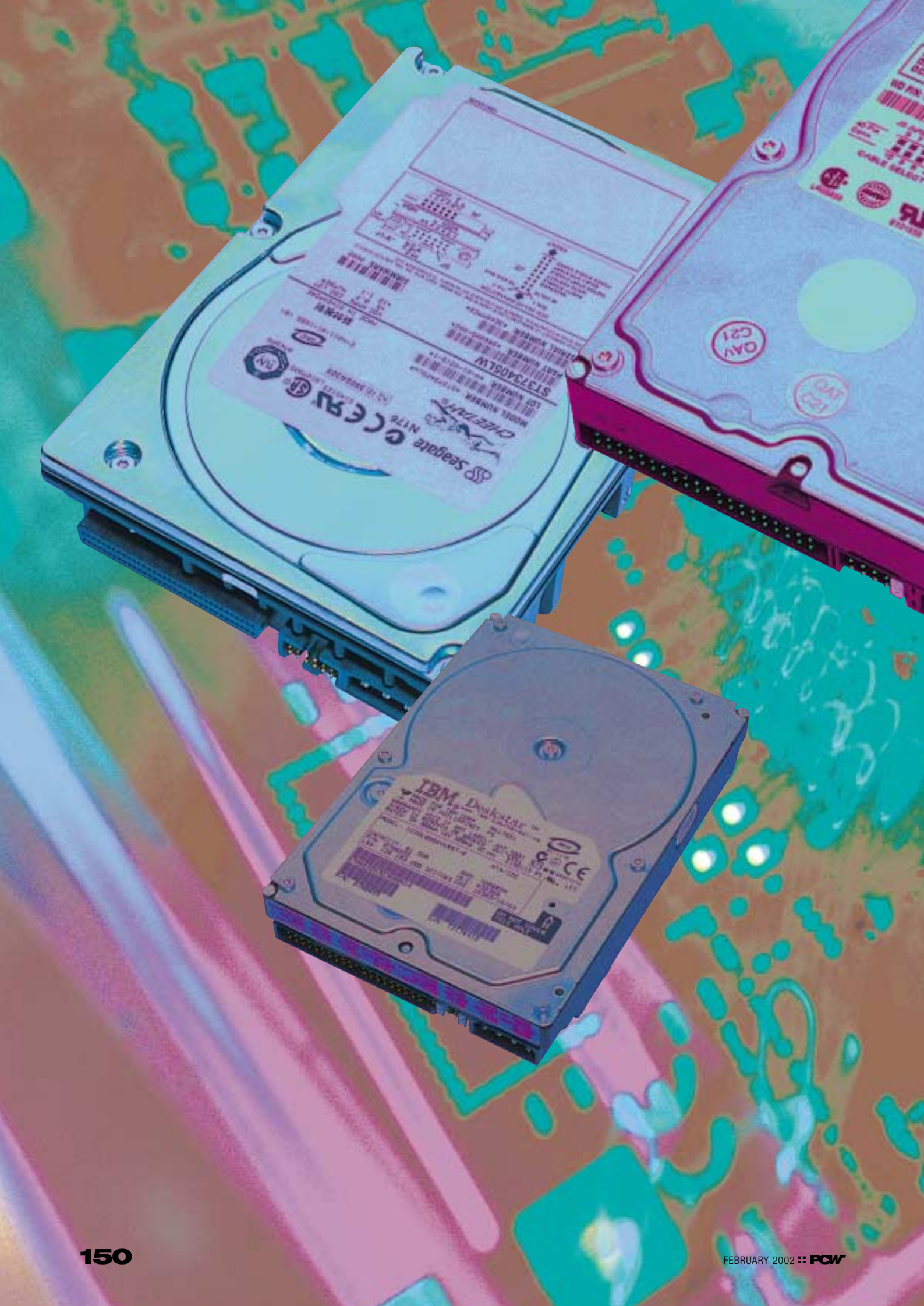

Seagate
IBM

WORDS: LARS-GORAN NILSSON **TESTING:** LEO WALDOCK **PHOTOGRAPHY:** HUGH THRELFALL

Simply storage

Hard drive technology has progressed rapidly over the past year, and there are many considerations to take into account before you buy. To make your choice easier, we've tested 13 hard drives so you don't have to!

There have been huge leaps in storage technology since the last *PCW* hard drive group test in August 2000, so perhaps it's not surprising that there are many changes this time around – not only in terms of capacity. In the line-up for the previous test, the largest drive stretched to only 50GB. This time, however, we've got drives all the way up to 120GB, with drives of 160GB and more just around the corner.

Other improvements have been made to the drive interface. Many of these have been upped from UltraDMA66 to UltraDMA100, and we're starting to see the first UltraDMA133 devices appear. On the SCSI side, we won't find any great new improvements as far as the interface is concerned, but the speed of the drives is generally faster than when we last tested them.

A couple of new external connection options also cropped up. The first is Firewire, which is a much more cost-effective alternative for external drives than SCSI, not to mention being far easier to install and configure. The second is, of course, USB 2.0, the latest standard for external drives and peripherals. One of the biggest changes, though, is in the lower price per gigabyte, making the price of storage more affordable than ever before.

