





WORDS: MARK WALSH PICTURES: HUGH THRELFALL

# Image conscious

A digital camera is a superb peripheral and, with prices constantly dropping, you can now buy an affordable high-quality device that is both fully featured and easy to use. To find out what's hot this Christmas we've tested 14 of the latest models

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# A

lthough the same can be said for nearly all computer peripherals, there has never been a better time to buy a digital camera. What sets them apart from the crowd, though, is their versatility; something that is unparalleled in the IT peripherals market. The list of features you will find in a sub-£1,000 camera is extensive to say the least, yet they rarely hamper their ease of use.

New digital cameras tend to be revisions of old products, but price reductions and technical advancements mean that cameras once thought of as high quality (and therefore high cost) are increasingly affordable.

Since our last digital camera group test a year ago, the 4megapixel barrier has finally been broken in the consumer market and compression techniques have been refined, giving far superior image quality. Hardware interpolation has become more prevalent, and the cost of storage media, such as Compact Flash and Smart-Media, has fallen to a more affordable level.

So, if you fancy treating someone special to the best money can buy this Christmas, or just want something to capture those special yuletide moments, here's a rundown of what the market has to offer. >

# GROUP TEST DIGITAL CAMERAS

## Canon Ixus 300

**PRICE** £487.61 (£414.99 ex VAT) **CONTACT** Canon 0800 616 417 [www.canon.co.uk](http://www.canon.co.uk)

**PROS** Great looking; smooth operator **CONS** Image quality below par for the price

**OVERALL** Sadly, the images are not what you would expect from something in this price range

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

A modified version of the original digital Ixus, this 2.1 megapixel camera boasts a 3x optical zoom and a 1,600 x 1,200 maximum resolution. Although slightly bigger than the original, it's still tiny, and one of the only really pocketable cameras currently on the market.

The Ixus' flat, stylish metal exterior is sturdy and its looks almost justify the high price tag of just under £500. You also get a superb quality 1.5in screen, fast start-up times and MPEG-1 (with audio) recording.

The Ixus feels like a proper camera and is comfortable to hold, regardless of its size

and lack of handgrip. Controls are well laid out, but its buttons could have been bigger.

The Type I Compact Flash card is 8MB; too small by today's standards, as barely a handful of high-res pics could be squeezed on. This model does not support Type II Flash cards, so you can't use IBM's MicroDrive.

We were glad to see that the Ixus 300 employs a lithium-ion battery, which uses a separate, compact charger.

Image quality was similar to the cheaper Canon Powershot A20 but, although this was sharp with colours warm, you should really expect more for your money.



## Canon Powershot A20

**PRICE** £317.24 (£269.99 ex VAT) **CONTACT** Canon 0800 616 417 [www.canon.co.uk](http://www.canon.co.uk)

**PROS** Fast; good image quality **CONS** Poor macro focus range

**OVERALL** Not the cheapest, but it's a perfectly competent camera and worthy of consideration

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■



As part of Canon's Powershot budget range, this 2.1 megapixel offering has a 3x optical zoom lens combined with 2.5x digital zoom. Its maximum resolution is 1,600 x 1,200 and writes only in jpeg format. Images on the whole were sharp and the colours bold but not saturated. But its poor macro focus range lets it down.

The A20 is slightly too big for the average pocket. Although wrapped in lightweight plastic, it still feels solid and is comfortable to hold, mainly due to the handgrip on the right-hand side. All controls are large and clearly labelled.

General operation is quick, and quiet compared to the other cameras on test.

The supplied Type I Compact Flash card is just 8MB, and the A20 doesn't support Type II Compact Flash. It does, however, have remarkable similarities to the more expensive Ixus also featured above, although the A20 lacks the movie mode of its more expensive Ixus brother.

The 1.8in LCD screen is sharp and bright, and the optical viewfinder large. The A20 takes four AA batteries and also has the advantage of a DC-input at the side, allowing it to be plugged into the mains.

## Casio QV400

**PRICE** £699.99 (£594.74 ex VAT) **CONTACT** Casio 020 8208 9450 [www.casio.co.uk](http://www.casio.co.uk)

**PROS** Excellent quality images; options-a-plenty **CONS** LCD slow to respond; expensive

**OVERALL** A very high-quality camera, with excellent features, but let down by cost and LCD screen

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

Delivering 4.1 megapixels, this is one of the highest quality consumer cameras available, beaten only by Sony's S85. The QV400's top resolution is also slightly lower than Sony's, at 2,240 x 1,680. Optical zoom is 3x, with the 3.2x digital zoom bringing maximum magnification up to 9.6x.

