Making their mark

The phenomenal rate of change in the inkjet-printer market has prompted us to present this round-up of the latest models.

The only thing that seems to change as quickly as computer technology is printer technology. Drop-sizes continue on their downward trend towards invisibility, making photos more believable; faster engines churn out pages at an ever greater rate of knots; and improvements in the chemical make-up of the inks that you put into your printer, do their best to make feathering a thing of the past.

PCW recognises the need to keep on top of changes in the market and so this month we take another look at inkjet printers, putting them through the same rigorous tests to which they are submitted in our annual group test, to see what's new, what's hot, and what fails to impress.

While our summer group test split the range into budget, A3, photo and office printers, the only stipulations, this time around was that the printers should use A4 as their standard paper size. This attracted a wide range of contenders. Some incorporated USB ports, others allowed us to connect only via the more conventional parallel interface. While most used conventional manufacturer-specific drivers, one opted instead for an implementation of PCL5 and PostScript Level 2.

Although prices also varied widely, this should not be taken as an indication of the speed or quality you can expect from the printers tested here. So, if you're looking to buy a new companion for your PC and want the lowdown on the market's new contenders, we have everything you need to know.

Contents

• *Printers tested and reviewed by Nik Rawlinson*

Illustration by Ned Jolliffe

Canon BJC-7000

This large parallel printer holds two oversized cartridges, one black, one colour (or photo) CMY. On our review model, unless almost an inch of paper stock was loaded into the feeder, it would report that there was none in the printer. Canon claims this printer can reproduce photos "indistinguishable from the originals", and although using the photo cartridge on photo paper at the finest-quality setting did produce good results, it was easy to see that the originator had been an inkjet printer. Colours were realistic but the pixels were easy to spot, especially in lighter areas. Printing the same photo with the colour cartridge was a no-go option. Stepping was clearly evident in the fades of our business graphics, even with Canon's coated paper and at the finest of the five possible quality settings.

Text was very impressive on this same setting, although it took 23 minutes 32 seconds to produce five pages. At the Middle quality setting, the characters were visibly feathered, while in the fastest mode they were reduced to a watery grey.

PCW DETAILS

★★★

Price *£269.08 (£229 ex VAT)*
Contact *Canon 0121 666 6262*
www.canon.co.uk
Good Points *Ink refills, not just replacement heads.*
Bad Points *Photo reproduction didn't live up to its promise. Problems with paper feeder.*
Conclusion *Disappointing.*

Epson Stylus Color 740

The Color 740 uses the same two-cartridge CMYK piezo technology as the Color 850. If we allowed the installation CD to "autorun" and install from the menu, the printer was unable to detect paper in its input tray. Parallel connection was supplemented by a USB port. Adobe PhotoDeluxe 2.0 was bundled. The driver offers the same colour adjustment options as the 850, adding controls to engage ICM (international colour matching) and sRGB (sustained red green blue) presets for colour matching. We ran our text test in Economy (120dpi), Normal (360dpi) and Photo (1440dpi) settings. While the highest setting produced clean, crisp output, it was at a speed of only five pages in 27min 10sec. At a page every 11 seconds the draft output was very disappointing, while the Normal setting resulted in feathering on plain paper. On coated paper the colours of our business graphics were vibrant and solid, arriving in 9min 19sec at the highest-quality setting, while on photo paper our photograph was reproduced without a flaw at an impressive 10min 33sec.

HIGHLY COMMENDED PERSONAL COMPUTER WORLD

PCW DETAILS

★★★★

Price *£272.60 (£232 ex VAT)*
Contact *Epson 0800 220546*
www.epson.co.uk
Good Points *USB option. Photo reproduction.*
Bad Points *Install problems. Poor economy quality.*
Conclusion *Versatile.*

Epson Stylus Color 850

The Epson Color 850 and 740 use piezo crystals to "vibrate" the ink from the nozzles. The 850 needs no power adapter, taking undiluted power from the mains. The range of paper available to the driver varies depending on which of the four quality settings is selected. Colour adjustment for brightness, contrast, saturation and individual CMY channel intensity is possible. The on-screen "time remaining" countdown fluctuates wildly and proved to be inaccurate in our tests. At all quality settings, various levels of feathering on text was visible on photocopy paper, although changing the paper stock for coated paper, even if retaining the Normal quality setting, improved this dramatically. A one-page business letter produced multiple times averaged out at 13sec (Economy), 13sec (Normal) and 2min 32sec (Superfine) per page. Business-graphics output on coated paper could not be faulted. Colours were vibrant, fades were smooth and a reverse hairline drawn through solid black was easily reproduced. On Epson's photo paper our A4 photograph arrived in just 5min 17sec, with realistic colours and excellent skin tones.

