

## Flatbed scanners

Agfa SnapScan 310

Agfa SnapScan 600

Black Widow 4830 Pro PP

Black Widow 9636 HiRes

Epson GT-5500

Hewlett-Packard ScanJet 5100C

Linotype-Hell Jade 2

Microtek Phantom 330CX

Microtek ScanMaker 630

Plustek OpticPro A31

Storm ImageWave

Storm TotalScan



# SCANTASTIC

Lower prices and improved technology mean that scanners are no longer considered a luxury. We put a dozen of the latest flatbed models to the test

A few years ago you probably wouldn't have even considered having a scanner at home. Flatbed scanners - even black-and-white models - were expensive and bulky. Hand-held models were more affordable, but they were difficult to use and produced poor images.

Fortunately, times have changed. Colour scanners are more affordable than ever before, and people have realised that you don't need to be a graphics professional to justify having one. If you've got photographs you'd like to post on a Web site or e-mail to friends, you can use a scanner to get them on to your PC. You can scan in and edit pictures to incorporate into documents, or scan text so you don't have to retype it. Scanners are incredibly useful and the chances are that once you've got one you won't know how you lived without it.

This month we've rounded up a dozen of the latest flatbed models, starting from less than £60, and put them through their paces.

### Types of scanner

There are three main types of scanner. Flatbed devices look like the top half of a photocopier, with a glass bed on which you place the things you want to scan. They produce the highest quality images and are very flexible. You can use them to scan pages from a book as well as photos, and they give good OCR (Optical Character Recognition) results, although it can be tedious having to lift the lid between each sheet when scanning in a long document. You can also use a flatbed scanner to scan 3D objects if you want to produce special effects. We recommend flatbed scanners for general use.

Flatbed models need a fair amount of room, so if desk

space is at a premium you might prefer a document scanner. These are generally about the size of a rolling pin, with a slot into which you feed your document. This sheet-feeding process makes them great for text because it is ideal for processing documents several pages long, although it's more difficult to position pictures accurately. Mitsubishi has a model with a 10-sheet feeder which is very effective, and Storm, Canon and Visioneer also produce competent document scanners.

Finally, there are hand-held scanners, which are now mostly confined to the bargain bins at your local computer dealer. They're cheap, but it's difficult to roll them over images evenly. They also have a very narrow scanning area, and now that flatbeds are so cheap it's simply not worth bothering with these.

### How does a scanner work?

Fundamentally, all scanners work in the same way. They shine a light at the thing you want to scan, then measure how much of it is reflected. A panel called a Charge-Coupled Device (CCD), made up of electronic sensors, measures the intensity of each of the three colours - red, green and blue - that make up white light and sends this data to the computer. The greater the number of readings, the more pixels or image elements the PC can recreate.

The resolution - or accuracy - of a scanner is measured in dots per inch (dpi), just like a printer. The more dots there are in every inch, the smaller each one can be and the more detailed the final scan is. Typically, a flatbed scanner will have a resolution of somewhere between 300dpi and 600dpi, although some of the models reviewed here claim even greater accuracy.

Although this resolution is higher than most other affordable types of scanner can manage, it isn't the whole story. You'll



often see two resolutions quoted for a particular scanner. The lower is the optical resolution, and is the number of dots that the scanner can physically distinguish.

The higher figure, which can be up to 9,600dpi, is achieved by a process known as interpolation. Basically, image data is supplied by the scanner to its software. This looks at the physical dots, and speculates as to what detail, if any, should lie in the areas in between.

Although it sounds like pure guesswork, it's based on sound mathematical principles and, providing the software is well written, it can work well. However, it can't actually create a more accurate scan, just an occasionally convincing impression of one.

The process also has other limitations. To quote the driver software for Storm scanners, interpolation will make scanning slower, hurt performance, increase your image file size – and is unlikely to improve the quality of your final image. In fact, we reckon that the ImageWave's interpolated scan was worse than the original, thoroughly justifying that warning.



## What's in a colour?

Scanner manufacturers are fond of claiming that their products can distinguish between enormous numbers of colours. It is important to pay attention to the claimed colour depth. This is measured in bits and, as usual, the general rule is the more the better.