Powered by four rechargeable AA batteries (supplied), the camera is large but more comfortable to use than its Sony rival. The optical viewfinder is also large, with a dioptre control to the side.

The on-screen menu walks you through the many options. Most notable is the Best

Shot mode that includes five settings for common environments such as night-time and the Soft Focus option. The joystick-style control handles the on-screen menu very well. The 1.8in LCD is bright, but was the slowest to respond to movement throughout the test.

A 16MB Type I Compact Flash card handles storage, which is disappointing as it only takes a few of the highest resolution jpegs to fill up the card. But all is forgiven as the card slot also accommodates Type II cards, and is the only one on test to officially support IBM's MicroDrive.





## Epson PhotoPC 3100Z

**PRICE** £649 (£552.34 ex VAT) **CONTACT** Epson 0800 220 546 [www.epson.co.uk](http://www.epson.co.uk)

**PROS** Excellent range of controls; easy to use **CONS** Short battery life; chunky

**OVERALL** Although not without its faults, this is the best fully featured camera on test

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

This update to the 3000Z is one of the best cameras we've seen. It produces some of the most accurate images on test, both indoors and out. Although the 3100Z is a 3.3-megapixel camera, it can interpolate up to 4.8 megapixels. A 3x optical zoom is coupled with a 2x digital zoom, and it can record MPEG-1s of up to 25 seconds, with audio.

Looks-wise, the 3100Z can only be described as chunky. The handgrip on the right-hand side makes it easy to hold onto, but there's nowhere that feels comfortable for your left hand. The huge optical viewfinder has a dioptre control to the side

and the 1.8in LCD screen is very clear and bright. All the options are present within the on-screen menu, which is easy to navigate thanks to a plethora of buttons.

Epson has wisely chosen Compact Flash for storage, and a 16MB card is enclosed. Tifs on 3.3-megapixel cameras measure 9MB, so this CF can only hold one image.

The camera is let down by slow start-up and shutdown times and the use of four AA batteries cuts life expectancy dramatically. Ease of use, good value and quality win through, however, making this a wise purchase for the tech-savvy photographer.



## Fujifilm 6900 Zoom

**PRICE** £666.22 (£567 ex VAT) **CONTACT** Fuji 020 7465 5745 [www.fujifilm.co.uk](http://www.fujifilm.co.uk)

**PROS** 6x optical zoom; fast; solid **CONS** Images were difficult to upload

**OVERALL** Complications when uploading dash this camera's chance of an award

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■



The 6900 Zoom is an update of the 6800 Zoom. After interpolation, this 3.3-megapixel SuperCCD camera delivers a 6-megapixel CCD image, giving a huge 2,832 x 2,128 maximum resolution (see box later). Although image quality is great, there's only a slight improvement over the other 3-megapixel cameras.

Optical zoom is a very impressive 6x, and the highest we've seen. The camera is not much of a looker, but it feels solid and is very easy to use. Controls may be quite small for its size, but everything is very well laid out and the on-screen menu is fabulous.

Our main issue with the camera was that we had difficulty extracting the images: the 6900 consistently caused two PCs to crash, eventually settling, after great difficulty, with the third.

The camera's other downfall lies in its storage media. Like all the cameras reviewed here, the supplied card (SmartMedia in this instance) is far too small. The bundled card is 16MB, which can only handle eight of the highest-resolution images at a time.

You are getting some impressive equipment for your money, but it is a lot of cash to fork out.

## HP Photosmart 318

**PRICE** £179.99 (£153.18 ex VAT) **CONTACT** HP 01344 369 369 [www.hp.com/uk](http://www.hp.com/uk)

**PROS** Inexpensive **CONS** No optical zoom; limited features

**OVERALL** It may be cheap, but it lacks so much of what makes digital photography enjoyable

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

This model from HP may be the cheapest on test, and is reasonably proficient, but it has some significant flaws that make it worth you spending a little more.

At 2.31 megapixels, it delivers a slightly higher resolution than most low-end cameras, coming in at 1,800 x 1,200. It is lightweight and reasonably compact, small enough to slide into a large trouser or coat pocket. However, it looks and feels flimsy. The LCD screen is a decent size, at 1.8in, but is slow to respond and the image is grainy.

Considering the cost, image quality is very impressive. However, colours are

harsh and images in general are quite grainy. Pictures can be stored on either the camera's 8MB of internal memory, or by using the Compact Flash slot. Sadly, a Flash card is not included.

