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THE BIGGEST AND BEST PHOTOGRAPHY BUYERS' GUIDE

164 PAGES
REVISED FOR
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EXPERT
REVIEWS
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CAMERA SHOPPER

THE BIGGEST AND BEST PHOTOGRAPHY BUYERS' GUIDE



Buying a camera is a key purchase for many households, and it's not a transaction to be taken lightly. The decision becomes even more knotty if you're an enthusiast photographer who takes their images very seriously, which is why we've put together this definitive buying guide, ready for the run-up to Christmas and beyond. Over the next 164 pages you will find in-depth reviews of the best SLRs, compact system cameras, lenses and accessories, brought to you by the people behind *Digital Camera* – Britain's best-selling photography magazine. Our testing procedures are rigorous and scientific, and our expert testers use state-of-the-art testing tools, so you can follow their recommendations with absolute confidence. Before I leave you to

enjoy the magazine, a quick word about prices. When a new camera comes out, makers have a suggested retail price, but cameras soon get discounted, so we've quoted the cheapest 'street' and online prices we can find at the time of going to press. Be aware that you'll normally pay more at a 'bricks and mortar' dealer than you will online, in return, they claim, for a more personalised service. Anyway, I hope we help you find the perfect camera, lens or accessory!

Geoff Harris Editor



The
UK's most
in-depth
reviews



Imaging lab manager Ali Jennings benchmarks cameras and lenses in our controlled testing environment

Trusted Tests

Rigorous ▶ Accurate ▶ Independent ▶ Fair

Camera Shopper is brought to you by the UK's most experienced team of photography journalists, which means you can trust everything you read on these pages and can buy your next piece of photography equipment with total confidence. In case you need any further convincing, here's why our tests are the best:

Depth

At *Camera Shopper*, we take great pride in the rigorous nature of our testing process. Every product and service is tested in appropriate circumstances, and a combination of real world and objective tests are performed to ensure all products and services are credibly

graded. Take a look at the opposite page for more details.

Passion

We believe the best way to test a product is to use it as it was intended, so our real world testing involves taking equipment on a proper shoot – whether outdoors or in the studio – and testing it exactly as you would use it in real life to let you know whether it's fit for purpose.

Objectivity

Although scientific data won't tell you everything about a product, it's a great way to draw direct comparisons and sense-check our real world conclusions, so we've devised a series of controlled tests for cameras and

lenses that supplement our real world testing with benchmarks.

Independence

Camera Shopper is 100% independent and never swayed by the influence of advertisers or PR firms. The tests you read in the magazine are our genuine unbiased opinions and Future Publishing, the company behind *Camera Shopper*, has a strict code of conduct on testing.

Transparency

The JPEG files of every test image we shoot can be downloaded from our website, TechRadar (www.techradar.com/cameras). This means you can check the quality for yourself and even run your own tests if you wish.

OUR SCORES AND AWARDS EXPLAINED

Two philosophies underpin our scoring system: transparency and flexibility. Transparency involves keeping our scoring accurate and explaining why we reach a verdict. Flexibility enables us to change our scoring criteria to ensure that each product and service is scored on appropriate criteria – a tripod, for instance, needs to be judged on different qualities than a digital SLR, and a flashgun needs to be judged on different

HOW WE TEST

Camera Shopper's test policy is the most strict and rigorous of any photography magazine. We believe the only way to bring you a genuine and reliable verdict on a product is to test it in both the field and the lab, so we use two sets of criteria to test SLRs and lenses – real-world testing and objective testing.

Real-world testing

The first and most important pillar of our process is real-world testing. We firmly believe that the best measure of a product is how it performs in the field (or studio) doing the job for which it was intended. The majority of our testing time is therefore spent using products in this way, so we can report back on how they cope under a number of different lighting scenarios and conditions.

The first part of our real-world testing involves telling you how a product handles and our impressions of its performance; the second is about examining the image quality produced, so we take a number of photographs under different conditions with every camera and lens we test, which means you can see the results achieved for yourself.

Benchmarking

The second pillar of our testing policy involves testing the output

qualities than a lens. Each of our tests scores out of five in one or more sub-categories and then applies an overall mark out of five, enabling you to tell the wheat from the chaff.

Five scores, five meanings:



Forget it



Below average



Good for the money



Very good in all areas



A truly exceptional, best-in-class product



Awarded to any product that comes top in a group test



Awarded to products that offer exceptional value for money



Awarded to any product that receives five stars in a test



Particularly innovative or breakthrough products receive this special award



A discretionary award given to truly exceptional products

of cameras and lenses under controlled conditions. We shoot a series of test charts that are specifically designed to test different performance aspects of a camera or lens. Further details about the tests we perform can be found in the panel to the right.

To minimise the variables when testing SLRs, we use Sigma's 50mm f/1.4 EX DG HSM prime lens, which is available for every SLR camera system.

Next, we perform an analysis of the test images using Imatest's Imatest Master (www.imatest.com) and DxO Analyzer (www.dxo.com/intl/image_quality/dxo_analyzer) to generate benchmark figures for each test. These can then be plotted against the results from rival products to enable us to

make a direct comparison and determine which performs better under different criteria.

Copies of the resolution test chart images are available to download from our website – go to www.techradar.com/cameras, choose the camera you're interested in and browse the review for full details of all tests. Benchmarks shouldn't be seen as a substitute for real-world testing, though – they won't tell you which camera handles best in the field or is easiest to use, but they do enable us to sense-check our real-world image test results and make accurate comparisons of products' capabilities.

No other magazine goes this far to deliver equipment test results you can really trust.

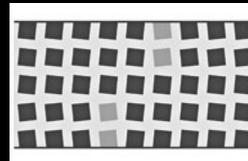


Our head of testing, Angela Nicholson, puts equipment through its paces

THE APPLIANCE OF SCIENCE

Camera Shopper runs tests under controlled conditions on both camera bodies and lenses. Lenses are assessed using an Imatest analysis of photos of three charts. We use both Imatest Master and DxO Analyzer to measure camera performance in four tests. Here's more about each test...

Lens tests



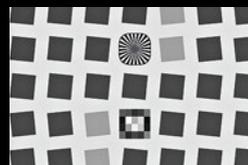
DISTORTION: IMATEST

1 This test measures the distortion caused by the lens. We shoot the simple, lined chart pictured above and then output an accuracy percentage in Imatest. The most accurate result (ie, the best) would be 0%.



FRINGING: IMATEST

2 This test measures the occurrence of chromatic aberration. We shoot the chart pictured above, then analyse the photos using Imatest. The results are expressed in pixels, with lower numbers being better.



SHARPNESS: IMATEST

3 Here we measure sharpness at different apertures from the centre to the outer edge. We shoot the chart pictured and Imatest outputs a figure based on line width divided by picture height – high numbers are better.

Camera tests



DYNAMIC RANGE: DXO ANALYZER

1 This is a measure of a camera's ability to capture detail in the highlights and shadows. We use DxO's transmissive chart, which enables us to test a dynamic range of 13.3 stops.



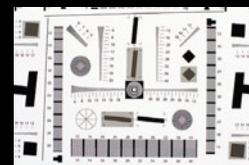
COLOUR ERROR: IMATEST

2 This measures colour reproduction. We shoot the X-Rite ColorChecker chart pictured above and output an accuracy percentage from Imatest, with 100% being the most accurate result possible.



NOISE: DXO ANALYZER

3 We use the dynamic range transmissive chart to analyse the signal-to-noise ratio for raw and JPEG files at every sensitivity setting using DxO Analyzer. A higher value means the signal is cleaner.



RESOLUTION

4 We use a resolution chart based on ISO-12233 from Applied Image Inc to indicate the limit of the camera's vertical resolution at the centre of the frame. The higher the value, the better the detail resolution.