As mentioned earlier, the CCD registers the brightness of each of the red, green and blue channels. To the human eye, it is obvious that red and blue are different, and we can distinguish many different shades of purple and violet in between. Each of those shades is made up of a certain proportion of RGB light. The more detailed your scanner's measurement of each channel, the more colours it can distinguish.

A 30-bit scanner, for example, uses 30 bits of data to register the colour information for each pixel of your image.

That's 10 bits for each channel –  $2^{10}$  or 1,024 levels each of red, green and blue. Multiply these together and you get a staggering 1,073,741,824 possible colours – more than your monitor can possibly display.

## Testing

To test the image quality produced by each scanner, we scanned the same photograph on all the models and examined the reproduction of some of its finer details. Then we scanned a block of text to see how much improvement you could expect from an interpolated scan, and checked the colour convergence – how closely the red, green and blue channels of a scan line up. If the channels are misaligned, the quality will be affected. Finally, we looked at how readily the scanners can distinguish different colours and different shades of grey.

Although these tests may seem to be the primary ones to look at when choosing a scanner, ease of use is just as important. After all, if it's a pain to scan an image, you'll never get to see that much-vaunted picture quality. All the scanners here are TWAIN-compliant, which means that you can launch their drivers from inside suitable graphics applications.

However, you're still reliant on the driver itself and Hewlett-Packard's stands out for the wrong reasons. It tries very hard to hold your hand – indeed, you can scan simply by pressing the button on the front of the scanner. Unfortunately, we found trying to alter any of the settings confusing, and you'll soon find it limiting.

On the other hand, Microtek shows the way in providing simple drivers that are controllable too. Linotype and Epson put the emphasis on fine control of your

## Colour scan samples



The Black Widow 4830 Pro PP's image quality is great for the price.

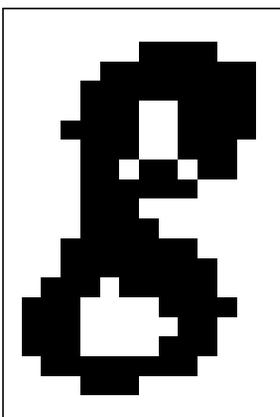


The ScanMaker 630 demonstrates its fine scanning capabilities.



Colour images from the SnapScan 310 are much better than text scans.

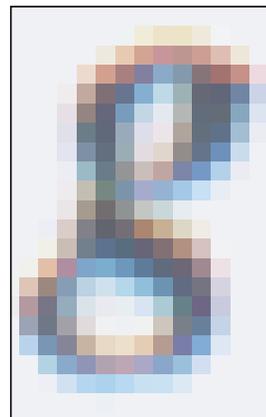
## Type scan samples



6-point type scanned by the Phantom 330CX is just recognizable at its maximum optical resolution.



Interpolation, however, makes the scan smoother and at its best can give excellent results.



Poor colour convergence – the fringes produced by the ImageWave will affect scans badly.