The complete lack of optical zoom is very disappointing, and the 2x digital zoom can simply be switched on or off: nothing in between. Basic flash modes are included, and images can be written as jpeg only.

Very much the kids' option, as it is basic and simple to use, but the lack of options somewhat defeats the object of buying a digital camera.



## Kodak DX3215

**PRICE** £249.99 (£212.76 ex VAT) **CONTACT** Kodak 0870 243 0270 [www.kodak.co.uk](http://www.kodak.co.uk)

**PROS** Simplicity itself **CONS** Poor quality; lacking features; cheap look

**OVERALL** It may be poor quality and look flimsy but, for under £250, you couldn't do much better

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

Kodak's range of Easyshare cameras unfortunately has the look and feel of disposables. But maybe that's the point, as they are designed to be easy to use and fun. This is the low-end model and is the simplest to use by a long shot.

At 1.3megapixels, the DX3215's images are also the poorest quality in the test – it can only muster a mere 1,280 x 960 maximum resolution. Optical zoom is at 2x, as is digital zoom. Internal memory is common in low-spec cameras, this model giving 8MB. A MultiMedia/SmartDigital (MMC/SD) memory slot is also available on

the right-hand side. It is particularly disappointing to see Kodak spurn Compact Flash and SmartMedia in this way.

The Easyshare docking station saves the day for this otherwise poor performing camera. The DX3215 slots in using a connection hidden on its underside. The transfer of images is a piece of cake, thanks to the perfectly competent transfer software, although its installation is pretty lengthy. A USB connection is also available.

The lack of any form of lens cover is disappointing; the use of a pouch is definitely recommended.



## Kodak DX3900

**PRICE** £449.99 (£425.52 ex VAT) **CONTACT** Kodak 0870 243 0270 [www.kodak.co.uk](http://www.kodak.co.uk)

**PROS** A joy to use **CONS** Lacking many key features; looks flimsy

**OVERALL** The DX3900 wins the simplicity award, but enthusiasts beware; it's very basic

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■



Despite its cost, this 3.3megapixel camera looks cheap. But the DX3900's simplicity and image quality make it worth considering by those who are happy just taking snaps.

At 3.3megapixels, and with a 2x optical zoom and 3x digital zoom, image quality is above average, even for a 3megapixel camera. Images are sharp and accurately coloured, with an overall natural feeling. The DX3900 slots easily into the Easyshare docking station, where images can be quickly and easily transferred. There's also the traditional USB port and supplied cable.

The 8MB Type I Compact Flash card is

far too small a capacity for a 3megapixel camera. You also require either long fingernails or a pair of tweezers to get the card out, as there is no removal mechanism.

The LCD screen is small at 1.5in; smaller than the £200 cheaper DX3215. However, the LCD status screen is a welcome addition. An automatic lens cover is included, but it's very flimsy. Oddly, Kodak has included Ni-MH batteries, as opposed to the more durable lithium-ion packs. That said, both lithium-ion and AA alkaline batteries are supported. Unfortunately, there's very little else to the DX3900.

## Nikon Coolpix 885

**PRICE** £522.87 (£445 ex VAT) **CONTACT** Nikon 0800 230 220 [www.nikon.co.uk](http://www.nikon.co.uk)

**PROS** Great all-round camera **CONS** Colours occasionally too rich

**OVERALL** A great mid-range camera, with impressive technical specifications

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

Nikon's revision to the 880 is hot off the production line. It appears similar to the low-end 775, but has many of the features of the 995. The 880 is big for a compact camera, but easy to hold thanks to a large handgrip, but your finger could easily slide upwards, blocking the ill-positioned flash. The 885 is light at 285g including the battery, and the 1.5in LCD screen is excellent.

Ideal if you're just getting into digital photography, the main photographic modes are reduced to fully automated and manual, where the full range of options such as white balance, ISO ratings and

manual focusing are available. It also features a useful quick review mode.

Capable of a 2,048 x 1,536 maximum resolution (3.37megapixels), the 3x optical zoom is coupled with a high-quality 4x digital zoom. It is surprising that a camera of this size does not have an automatic lens cover, but a cap is provided.

As for the images, they're sharp and colour is fabulous, if a little too rich at times, and the macro focus range is very impressive for a camera this size. These are compressed to either jpeg or tiff, and saved on to a 16MB Compact Flash card.