CAMERA SHOPPER

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Discover the rigorous and scientific ways we test cameras, lenses and accessories, helping you buy with confidence

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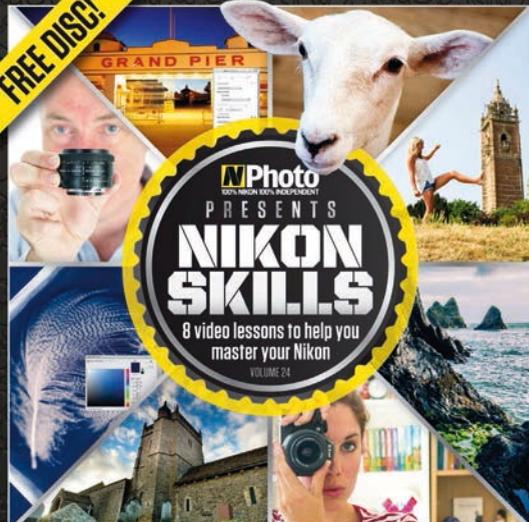
■ Lens choice ■ Focusing ■ ISO ■ Metering
■ Exposure modes ■ Depth of field ■ Flash



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8 video lessons to help you master your Nikon
VOLUME 24



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SLRs

SLRs, or Single Lens Reflex, cameras, may have a more traditional design than newer camera tech, but they're incredibly versatile

When buying an SLR, you're pretty much getting the cream of current consumer camera technology. Most professional photographers now use digital SLRs for at least some of their work, as they offer an irresistible combination of high optical performance, ease of use and rugged portability. SLRs also have more lenses and accessories available for them than any other kind of camera, and that includes the new breed of compact system cameras. The choice of lenses for Canon and Nikon SLRs, for example, is simply bewildering, and many older film lenses will work on digital SLRs, too. Entry level SLRs, such as the Nikon D3200, are a great way for beginners to learn about photography, but they also pack plenty of power for more experienced users. Move up into the mid-range and you can get SLRs that take near-professional quality shots for under £800. Meanwhile at the top end of the consumer SLR range, full-frame cameras such as the Nikon D800 and Canon EOS 5D Mark III are so good that many professionals swear by them, too. You can now get both cameras for around £2000, which is fantastic value when you see the kind of images you can take with them - as well as being able to record broadcast-quality, high-definition video. So, read on for definitive reviews of some of the best SLRs to suit a range of budgets...

NIKON

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Nikon D5200	14
Nikon D7100	18
Nikon D600	22
Nikon D800	26

CANON

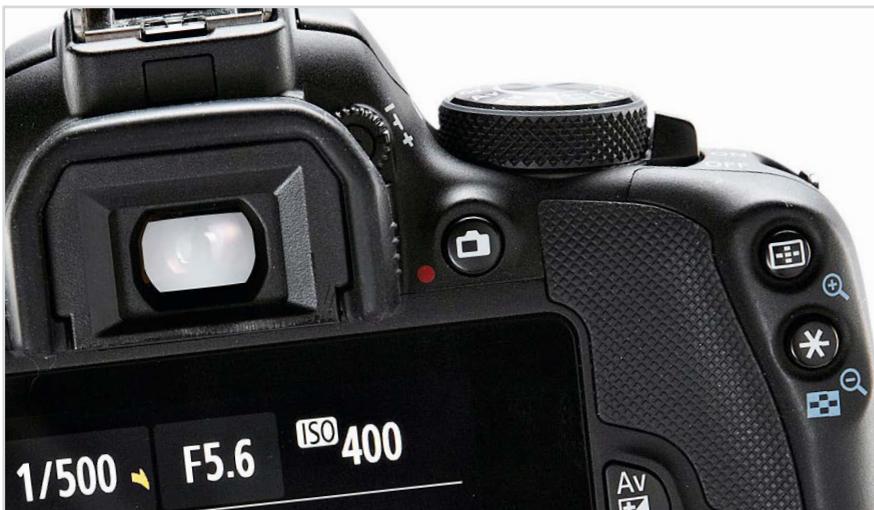
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PENTAX

Pentax K30	46
Pentax K5ii	50

SONY

Sony SLT A58	54
Sony SLT A77	58



> THE SPECS

Sensor	24.2Mp APS-C CMOS
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	Optical, with 95% frame coverage and 0.8x magnification
Video resolution	1080p (Full HD)
ISO range	100-6400 (expandable to 12800)
Autofocus points	11
Max burst rate	4fps
LCD	Three-inch, 921k-dot TFT
Shutter speeds	1/4000 to 30 secs
Weight	455g (505g with battery and memory card)
Dimensions	125x96x76.5mm
Power supply	EN-EL14 rechargeable Li-ion battery

Nikon had a great year in 2011, topping both the SLR and compact camera charts. Particularly popular was the D3100, the company's entry-level offering, which features a 14.2Mp sensor and is a great first SLR.

Having launched two new models at the top of its line-up already this year, Nikon has now refreshed its entry-level options, not by replacing the D3100, but by introducing the new D3200 to sit alongside it.

There's lots of interesting technology crammed into this SLR's relatively small body, including features that have trickled down from its more expensive models, including the EXPEED 3 engine, which promises to deliver quicker processing, low noise levels and a range of frame rates for the full HD video recording.

A number of other improvements have been made, including slight ergonomic upgrades in the form of new buttons and an enhanced rear LCD. But it's the 24.2Mp sensor that's grabbing the headlines, coming just weeks after the unveiling of Nikon's other high-resolution camera, the 36Mp Nikon D800 (see page 130 for an in-depth review).

RESOLUTION

Nikon is keen to point out the cropping potential this 24.4Mp sensor offers, as users who are unlikely to invest in a second, longer focal length lens can crop into images and still retain a large enough pixel count for high-quality images.

Another appealing feature is the option to purchase an additional Wi-Fi adapter, the WU-1A, which connects the camera to smart phones

ENTRY-LEVEL SLR Nikon D3200 > £302 (body only) > www.europe-nikon.com

The ultimate starter SLR?

Nikon's much-loved D3100 was one of the most successful beginner SLRs ever. **Amy Davies** tests its successor, which offers a whopping 24.2 Mp sensor and other extras

and tablets for remote shooting and uploading images to social networks.

BUILD AND HANDLING

The D3200 takes the lead from the D3100, but has a few improvements to the ergonomics that are helpful to the everyday shooter. While there are a limited number of direct control buttons, commonly used functions (such as the sensitivity settings) can be accessed via the 'i' quick menu button on the back of the camera.

Although it has quite a small body, the camera's deep grip provides good purchase, and the combined weight of the camera and standard 18-55mm kit

Above Don't underestimate the diminutive D3200. It's capable of taking quality, detail-packed images

lens is heavy enough to give the D3200 a quality feel. It's robust enough to withstand minor knocks and scrapes, although it obviously doesn't have the higher build quality of its bigger, more expensive brothers.

Nikon has improved the D3200's screen, bringing it up to 921,000 dots from the D3100's 230k-dot offering. The screen is very clear and bright, has a good angle of view from a variety of shooting positions, and copes well with changing lighting conditions. It's a shame it doesn't have an articulating screen, but Nikon says this would make the body bigger and more expensive.