Each of these factors has been taken into account, as we judge which device is the best in this year's *PCW* hard drive group test.

CONTENTS

Fujitsu MHN2300AT

INTERNAL EIDE

PRICE £145.70 (£124 ex VAT) **CONTACT** Dabs 0870 429 3120 www.dabs.com
PROS Good performance for its size **CONS** Requires an adaptor to fit in a standard desktop system
OVERALL It might not be the ideal desktop hard drive, but this is the future
SCORE ■■■■□

Bigger is not always better and, at only 2.5in, the Fujitsu MHN2300AT is the smallest hard drive in the test. This is what you'd expect to find in a modern laptop, but Fujitsu has decided it's time to bring smaller hard drives to the desktop market. We can see the reasoning behind this: more and more all-in-one systems are cropping up, and using notebook components in these desktop devices leaves more room for additional components.

The drive itself is not that remarkable, but it does manage to keep up pretty well with the standard 3.5in desktop drives in our tests, in spite of the fact that it's spinning at a rather conservative 4,200rpm – standard desktop drives rotate at either 5,400 or 7,200rpm.

In terms of capacity, it's far from the largest on test, coming in at 30GB, but we expect to see much larger drives from Fujitsu in the near future. On the other hand, this drive incorporates the latest technologies such as fluid dynamic bearings, which will keep the noise level down to a minimum and prolong the device's life.

Overall, the MHN2300AT is a good hard drive, but you'll need an adaptor to use it in your desktop PC, which will add about £15 to the final price.

INTERNAL SCSI

Fujitsu MAN3735MP

PRICE £675.61 (£574.99 ex VAT) **CONTACT** Simply 0870 727 2190 www.simply.co.uk
PROS Fastest 10,000rpm SCSI drive **CONS** Very expensive; Ultra80 SCSI interface
OVERALL A very fast drive and the Ultra160 version is worth consideration for Raid systems
SCORE ■■■■■

This is the only SCSI drive tested that is not an Ultra160 drive. This shouldn't make any difference if you are running it as the only drive in your system, but if you're intent on a Raid configuration, then it may be cause for thought.

Instead of the Ultra160, this drive uses the slightly older Ultra80 as standard. Ultra160 is an option, although we haven't tested that option here. However, this drive is still the second fastest on test, which shows that today's high-speed EIDE drives are still not quite fast enough to outperform SCSI. Therefore, SCSI is still the number one choice for Raid devices.

The MAN3735MP is also the only one of the SCSI drives to feature external heat dissipators to keep the temperature of the device down. This is probably just as well, as this drive runs very hot after a few hours, although not nearly as hot as the Seagate X15 36LP.

This Fujitsu hard drive is very costly, coming in at just over £675 inc VAT, making it the second most expensive device in this group test. However, you do get 73.5GB for your money, which is not too bad, but for the same price you can get three or four EIDE drives at more than 100GB each.

IBM Deskstar 60GXP

INTERNAL EIDE

PRICE £115.14 (£97.99 ex VAT) **CONTACT** Simply 0870 727 2190 www.simply.co.uk
PROS Fast, silent **CONS** 60GB is still relatively small
OVERALL A fast, quality drive that lacks a bit in capacity
SCORE ■■■■■

As the second fastest EIDE drive in the group test this month, the Deskstar 60GXP sets the pace. IBM has proved lately that it is capable of producing some very fast hard drives indeed.

The company is using glass substrate disks in its hard drives. This allows for higher data density as the disks are made of a material that doesn't interfere with the magnetic fields necessary to store data on a hard drive.

An objective of the IBM design team has evidently been to reduce the drive's noise levels. The company had chosen to use ceramic spindle bearings, which, while not being quite as efficient as fluid dynamic bearings, are still a huge improvement on normal ball bearings. If you're looking to build yourself a living-room computer, where noise levels are a prime consideration, this certainly is a drive you might want to consider.

Although the Deskstar 60GXP has a relatively small capacity (60GB), you should bear in mind that most, if not all, the drives in this group test will more than adequately suit the majority of home or small-business users. IBM's new 160GB drives are on the horizon, but do you really need to go that far?

Maxtor Diamondmax D540X

INTERNAL EIDE

PRICE £166.85 (£142 ex VAT) **CONTACT** Watford Electronics www.watford.co.uk
PROS Large capacity; well priced **CONS** Not very fast
OVERALL An affordable drive with a huge capacity to boot, although there are faster drives around
SCORE

The Maxtor Diamondmax D540X is one of the bigger drives on test, although it can't touch the massive 120GB drive from Western Digital. At 80GB it's still impressive and, unless you plan to become the next George Lucas, this should be sufficient for even the most hardened computer user.

There's nothing to get excited about with this drive. It only has two 40GB platters, and so has a very high data density. This should give it a slight performance increase over similar drives that split the capacity over a greater number of platters. As this is the only 5,400rpm internal drive on test, we can't quite compare it with the rest of the EIDE drives, but it is an indication that the market is heading towards faster and faster drives. For most home users a 5,400rpm drive will be more than fast enough, unless you're doing a lot of drive-intensive tasks, such as video editing or recording music straight to disk.

