Inkjet printers

We make choosing a colour inkjet simple with our round-up of all the latest models

The majority of inkjet manufacturers have reached a plateau in terms of image quality. Their flagship models now deliver true photo-quality prints and some would even say that the quality is superior to silver halide prints from film cameras. So manufacturers are now turning their attention to other aspects of printing. These include obvious areas such as speed and features, and less obvious ones such as light-fastness, drying time and colour matching.

Light-fastness can be roughly judged by manufacturers' quotes, but fading will also depend on where prints are displayed and whether they're protected from air or not. HP, for example, claims that images printed on its new range of PhotoREt IV printers will last for over 70 years – twice the life of silver halide prints. Epson claims a longevity of around 25 years and Canon 20 years.

It might come as a surprise that paper plays just as important a role as ink in fade resistance. This is also true for print quality, and we can't stress enough that you should use the manufacturer's recommended papers, especially if you want to print photos for display. Since inks and media are chemically matched, you only get the best quality by using the appropriate paper.

Colour matching has become an increasingly pertinent feature of the latest inkjets and it's worth bearing in mind standards such as Exif 2.2 when choosing a printer. Newer digital cameras support this standard, and in conjunction with a compatible printer it ensures the colours printed match the original colours.

This month, we've rounded up a selection of general-purpose inkjets and also models specifically aimed at photo printing. We've also covered A3 printers – three of the four on test offer PostScript options for printing proofs and the fourth can be purchased with PostScript 3 if you opt for the PostScript model.

Lastly, we've tested two multifunction devices (*see p98*) that integrate printer, scanner and copier functions into one to save money and desk space. To find out which printers take the awards, read on.

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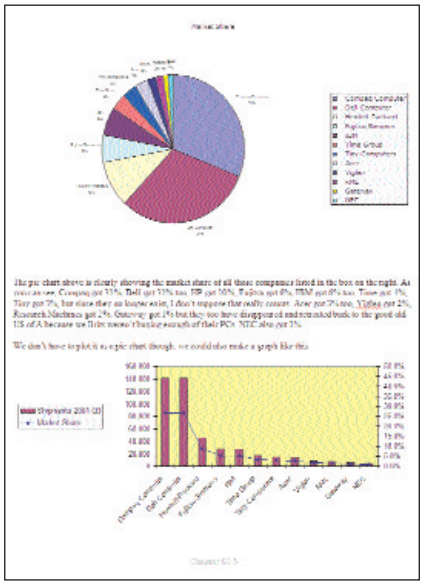
How we test

The best way to assess a printer's performance is to test it as it would be used by an end user. Our test documents are designed to simulate common printing tasks combined with more intensive ones to push the printer's capabilities of quality and speed to the limit.

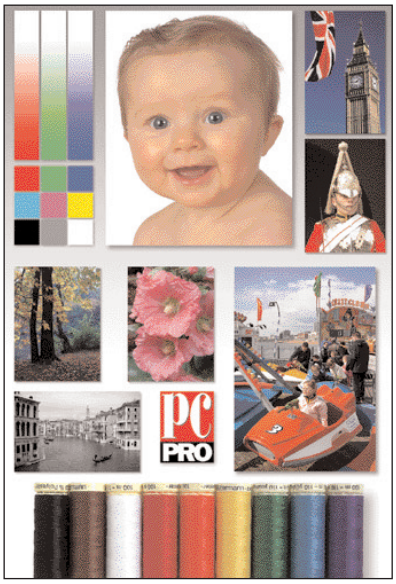
The tests we use for assessing speed and print quality are a development of those we used last year (*see Labs, issue 92, p76*). We've added a test for ink cartridge life using a standard 5 per cent mono document developed by IDC Consulting and a colour document with 5 per cent coverage of each CMY colour. We install a fresh set of cartridges and run printers continuously until prints start showing banding from a lack of ink. The results of our tests can be found on the feature table on p88 together with the manufacturer's claimed yields.

We use our standard test rigs for running the tests. These are based on 1GHz Athlon CPUs on AOpen AK33 motherboards with 256MB of SDR memory. We use Windows XP Professional installed on 18GB Seagate Cheetah SCSI hard disks.

For measuring print speed, we record the time taken for each test with a stopwatch, starting when the Print button is pressed and stopping when the final sheet drops onto the output tray. This eliminates any delay caused by host processing. We time a 25-page text test, which has around 5 per cent coverage, the A4 digital camera photo, the DTP document and the three-page report. Each test is given a weighting according to how important speed is in each type of document and the scores are then combined to give the overall speed rating.



The business report incorporates colour and different fonts to test plain paper capabilities.

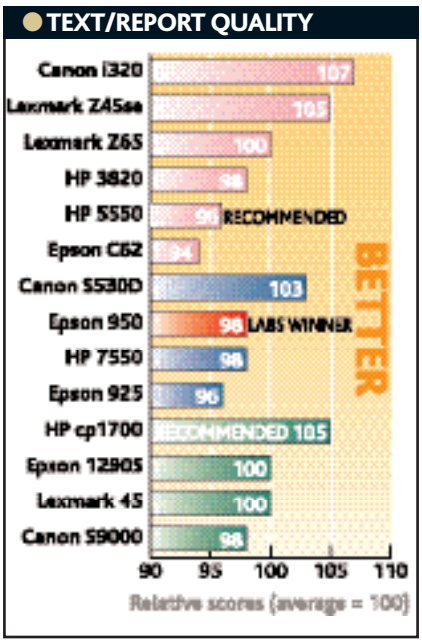


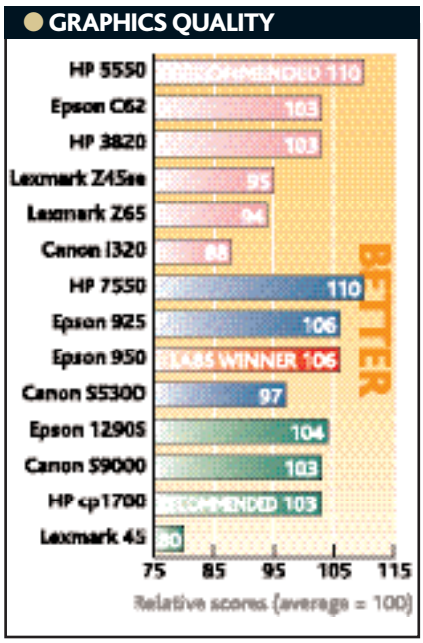
The photo montage proved a gruelling test for almost all printers with its varied scenes.

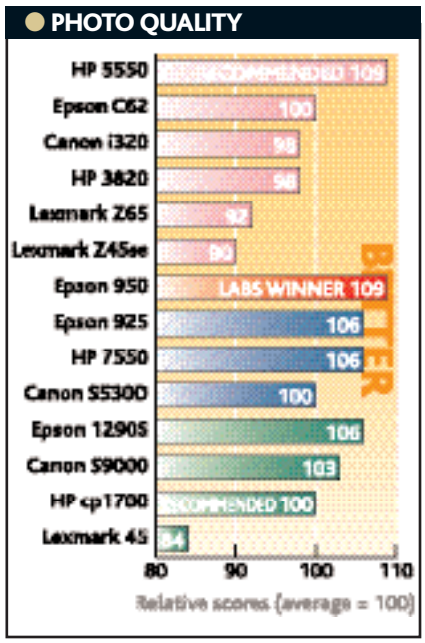
The quality tests are more subjective and, to ensure no bias, a panel of three judges independently assesses the printouts. Each test is awarded a score from one to ten and weightings are applied, giving certain tests greater importance. We use separate weightings for each inkjet category, since general-purpose printers are required to perform very different tasks to dedicated photo printers.