Zooming in on the... Nikon D3200

A quick tour of the camera's key features



The Guide Mode is a real bonus for those new to SLR photography



24-million pixels on an entry-level SLR allows for creative cropping



The inaccurate colours on the rear LCD make it tricky to assess quality



No raw shooting in Guide Mode limits editing options for beginners



Although not offering 100% coverage, the D3200's viewfinder is clear, bright and easy to work with

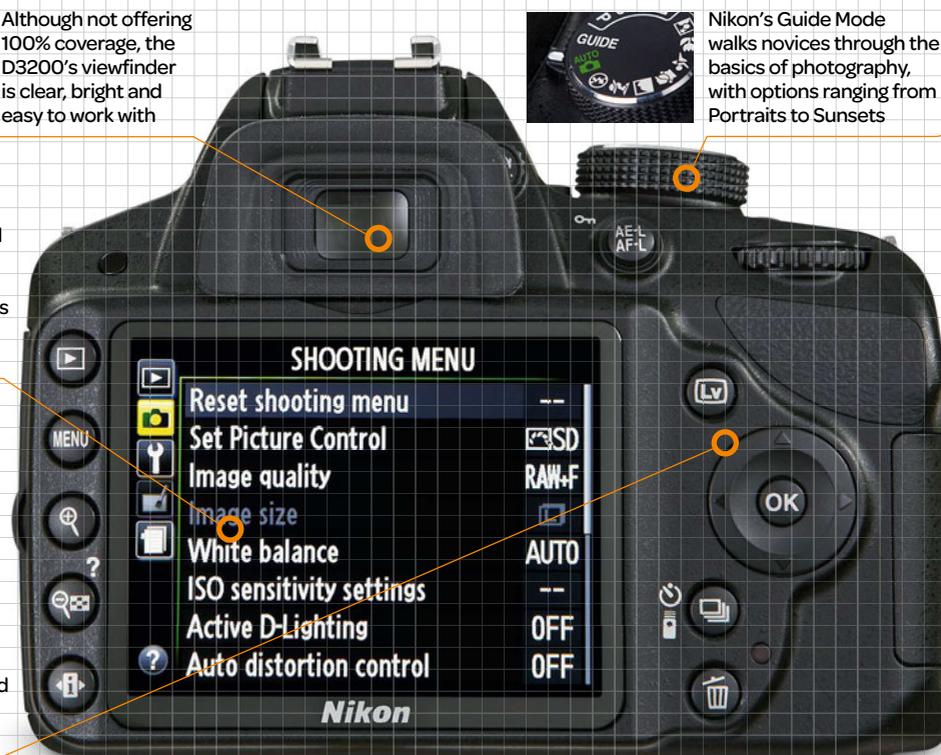


Nikon's Guide Mode walks novices through the basics of photography, with options ranging from Portraits to Sunsets

Nikon has upgraded the screen resolution, bringing it up to 921,000 dots from the D3100's 230k-dot device



New dedicated buttons for Live View and Drive mode have replaced the switches found on the D3100



Being an SLR, the D3200 has an optical viewfinder. Although not offering the same 100% field of view as other Nikon SLRs, it is nonetheless bright, clear and easy to work with.

With 11 autofocus (AF) points on offer, you can elect to have the camera choose a point for you, or switch to choosing it for yourself. Being a slightly more advanced operation, this option is hidden away in the menu system, which is a little frustrating.

PERFORMANCE

First impressions of the camera's performance are good, and it's bound

“You can choose autofocus points yourself, but this advanced option is hidden in the menu system”

to appeal to novice shooters. Plus, because it has a few more advanced features, enthusiasts won't feel the need to upgrade too quickly as they gain in confidence.

Autofocus acquisition in the majority of cases is quick, dropping slightly in low-light situations, but the system copes well otherwise. It's worth bearing in mind that autofocus

is slower when using Live View, as the speedy phase-detection system is replaced by a slower contrast-detection system. This may frustrate some shooters who are used to the quick speeds of compact cameras.

On the whole, the camera's Automatic White Balance (AWB) system does a good job of assessing the scene, and produces mostly accurate results. In some daylight situations, the camera produces slightly cooler images than is preferable, but, as usual, you have the opportunity to choose the white balance in-camera if you think that's going to be a problem.

One niggle, however, is the screen output, which favours colder, greenish tones, giving the impression that an image is much cooler than it actually is. For a couple of images taken in daylight or shade, we altered the white balance to the appropriate setting, and on the LCD the result seemed roughly accurate. However, when viewed on a computer screen they were overly warm, with an orange colour cast in some cases. While this wouldn't necessarily be a big issue for a more experienced user, who would likely

Meet the rivals...

See how the D3200 fares against the competition



Canon EOS 1100D
£300 (body only)
This 12.2Mp SLR's price and quality at high ISOs make it great for those not fussed about high pixel counts.
Our score: 4/5
Issue reviewed: 112



Nikon D3100
N/A
The best-selling SLR of 2011, Nikon's 14.2Mp D3100 is still a great buy second-hand.
Our score: 4/5
Issue reviewed: 107

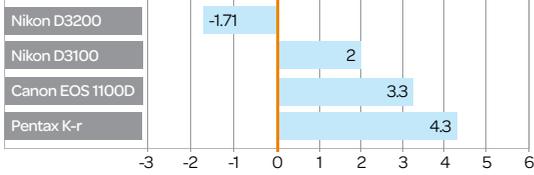


Nikon D5100
£495 (body only)
Currently cheaper than the D3200, the 16.2Mp D5100 also boasts an articulating screen.
Our score: 4/5
Issue reviewed: 113

SLR BENCHMARKS

See how the D3200 fared in our lab tests

COLOUR ERROR Closest to zero is best

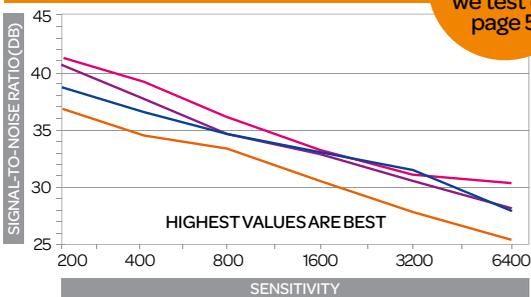


COLOUR ERROR RESULT: JPEG images direct from camera are slightly under-saturated, but contain a good tonal gradation

KEY Nikon D3200 Nikon D3100
Canon EOS 1100D Pentax K-r

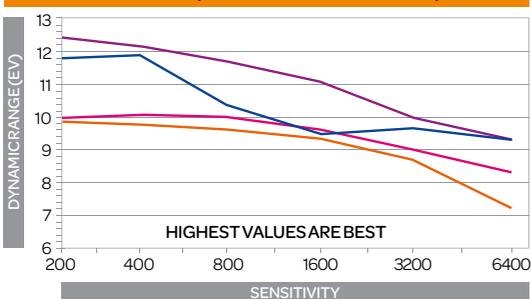
WHAT'S THIS?
Find out how we test on page 5

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: This shows that the D3200 makes a significant improvement over the D3100 across the entire sensitivity range

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Dynamic range results show an improvement over the D3100, with as much as 2EV difference at lower ISOs.