This is a very spacious drive with a price that puts it within the range of the mass market. We expect to see drives twice the size of the D540X by the time you read this, though, as Maxtor has just launched its new range of UltraDMA133 drives that will hit the market at capacities of 120GB and 160GB.

INTERNAL EIDE

Maxtor Diamondmax Plus D740X-6L

PRICE £173.89 (£148 ex VAT) **CONTACT** Dabs 0870 429 3120 www.dabs.com
PROS Large capacity; UltraDMA133 drive **CONS** No fluid dynamic bearings
OVERALL A value for money 7,200rpm hard drive with the latest in EIDE technology
SCORE

If you're a keen home video editor or sound recorder, perhaps the D540X is a little too mass-market for your needs. If so, its bigger brother the D740X, which sports a 7,200rpm spindle speed and the new UltraDMA133 interface, may be more suitable.

The capacity is the same as the D540X but this drive is not a Maxtor design – in fact, it's a Quantum device at heart. Maxtor has bought Quantum's hard drive business, so expect to see a lot more of this kind of device in the future. This development is not such a bad thing, as Quantum was well known for making quality products, and it was, after all, the company that came up with the UltraDMA133 specification.

This is not one of the quietest drives on test, as it features normal ball bearings rather than the more recent fluid dynamic bearings, which make a lot less noise. If you consider silence to be golden, then bear in mind that an alternative Maxtor drive featuring fluid dynamic bearings is available. If it's something you think you need and you're ordering online, be sure the model number ends with an L, not a J.

Even without the special bearings, this is still an excellent drive and it doesn't make too much noise.

Seagate Barracuda ATA IV

INTERNAL EIDE

PRICE £164.49 (£139.99 ex VAT) **CONTACT** Simply 0870 727 2190 www.simply.co.uk
PROS Quiet; Seashield drive protection **CONS** Not the fastest or the largest drive around
OVERALL A drive with a good price-performance balance
SCORE

Seagate is one of the longest-serving companies in the hard drive business and it has a proven track record for making first-class products. Seagate won our last hard drive group test with its first generation of the Barracuda ATA.

It's not done quite as well this time, falling down slightly in the performance race. But that's not to say this is a slow drive by any means, although it is the slowest of the 7,200rpm units in the test.

Seagate has developed some clever features of its own, such as the Seashield, which is a protective cover at the bottom of the drive that prevents you from damaging its circuit board and helps to reduce EMI (electromagnetic interference).

Between the Seashield and the drive controller, Seagate has fitted a foam layer that helps reduce drive noise and this, together with fluid dynamic bearings in the drive motor, make it one of the quietest drives on the market. At 80GB this is also Seagate's biggest EIDE drive. It's not the largest drive in the group test, but it's more than enough for an amateur video editor.

Where Seagate is winning a bit of ground is in the cost as this is a reasonably priced drive when you consider its performance and capacity.

Seagate Cheetah X15 36LP

INTERNAL SCSI

PRICE £515.82 (£439 ex VAT) **CONTACT** Simply 0870 727 2190 www.simply.co.uk
PROS The fastest drive around **CONS** Very expensive
OVERALL If you can afford it, and you need the speed, take a look
SCORE

This is currently the fastest hard drive available, spinning at a staggering 15,000rpm and supporting an Ultra160 SCSI interface. It also features a massive 8MB cache.

The 36.7GB X15 36LP is the fastest drive on test this month by far, which was not a surprise, but it does prove that a faster spindle speed and a large data cache do have a direct impact on drive performance.

The drive itself is pretty ordinary looking. There are none of the heatsink-style fins we have seen on some very fast SCSI drives in the past. However, this makes the drive run a little hot, so make sure you have additional cooling in the system case if you fit one of these drives to your PC.The Cheetah X15 is also quite noisy, although not unbearably so.

This is not a drive you would expect to find in a desktop system, rather in high-end servers or possibly workstations. The only problem is the cost, as you can get close to five EIDE drives twice its size for the same price. It does, however, come with an amazing five-year warranty, so if you ever have problems within this time, Seagate will repair or replace it.

So, if you're after the fastest drive around, this is the one to buy.

Seagate Cheetah 73LP

INTERNAL SCSI

PRICE £677.96 (£576.99 ex VAT) **CONTACT** Dabs 0870 429 3120 www.dabs.com
PROS Large storage capacity; fast **CONS** The Fujitsu MAN3735MP drive is faster and cheaper
OVERALL An excellent choice for a server, but not something for the home user
SCORE

The Cheetah 73LP has a much larger capacity than the X15 36LP, coming in it at an impressive 73.4GB. But it's not as fast, spinning at a more conventional 10,000rpm, which is fairly standard for today's SCSI hard drives. The 73LP features a smaller drive cache, too – at 4MB it's only half the size of the X15. This makes the drive a bit less of a performer, but its score didn't differ hugely from the X15 in our benchmarks. We would, however, expect a greater difference if these drives were used for server applications.