PHOTO PRINTING

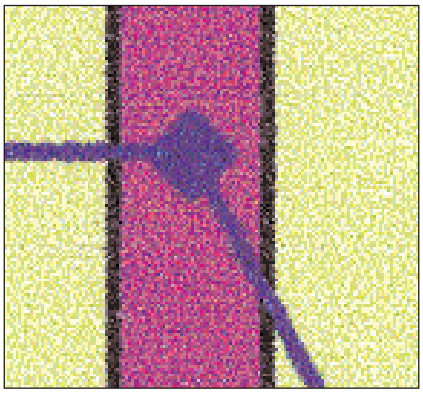
The main test is an A4 photo montage printed on either the manufacturer's own photo paper or Ilford photo paper where no branded photo paper is available, as is the case with Lexmark. All quality-enhancing features are turned on to achieve the best possible print quality from each printer. Specifically, we examine flesh tones, colour transitions in the various photos and the RGB fades. A monochrome photo is used to determine how well each printer produces greyscale images. We also assess the general colour accuracy based on skin tones and check prints for banding and grain. For the A3 printers, this test is repeated on A3 paper to again check for quality and for speed.



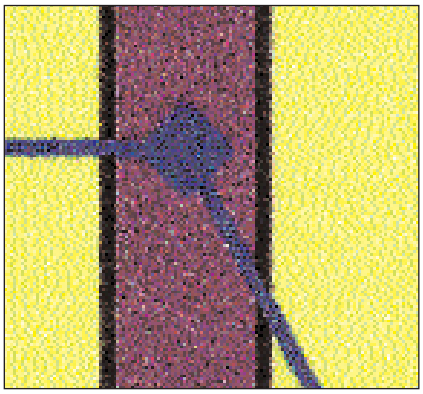




KEY: GENERAL-PURPOSE INKJETS PHOTO INKJETS A3 INKJETS



Weak yellow and feathering of dark colours detract from the Epson C62's report print.



Very little feathering and strong colours give the Canon i320's report the edge

Poor resolution, washed-out colours and banding were seen on the Lexmark Z65's print.

The HP 5550 delivers vivid, well-saturated colours and exquisite detail.

A secondary photo test involves printing a digital photo taken on the formerly A-Listed Fujifilm FinePix 6900 Zoom, primarily for timing purposes.

DTP DOCUMENT

The DTP test is printed on coated paper, which gives the best compromise between image quality and price. As Lexmark doesn't produce its own branded paper, we use Ilford glossy inkjet paper for its inkjets. Text quality is especially important in this test. All images should print without banding, and the monochrome photos should be free from any colour tinges caused by composite black (a mix of cyan, magenta and yellow). The reverse text (white text on a black background) is a tough test for some printers, with the thin lines of the serif font disappearing.

COLOUR PERFORMANCE

The last test on coated paper is the colour performance test. This technical test sorts the excellent from the merely good. It includes three solid blocks of cyan, yellow and magenta, which we use to assess purity. The test also includes grey blocks of varying intensities. One set is composed using black ink only, and the second using composite black. These can then be compared to check how closely the composite blocks match the others. Interestingly, we found that most drivers 'intelligently' ignored the black-only boxes and printed both sets using their composite black.

Perhaps the most telling tests are the three multicoloured fades, where banding, stepping, colour accuracy and graininess are all closely examined. Following this are fades in each of the four main colours. These should all fade equally and uniformly across the intensity range from zero to 100 per cent. The reverse hairlines test each printer's ability to leave 2pt, 1pt, 0.5pt, 0.2pt and 0.1pt white lines in a solid black block.

However, we don't place the greatest weighting on this test as it serves as more of a low-level examination of a printer's technical ability than of real-world performance.

PLAIN PAPER TESTING

All the other tests are printed on plain paper, with the three-page business report judged on both text quality and clarity of the graphical images and tables. The colour CorelDRAW image is checked for grey accuracy, banding and detail in the dark and light areas of the image and is repeated on A3 paper with those printers capable of it. The final page of text from the 25-page speed test is used in conjunction with the report to give an overall score for text quality.

FEATURES AND VALUE FOR MONEY

Although our testing of printers is based on quality and speed, features also contribute to the value-for-money rating of each printer. This not only takes into account obvious extras like media readers, but also the capabilities of the drivers, acoustics and design features like flat input and output trays.

QUALITY RESULTS

	Paper type	Canon i320	Epson Stylus C62	HP Deskjet 3820	HP Deskjet 5550	Lexmark Z45se	Lexmark Z65	Canon S530D	Epson Stylus Photo 925	Epson Stylus Photo 950	HP Photosmart 7550	Canon S9000	Epson Stylus Photo 1290S	HP cp1700	Lexmark Optra Color 45
Photo montage	Glossy photo	6	7	6	10	3	4	7	9	10	9	8	9	7	1
25-page document	Plain	10	7	7	5	9	7	8	7	6	6	6	7	9	9
CorelDRAW image	Plain	4	7	7	8	9	8	4	7	7	8	5	7	7	2
Three-page report	Plain	8	5	7	8	8	8	8	6	8	8	8	8	8	6
Colour performance	Coated	3	7	6	8	4	4	6	8	7	8	10	7	7	1
Four-page DTP document	Coated	4	7	8	10	3	3	7	8	9	10	6	8	7	2

SPEED RESULTS

	Paper type	Canon i320	Epson Stylus C62	HP Deskjet 3820	HP Deskjet 5550	Lexmark Z45se	Lexmark Z65	Canon S530D	Epson Stylus Photo 925	Epson Stylus Photo 950	HP Photosmart 7550	Canon S9000	Epson Stylus Photo 1290S	HP cp1700	Lexmark Optra Color 45
A4 digital photo	Glossy photo	241	436	328	290	1910	842	164	376	407	372	112	304	203	1,110
Photo montage	Glossy photo	263	436	303	266	1712	628	178	398	429	396	161	278	205	1,150
25-page document (text only)	Plain	5.4	8.7	4.6	5.2	6.5	8.4	8.3	2.4	8.4	5.9	4.1	2.9	5.5	3.4
CorelDRAW image	Plain	184	154	170	210	374	265	109	104	69	197	93	169	85	550
Three-page report	Plain	380	119	286	350	663	495	198	239	212	462	242	444	181	489
Four-page DTP document	Coated	541	595	849	1,003	1,065	1,245	497	720	639	1,703	217	703	446	1,535

All speed results are in seconds, apart from the 25-page document, which is detailed in pages per minute.