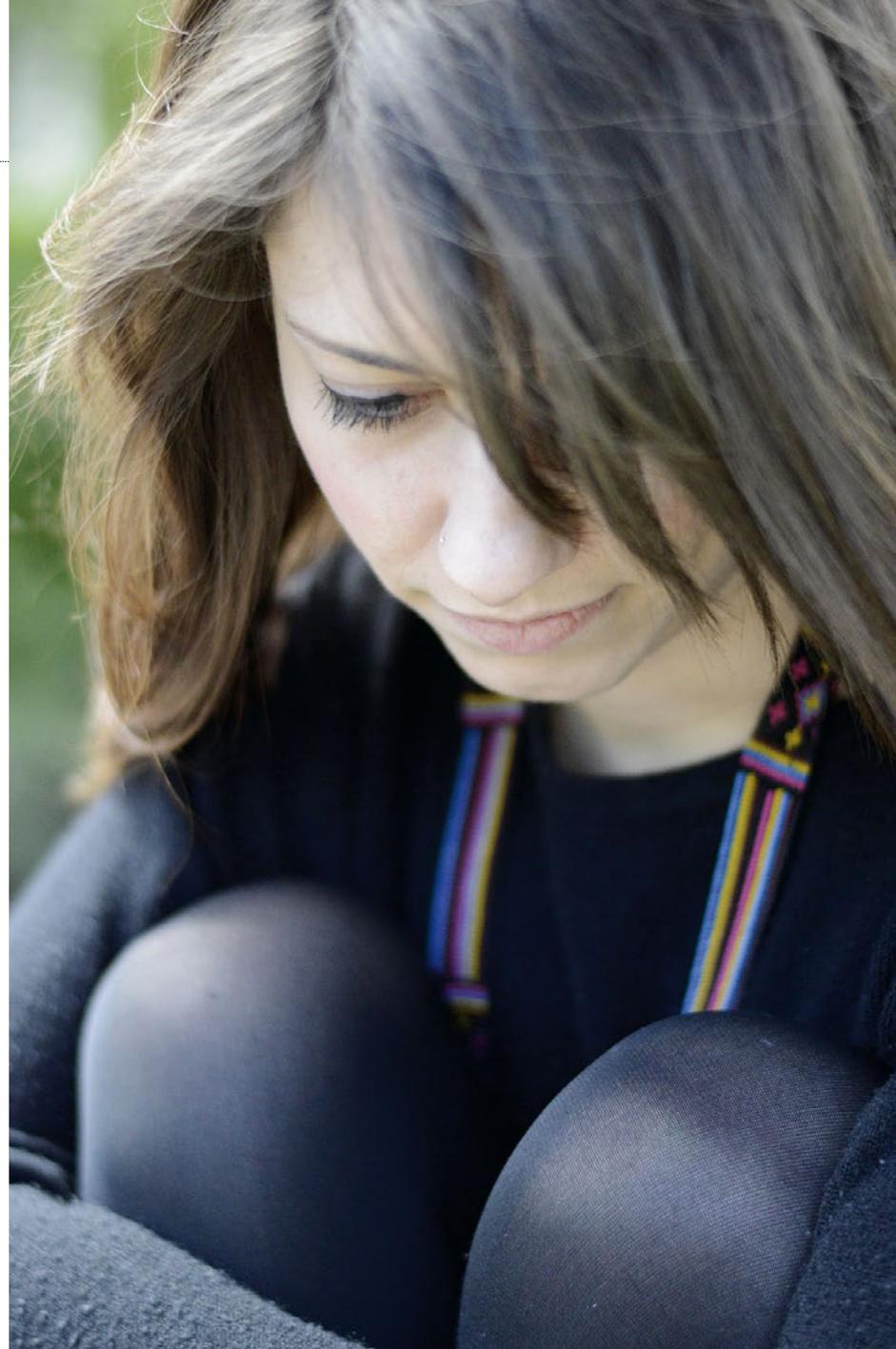
OVERALL BENCHMARK RESULT

JPEG images direct from the D3200 lack the vibrance of those from comparison cameras, but have good natural colours that can easily be boosted when processing. Raw image results (after conversion to TIFF) show good handling of signal-to-noise ratio, with a marked improvement over the D3100. Likewise, the increase in dynamic range compared with the D3100 shows that the D3200 is capable of capturing good tonal gradation in the shadows and highlights.

- be shooting in raw format and colour correcting afterwards, for the D3200's intended novice user it is an issue, as the rear screen can't be relied on.

By introducing a greater number of pixels to the sensor, there comes a risk of increased image noise, but our tests show that the D3200 performs well when compared with its predecessor – when shooting at high sensitivities, such as ISO1600, noise is well controlled.

Above Shot with a 50mm f/1.8 Nikon lens, this image demonstrates the creativity you can enjoy when switching lenses



NOISE REDUCTION ISSUES

When viewing images at 100% there is sometimes some smoothing where noise control has been implemented in JPEGs, but again it's important to think about the intended audience and the (un)likelihood of them producing very large prints. Any cropping would emphasise the noise, however. Viewing images at A4 size shows there's plenty of detail, good colour tones and a low level of noise. It's pleasing to see that good results can also be had with the 18-55mm zoom lens that's included as standard with the D3200's kit package.

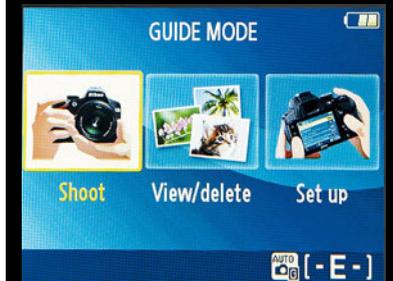
Happily, images shot at even higher sensitivity settings, such as ISO3200 and 6400, also show a good level of noise control. Although, as you might expect, there is some detail drop off, it's certainly preferable to not being able to get the shot at all. When

examining high sensitivity (ISO6400) raw format images with noise reduction switched off, we can see that more detail is captured – but at the expense of introducing more luminance and colour noise. If desired, the amount of noise reduction can be controlled via Nikon's Capture NX2 software, or with Adobe Photoshop when the profiles are available for download. It's also worth pointing out, though, that noise can't be controlled via View NX2, the software that's supplied with the camera.

You can also elect to shoot with noise reduction switched off in-camera, instead tailoring noise control in post-production. However, this wouldn't be recommended for most beginner users who would, in the majority of cases, be more than happy with the output provided by



Tech Briefing The Guide Mode



The Guide Mode makes it easier to take great shots, but also helps users to learn core SLR skills as they go along. For example, when using the new Reds in Sunsets mode, the camera guides the user through the process of altering white balance, so eventually they may gain the confidence to alter these settings independently.

It's great that these guides have been written in plain English, as well as referencing photographic terms for educational purposes. One downside to using Guide Mode, however, is that it takes away the option to capture images in raw format. While many beginners won't want to shoot raw files, it seems a little short-sighted to take away this option altogether.

the in-camera noise reduction tools. Matrix metering fares well in most situations, only struggling a little in high-contrast or mixed lighting. The option to change metering modes is, as you might expect, a little hidden away in the menu system. One of the

Above The D3200 has slightly underexposed the bright swans, but this can be fixed in-camera, or by using Nikon's supplied software or Photoshop

benefits of having a 24-million pixel sensor is the ability to crop into an image and still retain a high-resolution output. This is useful when shooting something further away than the reach of your lens. Cropping is available in-camera, and it's relatively easy to apply, negating the need to do much on a computer once the image is downloaded.

We can see the option to straighten horizons being appealing to novice users. We'd have liked to have seen the ability to add ratings from within the camera, making it easier to see which images to ditch and which to keep, but perhaps this is something Nikon could consider for future models.

modes further down the line. It's worth remembering, however, that for the moment, the D5100, which is higher up Nikon's chain than the D3200, is actually cheaper to buy. In our lab tests, its 16-million pixel sensor performed better than the D3200's, and it also has the benefit of an articulating rear LCD screen.

With the D3200, Nikon is bound to continue the success of the D3100. It's a shame that a few niggles, such as the quality of the screen, prevent this from being the perfect beginner camera, but it's very nearly there. There also comes a point when adding too many features becomes a bit confusing for beginners, too. 📷

OUR VERDICT

Nikon has delivered an excellent camera in the D3200. An entry-level camera with 24-million pixels is extraordinary, and it's pleasing to note that the extra pixels don't come at the cost of a reduction in image quality.