# GROUP TEST DIGITAL CAMERAS

## Nikon Coolpix 995

**PRICE** £799.99 (£680.84 ex VAT) **CONTACT** Nikon 0800 230 220 [www.nikon.co.uk](http://www.nikon.co.uk)

**PROS** Swivel head; superb focusing; **CONS** Bulky

**OVERALL** Great to use, good image quality, and all the features you expect from a digital camera

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

This 3.3megapixel camera adopts a swivelling head mechanism with an approximate 300-degree rotation cycle, making this the largest camera on test. The 995 is quite heavy but it holds well in the hand.

The Coolpix is capable of up to 15 seconds of MPEG-1 recording, but there's no audio. Jpeg compression is available at three levels, the largest producing files of up to 1MB; 9MB tiff compression is also available, but only one could fit on the bundled 16MB Compact Flash card.

Nikon is one of the only manufacturers to supply a Type II Compact Flash compatible

card slot and, although it does not officially support IBM's MicroDrive, it seemed to have no problems with a 1GB model.

The 995 has a huge 4x optical zoom, but this is coupled with a staggered 4x digital zoom. Composition is with a slightly grainy 1.8in LCD screen, augmented by an unnecessarily small optical viewfinder.

The Nikon offers fewer shutter and aperture settings than its closest rival, Sony's S85, at 15 and 10 respectively. However, its shutter speeds are unrivalled, achieving as little as 1/2,300 second. Excellent focusing means images are some of the best on test.



## Olympus C4040 Zoom

**PRICE** £703.82 (£599 ex VAT) **CONTACT** Olympus 0800 072 0070 [www.olympus.co.uk](http://www.olympus.co.uk)

**PROS** Great quality images; huge storage capacity **CONS** Tiny optical viewfinder

**OVERALL** A high-quality CCD, good range of options and a sturdy build make this a fantastic buy

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

On hearing the word Olympus, cameras (and possibly sportswear) immediately spring to mind. And with cameras like this, that kind of reputation is well deserved. Picture quality is crisp and clean, and colours are accurately reproduced.

Although this harbours a 4.13megapixel CCD, the C4040 is light when compared to the 3.3megapixel competition. That said, it is still just as sturdy. It's comfortable to hold thanks to a coarse handgrip on the right-hand side, and has a 3x optical zoom and a 2.5x digital zoom.

Olympus has used SmartMedia cards for

storage. The C4040 Zoom is capable of writing in both jpeg and tiff format and features hardware interpolation that will save images at 7.7megapixels.

The 1.8in LCD screen is very clear and bright, but goes hazy during movement and is quite slow to respond. Its anti-reflective coating, though, is top-notch. There is also a handy LCD status screen on the top.

On the downside, the optical viewfinder is quite small, and the dioptre control is situated at the side, but we found it very tricky to adjust. At just over £700, though, this is one of the best value cameras on test.



## Pentax Optio330

**PRICE** £499.99 (£425.52 ex VAT) **CONTACT** Pentax 01753 792 792 [www.pentax.co.uk](http://www.pentax.co.uk)

**PROS** Compact; high-quality images **CONS** Poor controls

**OVERALL** Offers high-res, but loses out to the less powerful Canon Ixus 300 due to poor ease of use

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

Although Pentax's 3.3megapixel model wins the prize for the smallest and slickest camera on test, it's too small. The controls and menu options are well laid out, but the buttons are not easily pressed – we found some needed poking in with a fingernail before the action was performed.

The aim is to provide a high-quality, easily portable camera, and this is achieved. Besides the high maximum resolution, the Optio330 offers a 3x optical zoom and 30-second MPEG-1 capture (without audio).

The 1.6in LCD screen is clear and very bright. The optical viewfinder has a

sliding dioptre control, a pleasant surprise, but we found it very odd to use and awkwardly placed.

A 16MB Type I Compact Flash card is included. This is tucked away behind a slightly awkward flap that feels flimsy. The lithium-ion battery is tiny, leading to a very short battery life at around 80 minutes. This is recharged in a separate unit.

Images were reasonably sharp, but were let down by poor colour accuracy. All in all, a high-quality camera, wonderfully compact, and good value, but, considering its weak controls, it pales against the competition.





## Sony DSC-P50

**PRICE** £311.37 (£265 ex VAT) **CONTACT** Sony 08705 111 999 [www.sony.co.uk](http://www.sony.co.uk)

**PROS** Good image quality **CONS** Poor design; tiny Memory Stick

**OVERALL** Sony's typical high quality is let down by a small Memory Stick and an ill-advised layout

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■

The low-cost P50 has 2.1megapixel CCD and a 2x optical zoom, coupled with a 3x digital zoom. Not particularly impressive stats, but the images produced are of a quality we've come to expect from Sony. Both sharp and clear, colour is also accurate. There are enough resolution options, and the menu is easy to navigate.