FEATURE TABLE







	Canon i320	Epson Stylus C62	HP Deskjet 3820	HP Deskjet 5550	Lexmark Z45se	Lexmark Z65	Canon S530D
Overall rating	101	97	94	111	95	93	92
Price (inc VAT)	£59 (£69)	£59 (£69)	£73 (£86)	£115 (£135)	£62 (£73)	£98 (£115)	£199 (£233)
Basic warranty	1yr on-site	1yr on-site	1yr RTB	1yr RTB	1yr on-site	1yr on-site	1yr on-site
Manufacturer's website	www.canon.co.uk	www.epson.co.uk	thenew.hp.com	thenew.hp.com	www.lexmark.co.uk	www.lexmark.co.uk	www.canon.co.uk
Supplier	dabs.com 0800 138 5182	dabs.com 0800 138 5182	dabs.com 0800 138 5182	Simply 0870 727 2100	dabs.com 0800 138 5182	Insight 0870 700 7350	dabs.com 0800 138 5182
Supplier's website	www.dabs.com	www.dabs.com	www.dabs.com	www.simply.co.uk	www.dabs.com	www.insight.com/uk	www.dabs.com
BASIC SPECIFICATIONS							
Print head technology	Thermal	Piezo-electric	Thermal	Thermal	Thermal	Thermal	Thermal
Drop size (picolitres)	5	4	5	4	CMY = 7, K = 24	CMY = 3-10, K = 24	5
Installed memory	32KB	32KB	2MB	8MB	Not stated	Not stated	56KB
LCD panel	✖	✖	✖	✖	✖	✖	Status, optional preview
Dimensions W x H x D (mm)	385 x 165 x 195	480 x 181 x 260	445 x 197 x 380	456 x 156 x 385	455 x 276 x 516	445 x 331 x 533	430 x 188 x 301
RESOLUTIONS SUPPORTED							
Draft mode (dpi)	Not stated	360 x 360	600 x 600	1,200 x 1,200	300 x 600	300 x 600	Not stated
Normal mode (dpi)	Not stated	1,440 x 720	1,200 x 1,200	1,200 x 1,200	600 x 600	600 x 600	Not stated
Maximum resolution (dpi)	2,400 x 1,200	5,760 x 720	4,800 x 1,200	4,800 x 1,200	4,800 x 1,200	4,800 x 1,200	2,400 x 1,200
CONSUMABLES PRICING (ALL PRICES EXC VAT)							
Print head	N/A, not replaceable	N/A, not replaceable	N/A, integrated into cartridge	N/A, integrated into cartridge	N/A, integrated into cartridge	N/A, integrated into cartridge	N/A, not replaceable
Mono cartridge	£4.50	£22	£12 (14ml)	£14	£19	£19	£9
Combination colour cartridge	£9	£19	£22 (19ml)	£18	£22	£22	N/A
Individual colour cartridge	N/A	N/A	N/A	N/A	N/A	N/A	£6
Photo cartridge	N/A	N/A	N/A	£18, optional for six-colour printing	N/A	N/A	N/A
Price of ink per page in mono (pence)*	3.5	3.7	2.6	3.5	3.2	3.2	2.9
Price of ink per page in colour (pence)*	5.3	6.3	7.1	4.5	3.7	4.9	4.6
CONSUMABLES LIFE							
Lifetime of print head (pages)	Life of printer	Life of printer	Same as ink life below	Same as ink life below	Same as ink life below	Same as ink life below	Life of printer
Number of print head colours	4	4	4	4 (optional six colours)	4	4	4
Type of ink	Dye-based	Dye-based	Dye-based with pigment-based black	Dye-based with pigment-based black	Dye-based with pigment-based black	Dye-based with pigment-based black	Dye-based with pigment-based black
Mono cartridge stated lifetime (pages) at 5 per cent coverage	130	600	464	450	600	600	310
Mono cartridge tested lifetime (pages) at 5 per cent coverage	198	843	315	567	506	676	548
Colour cartridge stated lifetime (pages) at 5 per cent per colour	170	300	312	400	600	450	390
Colour cartridge tested lifetime (pages) at 5 per cent per colour	187	349	395	509	517	304	625
Fade resistance (years)**	25	Not stated	Not stated	70	Not stated	Not stated	25
PAGES PER MINUTE							
Manufacturer quoted speed: mono (ppm)	Draft, 10; normal, 7.9	Draft, 14	Draft, 12; normal, 6; best, 2.5	Draft, 17; normal, 6; best, 2	Draft, 15	Draft, 21	Draft, 14; normal, 12
Manufacturer quoted speed: colour (ppm)	Draft, 7; normal, 3.6	Draft, 4	Draft, 3; normal, 0.8; best, 0.25	Draft, 3; normal, 0.9; best, 0.2	Draft, 8	Draft, 15	Draft, 10; normal, 6
THROUGHPUT AND POWER							
Maximum duty cycle (pages per month)	Not stated	Not stated	1,000	3,000	3,000	5,000	Not stated
Power-saving mode supported	Energy Star	Energy Star	Energy Star	Energy Star	Energy Star	Energy Star	Energy Star
Power consumption while printing (W)	14	18	25	30	Not stated	Not stated	36
Power consumption when in standby (W)	1	Not stated	4	4	3	5	6
Acoustic noise level, dB(A)	45	48	46	40	45	45	42
PAPER HANDLING							
Paper tray capacity (pages)	100	100	100	100	100	250 (150 rear, 100 front)	100
Output tray capacity (pages)	50	100	50	50	50	50	50
Minimum paper weight (g/m²)	64	64	60	60	45	45	64
Maximum paper weight (g/m²)	270	255	240	240	270	270	270
Manual feed input	✔	✔	✔	✔	✔	✔	✔
Flat output tray	✔	✖	✖	✔	✔	✖	✖
Flat input tray	✔	✖	✖	✔	✔	✔	✖
Hardware cancel button	✖	✖	✔	✔	✖	✖	✔
CONNECTIVITY							
USB 1.1	✔	✔	✔	✔	✔	✔	✔
USB 2	✔	✖	✖	✔	✔	✔	✔
Parallel	✖	✔	✔	✔	✖	✖	✖
Infrared	✖	✖	✖	✖	✖	✖	✖
CompactFlash slot	✖	✖	✖	✖	✖	✖	Via PC Card adaptor (included)
SmartMedia slot	✖	✖	✖	✖	✖	✖	Via PC Card adaptor (optional)
Other	✖	✖	✖	✖	✖	✖	Type II PC Card, direct USB
OS SUPPORT							
Windows 98/ME	✔	✔	✔	✔	✔	✔	✔
Windows 2000	✔	✔	✔	✔	✔	✔	✔
Windows XP	✔	✔	✔	✔	✔	✔	✔
Mac OS	8.6+	8.1+	8.6+	8.6+	8.6+	8.6+	8.6+
Other	✖	Windows NT 4	Windows NT 4	Windows NT 4	✖	✖	✖
PCL or colour matching support	Exif 2.2	Exif 2.2	HP PCL3 enhanced	ColorSync 2.5, Exif 2.2, HP PCL3 enhanced, ICM 2, sRGB	ColorSync, ICM 2, sRGB	ColorSync, ICM 2, sRGB	ColorSync 2.5+, Exif 2.2, ICM 2
Bundled software	Canon Easy-PhotoPrint2, Lord of the Rings Activity Studio, PhotoRecord, PhotoStitch, ZoomBrowser EX	Epson PhotoQuicker 3.2, Star Wars Episode 2 Attack of the Clones	✖	HP Photo Printing	✖	✖	Canon Easy-PhotoPrint2, PhotoRecord, PhotoStitch, ZoomBrowser EX
DRIVER OPTIONS							
Automatic head alignment	✖	✖	✖	✔	✔	✔	✖
Colour correction	✔	✔	✔	✔	✖	✖	✔
Resolution enhancement	✖	✔	✔	✔	✖	✖	✖
Automatic media selection	✖	✖	✖	✔	✖	✖	✖
Graphics mode auto-detection	✖	✔	✔	✔	✖	✖	✔
Ink saver/economy mode	✔	✔	✔	✔	✔	✔	✔
Ink level gauge	✔	✔	✔	✔	✔	✔	✔
Print progress indicator	✔	✔	✔	✔	✔	✔	✔
Reverse page order	✔	✔	✔	✔	✔	✔	✔
Multipage printing	✔	✔	✔	✔	✔	✔	✖
Poster	✔	✔	✔	✔	✔	✔	✖
Double-sided (manual duplex)	✔	✖	✔	✔	✔	✔	✔
Automatic duplex	✖	✖	✖	Optional	✖	✖	✖
Borderless A4 printing/ borderless 6 x 4in printing	✖/✔	✖/✖	✖/✖	✖/✔	✖	✖	✔/✔
Others	Night quiet mode, dry time, stamp/ background	Watermark, mirror	Ink volume, dry time	Ink volume, dry time	Banner, mirror	Banner, mirror	Dry time, stamp/ background

* Using stated page life and street prices of cartridges. ** Maximum lightfastness possible using recommended paper and ink.