For beginners looking to get a bit more creative with their photography, Nikon's innovative Guide Mode, brought over from the D3100, is a real boon (see Tech Briefing, above), and the camera also includes options for those wanting to explore advanced manual and semi-manual exposure

Below The D3200's simple control layout makes it ideal for SLR newcomers



Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The D3200 is almost the perfect SLR for beginners. Despite a few minor flaws, anybody looking to make their first step into SLR photography will be very pleased indeed with this camera.

> THE SPECS

Sensor	24.1Mp APS-C format (23.5x15.6mm) CMOS
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	Optical (covering 95%)
Video resolution	1920x1080 at 60i, 50i, 30p, 25p or 24p
ISO range	100-6400 (expandable to 25600)
Autofocus points	39 phase detection
Max burst rate	5fps
LCD	Articulating three-inch 921,000-dot
Weight	505g (body only)
Dimensions	129x98x78mm
Power supply	EN-EL14 rechargeable Li-ion battery (supplied)



SLR Nikon D5200 > £561 (with 18-55mm VR lens) > www.europe-nikon.com

Ever since Nikon put a 24-million effective pixel sensor in the D3200 we've been expecting this pixel count to reach a little further up the manufacturer's SLR line-up.

So the announcement that the new D5200, which usurps the Nikon D5100 from its position immediately below the D7000 in the range, has a CMOS sensor with 24-million pixels wasn't really a surprise.

However, the D5200 uses a new 24.1-million effective pixel sensor that has not been seen elsewhere and, according to Nikon, we can expect the new device to have a more extensive dynamic range.

Feature-wise the D5200 has the same pixel count as the D3200 (albeit with a different sensor), an articulating screen like the D5100 and the same metering and autofocus systems as the D7000. The new camera's control layout, however, is very similar to the D5100's, and is more streamlined than the D7000's.

FEATURES

Nikon has paired the D5200's 24.1-million effective pixel CMOS sensor with its EXPEED 3 processing engine, and this enables a native sensitivity range of ISO100-6400. If the light levels are very low, it can be expanded upwards to the equivalent of ISO25600.

Whereas the D5100 has Nikon's Multi-CAM 1000 AF module with 11 focus points, including one cross-type point, the D5200 has the Multi-CAM 4800 DX unit that is also found in the D7000. This means that it has a total of 39 AF points with nine being cross-type. This should make the

Your latest flexible friend

Nikon's 24.1Mp D5200 is aimed at new photographers who want to take more creative shots. **Angela Nicholson** sees if it gets the right balance of power and usability

D5200's AF system more flexible and effective than the D5100's. It may also make the D5200 more attractive to photographers wanting to try their hand at sports photography, because it can shoot at a maximum continuous rate of five frames per second (fps), up 1fps on the D5100.

Another feature borrowed from the D7000 is the 2,016-pixel RGB sensor for light metering and white balance assessment. This feeds information into the improved Automatic Scene Recognition system, which attempts to match the exposure settings, autofocus and white balance to the scene.

Above The D5200 uses a 24.1-million effective pixel sensor that hasn't been seen before

According to Nikon UK's Simon Iddon, product manager for DX Products, the size of the minimum recognisable target for the Automatic Scene Recognition system has been reduced, making it more precise. Its tracking performance has also been improved so that the camera is better able to expose faces across the frame.

Like the D5100, the D5200 boasts Special Effects (see Tech Briefing, page 104) and an in-camera HDR mode that combines two shots to create one image with greater shadow and highlight detail. Unfortunately, as before, both modes can only be used when shooting JPEG files.

Zooming in on the... Nikon D5200

A quick tour of the camera's key features



The 'i' button gives a quick route to 14 key features for adjustment



The screen can be seen even when shooting from awkward angles



Few direct controls mean most adjustments are made on screen



You'll need to buy attachments for GPS and Wi-Fi connectivity



The Fn button can be customised to access one of 14 features, and we found it best to use it to access the sensitivity options quickly



This mode dial allows users to switch quickly between all the different advanced mode and automatic options



Live View is activated here before the red video button can be used to start movie recording



This button accesses the drive modes. By default the self-timer only stays active for one shot, but it can be set for up to nine shots



◀ FEELING CHEATED

◀ FEELING TREATED

Naturally, the D5200 is capable of recording full HD videos, like the D5100, but the frame rate range has been expanded to include 60i and 50i as well as 30p, 25p and 24p. This should make for smoother footage of moving subjects and gives scope for creating slow-motion movies.

BUILD AND HANDLING

Most people would be hard pressed to tell the difference between the Nikon D5200 and the D5100 as they look almost identical, although the new camera has a Drive Mode button on its top plate and the D5100 doesn't.

“The camera's user interface has been updated and it now looks cleaner and more modern”

In addition, the spec sheets reveal that the cameras' three dimensions vary by 1mm each and that the D5200 is 5g lighter than the older camera. This weight reduction hasn't been made at the cost of build quality though.

Those with small hands will find there's just enough room on the rubber-coated grip to accommodate three fingers, but most users will find

it more comfortable to curl their little finger under the camera body while they hold the camera with their index finger on the shutter-release button.

Nikon has given the D5200 the same three-inch 921,000-dot vari-angle LCD as the D5100 has. While this is useful for composing images from a wide variety of angles – even table-top still-life images can be shot more comfortably because there's less neck craning – it's just a little disappointing that the company hasn't made it touch-sensitive.

While the control layout of the D5200 is the same as the D5100, the camera's user interface has been updated and it now looks cleaner and more modern. Also like the D5100, there are relatively few buttons on the D5200, and most settings adjustments are made via on-screen controls. Pressing the 'i' button on the back of the camera brings up the information screen, which displays 14 features that may be adjusted (depending upon the shooting mode).

Setting changes are made by navigating to the desired feature, pressing the OK button and then selecting the desired option. It's

Meet the rivals...

See how the D5200 stands up against the competition



Canon EOS 650D
£529 (with 18-55mm lens)
 This camera 'only' offers 18Mp, but has a superb touchscreen and a full complement of buttons.
Our score: 4/5
Issue reviewed: 129



Pentax K-30
£444 (with 18-55mm lens)
 The K-30 captures great images, but buy the 18-135mm lens kit (£769) for the best results.
Our score: 4/5
See page: 46

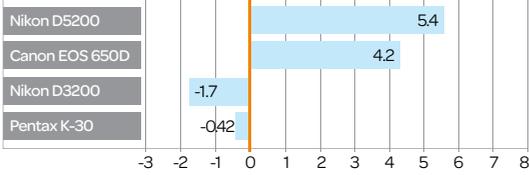


Nikon D3200
£360 (with 18-55mm lens)
 A great camera to learn with, the 24.2Mp D3200 has plenty of scope for development.
Our score: 4/5
See page: 10

SLR BENCHMARKS

See how the Nikon D5200 fared in our tests

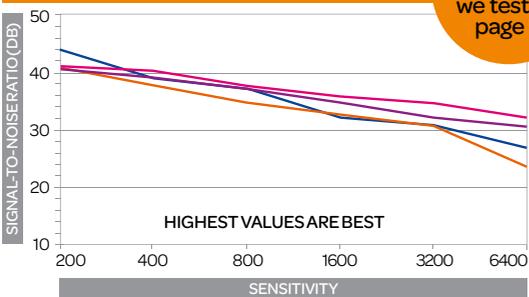
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: Although it's technically not the best performer, the D5200 fairs pretty well for colour output

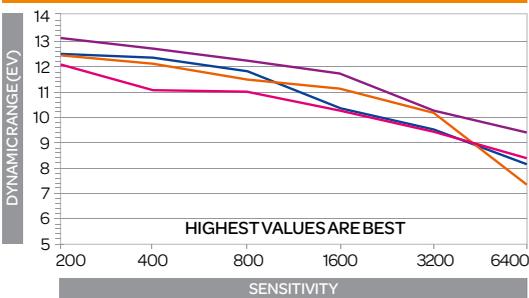
KEY Nikon D5200 (purple), Canon EOS 650D (pink), Nikon D3200 (orange), Pentax K-30 (blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Despite having the highest resolution, the D5200 produces images with similar levels of noise to its competition

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: With a dynamic range that peaks at over 13EV, the D5200 records a fantastic range of tones in a single image

OVERALL BENCHMARK RESULT

The signal-to-noise ratio of the D5200's JPEG and raw files (after conversion to TIFF) is close to, but a little behind the others. The dynamic range impresses, with the JPEG files taken at sensitivities below ISO1600 beating the competing camera by almost a stop. Above ISO1600 the dynamic range drops and is closer to that of the other cameras.