PCW DETAILS

★★★★

Price *£318.43 (£271 ex VAT)*
Contact *Epson 0800 220546*
www.epson.co.uk
Good Points *Photo reproduction.*
Bad Points *High-quality text is slow. Inaccurate countdown timer.*
Conclusion *Great for photos.*

HP DeskJet 710C

The 710 incorporates a quick-release door to free jammed paper and links to the PC using a standard parallel cable. A wake-up on data function means that printing to it on its "off" state will turn it on. It can handle six paper types, including transparency film. With a maximum resolution of 600dpi, this unit incorporates ColorSmart and ICM technology to ensure realistic colours. The Econofast setting was good enough for final copies of text documents.

At 1min 10sec for five word-processed pages it was faster than many of its contemporaries, and this time rose to only 1min 45sec and 1min 50sec for five pages in Normal and Best settings respectively. The graduated fills in our business graphics were some of the smoothest we have seen, although on both photocopy and inkjet paper the reverse hairline running through a block of black ink was difficult to see. On inkjet paper our colours were vivid, solid and true. The Best quality setting delivered this A4 page of business graphics from CorelDraw in 8min 11sec, but selecting Normal slashed this to 2min 18sec. Skin tones were faithfully reproduced and composite black did not seep into lighter areas.

PCW DETAILS

★★★★

Price *£210.33 (£179 ex VAT)*
Contact *Hewlett-Packard 0990 474747* www.hp.co.uk
Good Points *Fast. Easy install. Standby data wake-up. Paper-jam door.*
Bad Points *Minor improvements could be made.*
Conclusion *A neat complement to the home PC.*

HP DeskJet 895CXi

Like the Epson Stylus Color 740, this printer incorporates a USB connection. The two-cartridge CMYK heads are brought to the middle of the carriage for easy access whenever the lid is lifted. An easy-access door in the back makes clearing paper jams easy, and a wake-up feature prompts you to turn the printer on before printing. Thirteen paper types can be selected, and users can choose between ICM and manually adjustable ColorSmart, HP's technology that analyses and automatically adjusts the image to provide what it believes to be the best colour balance. Multiple pages can be printed on a single sheet, or enlarged to print across a number of pages to be tiled. Output quality was excellent. Even at the Econofast setting (four text pages in 44sec) the standard was impressive. At Best quality, the same five immaculate pages arrived in just 2min 6sec. Business graphics were handled well. On HP's Premium Inkjet Paper and at the Best quality setting, colours were vibrant and realistic. Graduated fades were smooth and Pantone blocks were handled well.

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Our photo output was excellent, with well reproduced skin tones on HP's own photo paper taking just 7min 32sec to arrive at Best quality.

PCW DETAILS

★★★★★

Price *£292.58 (£249 ex VAT)*
Contact *Hewlett-Packard 0990 474747* www.hp.co.uk
Good Points *Print quality. USB option.*
Bad Points *None to speak of.*
Conclusion *A great all-round printer.*

HP DeskJet 2000C

An extra paper tray and HP's JetDirect 300X unit, a print server for 10/100Base-TX environments, turns the 2000C into a network printer aimed firmly at the business market. Those considering an inkjet as their main network printer should consider the cost implications. Ink is more expensive than toner, and the coated paper preferred by these machines is more expensive than standard photocopy paper. With Econofast (draft) quality to match the best rival output, it produced five text pages in just 43sec. Rising to 1min 9sec and 1min 36sec for Normal and Best quality settings respectively, characters were well defined with sharp edges, even on photocopy paper. Although nothing special on photocopy paper, using HP's inkjet paper gave impressive results in the business graphics test with some of the best graduated fades we have seen. Colours were bold and pure, and the four Pantone test blocks were solid. It even managed to complete the very difficult test of running a white hairline through a black block. On the photo test the colours were good, but on HP's photo paper the results were heavily banded.