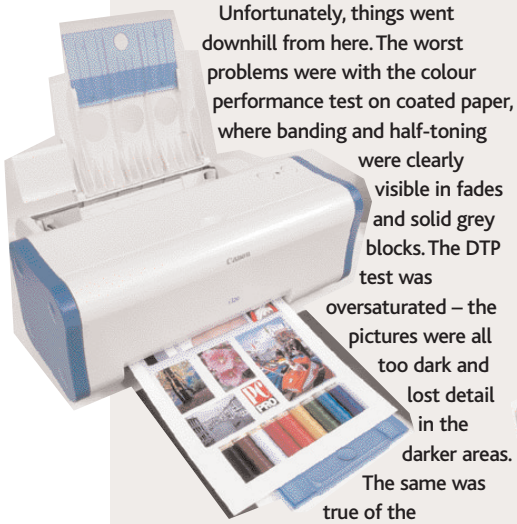
Epson Stylus Photo 925	Epson Stylus Photo 950	HP Photosmart 7550	Canon S9000	Epson Stylus Photo 1290S	HP cp1700	Lexmark Optra Color 45
98	113	100	105	106	110	67
£185 (£217)	£281 (£330)	£221 (£260)	£365 (£429)	£259 (£304)	£285 (£335)	£459 (£539)
1yr on-site	1yr on-site	1yr RTB	1yr on-site	1yr on-site	1yr RTB	1yr RTB
www.epson.co.uk	www.epson.co.uk	thenew.hp.com	www.canon.co.uk	www.epson.co.uk	thenew.hp.com	www.lexmark.co.uk
dabs.com	Insight	Insight	dabs.com	dabs.com	dabs.com	dabs.com
0800 138 5182	0870 700 7350	0870 700 7350	0800 138 5182	0800 138 5182	0800 138 5182	0800 138 5182
www.dabs.com	www.insight.com/uk	www.insight.com/uk	www.dabs.com	www.dabs.com	www.dabs.com	www.dabs.com
Piezo-electric	Piezo-electric	Thermal	Thermal	Piezo-electric	Thermal	Thermal
4	4	4	4	4	CMY = 4, K = 18	CMY = 18, K = 24
32KB	256KB	16MB	80KB	256KB	16MB	8MB
Status, optional preview	✖	Preview	✖	✖	Status	✖
492 x 228 x 290	515 x 299 x 663	475 x 160 x 390	573 x 196 x 334	609 x 416 x 779	673 x 284 x 654	563 x 247 x 277
360 x 360	360 x 360	1,200 x 1,200	Not stated	360 x 360	1,200 x 1,200	600 x 600
1,440 x 720	1,440 x 720	1,200 x 1,200	Not stated	1,440 x 720	1,200 x 1,200	600 x 600
5,760 x 720	2,880 x 1,440	4,800 x 1,200	2,400 x 1,200	2,880 x 720	2,400 x 1,200	600 x 600
N/A, not replaceable	N/A, not replaceable	N/A, integrated into cartridge	N/A, not replaceable	N/A, not replaceable	£25 each for CYMK	N/A, integrated into cartridge
£17	£9, 2 required	£14	£7	£13	£24	£19
£15	N/A	£18	N/A	£15	N/A	£22
N/A	£9	N/A	£7	N/A	£20	N/A
Included in combination cartridge	£9, individual	£18	£7, individual	Included in combination cartridge	N/A	N/A
3.1	1.4	3.5	2.6	2.4	1.9	3.2
6.8	6.1	4.5	7.8	4.5	3.4	8
Life of printer	Life of printer	Same as ink life below	Life of printer	Life of printer	CMY = 24,000, K = 16,000	Same as ink life below
6	6	7	6	6	4	4 (optional six colours)
Dye-based	Dye-based	Dye-based with pigment-based black	Dye-based	Dye-based	Dye-based with pigment-based black	Dye-based with pigment-based black
540	628	450	270	540	1,400	600
503	1,023	567	317	569	Not tested	521
220	440	400	270	330	1,750	275
204	901	509	263	284	Not tested	232
20	25	70	25	20	Not stated	Not stated
Draft, 8.5	Draft, 8.8	Draft, 10	Draft A4, 6; normal A4, 5.7	Draft A4, 9.4	Draft A4, 16; draft A3, 10	Draft A4, 8
Draft, 2	Draft, 7.3	Draft, 11	Draft A4, 6; normal A4, 4.2	Draft A4, 9	Draft A4, 5.5; draft A3, 3.7	Draft A4, 4
Not stated	Not stated	5,000	Not stated	Not stated	5,000	5,000
Energy Star	Energy Star	Energy Star	Energy Star	Energy Star	Energy Star	Energy Star
15	12	40	24	18	48	40
Not stated	Not stated	2	3	Not stated	9	25
43	45	45	37	38	47	47
100	100	100	100	100	150	150
100	100	50	50	100	75	50
60	64	60	64	64	60	60
255	255	240	245	255	270	273
✔	✔	✔	✔	✔	✔	✔
✖	✔	✔	✖	✔	✔	✔
✖	✔	✔	✔	✖	✔	✔
✔	✖	✔	✖	✖	✔	✔
✔	✔	✔	✔	✔	✔	✖
✖	✖	✔	✖	✖	✖	✖
✖	✔	✖	✖	✔	✔	✖
✖	✖	✖	✖	✖	✔	✖
✔, Type II	✖	✔, Type II	✖	✖	✖	✖
✔	✖	✔	✖	✖	✖	✖
Memory Stick	✖	SD/MMC, Memory Stick, direct USB	✖	✖	JetDirect LAN (optional)	Internal solutions port
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔
8.1+	8.1+	9+	8.6+	8.1+	8.6+	7+
Windows NT 4	Windows NT 4	✖	✖	Windows NT 4	DOS	Windows 3.1x, NT 4
Exif 2.2, PIM2	ColorSync 2, Exif 2.2, PIM, sRGB, Windows ICM	Exif 2.2, HP PCL 3	ColorSync 2.5+, Exif 2.2, ICM 2, Optional PostScript PowerRIP 2000	Exif 2.2, optional PostScript StylusRIP, PIM2	HP PCL 3 enhanced, PostScript 3 (only on cp1700ps)	PCL 5c, PostScript 2
Epson PhotoQuicker 3.2	Epson PhotoQuicker 3.2, Epson PrintCD	HP Photo Printing, HP Memories Disk Creator	Canon ZoomBrowser EX, PhotoRecord, PhotoStitch	Adobe Photoshop Elements, Epson PhotoQuicker 3.2	HP Photo Printing, IR Print	MarkVision
✖	✖	✔	✖	✖	✔	✖
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✖	✔	✔	✖
✖	✖	✔	✖	✖	✔	✖
✔	✔	✔	✔	✔	✔	✖
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔, on status panel	✖
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✖
✖	✔	✔	✔	✔	✔	✔
✖	✖	✖	✖	✖	✖	✖
✔/✔	✔/✔	✖/✔	✔/✔	✔/✔	✖	✖
Watermark, auto cutter	CD printing, auto cutter	Ink volume, dry time	Stamp/background	Watermark	Watermark, ink volume, dry time	✖

Canon i320

PRICE £59 (£69 inc VAT)
SUPPLIER dabs.com 0800 138 5182
VERDICT **Speedy prints and a decent array of features bolster the i320's score, but quality is below average.**

Despite looking like an avant-garde four-slice toaster, the Canon i320 managed to impress us with a decent set of features, quick printing and acceptable quality at a low price. However, it doesn't use separate ink tanks and the small capacity of the cartridges pushes up the cost per page to 3.5p for mono and 5.3p for colour.

We were surprised at how well the i320 handled text. Letters were crisp, dark and of almost laser quality. That said, all of the printers here gave superb results in this test. The quality continued in the report document, with the only issue being a slight graininess of solid colours.



Unfortunately, things went downhill from here. The worst problems were with the colour performance test on coated paper, where banding and half-toning were clearly visible in fades and solid grey blocks. The DTP test was oversaturated – the pictures were all too dark and lost detail in the darker areas. The same was true of the CorelDRAW image, where some shading was completely lost.

If you're thinking of printing photos on glossy paper, the i320 isn't the best printer for the job. Our photo montage was grainy and, although the colour accuracy was good, the output isn't strictly photo quality.

Thanks to USB 2 and Exif 2.2 compatibility, a good software bundle and drivers whose only major missing setting is for resolution enhancement, the i320 does well for features. If you need good text quality and aren't worried about high-resolution colour output, the Canon offers good value in this company.

PC PRO RATINGS
OVERALL **101**
QUALITY 96 FEATURES 103
SPEED 109 VALUE 101
100 IS THE AVERAGE

Epson Stylus C62

PRICE £59 (£69 inc VAT)
SUPPLIER dabs.com 0800 138 5182
VERDICT **The C62 is quick when printing text, but a lack of more advanced features and high running costs hold it back.**

Epson has been known in the past for slow text printing, but the C62 is the quickest on test. It completed the 25-page text document in less than four minutes, equating to 8.7ppm. Only when printing photos was it left behind, taking over seven minutes to print the A4 images when the two HPs and the Canon managed under it five minutes.

Quality-wise, the Epson was outclassed, not surprisingly, by the much more expensive HP Deskjet 5550. In particular, it fell down on the three-page report, where solid fills were patchy. There was also bleeding around dark lines printed on light backgrounds and small fonts. This latter fault caused the interiors of some letters to be filled in, decreasing readability.