- simple and effective, but many enthusiasts may prefer to have a few more direct controls.

PERFORMANCE

Given its high pixel count we would expect the D5200 to be able to resolve plenty of detail provided that image noise is controlled effectively. Happily Nikon's new SLR doesn't disappoint in this respect. Predictably, the amount of detail that's recorded drops

Above A custom white balance setting was required to give this scene a bit more warmth



at the camera's highest sensitivity settings, with a significant drop at the top native sensitivity setting (ISO6400). This is generally within acceptable limits, but we recommend reserving the expansion settings for emergencies and sticking to ISO3200 or below where possible. Even at ISO3200 the size at which some images can be used may be limited by the presence of slight banding in some of the darker midtones.

The D5200's 2,016-pixel RGB Matrix metering system does an excellent job with most scenes, and it isn't easily tricked into under- or over-exposure. In most cases it can be left to its own devices, but in extreme situations – in snowy conditions, for example – it may be necessary to dial in a little Exposure Compensation,

but that is to be expected. Nikon has had issues with some SLR screens displaying colours inaccurately, but we found that the D5200's screen consistently shows colours as they appear in the captured image. This makes it much easier to assess the white balance.

In Standard Picture Control mode the D5200 generally delivers accurate and vibrant colours, but the automatic white balance system can make images shot in shade look a bit lifeless and under-saturated. This is easily addressed by setting a custom white balance, which warms things up – in some cases a bit too much.

We also found that the Landscape Picture Control mode over-enhances blues and greens, so they look unnatural. The Monochrome mode,



Tech Briefing Special Effects



Special effects or digital filter effects are becoming an increasingly popular feature of SLRs and CSCs. When these options are activated they apply a variety of contrast, exposure and colour adjustments to the image as it is processed in-camera. Because CSCs use the Live View feed from the sensor to provide the image to the viewfinder or the LCD, the effects can be seen before the image is captured. Similarly, you can preview the effect of the D5200's Effects modes on its LCD in Live View mode.

Adjusting the image gives the camera's processing engine a lot of work, so the on-screen image can lag a little when the camera moves.

however, produces some nice results. Helpfully, the Picture Control modes can also be used when shooting raw and JPEG images simultaneously to produce a mono JPEG as well as a raw file with all the colour information.

With 39 phase-detection AF points, the image frame is fairly well covered, but the outer edges are still

Above The sensor provides plenty of detail and you can also focus using Live View, as here

Below Special Effects are accessible via the mode dial

beyond reach. We found the system very responsive though, and subjects are brought quickly into focus even with the 18-55mm kit lens mounted on the camera. Compared with the average compact system cameras, however, the contrast-detection system available in Live View mode is slow. It's no different to most other SLRs, but it can't be used when shooting moving subjects.

We're a little surprised that Nikon hasn't made any changes to the Special Effects modes available on the D5200 via the mode dial. It's the same seven that are available on the D5100: Night Vision, Colour Sketch, Miniature, Selective Colour, Miniature, Silhouette and High and Low Key. These are still JPEG-only options for stills photography unfortunately.

The good news is that the new processing engine makes the Live View feed a little smoother than on the D5100 when these modes are selected, although there is sometimes still some lag.

OUR VERDICT

It's a bit disappointing that the D5200 doesn't introduce anything new apart from the sensor, and it is a fairly predictable upgrade to the D5100 that borrows features from the D7000. It would have been nice if

Nikon had added a few new Special Effects, for example – perhaps a high-contrast black-and-white mode – and made these effects available when shooting raw and JPEG files, rather than just JPEGs.

We would also have liked to have seen a touchscreen and Wi-Fi connectivity built in, as these could be hot features in 2013 and would help the camera compete with CSCs.

Provided you are happy not to have an array of buttons and dials allowing very quick access to key features, the D5200 seems a great option for enthusiast photographers looking for a small, versatile camera as well as those wanting to step up from an entry-level camera like the D3200. A genuinely good buy. **A**



Digital Camera

FEATURES



IMAGE QUALITY



BUILD/HANDLING



VALUE



Overall **A**

WE SAY: The Nikon D5200 is generally a solid performer that delivers images with well-controlled noise and plenty of detail, but we would have liked Nikon to have been more adventurous with cutting-edge extras.

> THE SPECS

Sensor	24.1MP APS-C (DX) format sensor (23.5x15.6mm)
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	Optical pentaprism with 100% coverage
Video resolution	Full HD (1920x1080p)
ISO range	ISO 100-6400 expandable to ISO 25,600
Autofocus points	51
Max burst rate	6fps full resolution, 7fps at 15.4MP
LCD	3.2-inch 1,229,000-dot
Weight	765g
Dimensions	135.5x106.5x76mm
Power supply	Rechargeable Li-ion EN-EL15 battery (supplied)



SLR Nikon D7100 > £801 (body only) > www.nikon.co.uk

For some, the news that Nikon has updated its 16.2-million-pixel enthusiast-centric D7000 with the introduction of the 24.1-million-pixel D7100 would be cause enough for celebration, but for nerdier types the main source of excitement is that Nikon is omitting the anti-aliasing element from the filter above the chip.

This is something that we've seen before with the Nikon D800E and Pentax K-5IIS, but these cameras are variations on the Nikon D800 and Pentax K-5II that both have anti-aliasing filters. The D7100 isn't available in two varieties and it can only be bought without the filter.

FEATURES

Like Nikon's more recent SLRs, including the D4 and D800, the D7100 has the EXPEED 3 processing engine. In combination with the sensor, this allows a light sensitivity range of ISO 100-6400, which can be expanded to the equivalent ISO 25,600 if required.

Despite having the same processing engine and pixel count as the D3200 and D5200, the D7100 can shoot at a faster frame rate of 6fps (frames per second). This trumps the D5200 by 1fps and the D3200 by 2fps, potentially making it better suited to sport and action photography.

However, the D7100 has another trick up its sleeve that enables things to be pushed a little bit further with a 1.3x crop mode. This is useful if you need to get a little tighter in on your subject and don't want to crop the image post-capture, and it enables the maximum continuous shooting rate to be boosted to 7fps.

Filter-free Nikon

Nikon has taken a risk by leaving the anti-aliasing filter off the D7100's sensor. **Angela Nicholson** decides whether it has paid off

Nikon has further boosted the D7100's sport and wildlife shooting credentials with the inclusion of the 51-point Multi-Cam 3500DX AF module, which has 15 cross-type AF points around the centre of the frame. In comparison, the D7000 has 39 AF points of which nine are cross-type.

Those who think 51 AF points is a bit excessive can opt to restrict the selection to 11 in single AF mode. In continuous AF mode the camera can be set to track the subject using 51, 21 or 9 AF points after the user has selected the starting AF point. Alternatively, there's 3D-tracking available in continuous AF mode, which looks at the colour of the subject and attempts to follow it around the frame.