The 73LP does, of course, have an Ultra160 SCSI interface, but there is also a model available with a fibre channel interconnector (the ST373405FC). But if you thought the X15 was expensive, then you'll find the 73LP beyond your reach, as it's just under £700 inc VAT.

This is an excellent drive for any business looking at upgrading its servers. It comes with the same impressive five-year warranty as the X15, which makes it a pretty good investment.

The expected MTBF (mean time between failure) is set at an amazing 1,200,000 hours, so if reliability and stability are important to you, then Seagate's claims are sure to appeal.

Western Digital Caviar WD1200BB

INTERNAL EIDE

PRICE £261.02 (£222.15 ex VAT) **CONTACT** Komplett www.komplett.co.uk
PROS Enormous capacity; very fast **CONS** No UltraDMA133 support
OVERALL At the time of writing it is the largest EIDE available, but at a cost
SCORE

If you're after the largest and fastest EIDE drive on the market, the Western Digital WD1200 is the drive to go for. It boasts a massive 120GB capacity, the disks are spinning away at 7,200rpm, and the drive features a 2MB data buffer.

This was the fastest EIDE drive in our tests, although it was only slightly ahead of the competition. The big downside with this drive is the cost, but you won't be needing another drive for a good few years to come.

It's amazing to see a drive with this capacity in a 1in high casing, because it's not so long ago that we were seeing SCSI drives with half of the WD1200's capacity but half an inch higher, making them difficult to slot into a standard consumer case. This decrease in size is possible thanks to the higher track and data density used by these new drives. Western Digital has squeezed 120GB onto only three platters inside this drive. Although you'll never hit the bandwidth ceiling, it's still a shame this is only an UltraDMA100 drive. This is, after all, a brand new product and we would have hoped that Western Digital would have taken advantage of the growing support for UltraDMA133.

That said, though, it's hard to go wrong with this drive, if you can afford it.

Buslink External USB 2.0 Hard Drive

EXTERNAL USB 2.0

PRICE £299 (£254 ex VAT) **CONTACT** PC World 0870 333 1222 www.pcworld.com
PROS Very fast; solidly build **CONS** External power unit
OVERALL The best USB 2.0 drive currently on the market, but at a cost
SCORE

Buslink is not a well-known name in the UK hard drive market. We reviewed this drive as a standalone product last month, as it was one of the first USB 2.0 peripherals we had seen.

The external casing feels very solid, which is not surprising considering it is built using aluminium. Inside, you'll find a 60GB 7,200rpm hard drive, which proved to be the fastest of the USB 2.0 devices on test. Buslink supplies a five-port USB 2.0 card with the hard drive, which has one internal and four external connectors. You also get some backup software and a tiny installation pamphlet.

Buslink seems to have given the drive casing a bit more thought than its competitors, as you can stand the drive on the side so it takes up less space. You'll also find a power switch around the back that allows you to turn it off when not in use.

As with all the external drives we've looked at this month, the Buslink comes with an external power supply. This helps keep down the size and weight of the main unit, but it makes it less portable because you need to carry a power brick and a power cable with the drive.

Overall, this is a very impressive device that performs brilliantly.

EXTERNAL USB 2.0

Lacie Studiodrive 80GB USB 2.0

PRICE £233.83 (£199 ex VAT) **CONTACT** Dabs 0870 429 3120 www.dabs.com
PROS Huge storage capacity; price **CONS** Chunky drive case
OVERALL The biggest external drive in both capacity and dimension
SCORE

This is the biggest external drive on test, not only in terms of capacity but also when it comes to physical size. Lacie is using its standard drive housing for this device and, as it's built to accommodate a 5.25in device, it's very big for something that doesn't have to take up so much space. The hard drive inside the casing is an 80GB unit spinning at 5,400rpm. It's fast, but not as fast as the unit from Buslink.

Lacie is a big name in the Mac world, with all its hardware tested and supplied with drivers for the Mac. A hard drive should just plug in and go, however, Lacie does not make installation very straightforward. Rather than giving instructions on how to connect a USB 2.0 adaptor, it assumes you have already done this. The instructions also suggest you should attach the drive to standard USB 1.1 ports on your computer, however this is inadvisable as it will seriously degrade performance.

The Lacie was beaten by the Buslink drive in our read test by over four minutes. This is not a particularly large margin, and it makes up for it by being almost as fast as the Buslink in our write test.

It's hard to recommend the Lacie Studiodrive due to its size, but it is one of the cheapest external drives on test.

Maxtor Personal Storage 3000DV

EXTERNAL FIREWIRE

PRICE £269.08 (£229 ex VAT) **CONTACT** Elitexmicros 0121 321 2121 www.elitexmicros.co.uk
PROS Easy to install if you have a Firewire card **CONS** Not as fast as the USB 2.0 drives; expensive
OVERALL If you need an external storage and have Firewire ports already, this is the one to go for
SCORE

As the only Firewire drive in this group it's a bit difficult to compare the test results. On the whole, though, the Maxtor 3000DV should be fairly comparable to the USB 2.0 drives in terms of performance.