## Flatbed scanners compared

Manufacturer	Agfa 	Agfa	Black Widow 	Black Widow	Epson
<b>Product</b>					
<b>Model name</b>	SnapScan 310	SnapScan 600	4830 Pro PP	9636 HiRes	GT-5500
<b>Price (inc VAT)</b>	£141	£257.33	£57.58	£351.33	£284.35
<b>Phone number</b>	0181 231 4906	0181 231 4906	01324 825999	01324 825999	01442 261144
<b>Web site</b>	www.agfa.com	www.agfa.com	www.blackwidow.co.uk	www.blackwidow.co.uk	www.epson.co.uk
<b>Specifications</b>					
<b>Max optical resolution (dpi)</b>	300x600	600x1200	300x600	600x1200	400x800
<b>Max interpolated resolution (dpi)</b>	4800	4800	4800	9600	3200
<b>Scanning area</b>	A4	A4	A4	A4	A4
<b>Colour depth (bits)</b>	30	30	30	36	30
<b>Interface</b>	SCSI	SCSI	Parallel	SCSI	SCSI
<b>SCSI card interface</b>	ISA	ISA	N/A	ISA	ISA
<b>Bundled software</b>	Ulead PhotoExpress, OmniPage LE, PaperPort	Ulead PhotoExpress, OmniPage LE, PaperPort	PhotoDeluxe, Textbridge Classic	PhotoShop LE, Textbridge Pro	PhotoDeluxe, PageManager, OmniPage LE
<b>Accessories</b>	ADF, TMA	ADF, TMA	○	TMA	○
<b>Ratings</b>					
<b>Build quality</b>	★★★★	★★★★★	★★★★	★★★	★★★★
<b>Ease of use</b>	★★★★★	★★★★★	★★★★	★★★★	★★★★
<b>Image quality</b>	★★★	★★★★	★★★★	★★★★	★★★
<b>Value for money</b>	★★★★★	★★★★	★★★★★	★★★	★★★
<b>Overall</b>	★★★★	★★★★	★★★★★	★★★★	★★★
<b>Verdict</b>	A good choice for a mid-priced SCSI scanner, with a choice of drivers giving lots of control.	The same drivers as the 310, but better image quality and a higher price.	With image quality that belies its low cost, the 4830 Pro is a great buy.	Good-quality scans and easy to use, but there's little benefit from its extra colour depth.	Not outstanding, but a good solid choice if you want to buy from a big name.

**Notes:** ADF=Automatic Document Feeder, TMA=Transmissive Material Adaptor

★ = Poor ★★ = Below average ★★★ = Average ★★★★ = Good

scans, while Agfa goes even further with two drivers for each of its scanners. FotoSnap is aimed at beginners, while FotoLook offers more options to fine-tune all your settings.

### Software

Whatever you want to do with your scanner you'll need software to help you do it, and image-editing programs are supplied with all the scanners reviewed, with the most popular packages being Ulead PhotoImpact and Adobe PhotoDeluxe. Both of these are reasonably powerful, although they lack the flexibility of professional software like Adobe PhotoShop.

If you don't get on with any of these programs, it's worth looking at PaintShop Pro. It's available as shareware (the latest version is on our cover CD) and is far better than it has any right to be at the price. Another possibility if you want to have fun with images is Kai's Power Goo, which allows you to

distort pictures to your heart's content.

Every scanner here is bundled with a cut-down OCR program, all of which are surprisingly competent.

Black Widow's 9836 HiRes breaks step though, coming with Xerox Textbridge Pro. Full versions like this can recognise text from more complex documents, even white text on a black background and drop capitals, and offer greater accuracy than their budget siblings. They are a worthwhile upgrade if you intend to scan a lot of text documents, but for most users the bundled packages will be fine.

### Connections

Something else you need to consider when buying a scanner is how easy it is to connect to your PC. Here there are two main choices. The cheaper scanners use a parallel interface, so they have to share a port with your printer. This is generally simple to arrange, but could be awkward if you already have another

parallel device - perhaps a Zip drive - daisy-chained with your printer. It's also a slow method, and in some rare cases scanners and their drivers can cause conflicts so you end up with nothing working.

More advanced users will probably be happier with a SCSI scanner. The SCSI interface is much faster than a parallel port, and you can attach up to seven devices to a SCSI card, so expansion isn't a problem. In addition, adding to an existing SCSI system is generally trouble-free. But because it entails opening up your PC to fit a SCSI card, it can be trickier to set up in the first place.

We didn't have problems with any of those delivered with the scanners we review here - cards from market-leader Adaptec are commonly supplied - so a more compelling argument for not choosing a SCSI scanner may be cost. SCSI scanners are more expensive than parallel models and they also tend to be bulkier as well.