Like the D7000, the D7100 has a 2,016-pixel RGB sensor that provides data to the Scene Recognitions system that guides the metering, white balance and autofocusing systems.

Above The weather-sealed D7100 boasts 24.1 million pixels

Users can take control over the colour of their images via the Picture Control modes (Standard, Neutral, Vivid, Monochrome, Portrait and Landscape) with options to adjust the sharpening, contrast, brightness, saturation and hue of the colour modes.

BUILD AND HANDLING

Although it doesn't have the bombproof air of the Nikon D4, the D7100 feels very nicely put together and has a solid build. Its weatherproof seals also mean that it can be used in a wide range of conditions, and you don't need to head home if the heavens open.

Softly textured coatings on the front and rear grips provide decent purchase, so that the camera feels comfortable in your hand even when carried for long periods.

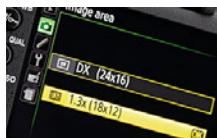
Although there are a few fairly minor changes to the control layout of the D7100 in comparison with the

Zooming in on the... Nikon D7100

A quick tour of the camera's key features



Switch between focus modes while looking through the viewfinder



There's a 1.3x crop mode that produces 15.4Mp images



While lock buttons are useful, they can make using the dials a bit fiddly



You have to select to shoot JPEGs before the HDR mode can be used



A mic port and headphone port allow better sound recording and monitoring when shooting videos



The Effects modes are Night vision, Color sketch, Miniature effect, Selective color, Silhouette, High key and Low key



This can be set to one of four uses. We found it best to use it to activate the virtual horizon



Pressing the i button gives quick access to some key features, such as the 1.3x Crop mode, Picture Control mode and HDR mode



D7000, they don't take long to get used to, and upgraders will soon find themselves reaching automatically for the correct controls. The menu system will also be very familiar.

As it's an SLR, the D7100 has an optical viewfinder. This is a bright pentaprism device that shows 100 per cent of the image frame, so you can compose with confidence knowing there won't be any extras appearing around the edges of the image.

Despite the clarity of the viewfinder, where possible we would opt to use the magnified Live View image on the 3.2-inch, 1,229,000 dot LCD when focusing manually. This

“Autofocus is fast and accurate, getting the subject sharp in next to no time in most situations”

provides a very detailed view even in fairly bright light that makes it easy to assess critical focus. It would be even more useful if the screen was on an articulating hinge though.

PERFORMANCE

Nikon is aiming the D7100 squarely at enthusiast photographers, and these users typically shoot a bit of everything, from landscape to sport

and macro to wildlife with all sorts in-between. Consequently, the D7100 needs to be an all-rounder.

With its 51-AF points and 6 or 7fps continuous shooting rate, the D7100 seems like a good choice for sports and wildlife enthusiasts. But even with a Class 10 SD card installed it has a relatively low burst depth. When shooting DX format images we were only able to squeeze out around 12-15 fine quality JPEG images or six raw files before the frame rate dipped below the 6fps maximum. It takes just over two seconds to fire off these JPEG shots (or one second for the raw files), so timing is of the essence – not that this will phase most experienced photographers.

On the plus side, the autofocus system is fast and accurate, getting the subject sharp in next to no time in most situations, and successfully tracking moving objects. Using the new Nikkor 70-200mm f/4G ED lens with the AF-S TC-20E III 2x teleconverter, we were also able to confirm that the AF system continues to function when the maximum aperture falls to f/8. And rather than just the central AF point functioning, in half-decent light the whole array of

Meet the rivals...

See how the D7100 stands up against the competition



Canon EOS 60D
£609 (body only)
This 18MP APS-C SLR looks ripe for replacement, but it's still a great camera and has a variangle screen.
Our score: 4/5
Issue reviewed: 106



Nikon D7000
£642 (body only)
A favourite with enthusiast photographers, this 16.2MP SLR continues in the Nikon range for now.
Our score: 3/5
Issue reviewed: 107

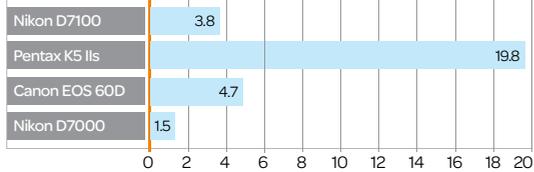


Pentax K-5 IIS
£859 (body only)
This is identical to the 16MP Pentax K-5II, but without the low pass filter over the sensor.
Our score: N/A
Issue reviewed: N/A

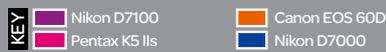
SLR BENCHMARKS

See how the Nikon D7100 fared in our tests

COLOUR ERROR Closest to zero is best



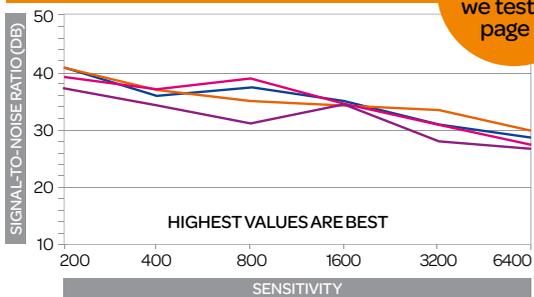
COLOUR ERROR RESULT: Although not as accurate as the D7000, the D7100 puts in a good performance and produces natural colours



WHAT'S THIS?

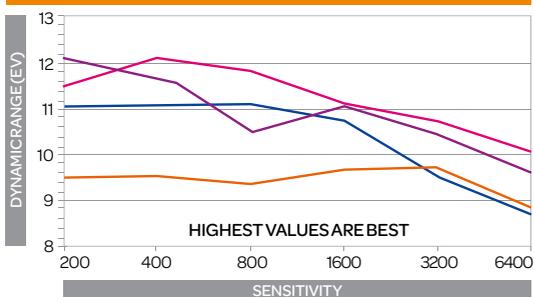
Find out how we test on page 5

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: These results confirm our real world findings and indicate that the D7100 produces noisier images than its rivals

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: The D7100 has a very high dynamic range at the lower sensitivities, with only the Pentax K-5IIS beating it at times

OVERALL BENCHMARK RESULT

Our lab tests confirm that the D7100 is capable of resolving a lot of sharp detail, but that noise is more apparent than in some competing cameras. The dynamic range score isn't the best we have seen, but it's often significantly higher than the older Canon 60D and Nikon D7000 can manage. This shows that the D7100's images can contain a wide range of tones.

51 are operational, although using the 15 cross-type sensors gets the subject in focus quicker than the outer points. If light levels fall, however, you have to stick with the central AF point.

Our tests indicate that while the D7100 can't resolve more detail than the 24MP D3200 and D5200 at the lower sensitivity settings, the images look slightly sharper at 100 per cent on screen. The images are sharp straight from the camera, with no sign

Above Images are very sharp direct from the camera



of haloing, and a smooth loss of detail as the resolution limit is exceeded.

As the sensitivity level is pushed up, the D7100 manages to record more detail than either the D3200 or D5200. But this is at the expense of a little noise. Comparing high sensitivity images from the D7100 with those from the D5200 and D3200 reveals that the D7100's images have quite a bit more chroma noise. We suspect that Nikon has set the D7100's processing engine to produce noisier images to preserve the detail, as this is more likely to appeal to enthusiasts. Experienced users are more inclined to shoot raw files and process them carefully to strike the right balance between noise and detail resolution than novices, who are more comfortable with the

D3200 and shooting JPEG images. At ISO 3200 and 6400, the D7100 generally produces images with fine-grained noise without any clumping, or the banding that troubles images from the D5200. As a result they look good when sized to make A3 prints, and they make excellent monochrome images.

There are no surprises with the D7100's automatic white balance system as it manages to cope reasonably well with most lighting conditions that it encounters. As usual though, a custom white balance setting is the best option under mixed or artificial lighting.