The drive we tested came with 60GB of storage, only half that of the biggest EIDE drive on test this month, but it's also available with an 80GB capacity. The drive casing is quite chunky, making this a less-than-ideal portable drive. You'll find a 6pin Firewire cable in the box and software for Macs. In use, the drive is spinning at 7,200rpm, which should eliminate any data bottlenecks.

The interface is capable of transferring data at 400Mbits/sec or 50Mbytes/sec, which makes is a bit slower than the aging UltraDMA66 specification, which was the standard EIDE interface not so long ago.

We did a transfer test on the external drives, copying 23.4GB of avi files. The Maxtor Personal Storage 3000DV was the slowest of the drives tested, but this is more down to the drive interface than the hard drive itself, as USB 2.0 offers a higher data throughput. It's not a huge difference and we wouldn't recommend you buy a USB 2.0 controller if all you need is an external drive and you have a Firewire card.

Maxtor Personal Storage 3000LE

EXTERNAL USB 2.0

PRICE £172.72 (£147 ex VAT) **CONTACT** Dabs 0870 429 3120 www.dabs.com
PROS USB 2.0 **CONS** Small capacity
OVERALL There are better options on test this month if you're looking for a USB 2.0 drive
SCORE

This is a very close relative of the Personal Storage 3000DV from Maxtor. The only real difference is the interface, as this drive uses USB 2.0 rather than Firewire.

To make the drives look different Maxtor has changed the colour of the case slightly, from grey corner pieces to red. The capacity of our review unit was quite a bit smaller than that of the 3000DV, coming in at only 40GB. The spindle speed is also slower; this drive is a standard 5,400rpm unit. Interestingly, Maxtor only offers the 3000LE with a capacity of 40GB.

As a point of interest, we undertook some comparative testing of the USB 2.0 and 1.1 interfaces on this drive, copying the same amount of data, a rather chunky 23.4GB of avi files, each time. This took a lengthy 45 minutes and 33 seconds on USB 2.0, but over seven hours to transfer across USB 1.1. The differences when reading were pretty much the same. So, if you intended to use a USB 2.0 device to copy data between a USB 2.0 equipped PC and a device with USB 1.1, you might want to keep the file size down to a minimum, unless you have a lot of spare time.

Overall, this is a reasonable drive but the low capacity makes it less than an ideal choice for big backups.

WHAT DOES A HARD DRIVE REALLY COST?

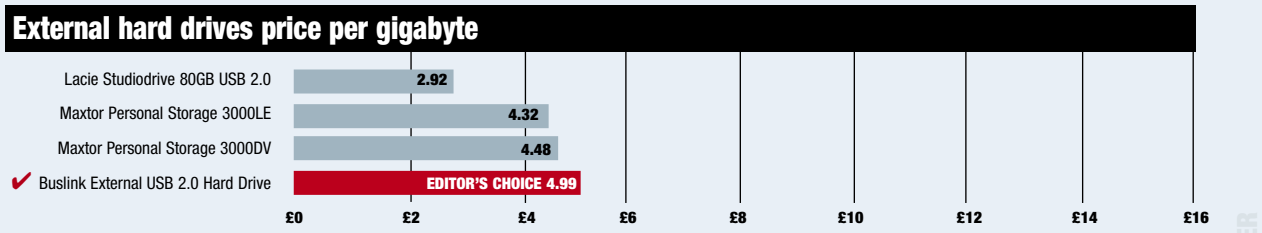
When you're looking to buy a hard drive there is usually one factor that overshadows all the others – the price. So, you need extra hard drive space, but how much do you need if you want to run today's capacity-munching applications?

Well, as with all computer related technology, development in this area moves forward in the blink of an eye. If you've got a 20GB hard drive in your system today, you might think it's enough to keep you going for a good time yet. This was true last year, but if you look back through the past few months of *PCW* system group tests, you'll probably find very few manufacturers that are supplying drives of less than double that size.

It was no surprise, then, to see that only two of the drives in this group test came in at less than 40GB. One of them was a 2.5in drive, which is most often used in a notebook, but looks set to appear in a desktop near you soon, and the other was a high-performance SCSI device, more likely to be seen in a Raid configuration anyway.

If you're looking to buy a drive today, we'd recommend you get at least a 60GB device. It's a false economy to buy anything less. This is because if you calculate the price per gigabyte (and it used to be the price per megabyte not so long ago), you'll notice that most of the drives with larger capacities come out much cheaper than the smaller drives. A typical price for a 20GB drive today is around the £70 mark, which is not terribly expensive, but for only £20 or £30 extra you can double or even triple the size. A 20GB drive for £70 is costing you a not inconsiderable £3.50 per gigabyte, whereas a £100 60GB drive is a much more reasonable £1.67 per gigabyte.

To help calculate the cost of the drives reviewed here, we've produced two graphs to show the relative cost per gigabyte that each drive in this group test will set you back. We've divided them into internal and external drives to make it easier to locate the drive you're looking for, but bear in mind that drives with different spindle speeds can't be compared, as faster drives have a higher price tag for that reason alone.