The principal disadvantage when buying a Sony camera is the use of Memory Stick media, which is still more expensive than Compact Flash or SmartMedia in most instances. This model comes with a disappointing 4MB stick – enough to store a

couple of high-resolution jpeg images, and not even a single tiff.

Uncomfortable to hold, you continuously find your left hand slipping around the camera and covering the lens. The 1.5in LCD screen is bright and responsive, but is placed just where your nose would go, so it becomes smudged easily, even for the most hygienic of us.

Many corners seem to have been cut here to keep the price down. The LCD is great, as is image quality, but more thought to the layout and a higher-capacity Memory Stick are needed.



## Sony DSC-S85

**PRICE** £899.99 (£765.95 ex VAT) **CONTACT** Sony 08705 111 999 [www.sony.co.uk](http://www.sony.co.uk)

**PROS** Excellent images; solid and easy to use **CONS** Expensive; uses Memory Stick media

**OVERALL** An expertly crafted camera, but the cost of its storage media lost it an Editor's Choice award

**FEATURES** ■■■■■ **PERFORMANCE** ■■■■■

**VALUE FOR MONEY** ■■■■■ **OVERALL** ■■■■■



This Sony model was the first consumer camera to break the 4megapixel barrier, and is one of very few on test to do so. It uses Sony's ICX406 4.1megapixel CCD sensor that can achieve maximum resolutions of 2,272 x 1,704. Inevitably, images are fabulous; sharp bright and clear, and colour leaves little to be desired.

The S85 actually looks and feels like a camera. It is robust, and all major controls are chunky and clearly marked. The LCD status screen is particularly useful, situated next to the 1.8in LCD viewscreen. The S85 also has the advantage of a hotshoe. The

Carl Zeiss lens gives 3x optical zoom, which is augmented by a 2x digital zoom.

A 16MB Sony Memory Stick is supplied, which is small considering how much you are already forking out, but a vast improvement on the inexcusable 4MB stick packaged with Sony's P50.

Jpeg compression squeezes highest resolution files to 1.7MB at best quality, and mono gif and tiff formats are available. Picture Transfer Protocol is also supported, which lets Windows XP access files without the need for driver installation. It can also capture MPEG-1 files of up to 15 seconds.

### BRINGING SUPERCCD INTO FOCUS

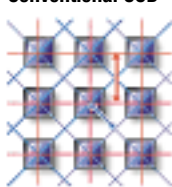
Fujifilm's use of a Super Charged-Coupled Device, or SuperCCD, has caused some controversy. Created by Fujifilm, and used exclusively on Fujifilm cameras, SuperCCD chips use octagonal photodiodes, as opposed to the square ones on a Normal CCD (see figure 1).

These are then rotated through 45 degrees, and Fujifilm has managed to eliminate some of the wiring, thus placing the photodiodes closer together.

Taking Fujifilm's 6900Zoom as an example, this 3.3megapixel camera is then able to effectively generate a further 3.3megapixels. In essence these fill the gaps between the original pixels (see figure 2).

This therefore creates an image with twice the number of pixels as one captured with a normal CCD camera, but unfortunately leads

Conventional CCD



Super CCD

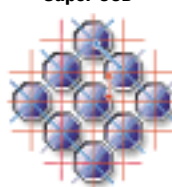
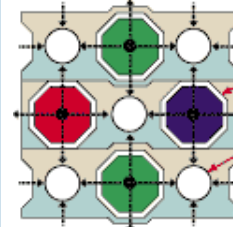


FIG 1

Octagonal photodiodes used by SuperCCDs

to very large files, and so compression ratios must be increased to fit the images onto an average media card.

This can adversely affect picture quality,



Actual pixel

Created pixel

FIG 2

Filling the gaps between the original pixels

which is why for some digital photographers the SuperCCD is an emotive subject. See the Fujifilm 6900Zoom review to find out what we thought.