PCW DETAILS

★★★★

Price *£705.00 (£600 ex VAT)*
Contact *Hewlett-Packard 0990 474747* www.hp.co.uk
Good Points *Fast, versatile, expandable.*
Bad Points *Poor photo handling on photo paper.*
Conclusion *Great for the office, but maybe not for the home user.*

Lexmark 3200

The 3200 is a four-colour (CMYK), two-cartridge printer. Installation was easy and the interface was a standard parallel connection, although no cable was supplied. With no output tray, the completed pages are deposited on a plastic pier resting on the desk. The driver is fairly versatile, allowing the more adventurous user to tweak the brightness, contrast and saturation of the image, or the strength of the individual red, green and blue channels — useful when printing photos. Output was generally impressive. Draft text (600dpi) was slightly grey and lined, but both High (1200dpi) and Normal quality (600dpi) were a solid black. Higher-quality settings sacrificed speed, with a 20sec draft page rising to 28sec at normal and 1min 43sec at High quality. Lexmark claims 6ppm mono, although in the Draft setting this printer took 1min 40sec to produce only five copies of a standard single-page business letter. Solid colours in our business graphics looked rich and vibrant on coated paper, although it failed to print a grey 50% black: the result was instead a deep chocolate brown. Although the test photo was feintly lined, this minor imperfection was visible only upon very close inspection.

PCW DETAILS

★★★

Price *£176.25 (£150 ex VAT)*
Contact *Lexmark 01628 481500*
www.lexmark.co.uk
Good Points *Inexpensive. Good High and Normal quality.*
Bad Points *No output tray.*
Conclusion *A good printer for the light user.*

Lexmark OptraColor 40

Rather than employing a proprietary driver standard, Lexmark has opted to give the choice of either PCL5c or PostScript Level 2. However, this does restrict the user to 600x600dpi output (1200dpi through image smoothing). We were unable to complete our photo-printing test with the standard 4Mb memory and had to upgrade to 12Mb before the OptraColor 40 was able to produce a complete page. This is a major deficiency in what Lexmark maintains could be used as a network printer, although connection is via the standard parallel interface. Further, even after cleaning the heads and trying a variety of print media, the photo results were obstinately banded and induced a massive 7min 39sec spool time. When receiving a page of text, this printer's 8sec spooling time was a little slow. However, on photocopy paper the ink demonstrated uniform density and clean edges with only the minimum of feathering. Five pages arrived in just 1min 50sec. On Lexmark's inkjet paper business-graphic presentation was impressive. Fades were smooth, and colours were bright and solid. On both inkjet and photocopy paper it had no difficulty in producing a hairline of white through a block of solid black.

PCW DETAILS

★★★

Price *£434.75 (£370 ex VAT)*
Contact *Lexmark 01628 481500*
www.lexmark.co.uk
Good Points *Industry-standard drivers.*
Bad Points *Inadequate memory. Poor photo reproduction.*
Conclusion *Rather expensive for what you get.*