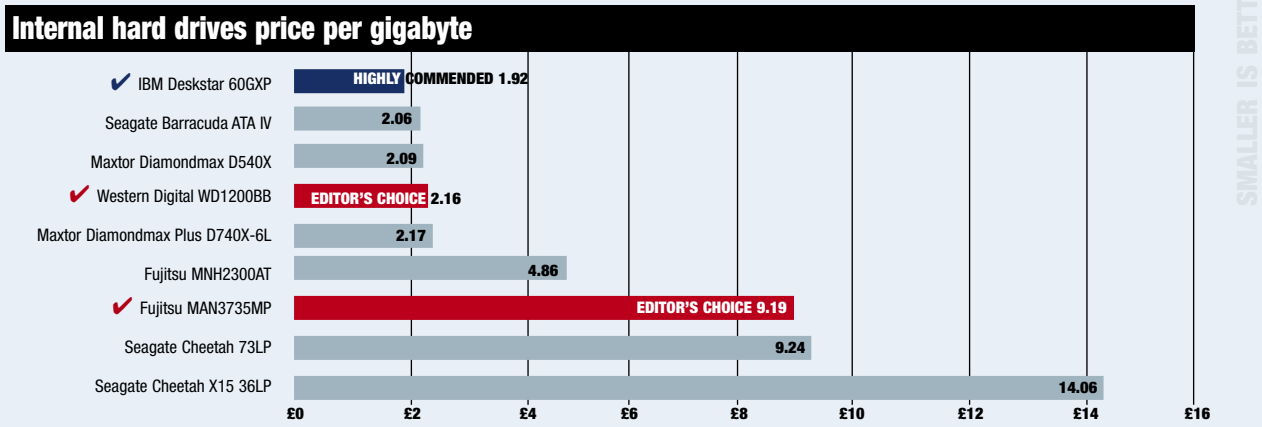


TABLE OF FEATURES

MANUFACTURER	FUJITSU	FUJITSU	IBM	MAXTOR	MAXTOR	SEAGATE
MODEL	MHN2300AT	MAN3735MP	DESKSTAR 60GXP	DIAMONDMAX D540X	DIAMONDMAX PLUS D740X-6L	BARRACUDA ATA IV
Model number	MHN2300AT	MAN3735MP	IC35L060AVER07-0	4D080H4	4K040H2	ST380021A
Price inc VAT (ex VAT)	£145.70 (£124)	£675.61 (£574.99)	£115.14 (£97.99)	£166.85 (£142)	£173.89 (£148)	£164.49 (£139.99)
Supplier's URL	www.dabs.com	www.simply.co.uk	www.simply.co.uk	www.watford.co.uk	www.dabs.com	www.simply.co.uk
Manufacturer's URL	www.fujitsu-europe.com	www.fujitsu-europe.com	www.storage.ibm.com	www.maxtor.com	www.maxtor.com	www.seagate.com
DRIVE SPECS						
Drive interface	UltraDMA100 (notebook connector)	Ultra80 SCSI	UltraDMA100	UltraDMA100	UltraDMA133	UltraDMA100
Drive type	Internal 2.5in	Internal 3.5in	Internal 3.5in	Internal 3.5in	Internal 3.5in	Internal 3.5in
Nominal capacity (GB)	30	73.5	60	80	80	80
Spindle speed (rpm)	4,200	10,000	7,200	5,400	7,200	7,200
Buffer (KB)	2,048	8,192	2,048	2,048	2,048	2,048
Heads	4	8	6	4	4	4
Platters	2	4	3	2	2	2
PERFORMANCE						
Average read seek (ms)	12	0.4	8.5	12	8.5	9.5
Average latency (ms)	7.14	2.99	4.17	5.5	4.2	4.15
Track to track (ms)	1.5	4.5	1.2	2	0.8	0.95
Full stroke (ms)	22	11	15	24	17.8	Not supplied
OTHER INFORMATION						
Supplied cables	None	None	None	None	None	None
Warranty	3 years	5 years	3 years	3 years	3 years	3 years