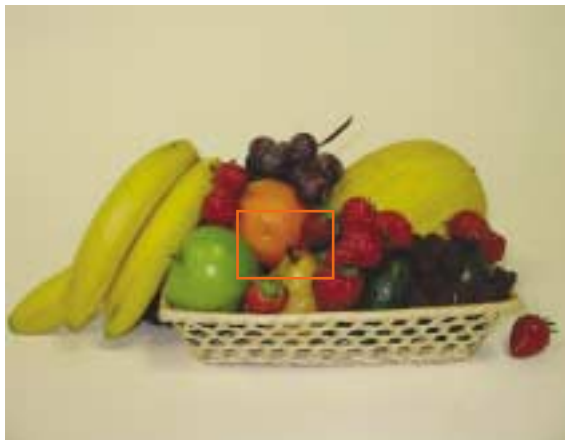
### How the cameras compared

**T**hese images are taken from the fruit shots, photographed in a controlled environment, as these give a better representation of the difference in image quality between the cameras. A complete version of the image is shown to the right.

The images were enlarged to A3 (the size of this spread), then cropped to the small area indicated in the picture opposite to test the resolving powers of each camera's CCD. They were checked for uniform sharpness across their

surfaces, colour saturation and metering. We also examined each one for compression artefacts, electronic noise and optical distortion.

Unfortunately, due to the nature of magazine publishing, although as much as possible is done to maintain the accuracy of these images, they have gone under multiple reproduction and printing processes before ending up on the page, and therefore the results you see here may differ slightly from those taken by each camera.



Canon Ixus 300



Epson PhotoPC 3100Z



Canon Powershot A20



Fujifilm 6900 Zoom



Casio QV400



HP Photosmart 318





**Kodak DX3215**



**Olympus C4040 Zoom**



**Kodak DX3900**



**Pentax Optio330**



**Nikon Coolpix 885**



**Sony DSC-P50**



**Nikon Coolpix 995**



**Sony DSC-S85**



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MANUFACTURER	CANON	CANON	CASIO	EPSON
PRODUCT	IXUS 300	POWERSHOT A20	QV400	3100Z
Price inc VAT (ex VAT)	£487.61 (£414.99)	£317.24 (£269.99)	£699.99 (£595.74)	£649 (£552.34)
Telephone	0800 616 417	0800 616 417	020 8451 9131	0800 220 546
URL	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.casio.co.uk">www.casio.co.uk</a>	<a href="http://www.epson.co.uk">www.epson.co.uk</a>
QUALITY AND STORAGE				
Image sensor	2.1megapixels	2.1megapixels	4.1megapixels	3.3megapixels
Max resolution	1,600 x 1,200	1,600 x 1,200	2,240 x 1,680	2,544 x 1,904
OPTICS & EXPOSURE				
Optical zoom/digital zoom	3x/2.5x	3x/2.5x	3x/3.2x	3x/2x
Focal length (35mm equivalent)	5.4-16.2mm	32-64mm	34mm-102mm	34-102mm
Aperture (min-max zoom)	f2.7-f4.7	f2.9-f4.0	f2-f8	f2.0-f8.0
Focus range	76cm-infinity	66cm to infinity	30cm to infinity	50cm to infinity
Macro focus range	16-76cm	12-66cm	20-50cm	20-50cm
Shutter priority steps	✓	✓	✓	✓
Aperture priority steps	✓	✓	✓	✓
Exposure compensation	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)
Shutter speeds	1-1/1,500 sec	2-1/1,000 sec	1/1,000sec	8-1/750 sec.
Flash modes	Auto, red-eye, off, slow sync speed2	Auto, red-eye, off	Auto, fill in, red-eye, off	Auto, red-eye, off, slow-sync mode, leading-sync, hotshoe
FEATURES				
LCD screen	1.5in	1.8in	1.8in	1.8in
ISO rating	100	100-400	100-400	100

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MANUFACTURER	OLYMPUS	PENTAX	SONY	SONY
NAME	C4040 ZOOM	OPTIO330	DSC-P50	DSC-S85
Price inc VAT (ex VAT)	£703.82 (£599 ex VAT)	£499.99 (£425.53)	£311.37 (£265)	£899.99 (£765.95)
Telephone	0800 072 0070	01753 792 792	08705 111 999	08705 111 999
URL	<a href="http://www.olympus.co.uk">www.olympus.co.uk</a>	<a href="http://www.pentax.co.uk">www.pentax.co.uk</a>	<a href="http://www.sony.co.uk">www.sony.co.uk</a>	<a href="http://www.sony.co.uk">www.sony.co.uk</a>
QUALITY AND STORAGE				
Image sensor	4.1megapixels	3.34megapixels	2.1megapixels	4.13megapixels
Max resolution	3,200 x 2,400	2,048 x 1,536	1,600 x 1,200	2,272 x 1,704
OPTICS & EXPOSURE				
Optical zoom/digital zoom	3x/2.5x	3x/2x	2x/3x	3x/2x
Focal length (35mm equivalent)	35-105mm	37-111mm	41-123mm	34-102mm
Aperture (min-max zoom)	f1.8-f10	Not available	f3.8-f3.9	f2.6-f4.8
Focus range	30cm to infinity	80cm to infinity	Not available	40cm to infinity
Macro focus range	2cm to infinity	20cm to 80cm	Not available	14cm to 40cm
Shutter priority steps	✓	✓	✓	✓
Aperture priority steps	✓	✓	✓	✓
Exposure compensation	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)
Shutter speeds	4-1/800 sec	15 to 1/2000 sec	Not available	8 to 1/1000 sec
Flash modes	Auto, red-eye, fill in, slow sync	Auto, red-eye, off, night scene, slow sync	Auto, red-eye, off	Auto, red-eye, off
FEATURES				
LCD screen	1.8in	1.6in	1.5in	1.8in
ISO rating	100-400	100-200	100-400	100-400