How printers utilise USB

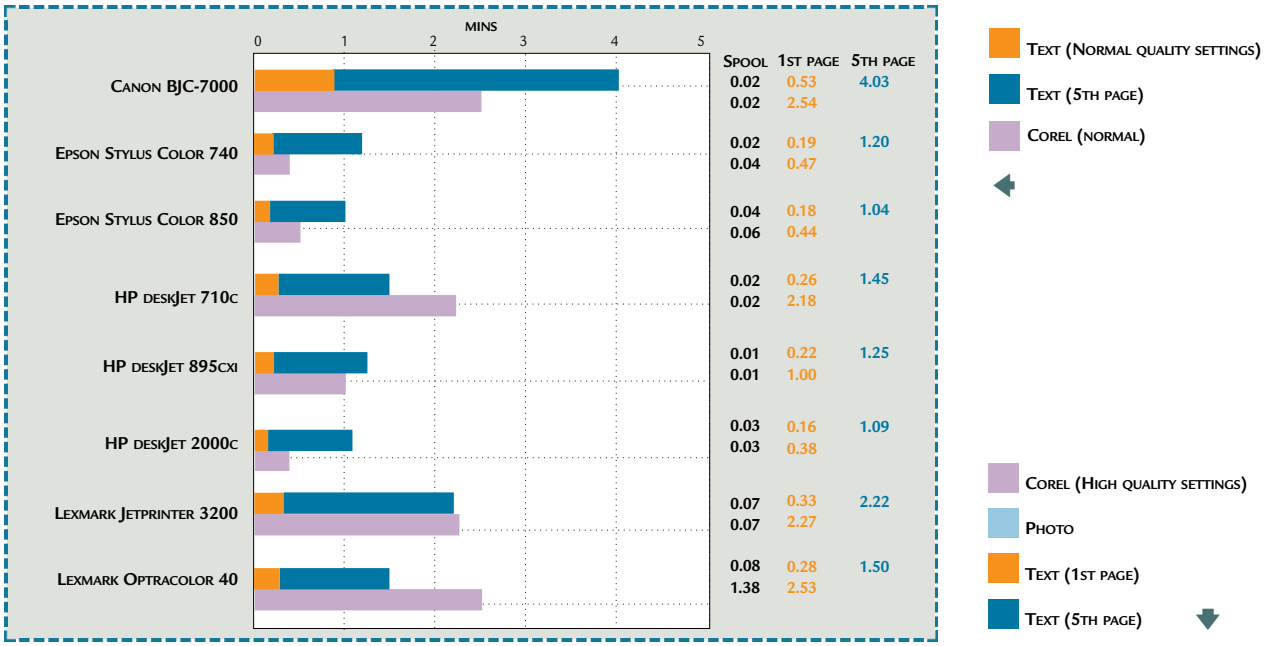
Two of the printers that appear in this round-up of inkjets, Hewlett-Packard's DeskJet 895CXi and Epson's Stylus Color 740, incorporate USB and are the first two printers we have seen to incorporate the technology.

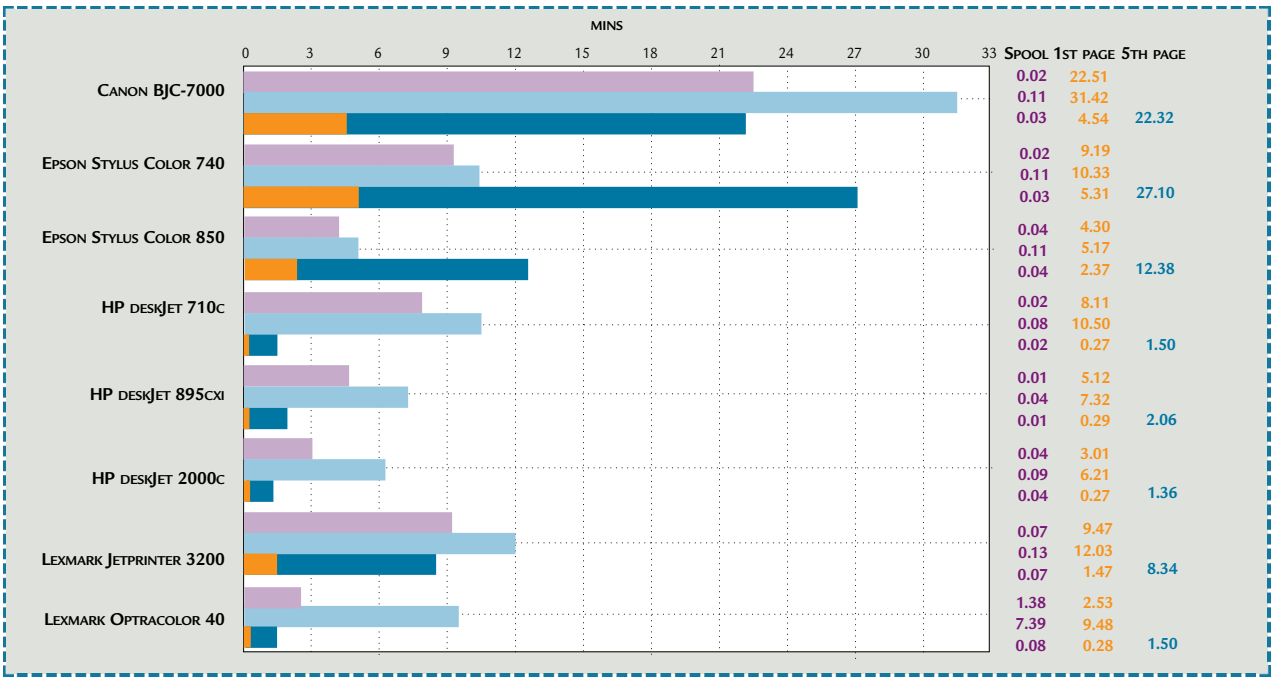
Hewlett-Packard manufactures a parallel-to-USB adapter for existing printers, but the benefit of using a printer with the technology built in means that it leaves the parallel port free for any devices without a pass-through connector, or for use in computers such as the Apple iMac that do not include a parallel port. While this has not yet found its way onto the PC, the more widespread adoption of USB means that we may see it replacing serial and parallel connections entirely in the future.