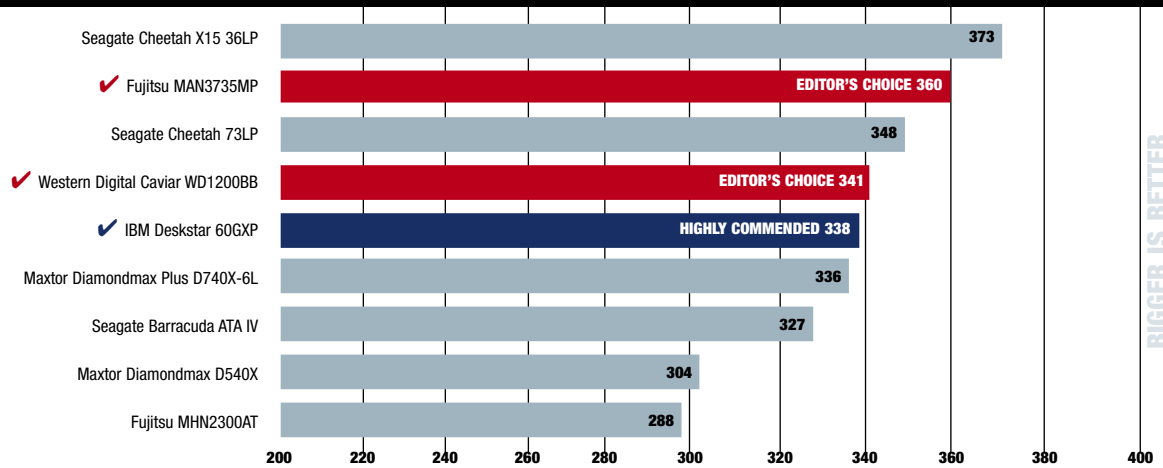
HOW WE TESTED

The internal hard drives were tested using a customised run of Sysmark 2000 on an old system. This was built around a 450MHz Pentium II processor, with just 16MB of memory, a Promise UltraDMA133 controller and, for the SCSI drives, an Adaptec 39160 controller. The operating system was Windows 98 SE.

By using so little memory in the system we forced Windows to do a lot of disk swapping, which highlights the performance of the drives rather than the system. The score was calculated by adding up all the separate scores from each application within our customised Sysmark run to give an overview of the performance differences between the drives.

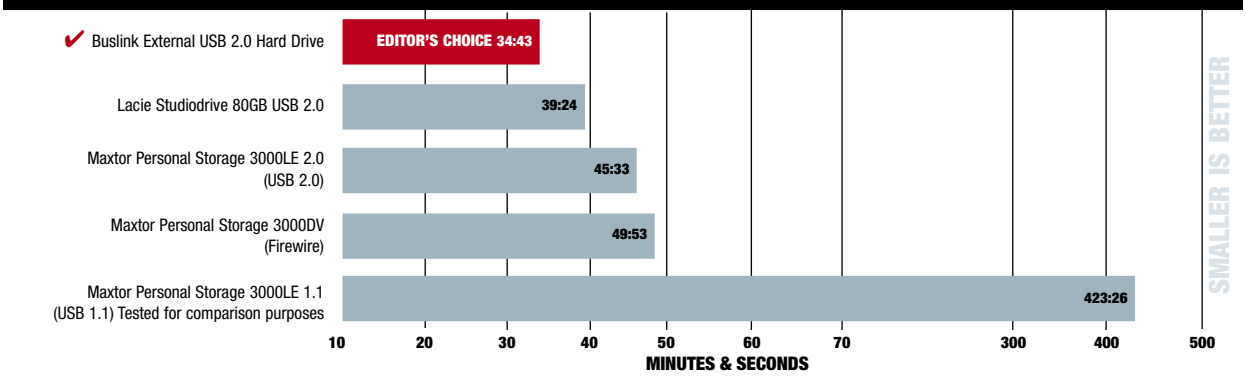
The external drives were tested by copying 23.4GB of avi files from the Seagate Cheetah 73LP to the external drive to assess the write performance. This was timed. To give us an idea of the read performance, we copied the same files back onto the Seagate drive and made a note of how long the operation took to complete. All external drives were connected to an Adaptec Duoconnect USB 2.0 and Firewire controller.

Internal hard drives test results (customised Sysmark 2000 test)