The photo montage was printed well, with only the Deskjet 5550 making a better job of it. Slight banding held the Epson back here, allied to the same patchy effect when printing the green and blue fades and solid blocks. The other tests were performed reasonably well, though.

The Epson lags behind in the features race, however. It doesn't have individual colour ink tanks and the integrated print head counts against it. Driver options are also limited, with head alignment being a manual process and no built-in facility for manual duplex printing.

Overall, the C62 is average here. While it's quick at printing text, the relatively expensive page costs of 3.7p and 6.3p per page for mono and colour respectively make it less appealing. If your budget is limited, choose the better-featured Canon i320.

PC PRO RATINGS
OVERALL **97**
QUALITY 100 FEATURES 74
SPEED 113 VALUE 93
100 IS THE AVERAGE

HP Deskjet 3820

PRICE £73 (£86 inc VAT)
SUPPLIER dabs.com 0800 138 5182
VERDICT **Speed and overall quality are respectable, but it's left well behind by its more expensive brother.**

Holding up HP's banner at the budget end of the market is the Deskjet 3820. It uses the same engine as the older 900 series, so supplies are readily available. This means it's economical in mono, with a page cost of 2.6p. Unfortunately, though, it's the most expensive in colour, with each 15 per cent page costing 7.1p.

In the quality tests, the 3820 performed best when printing the four-page DTP document. The only noticeable problem was grainy pictures, but that's to be expected at this price. It did less well in the photo montage and colour performance tests, where grainy images affected skin tones and the lighter areas of the fades. All the other quality tests were performed well, though.

The 3820 was the slowest in this section for plain text output. It only managed 4.5ppm, around half the speed of the Epson Stylus C62. It was also slower than both the Epson and Canon for the DTP document, although this can be partially excused thanks to the great print quality.

The drivers are lacking in some areas. We'd have liked to see options for reducing and enlarging the output built in, and the 3820 lacks the handy automatic head alignment of the 5550. In its favour, it includes options for changing the volume of ink put onto the page and the time allowed for the ink to dry before the paper is released.

Overall, if you need cheap mono prints the 3820 is an option, but the running costs for colour and the missing features count against it. The Canon i320 is a better budget buy, but the Deskjet 5550 is worth the extra outlay.

PC PRO RATINGS
OVERALL **94**
QUALITY 105 FEATURES 66
SPEED 102 VALUE 96
100 IS THE AVERAGE

HP Deskjet 5550

PRICE £115 (£135 inc VAT)
SUPPLIER Simply 0870 727 2100
VERDICT **Considering the stunning quality of the 5550, it's a real bargain.**

The Deskjet 5550 is our current A-Listed colour inkjet and easily defends its standing in this Labs. It uses the same new ink system as the Photosmart 7550 and the psc2110 (*see p98*). As standard, it employs a dye-based tricolour cartridge and a pigmented black, and with the optional photo cartridge (comprising dye-based black, light cyan and light magenta) replacing the black it delivers superb quality output.

Without the photo cartridge, photos appeared slightly grainy, akin to the 3820. However, photos printed with it were stunning. The A4 montage gained full marks for quality and was printed in only a few seconds longer than the Canon i320 at four minutes, 23 seconds. The only test that slowed it considerably was the DTP document on coated paper, although it was worth the wait for the excellent quality. Our standard text document was pushed out in under six minutes at a mediocre speed of just over 5ppm.

The 5550 isn't the cheapest printer to run, though, costing 3.5p per mono page. However, colour pages cost just 4.5p and this price includes a new print head with each cartridge. Canon and Epson page costs only cover ink, as their print heads are integrated and aren't replaceable. If their print heads become sufficiently clogged to noticeably reduce print quality, you'll have to buy a new printer.

The 5550's drivers are easy to install and offer comprehensive controls. With an optional £40 duplex unit, the only missing feature is borderless A4 printing – it can only manage this on 6 x 4in paper.

The HP Deskjet 5550 is a great general-purpose printer. If you can afford it and you're more worried about quality than outright speed, this is the machine to go for.

PC PRO RATINGS
OVERALL **111**
QUALITY 125 FEATURES 143
SPEED 99 VALUE 110
100 IS THE AVERAGE

Lexmark Z45se

PRICE £62 (£73 inc VAT)
SUPPLIER dabs.com 0800 138 5182
VERDICT **Slow output and grainy photos are disappointing, but low running costs are welcome.**

Of Lexmark's two printers in this section, the cheaper Z45se is the better buy. Despite not using the same cartridges as the Z65, it offers superior quality output than we saw from the Z65's new, slim versions. Maximum resolution is a respectable 4,800 x 1,200dpi and the coloured inks are dye based with a pigmented black. This means text on plain and coated paper was sharp, and faint feathering was only visible close up. The CorelDRAW image was also printed well. Colours were bright and the shading on the face was accurately reproduced. However, the DTP document had brown tinges around letters and mono images, and photos were grainy, despite being printed on the recommended glossy paper. The photo montage was very grainy too, even on the cyan, magenta and yellow squares that should be printed without mixing colours.

Driver options are limited. They don't allow colour correction or image resizing. Banner paper is allowed, though, as is mirror-image printing for iron-on transfers. Automatic head alignment speeds up the setup process.

Print speed was slow. It took almost 30 minutes to print the A4 photo montage and 20 minutes for the DTP document. It averaged 6.5ppm for the text test, but lagged well behind the best. Running costs are relatively low at 3.2p and 3.7p for mono and colour respectively. Overall, for those printing only on plain paper, the Z45se makes good sense, but not for those printing photos.

PC PRO RATINGS
OVERALL **95**
QUALITY 90 FEATURES 105
SPEED 86 VALUE 106
100 IS THE AVERAGE

Lexmark Z65

PRICE £98 (£115 inc VAT)
SUPPLIER Insight 0870 700 7350
VERDICT **In spite of the new cartridge system, the Z65 produces lesser-quality prints than its smaller brother.**

The Lexmark Z65 is aimed more at SoHo users than the Z45se. It has two input trays, allowing the first page of documents to be printed with headed or different-coloured paper. Its monthly duty cycle is also 2,000 pages higher than the Z45se, indicating that it's intended to be used in a more demanding environment.

The Z65 uses a different set of cartridges to both the other Lexmarks on test. They're physically smaller and, although the black unit printed 13 per cent more pages than Lexmark claims, the colour cartridge printed a similar amount less than claimed.

The Z65 was much quicker than the Z45se for all the tests except the DTP test, where it took over 20 minutes to print. The text document was churned out at 8.4ppm, nearly 2ppm faster than the Z45se and almost as fast as the Epson C62. However, the A4 photo montage took a disappointing ten minutes.

In common with the Z45se, the Z65 performed better on plain paper compared with others in the group than on the glossy paper recommended by Lexmark. Text showed noticeable feathering, but colours were accurate on the CorelDRAW image, although it was slightly grainy overall. Sadly, the photo montage was poor, suffering from noticeable grain throughout as well as banding. Also, in the colour performance test, the grey boxes had a pronounced magenta tint, showing that the composite black was flawed.

With higher colour running costs than the Z45se and a steeper initial price, it's hard to see a reason for buying the Z65 other than the dual input trays. The Epson C62 is significantly faster and offers better quality while costing less, but the superb HP Deskjet 5550 costs just £15 more. The choice isn't difficult.

PC PRO RATINGS
OVERALL **93**
QUALITY 85 FEATURES 112
SPEED 92 VALUE 94
100 IS THE AVERAGE

Canon S530D

PRICE £199 (£233 inc VAT) SUPPLIER dabs.com 0800 138 5182

VERDICT **Generally disappointing photo performance is almost redeemed by speedy printing, but a lack of features at this price is frustrating.**

Canon's S530D has a familiar feel about it, primarily because it uses the same body as the existing S820D. The LCD status panel and PC Card slot allow photos to be printed without a PC and there's a mini-USB port for direct printing from compatible Canon digital cameras. A colour preview LCD is optional for viewing images on memory cards – a standard feature of the HP Photosmart 7550 – and Canon also bundles a CompactFlash PC Card reader.

The ink system uses four separate tanks for minimum waste and replacements cost £9 for a black cartridge and £6 for a colour. Thanks to decent yields, which turned out to be almost double what Canon claimed, running costs are some of the lowest of all the photo printers on test. Like the 7550, colours are dye based with a pigmented black for crisp, deep black text.