USB driver support is built in to Windows 98, and carrying data at 12 megabits per second it is suitable for non-speed-critical applications such as printers and digital cameras; not hard drives, though. USB connections allow a bi-directional data flow, so that the printer can pass information back to the PC as well as accepting data to print. Such information could include the state of the ink wells or paper-jam warnings.

Perhaps the most significant aspect of the USB interface to tempt the printer user is the ability to connect multiple peripherals to a single port and hence do away with clumsy switcher boxes. In this way, the home user will be able to connect perhaps a laser and a colour inkjet to a single PC and direct specific jobs to each at will.

PCW Labs report





How we did the tests

To test the speed of the printers' engines, they were first asked to print a standard business letter containing a variety of fonts and font sizes, as well as a scanned signature. As this represented a realistic use of the machine and required paper coverage of more than 5%, it highlighted the difference between manufacturers' claims and the actual performance of their products.

We also wanted to test the printers' colour-printing capabilities and so devised two further tests. The first was a page of business graphics produced in CorelDraw. Incorporating fades, solid blocks, the *PCW* logo and even four Pantone blocks, it pushed each printer's rendering capabilities to the limit. This we printed on both photocopy and coated paper to measure the versatility of its inks. Our business graphics test examines bleeding of ink, and the solidity and uniform density of colour in areas of extended paper coverage. To test the number of distinguishable levels of tone possible, four faded bars in black, cyan, magenta and yellow fade from 100% coverage to 0%. Visible stepping indicates fewer levels and possibly lower quality. Finally, a thin white hairline is drawn through a block of solid black to check for accuracy and feathering.

The final test was to reproduce a full-page A4 photo incorporating a montage of green, blue, red and yellow images. The yellow image was surrounded by composite black to test bleeding, while a band of swimmers running into the ocean tested each printer's ability to produce realistic skin tones — a particularly difficult task.

Many thanks to PhotoDisc <www.photodisc.com> who supplied the photographic images used in the tests.