FUJIFILM	HP	KODAK	KODAK	NIKON	NIKON
6900 ZOOM	PHOTOSMART 318	DX3215	DX3900	COOLPIX 885	COOLPIX 995
£666.22 (£567)	£179 (£153.18)	£249.99 (£212.76)	£449.99 (£425.52)	£522.87 (£445)	£799.99 (£680.84)
020 7465 5745	01344 369 369	0870 243 0270	0870 243 0270	0800 230 220	0800 230 220
<a href="http://www.fujifilm.co.uk">www.fujifilm.co.uk</a>	<a href="http://www.hp.com/uk">www.hp.com/uk</a>	<a href="http://www.kodak.co.uk">www.kodak.co.uk</a>	<a href="http://www.kodak.co.uk">www.kodak.co.uk</a>	<a href="http://www.nikon.co.uk">www.nikon.co.uk</a>	<a href="http://www.nikon.co.uk">www.nikon.co.uk</a>
6.0megapixels (SuperCCD)	2.3megapixels	1.3megapixels	3.3megapixels	3.3megapixels	3.3megapixels
2,832 x 2,128	1,800 x 1,200	1,280 x 960	2,2160 x 1,440	2,048 x 1,536	2,048 x 1,536
6x/3.7x	x/2x	2x/2x	2x/3x	3x/4x	4x/4x
35-210mm	6.79mm fixed	30-60mm	35-70mm	38-114mm	38-152mm
f2.8-f11	f2.8-f8.0	f4.5-9.0	f2.8-4.0	f2.8-f7.6	f2.6-f10.4
50cm to infinity	20cm to infinity	75cm to infinity	50cm to infinity	30cm to infinity	30cm to infinity
10-80cm	N/A	25cm to infinity	7cm-70cm	4cm to infinity	2cm to infinity
✓	x	✓	✓	✓	✓
✓	x	✓	✓	✓	✓
plus/minus 2.0EV (1/3 steps)	N/A	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV (1/3 steps)	plus/minus 2.0EV in steps of 1/3 EV
3 to 1/2000 sec	1.4ms to 320ms	1/4-1/1000 sec.	Not available	8-1/1,000 sec.	8-1/2,300 sec.
Not available	Auto, red-eye, off	Auto, red-eye, off	Auto, red-eye, off	Auto, red-eye, off, fill-flash, slow sync	Auto, red-eye, off, fill-flash, slow sync
2in	1.8in	1.6in	1.5in	1.5in	1.8in
100-400	100	100	100-400	100-400	100-800

## HOW WE TESTED

**D**igital cameras may not use film, but they share many performance issues with their analog counterparts. Lenses still have to focus an image sharply with the minimum of distortion. Electronics and mechanics must respond as quickly as possible to user requests, such as pressing the shutter at a critical moment. Flashes should illuminate naturally while minimising red-eye effects. Exposure and metering systems should provide the required level of control, while still delivering a decent image.

We developed a number of tests to see how the cameras performed in terms of resolving power, compression artefacts, electronic noise, optical distortion, macro capability and effectiveness of red-eye flash reduction.

For all tests we set each camera to its highest optical resolution and best-quality jpeg. The exposure and white balance were set to automatic. We believe these to be the most common conditions under which digital cameras are used.

Our first main test pushed the camera's optics and colour accuracy. We arranged fruit of various proportions and colours in a basket, and positioned each camera in turn on a tripod. We then adjusted the position of the camera until the arrangement filled the width of the frame as viewed on the LCD monitor. Each zoom lens was kept at its widest angle.