Hewlett-Packard	Linotype-Hell	Microtek	Microtek 	Plustek	Storm	Storm
ScanJet 5100C	Jade 2	Phantom 330CX	ScanMaker 630	OpticPro A31	ImageWave	TotalScan
£233.83	£468.83	£79.95	£270	£410.08	£99	£149
0990 474747	01242 222333	01379 649200	01379 649200	0171 831 3139	01608 645756	01608 645756
www.hp.com/uk	www.linotype-hell.co.uk	www.microtek.nl	www.microtek.nl	www.plustek.com	www.stormtech.com	www.stormtech.com
300x600	600x1200	300x600	600x1200	400x800	300x600	600x1200
1200	5000	4800	9600	1200	5000	9600
A4	Legal	A4	A4	A3	A4	A4
30	30	30	30	30	30	30
Parallel	SCSI	Parallel	SCSI	Parallel	Parallel	Parallel
N/A	PCI	N/A	ISA	N/A	N/A	N/A
HP PrecisionScan, PhotoDeluxe	Picture Publisher, TextBridge Classic, ColorFactory Pro, Linotype fonts	PhotoExpress, OmniPage LE	PhotoImpact, OmniPage LE, PaperMaster, PhotoSoap	Photomagic, Recognita OCR	EasyPhoto, PhotoDeluxe, Textbridge Classic	EasyPhoto, PhotoDeluxe, Pagis SE
ADF	ADF, TMA	○	ADF, TMA	○	○	○
★★★★	★★★★	★★★	★★★★	★★★	★★	★★
★★	★★★★	★★★★	★★★★	★★★	★★★	★★★
★★★	★★★★	★★★	★★★★	★★	★	★★★
★★★	★★★	★★★★	★★★★	★★★★	★★★	★★★
★★★	★★★★	★★★	★★★★	★★★	★★	★★★
Fine for beginners, it offers reasonable image quality, but the driver is very frustrating.	Superb images and excellent software, but with a price to match.	Although its colour convergence lets it down badly, the Phantom produces fair images at a good price.	If you've got a bit more to spend, the ScanMaker 630 is a fine choice. It has decent software and gives good results.	Poor image quality, but the only choice if you want an A3 scanner on a budget.	The worst picture quality of the lot. Avoid the ImageWave.	It's better than its little brother, but that's not saying much. Image quality is unimpressive.

★★★★ = Excellent    ○ No ● Yes

One interface to watch is the Universal Serial Bus. USB ports are now fitted to almost every new PC and the interface is supported by later versions of Windows 95 and the upcoming Windows 98. It should combine many of the advantages of parallel and SCSI interfaces, and although we've only seen one USB scanner so far (the Storm PageScan USB) we were impressed by it.

### A timely warning

Finally, a word of caution. Scanners are generally fairly reliable in that once you've actually got them working, they will continue to do so.

However, they are easily damaged in transit (four devices we had hoped to test here were dead on arrival) especially if the scanning head is free to move. Ask if there is any way of securing this, and check on your supplier's policy on machines that are DOA. Don't settle for anything less than immediate replacement.



**Our Best Buy award goes to the cheapest scanner in this group test, largely because of its sub-£60 price tag. The image quality produced by the Black Widow 4830 Pro PP is only middling when compared to the rest of the contenders, but it is more than acceptable for general use. When you match this against its price and its simplicity it looks even better.**

**Admittedly, you don't get sophisticated tools to manipulate the scanned image, but we scarcely missed them, especially as PhotoDeluxe is included. Textbridge comes too, just to complete a well-rounded bundle.**



**If you want to do a lot of scanning, we don't feel that the 4830 Pro would fit the bill. Accordingly, we're giving Recommended awards to two, rather**

**pricier, devices. First, the Microtek ScanMaker 630 is the product of long experience in this field, as Microtek manufactures scanners for some better-known brand names.**

**It is a SCSI scanner, so it will transmit data to your PC more quickly than a parallel model. It's reasonably fast and produces accurate scans with colours that are faithful to the original. Just as importantly, it's well-built, not too bulky and comes with a good collection of bundled software. You should be very happy with it for extended use.**

**Our second Recommended award goes to the Agfa SnapScan 310, primarily because of its driver software. The device itself is reasonably priced for a SCSI scanner, and it produces good, though slightly dark, images. We wouldn't recommend it for scanning text or line art, but its drivers manage to combine ease of use while allowing you to tweak virtually every aspect of your scans.**

John Sabine