Capable of a maximum resolution of 2,400 x 1,200dpi, the S530D falls behind other photo printers, but higher resolutions don't necessarily mean better quality. However, the relatively poor quality of the photo montage suggests the Canon's lower resolution could be to blame. When compared with the Epson Stylus Photo 950, the S530D's print was a lot lighter, grainier and suffered from banding.

Colour performance was fairly good, although the yellow cotton reel turned a mustard colour. On coated paper, colour fades were acceptable, but again solid colour boxes were grainier than we'd have expected at this price. The S530D's worst moment came when printing colour images on plain paper. Colours were muddy and graininess again prevailed, although there was no banding.

Where the S530D excelled was in printing text and colour business reports in normal mode, which it did quickly and at a surprisingly high quality. Obviously, this isn't great news if you're looking to mainly print photos, but makes the S530D a more versatile device.

Printing documents extremely quickly was the S530D's main redeeming feature, and it was by far the fastest photo printer on test. Printing the A4 photo montage took under three minutes, while the other three photo printers took over twice as long. Our standard letter was printed at over 8ppm, much faster than the Stylus Photo 925, which only managed 2.4ppm.

Unfortunately for Canon, we believe quality is more important than speed, so the apparent compromise hasn't paid off. The S530D gains some ground by offering borderless printing up to A4 and colour matching with Exif 2.2 support, but other niggles like the curved and exposed input and output paper trays all combine to leave the Canon without an award.

PC PRO RATINGS
OVERALL
92
QUALITY 85 FEATURES 89
SPEED 117 VALUE 83
100 IS THE AVERAGE

Epson Stylus Photo 925

PRICE £185 (£217 inc VAT) SUPPLIER dabs.com 0800 138 5182

VERDICT **Great photo quality and an auto cutter make the 925 a good choice, but it's slow.**

The Stylus Photo 925 is similar to the Canon S530D and HP 7550 in that it can act as a standalone direct photo printer, sporting an LCD status panel and several memory card readers. There's also an optional colour preview display (not cheap at £67) and a USB port for external storage devices.

With six dye-based colours, the 925 has a larger gamut than the Canon S530D, but the HP includes a secondary pigment black for seven-ink printing. Another of the 925's advantages over the S530D is its resolution – the 925 is capable of 5,760 x 720dpi, while the Canon manages 2,400 x 1,200dpi. In case you're wondering about the maths here, the Epson lays down around 50 per cent more dots per inch. One slight disadvantage is that the 925 doesn't use individual ink tanks and, as the cartridges are relatively expensive for their yields (particularly the colour tank), it doesn't offer the lowest running costs.

However, the 925's lower purchase cost and the fact that it's packed with features like the auto-cutter make up for the higher ink cost. Naturally, it will accept roll paper for easy photo printing and supports borderless prints even at A4, ensuring no wasted media.

The other good news is that the Epson delivers much better print quality than the Canon. Skin tones on the photo montage were realistic and the fine 4pl drop size meant that no graininess was visible at normal viewing distances. Colours were vivid and fades were smooth without the stepping seen on the Canon. In fact, we thought the 925 was slightly better than the 950 for printing raw colours and fades. Plus, if you can ignore the practically invisible banding, the 925 easily rivals the expensive 950 for overall photo quality.

On plain paper, the 925 performed almost identically to the 950, delivering a sharp, clean print, but colour did suffer compared with prints on coated paper. Text quality was second only to the Canon and, despite lacking the pigmented ink, still appeared jet black with only a little feathering. Our four-page report on coated paper was competently printed, and the three-page business report was only slightly worse for being printed on plain paper.

Sadly, you'll have to wait considerably longer for your prints than with the Canon, but the extra quality is worth it. Plus, the PhotoQuicker software allows you to easily tag a selection of photos, leave them to print and cut them ready to put into an album. The bottom line is that if your budget can't stretch to the Stylus Photo 950, the 925 makes a worthy alternative.

PC PRO RATINGS
OVERALL
98
QUALITY 101 FEATURES 97
SPEED 94 VALUE 89
100 IS THE AVERAGE

Epson Stylus Photo 950

PRICE £281 (£330 inc VAT) SUPPLIER Insight 0870 700 7350

VERDICT **Unbeatable quality, decent speed and useful features make the 950 the benchmark for other manufacturers to beat.**

Ever since its launch nine months ago, we knew the Stylus Photo would be hard to beat. The combination of a seven-ink, individual cartridge system, automatic paper cutter and ability to print directly onto CD-Rs puts most other printers to shame for features, and the 950's awesome print quality, and amazing speed at which it delivers it, remains unbeaten.

There are no media readers, a status display or preview LCD – this printer is aimed at advanced amateurs who want to edit their photos in Photoshop before printing them. This means you're not paying for unwanted extras, which is a good thing as the 950 is already one of the most expensive photo printers around at £281.

With a top resolution of 2,880 x 1,440dpi and 4pl drops, the 950 is capable of incredible detail. We couldn't fault the photo-montage print – skin tones and other colours were faithfully reproduced and fades were smooth, with grain and banding non-existent.

Plus, even at this top resolution, the print took only half a minute longer than the 925 and HP Photosmart 7550. It's also a lot quicker than the Epson 895, our previous Labs Winner (*see Labs, issue 92, p76*).

Black text is extremely sharp from the new dual-cartridge setup and much speedier than we're used to from Epson.

In our 25-page test, the 950 managed 8.4ppm, beating even the quick Canon S530D. Our four-page DTP test was handled with ease on Epson's coated paper, with bright colours and smooth text, lines and fades. Plain paper performance was almost as good as the HP 7550 and images weren't as grainy.

As you'd expect at this price, borderless printing is possible at A4 and also on roll paper. It's a shame, though, that you can only choose 1,440dpi when printing borderless on 100 or 150mm roll paper, which introduces some banding, but the quality remains excellent and the auto cutter is very convenient.

Although this pales when compared with HP's 70 years' fade resistance, Epson guarantees up to 25 years' lightfastness on the correct media. When it comes to printing onto CDs, you'll need to use special CD-Rs as you can't print on standard media. The good news is that the results rival commercial audio CDs, with such a vivid glossy finish that you'll never use a paper label again.

While it costs more than the Photosmart 7550, the 950's supreme quality, speed and features make it worth the extra cash and help it retain its all-important A-List position.

HP Photosmart 7550

PRICE £221 (£260 inc VAT) SUPPLIER Insight 0870 700 7350

VERDICT **For ultimate print quality, the Epson 950 remains our first choice, but the HP 7550 is ideal if you need to eliminate the PC occasionally.**

Photosmart is HP's brand for dedicated photo printers, and the 7550 is the company's all-singing, all-dancing flagship inkjet. Crammed with enough gadgets to make James Bond jealous, it's aimed at those who want superb photo quality and the ability to modify and print digital photos without the need for PC intervention.

With a 4.5cm colour LCD, you can view, crop, rotate and add borders to photos before printing them. There's a 10 x 15cm tray for loading up to 20 sheets of photo paper and the 7550 will print onto these with no margins. Sadly, it doesn't offer borderless A4 copies like the Canon or Epsons.

As you'd expect, the 7550 uses the new PhotoREt IV technology and can hold all three cartridges (unlike the 5550, which requires swapping) and so delivers seven-colour printing as standard. The tricolour and photo cartridges cost £18 each, while the pigmented black cartridge is £14, and include the print head for a reduced chance of blocked nozzles. We found they all exceeded their stated yields, making the 7550 one of the cheapest photo printers to run, costing only 4.5p per 15 per cent colour sheet.

With four integrated memory card readers, it's unlikely this printer won't support your digital camera. Also, if you own a compatible HP Cam, you can plug it directly into the printer without the need for any card swapping.

Testing the 7550 for speed, we found it was the slowest of the four photo printers on test. We ran slightly different tests to when we reviewed it last month (*see Reviews, issue 99, p136*). It was particularly slow at printing the four-page DTP document on coated paper, taking almost 30 minutes to complete the job. Happily, though, the quality was better than the Stylus Photo 925's with laser-like black text, and the HP matched the 925's speed in the two important photo tests. Plus, it managed almost 6ppm in the text test, while the Epson was sluggish at 2.4ppm.