We used the camera displays to compose the pictures at close range because the optical viewfinders suffered from parallax effect and didn't give an accurate representation of coverage. This also allowed us to measure the displays' coverage compared to what was captured.

The arrangement revealed any geometric distortions, while the repetition of various objects allowed sharpness to be compared between the centre and corners.

Taking pictures in party environments is always a tough test of red-eye reduction modes, focusing under low light and flash-based exposures, so we also tested each camera under



similar conditions. We plunged a room into near darkness, set the cameras to red-eye reduction mode and took a photo of the same person from a couple of metres away and looked out for poor exposures and devilish pupils.

We also used each camera for as

long as possible, taking many photos under a variety of conditions. As with a film camera, we looked for handling issues, optical distortions and poor exposures or metering. We closely examined images for electronic noise and compression artefacts that can plague digital cameras.

## Editor's Choice

**M**any of the cameras on test thoroughly impressed. The fully featured models in particular were very inspiring, and any one of them would suit the more experienced user down to the ground. Unfortunately, though, this test proved you still do have to fork out a substantial amount of your hard-earned cash to get a quality camera. Those models that came in at under £300 just weren't good value: either image quality was unsatisfactory to the point of being redundant, or they lacked the key features that give digital cameras an advantage over the traditional film-based models.

Were we to choose a 'best value' camera, though, Canon would win hands down with the Powershot A20. Very similar to the popular Ixus 300, but without the sex appeal, this 2.1 megapixel camera is compact yet still comfortable to hold. It's quick to respond and has decent image quality.

The large 1.8in screen is sharp and bright, and it has a 3x optical and 2.5x digital zoom, with the option of attaching an extra lens at the front. The rest of the sub-£400 competition paled in comparison to either Canon in terms of image quality or features. At under £320 all in, the Canon Powershot A20 is thoroughly recommended to those who are on a budget.

### The winners

Three cameras were awarded five stars overall, and deservedly so, but **Olympus' C4040 Zoom** won through, receiving the coveted **Editor's Choice**. Essentially a 4.1 megapixel camera, it is also capable of hardware interpolation up to 7.7 megapixels. Image quality is first class, and both optical and digital zoom ranges were plentiful, at 3x and 2.5x respectively. It is also very comfortable to hold, thanks to a coarse handgrip and, despite its long list of features, is much lighter than the other fully featured cameras on test. All of this is on a par with the other two award winners, but we were still disappointed that the camera features only a 16MB card as standard – not really enough to take full advantage of its hardware interpolation.

On that note, the issue of storage media was something that weighed heavily with us. Of the four

types used, we feel Compact Flash (CF) and SmartMedia still have the edge over Memory Stick and MultiMedia Card/Smart Digital (MMC/SD), a decision made on the basis of availability and cost. Although Memory Stick is making good progress, it still does not have the market share of its longer-established competitors.

The two remaining award winners opt for CF storage. Sadly, though, neither 'officially' provides support for the IBM MicroDrive, although both take Type II cards.

**Epson's PhotoPC 3100Z** received an award from us last month, as it gave some of the best images we have ever seen from a digital camera, and in this group test we have given it a **Highly Commended** award. Although packing a comparatively small 3.3 megapixel CCD, the 3100Z features hardware interpolation of up to 4.8 megapixels. The 3100Z also had the longest potential MPEG-1 recording, and with audio. Both the optical viewfinder and 1.8in LCD screen are large, and the LCD is very clear and bright.

All that lets it down is its bulk and the capacity of the supplied CF card. A complaint we had with all of the cameras save one was that storage capacity was way too small; only a single tiff could be stored on even the biggest cards.

The **Nikon Coolpix 995** also made an impact and received a **Highly Commended** award. The biggest camera here it was also one of the most flexible. The swivelling head mechanism is great for those awkward angle shots, and it offered the fastest shutter speeds, coming in at as short as 1/2,300 second.

A mention should also go to Sony's S85. This 4.1 megapixel camera has excellent features, great images and a high-quality build, plus it's easy to use. The Carl Zeiss lens was first rate, with 3x optical zoom and 2x digital zoom. However, at over £100 more expensive, and with the slightly higher average cost of its Memory Stick media, it lost out to those above.

We cannot stress enough how important it is to try before you buy, as elements such as how the camera feels and the way it works are primarily down to personal opinion.



**Olympus C4040 Zoom**



**Epson PhotoPC 3100Z**



**Nikon Coolpix 995**

**We cannot stress enough how important it is to try before you buy**