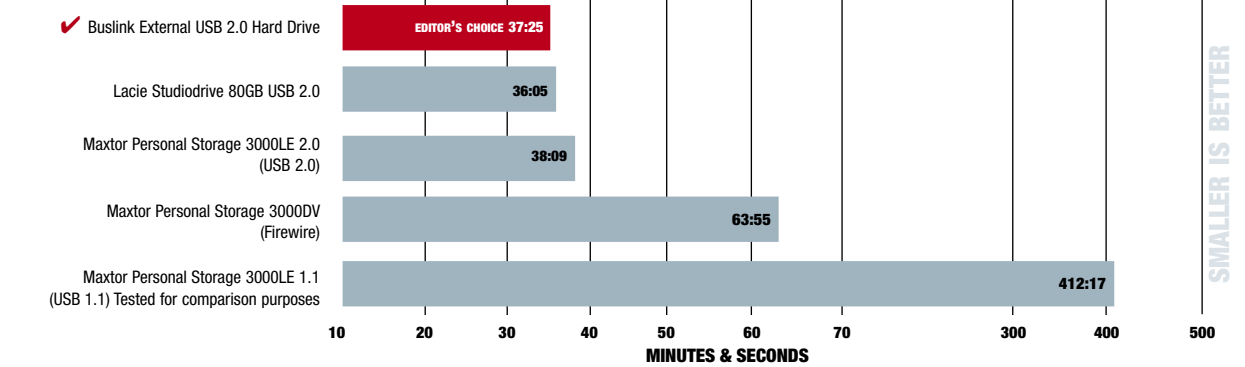


SEAGATE	SEAGATE	WESTERN DIGITAL	BUSLINK	LACIE	MAXTOR	MAXTOR
CHEETAH X15 36LP	CHEETAH 73LP	CAVIAR WD1200B	EXTERNAL USB 2.0 HARD DRIVE	STUDIODRIVE 80GB	PERSONAL STORAGE 3000DV	PERSONAL STORAGE 3000LE
ST336752LW	ST373405LW	WD1200BB	N/A	N/A	3000DV	3000LE
£515.82 (£439)	£677.96 (£576.99)	£261.02 (£222.15)	£299 (£254)	£233.83 (£199)	£269.08 (£229)	£172.72 (£147)
www.dabs.com	www.simply.co.uk	www.komplett.co.uk	www.pcworld.co.uk	www.dabs.com	www.elitexmicros.co.uk	ww.dabs.com
www.seagate.com	www.seagate.com	www.westerndigital.com	www.buslink.com	www.lacie.co.uk	www.maxtor.com	www.maxtor.com
Ultra160 SCSI	Ultra160 SCSI	UltraDMA100	USB 2.0	USB 2.0	Firewire	USB 2.0
Internal 3.5in	Internal 3.5in	Internal 3.5in	External	External	External	External
36.7	73.4	120	60	80	60	40
15,000	10,000	7,200	7,200	5,400	7,200	5,400
8,192	4,096	2,048	Not supplied	2MB	2MB	2MB
8	8	6	Not supplied	Not supplied	Not supplied	Not supplied
4	4	3	Not supplied	Not supplied	Not supplied	Not supplied
3.6	5.1	8.9	9.5	10.9	Not supplied	10
2	2.99	4.2	Not supplied	Not supplied	4.1	5.5
0.4	0.4	2	Not supplied	Not supplied	1	1
7	9.4	21	Not supplied	Not supplied	20	24
None	None	USB	USB	Firewire	USB	USB
5 years	5 years	3 years	1 year	1 year	1 year	1 year

External hard drives read test results



External hard drives write test results



Editor's Choice

It's always a tough choice picking the winners in any group test, and when it comes to hard drives it's more difficult as it is usually down to very small differences between the various drives. They all use very similar technology as far as the interface, read and write heads, and platters are concerned. However, there are still enough differences between the various devices to make some of them better performers, and better value, than the others. The biggest development to have taken place since our last hard drive group test is the hike in the data density, which has more than doubled over the past year.

We're now reaching the limit of the humble EIDE controller. The maximum drive capacity an UltraDMA100 controller can handle is 137GB, and this will be reached before the end of the year. The short-term fix for this is the new UltraDMA133 controllers that are starting to crop up. Unfortunately, you have to buy a separate controller card for your hard drive until they become commonplace on motherboards. The long-term solution, however, is Serial ATA, which should be launched in 2002, if the standard has been set by then. Serial ATA can handle larger drives and much higher data transfer rates.

When it comes to buying a hard drive the most important features to look at are the spindle speed and drive cache. The higher the spindle speed, the faster files can be located and read, and the larger the cache, the more used data can be stored, cutting read times for re-use.

Another aspect worthy of consideration is, of course, the noise level of the drives, although this is hard to measure and can change from unit to unit to some degree. It is worth buying a drive with the new fluid dynamic bearings, as these produce far less noise than standard ball bearings. There are, however, similar technologies that will keep the noise level down and some manufacturers have gone further and built special designs into their drives to prevent noise.

But the most important decision you will make when buying a new hard drive relates to the price. You might find a unit that initially seems very cheap, but make sure you calculate the price per gigabyte to get the real cost of the drive and compare this to alternatives. You might find that a smaller drive costs more than a slightly larger device in the long run.

Before we move onto our award winners, a note on external drives: buy one that either comes with an interface card, or that suits the interfaces you already have on your PC. Otherwise, you may have to shell out extra for a means of connection.

The winners

As home users, most of us have an EIDE drive in our machine, so that's where we'll start the awards. Our first **Editor's Choice** award goes to the **Western Digital Caviar WD1200BB**, which is the biggest EIDE drive we've seen to date in the *PCW* offices. Size is not everything when it comes to hard drives, and the WD1200BB also boasts excellent performance. It's the fastest EIDE drive on test this month and it benefits from a relatively low price per gigabyte, too. You might, however, want to check that this drive will work with your PC, as some older machines might not be able to handle the physical size of this device.

The runner-up in the EIDE category is the **IBM Deskstar 60GXP**. Only half the capacity of the winner, this is still an excellent hard drive and one of the fastest on test. The IBM walks away with a **Highly Commended** gong because of its price – it is the only drive here that costs less than £2 per gigabyte. This is also the drive to go for if you have a slightly older motherboard that can't handle drives larger than 80GB.

Relatively few SCSI drives were submitted for review in this test, but it was still a fight to the end. The **Editor's Choice** award had to go to the **Fujitsu MAN3735MP**, as it beats the Seagate Cheetah 73LP in terms of both performance and price per gigabyte. Even though the Seagate Cheetah X15 was the fastest drive on test, the Fujitsu stores twice as much data.

The external drives were more difficult to judge, but at the end the rather plainly named **Buslink External USB 2.0 Hard Drive** won the **Editor's Choice** award, as it comes with a USB 2.0 card in the box and is an excellent performer, although it is a bit expensive. But then again, so are most external drives.

The Deskstar is the only drive that costs less than £2 per GB

Western Digital Caviar WD1200BB

IBM Deskstar 60GXP

Fujitsu MAN3735MP

Buslink External USB 2.0 Hard Drive