In the PhotoREt IV mode, the quality of the photo montage almost rivalled the 950 and easily matched the 925. Grain was imperceptible and there was no discernable banding. Another bonus is that the 7550 proved the best performer on plain paper, producing decent colour and detail from the CorelDRAW image.

With HP claiming over 70 years' lightfastness from the new media range, and with a good variety of papers to choose from, the 7550 edges ahead of the 925 again, but can't take the A-List spot from the 950.

Lexmark X85, HP psc2110

PRICE Lexmark, £105 (£123 inc VAT); HP, £159 (£187 inc VAT)
SUPPLIER dabs.com 0800 138 5182

For general-purpose colour printing and copying, the Lexmark's quality is acceptable.

The HP psc2110 integrates a decent quality 600 x 1,200ppi flatbed scanner and the same PhotoREt IV engine as used in the Deskjet 5550. This means you can create colour copies without the need for a PC at a claimed 10ppm. This is in 'fast' mode, though, and you'll want to select best mode for an accurate reproduction of the original document. With an intuitive control panel and a single-line LCD panel, the psc2110 is a cinch to operate. Compared with the chunky Lexmark, the HP is more compact; the scanner is so well integrated you'd be forgiven for not realising it had one.

Lexmark's X85 has similar specifications to the HP – a maximum print resolution of 4,800 x 1,200dpi and a flatbed scanner with an optical resolution of 600 x 1,200ppi. It also functions as a standalone colour and mono copier, but Lexmark claims a more believable 3ppm for colour copying. The £50 price difference can mainly be attributed to the fact that the X85 uses the same older print engine as the Z45se. This delivers big 7pl colour drops and huge 24pl black drops.

The HP can achieve a much finer quality from its 4pl drop sizes from all its inks. Using the standard four-ink system in the psc2110, the quality was more than acceptable for general printing. The photo montage, while slightly grainy, showed good colour accuracy and neutral greys. Fades were smooth, but it's only when you switch the pigmented black for the dye-based photo cartridge for six-colour, PhotoREt IV printing that the best quality is achieved. This boosts quality to the same level as the Deskjet 5550 (when also using six-colour printing) and makes the psc2110 ideal for printing photos with no compromise.

The HP psc2110 offers oustanding photo quality.

Text was crisp and black when using the pigmented black cartridge and quality hardly suffered with the photo cartridge installed. Plain paper performance, as expected from this print engine, was excellent, but the Lexmark, also renowned for superb text output, matched the psc2110 here. On coated paper, the psc2110 proved its worth by delivering awesome quality compared to the Lexmark, which produced grainy, low-quality prints, despite the fact that we used the glossy photo paper recommended by Lexmark for these tests. Colours from the X85 were slightly washed out and fades were marred by large dots that were visible even from normal viewing distances, giving prints a grainy look.

The X85's photo montage suffered from the same problems, but colours were accurate on the whole. For general-purpose colour printing and copying, the Lexmark's quality is acceptable, but the HP is significantly better. When testing both printers' colour copy modes, they produced respectable prints on glossy paper, faithfully reproducing the original colours and being fairly swift, even in best modes.

The HP was slightly slower than the X85 at copying an A4 magazine cover, taking five minutes,14 seconds compared with the Lexmark's four and a half minutes. However, the HP reproduced skin tones with better accuracy than the Lexmark, and the print had smoother transitions. But the X85 still delivered strong colours for text and headings; our main gripe was that it left a two-inch blank margin at the bottom of the sheet while the HP was able to copy even A4 documents with footers.

A mono A4 copy took the HP just under 19 seconds, overtaking the X85, which took 32 seconds and missed out the footer. On the whole, the Lexmark was significantly slower than the HP. It took over half an hour to print the photo montage in best quality, while the psc2110 managed it in a little over five minutes at PhotoREt IV quality.

Scanner quality is also an important factor to consider, and the HP again outshone the Lexmark. Our jewellery scan at 600ppi looked bright and sharp on the psc2110, but the Lexmark returned dull blues and greens, while the overall image was much more blurred. The scan of different skin tones was more realistic on the HP, while the Lexmark introduced some odd pink and red shades.

As if this wasn't enough, the HP was quicker at scanning too. The 6 x 4in photo took only 7.4 seconds to scan on the HP at 150ppi, while it took 15 seconds on the Lexmark. The jewellery image was scanned at 600ppi in just 15.9 seconds on the psc2110, but the Lexmark made us wait over 25 seconds.

These results speak for themselves. If you're after a standalone colour copier that's capable of superb photo quality, look no further than the HP psc2110.

JIM MARTIN

PC PRO LEXMARK, HP

SPECIFICATIONS **Lexmark** Printer: 4,800 x 1,200dpi, four-colour thermal inkjet, USB 2 interface, 100-sheet input tray. Scanner: 600 x 1,200ppi optical resolution, 48-bit internal colour, 24-bit external colour. **HP** Printer: 4,800 x 1,200dpi, six-colour capable thermal inkjet, USB 2 interface, 100-sheet input tray. Scanner: 600 x 1,200ppi optical resolution, 48-bit internal colour, 24-bit external colour.

RUNNING COSTS **Lexmark** Black cartridge, £19. Tricolour cartridge, £22 (costs include print head). Cost per A4 page (excluding paper): 3.2p per mono page at 5 per cent coverage; 3.7p per colour page at 15 per cent CMY coverage. **HP** Black cartridge, £14. Tricolour cartridge, £18 (costs include print head). Tricolour photo cartridge, £18. Cost per A4 page (excluding paper): 3.5p per mono page at 5 per cent coverage; 4.5p per colour page at 15 per cent CMY coverage.

Canon S9000

PRICE £365 (£429 inc VAT) SUPPLIER dabs.com 0800 138 5182

VERDICT **The S9000 offers excellent photo-quality prints up to A3+ in size and delivers them faster than others can produce A4. However, it's expensive and not the cheapest to run.**

The S9000 builds upon the success of the S900, offering the same mix of speed, quality and borderless prints but with the ability to output at up to A3+ in size. The printer is distinctive in silver and grey, and with the tray fully extended takes up a considerable amount of desk space.

In our tests, producing an A4 photo took a mere one minute, 52 seconds, while the A3 version took just two minutes longer. This is quite a feat considering the HP took three minutes, 25 seconds to produce just an A4 print.

It wasn't the fastest A3 printer at text, however, averaging just over 4ppm for the 25-page A4 document. It was also slower than the HP at the CorelDRAW test, indicating that the S9000 is more optimised for photo and coated papers than plain paper printing.

That was equally true when it came to the quality of the output, which was clearly better on photo papers than plain, despite Canon's claim that its MicroFine Droplet Technology provides unrivalled quality on plain paper.

The photo montage at both A4 and A3 was superb, thanks to true and vivid colours, but close inspection revealed some banding in areas of solid tones that meant it scored just shy of the Epson. The Canon's colour accuracy, however, was emphasised by the colour performance test. It produced accurate blocks and perfectly even fades, allowing it to achieve a perfect ten in this test. The CorelDRAW test on plain paper was only average compared to the other three A3 printers, though. The S9000 is further let down by its text output on plain paper, with lettering that was too spidery for our liking.

The Canon uses six inks to produce its photos, with separate tanks for each colour. These cost £7 each and, with a quoted lifetime of just 270 pages, colour pages work out at 7.8p – far more than for the Epson and HP. The only advantage is that you can replace each colour separately as it runs out rather than having to waste ink as with the Epson and Lexmark.

Features-wise, the Canon is lacking when compared with the HP, with no duplexer option, although software to make it PostScript compatible is available. It also doesn't offer Epson's PIM technology, but does support the newer and widely compatible Exif 2.2 standard for accurate colour matching.

Ultimately, the Canon S9000's poor text and average plain paper performance are more than offset by the superb photo prints it produces at a record speed. However, its high purchase and running costs mean it's not the best-value printer.