PHOTO AND TEXT SAMPLES


Canon BJC-7000


Epson Stylus Color 740


Epson Stylus Color 850


HP DeskJet 710C

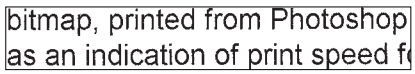

HP DeskJet 895CXi


HP DeskJet 2000C


Lexmark 3200

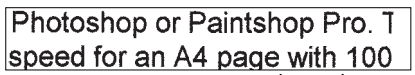

Lexmark OptraColor 40


Control

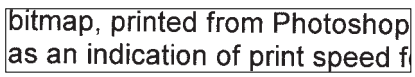


Canon BJC-7000

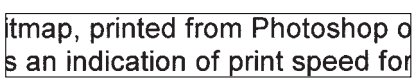
Epson Stylus Color 740



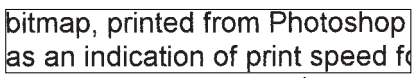
Epson Stylus Color 850



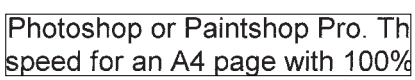
HP DeskJet 710C



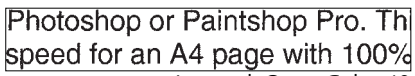
HP DeskJet 895CXi



HP DeskJet 2000C



Lexmark 3200



Lexmark OptraColor 40

CorelDraw samples

Canon BJC-7000

HP DeskJet 710C

Lexmark 3200

Epson Stylus Color 740

HP DeskJet 895CXi

Lexmark OptraColor 40

Epson Stylus Color 850

HP DeskJet 2000C

Control

Table of features

Manufacturer	Canon	Epson	Epson	Hewlett-Packard
Model	BJC-7000	Stylus Color 740	Stylus Color 850	DeskJet 710C
Price (ex VAT)	£229	£232	£271.00	£179
Telephone	0121 666 6262	0800 220546	0800 220546	0990 474747
Web site	www.canon.co.uk	www.epson.co.uk	www.epson.co.uk	www.hp.com
Maximum resolution (dpi)	1200 x 600	1440 x 720	1440 x 720	600
Input paper tray capacity	130 sheets	100 sheets	100 sheets	100 sheets
Bundled software	None	Adobe PhotoDeluxe 2	None	None
Cost of mono cartridge ex VAT	£29.99	£17.50	£17.69	£21.80
Cost of colour cartridge ex VAT	£31.99	£17.50	£18.10	£26.60

Manufacturer	Hewlett-Packard	Hewlett-Packard	Lexmark	Lexmark
Model	DeskJet 895CXi	DeskJet 2000C	JetPrinter 3200	OptraColor 40
Price (ex VAT)	£249	£600	£150	£370
Telephone	0990 474747	0990 474747	01628 481500	01628 481500
Web site	www.hp.com	www.hp.com	www.lexmark.co.uk	www.lexmark.co.uk
Maximum resolution (dpi)	600	600	1200 x 1200	600 x 600
Input paper tray capacity	100 sheets	150 sheets	100 sheets	150 sheets
Bundled software	None	None	Windows Draw 6	None
Cost of mono cartridge ex VAT	£21.80	£26.60	£18.52	£22.37
Cost of colour cartridge ex VAT	£26.60	£26.60	£22.37	£24.93

Editor's Choice

Speed and quality of output is all the proof we need.

The speed of the printers reviewed here varied widely, as did the quality of the output they produced. Judging which should be awarded the prestigious *PCW* Editor's Choice award therefore involved identifying the optimum balance between these two factors. Further, while for some users price may be a secondary consideration, for a great number it may feature more highly in the list of factors that influence their choice.

The cheapest of the crop reviewed here is the Lexmark JetPrinter 3200, attaining a very respectable 1200 x 1200 dpi resolution, squeezing over 1.4 million dots into each square inch of paper. Although this ensures more or less continuous tonal coverage with smooth transitions between colours and shades, it should be remembered that at much more that 150dpi the human eye finds it difficult to spot the individual dots.

Epson's Stylus Color 850 and Stylus Color 740 undoubtedly produced the best photo reproduction with a top resolution of 1440 x 720 each. Although with colours, tones and saturation to match the original article when printed on photo paper, their ponderous approach to text let them down.

The 740 was faster than its competitors at the Draft quality setting, but this was not of high enough quality to be used for official documents. The high-quality modes of both Epson printers produced pleasing text output, but they lagged behind the Hewlett-Packard units in terms of job time. The **Epson Stylus Color 740** has a slight edge over its larger sibling in the inclusion of a USB port, and so for its photo performance receives our **Highly Commended** accolade.

The average user would be hard pressed to find fault with the quality and speed of the Econofast mode employed by the **Hewlett-Packard 895Cxi**. Although it is slower in Normal quality modes than the two Epson offerings, we feel that the fact you could happily use Econofast for vital documents puts it strides ahead. Like Epson's 740, it gives the user the option of a USB connection. The fact that the HP printers numbered among those with the lowest resolution should not be held against them: HP uses its own PhotoREt technology which allows the printers to place up to 16 individual drops of ink onto each spot, eliminating the need to increase resolution to eliminate white areas while still making lighter tones possible. Although not quite up to the standard of Epson's offerings, the CXi's photo and business graphics reproduction were impressive when the speed at which they were produced was taken into account. The range of paper with which it can cope would be difficult to better, and the open-cover sensor, dragging the cartridges to a serviceable position, make replacing the ink a breeze. We found it difficult to fault this machine and so award it our coveted **Editor's Choice**.

▲ **Our Editor's Choice, the Hewlett-Packard 895CXi. Overall, we found it hard to fault it**

▶ **The Epson Stylus Color 740, with its impressive photo reproduction, is Highly Commended**