PC PRO RATINGS
OVERALL
105
QUALITY 118 FEATURES 97
SPEED 119 VALUE 96
100 IS THE AVERAGE

Epson Stylus Photo 1290S

PRICE £259 (£304 inc VAT) SUPPLIER dabs.com 0800 138 5182

VERDICT **The Epson's slow output is made up for by its superb print quality, reasonable running costs and low price.**

Epson has frequently won awards in *PC Pro* for its A4 printers, but can it carry this success over to its A3 printers? The Stylus Photo 1290S is the company's entry-level A3 printer and is the cheapest of the four tested here by a small margin.

Like the Canon S9000, it's a six-colour inkjet, and software providing PostScript compatibility is available as a £79 option. In terms of features, it loses out to the other A3 printers, with the main culprit being its lack of separate ink cartridges. This means you're forced to replace the whole colour cartridge when any one of the inks run out, and the Epson won't continue to print even if your job only requires colours that are still remaining.

However, assuming you use your inks fairly equally, the cost per page is reasonable at 4.5p for colour and 2.4p for mono. The combined colour ink cartridge is cheaper than Lexmark's and lasts longer than both the Lexmark and Canon. However, it can't compete with the big-capacity HP.

Epson also loses out by not quoting a figure for duty cycle, and the relatively flimsy feel of the printer casing doesn't inspire confidence. In Epson's favour, the Stylus 1290S does feature PIM and Exif support to get accurate colours from compatible digital cameras and has the ability to make borderless prints. Epson also guarantees the lightfastness of its dye-based inks on the correct paper for 20 years.

We were pleased to note how quiet the Stylus 1290S was, as Epson's printers often make quite a racket. This was fortunate, as we had to wait a while for prints. The A4 photo and CorelDRAW image both took over four minutes to appear, while the A3 montage took over eight minutes to hit the out tray. Text was no quicker, with the Epson being the slowest of the A3 printers, taking over eight and half minutes to produce the 25-page document. This equates to a speed of only 2.9ppm, indicating that this is a printer to avoid for office documents.

However, the results were worth waiting for. The A4 photo and the A3 montage were both superbly reproduced. The images were vivid, with lots of detail and accurate colours. Text, as always with Epson, wasn't up to the standard of the photo images – adequate on coated paper but spidery on plain.

The Epson may not have the best overall mix of quality, speed and features, but if you aren't in a time-pushed environment and have a different printer for text, the low price makes it an attractive buy.

PC PRO RATINGS
OVERALL
106
QUALITY 129 FEATURES 93
SPEED 91 VALUE 111
100 IS THE AVERAGE

HP cp1700

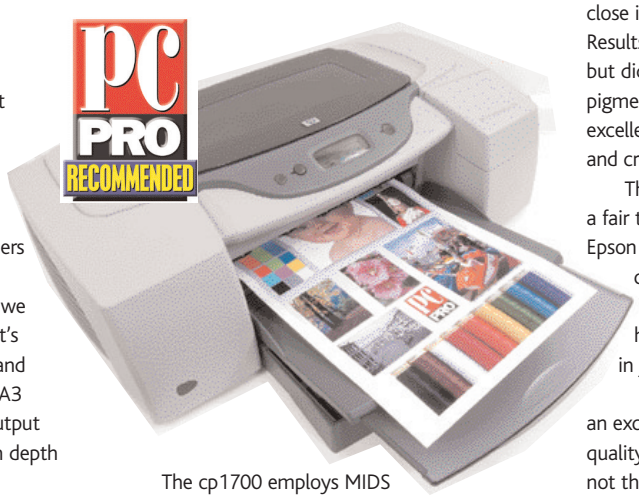
PRICE £285 (£335 inc VAT) SUPPLIER dabs.com 0800 138 5182

VERDICT **The cp1700 is an excellent all-round A3 printer with a good range of upgrade options.**

HP printers are known for their all-round quality and versatility, and the cp1700 is no exception. A host of extras are available as options, such as a duplex unit, second 250-sheet paper tray, JetDirect print server and PostScript-compatible version. There's even a special driver available for designers printing from AutoCAD.

However, in the base configuration we tested, there's still a lot to the cp1700. It's a beast of an inkjet, being the heaviest and featuring the widest footprint of all the A3 printers on test. But, as the input and output trays are both at the front, it's shorter in depth than the Canon and Epson. This has the additional advantage that paper can be laid flat, avoiding paper curl.

The sturdy build quality suggests the cp1700 can handle the rigours of office printing, and HP quotes a maximum duty cycle of 5,000 pages a month. An odd feature is the infrared port, which seems a strange inclusion for a machine geared toward designers.



The cp1700 employs MIDS (Modular Ink Delivery System), which is HP's jargon for describing its separate ink cartridge system. The cartridges themselves are expensive but last far longer than their competitors, resulting in a cost per page of only 1.9p for mono and 3.4p for colour, while the replaceable print heads last for 24,000 pages for colour and 16,000 for black.

The print engine uses the four-colour HP PhotoREt III system, which, while not up to the standard of the new PhotoREt IV technology, produces very good results, as our tests testify. Photo output on Premium Glossy paper was superb, although it was a step down from the Epson and Canon. While excellent at first glance, close inspection revealed some graininess. Results everywhere else were equally good, but didn't blow us away. Thanks to the pigment-based black ink, one area where the HP excelled was printing text, producing dark blacks and crisp letters.

The decent image quality was matched by a fair turn of speed, comfortably outrunning the Epson and Lexmark. It was the fastest at text, coming in at 5.5ppm, and was able to produce an A3 photo in under five and a half minutes, with an A4 photo appearing in just under three and a half minutes.

In typical HP fashion, the cp1700 is an excellent mix of quality and speed. It's not the best in either area, but it's not far off. Add the low running costs, sturdy construction and a plethora of options and HP has a comfortable award winner on its hands.

PC PRO RATINGS
OVERALL 110
QUALITY 115 FEATURES 108
SPEED 112 VALUE 116
100 IS THE AVERAGE

Lexmark Optra Color 45

PRICE £459 (£539 inc VAT) SUPPLIER dabs.com 0800 138 5182

VERDICT **Disappointing image quality, high running costs and an expensive initial investment mean that Lexmark is an also-ran in this Labs.**

The Lexmark is the lowest-resolution A3 printer in this Labs, capable of only 600 x 600dpi output. Lower numbers don't necessarily mean poor output, but unfortunately the Lexmark doesn't have what it takes in the quality stakes to impress us.

This is especially disappointing considering it's the priciest of the A3 units on test by some way. It's also the most expensive to run. Colour is combined into one three-ink cartridge and will set you back around £20. And, though Lexmark claims the cartridge will print 275 pages, we found it printed only 232, pushing the price per page in colour to over 8p.

Like the HP, input and output trays are both located at the front, but the styling is unappealing. The Lexmark is the only printer to feature an LCD panel that can be used to change settings without needing a PC.

The 45 is clearly geared towards the office environment, thanks to its built-in PostScript 2 emulation, optional Ethernet port and MarkVision software. But this only partly explains the high price. It comes with 8MB of memory as standard, which can be upgraded via a SIMM socket with an additional 64MB. There are also slots for additional Flash memory for handling things such as fonts, logos and forms. For standalone use, you're limited to parallel connection only, as it doesn't have a USB port.

Testing the Lexmark proved it was the slowest A3 printer by some margin. It took 18 minutes, 30 seconds to produce an A4 digital photo and over 23 minutes to produce our A3 montage. It was also the slowest at printing all the other tests with images. In particular, the CorelDRAW image caused problems and we were forced to convert it to a bitmap to enable the printer to output it. The only saving grace was in the 25-page text document, which was printed faster than the Epson Stylus Photo 1290S.

Text quality was as good as the HP cp1700's, with dark and crisp lettering. However, the Optra Color performed poorly in all the other quality tests. The Lexmark's low resolution was apparent in both the photos and the colour images on plain paper, with grainy output that lacked vividness compared with the competition, while in the colour performance tests the fades were stepped rather than smooth.

In the company of the other A3 printers in this Labs, the Lexmark is slow, offers poor print quality and is difficult to use, with paper trays that were awkward to fit. If you need network connectivity and PostScript support for your A3 prints we recommend the network-enabled HP cp1700 instead.

PC PRO RATINGS
OVERALL 67
QUALITY 39 FEATURES 102
SPEED 78 VALUE 77
100 IS THE AVERAGE