In most cases the camera manages to produce vibrant but natural looking colours, only occasionally over saturating bright greens when the



Tech Briefing Anti-aliasing filter



Most camera manufacturers use an anti-aliasing filter (AKA low-pass filter) to reduce the risk of interference patterns known as moiré patterning. This can occur when an object with a fine texture that's close to the sensor's resolving limit is photographed. The downside of using a low-pass filter is that it softens the images slightly and this has to be addressed by sharpening the image, post capture.

Nikon claims that the pixel density of the D7100's APS-C format sensor is sufficiently high that there are relatively few occasions when moiré patterning is likely to occur, and consequently no anti-aliasing filter is required. As a result, the D7100 can capture sharper images.

Landscape or Standard Picture Control options are selected.

The D7000 has a tendency to over-expose the mid-tones, but the D7100 seems a bit more complex. In many situations it delivers a perfect result when left to its own devices, but there were quite a few occasions when shooting under an overcast sky during this test that we had to use the

Above The matrix metering gives good results here but a similar shot needed 1EV extra exposure

Below The information in the viewfinder shows which autofocus mode is selected

exposure compensation control to get the result we wanted. In most instances we had to dial in 1/3EV or 2/3EV, but some shots required as much as 1EV extra exposure above what the Matrix metering system suggested. Conversely, on a few occasions a little under-exposure was sometimes required to preserve the highlights in the sky.

VERDICT

All things considered, Nikon has produced an attractive offering for enthusiast photographers that centres around the thing that these users value the most – detail. The D7100 produces sharp, detail rich images straight from the camera, and noise is well controlled up to ISO 6400. However, we wouldn't recommend straying beyond this value and into the expansion range.

Those who like to dabble in sports photography will also be satisfied, provided they are happy to time their shots carefully and not press the shutter release too early. The autofocus system is extremely capable and it gets the subject sharp even in quite low light. Thanks to the 1.3x crop, photographers can also get a little closer to their subject in-camera.

Image colours have typical Nikon punch, with the Standard Picture

Control setting producing pleasantly vibrant images in most situations.

We usually recommend that you keep an eye on the histogram view when shooting to ensure that images are correctly exposed, and this is sound advice with the D7100 as the Matrix metering system is a prone to under-exposing in some situations. But at least it protects the highlights.

Although Nikon has given the D7100 a pretty extensive feature set, it would have been better if the company had pushed things a bit further, perhaps including Wi-Fi technology in-camera and making the screen touch sensitive. On balance, however, we think that the Nikon D7100 is an enjoyable and rewarding camera to use. 📷



Digital Camera

FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: An honest camera that delivers sharp images with bags of detail but some fine-grained noise from sensitivities as low as ISO 400. It's a great choice for landscape, still life and macro enthusiasts.

> THE SPECS

Sensor	24.3Mp FX (35.9x24mm) full-frame CMOS sensor
Focal length conversion	1.1x
Memory	SD/SDHC/SDXC
Viewfinder	Eye-level pentaprism, 100% field of view, 0.7x magnification
Video resolution	1,920x1,080p full HD at 30, 25 or 24fps
ISO range	100-6400 (expandable to 50 and 25600)
Autofocus points	39 (nine cross-type)
Maxburst rate	5.5fps for 100 Normal quality JPEGs, 57 Fine or 16 14-bit raw files
LCD	3.2-inch, 921k-dot
Shutter speeds	1/4000 sec to 30 secs, plus Bulb
Weight	Approx. 760g (body only)
Dimensions	141x113x82mm
Power supply	Li-ion EN-EL 15 battery (supplied)



FULL-FRAME SLR Nikon D600 > £1,327 (body only) > www.nikon.co.uk

Full frame for a decent price

Has Nikon cut any corners to produce the D600, its smallest and least expensive full-frame SLR? **Ben Andrews** finds out

Nikon has been busy with new SLRs, having recently released the D4 and D800. But the company isn't taking a break just yet. Although the D800 has proved itself a hugely capable camera, it's still a professional tool, and a big leap from the enthusiast-level D7000.

The new D600 aims to fill this gap by being Nikon's first 'accessible' full-frame SLR. Its sub-£2,000 price tag comfortably undercuts the RRP of the D800 and Canon EOS 5D Mark III, while the camera's size and weight are only a marginal increase over those of the cropped-sensor D7000.

FEATURES

At the heart of the D600 is a new 24.3-million pixel, FX format CMOS sensor. It may seem quite a drop from the 36.3Mp chip in the D800, but it's still enough to outdo a D4 or 5D Mark III in terms of outright resolution.

The D600 shares the same EXPEED 3 engine as the D4 and D800. In the D600 it's capable of a 5.5fps continuous shooting rate, making it slightly faster than the D800's 4fps (thanks mostly to the D600 needing to shift fewer pixels).

Sensitivity settings range from standard settings of ISO100-6400, but can be extended down to ISO50 or as high as ISO25600 for shooting in low light (with a big increase in noise).

Autofocus is taken care of by a revamped version of the Multi-CAM 4800 system. This has 39-AF points (nine cross-type). The central seven points will function at apertures as

small as f/8, so teleconverter users can still retain AF capability.

Time-lapse shooting mode is a feature taken from the D800 (see page 106). Its basic functionality is similar to built-in intervalometers, but Nikon has taken things further by saving recorded sequences straight into a full HD video file. With a function like this demanding many shutter actuations, it's good to see the D600's shutter is rated for 150,000 cycles.

The D600 is also similarly specified to the D800 in the video department, with uncompressed recording available when tethered via HDMI. There are also headphone and

Above Nikon has successfully squeezed full-frame shooting power into a compact shell

external mic sockets for audio. The only major omission is the inability to control lens aperture during recording.

BUILD AND HANDLING

Anyone who's handled a D7000 will feel at home picking up the D600. It's deliberately designed to be as user-friendly as the D7000, and shares an almost identical interface. In the hand there's little to separate the two cameras, with the D600 being just 9mm wider, 8mm taller and 5mm deeper. The extra 10% weight difference is barely noticeable, making the D600 a very comfortable camera to carry around.

Zooming in on the... Nikon D600

A quick tour of the camera's key features



Shoot straight and level with the built-in, two-axis virtual horizon



Dedicated headphone and microphone sockets enhance video recording



AF sensors cluster in the centre of frame: annoying for some shots



A GPS unit can be attached to tag shots, but is a costly extra

Adding a locking button to the mode dial prevents any unexpected movement that could compromise images



Unlike Canon's pro SLRs, the D600 includes a pop-up flash. It's useful for fill-flash or triggering studio flashes



This new button directs you straight to colour adjustment options, but we're not sure these require a dedicated control



Stills, video and Live View controls are grouped. The record button is by the shutter release



FEELING CHEATED

FEELING TREATED

Thankfully, this lightness doesn't come at the expense of reduced build quality. The camera feels almost as rugged as the D800, with its part-magnesium construction, and is weather-sealed against moisture and dust. Casing materials are up to Nikon's usual high standard, with tactile rubberised inserts aiding grip.

Shrinking a full-frame body to this extent while cramming in so many controls can have a knock-on effect on ergonomics, but the D600 remains a comfortable camera to shoot with. Both front and thumb grips are large enough for those with

“Shrinking a full-frame body can affect ergonomics, but the D600 is still comfortable to shoot with”

bigger hands, and all major buttons fall within easy reach.

Dominating the camera's rear panel is a 3.2-inch, 921,000-dot LCD screen. This features the same automatic brightness adjustment and excellent viewing angles as the screen on the D800, making for a reliably accurate monitor when reviewing images in the field.

Left of the LCD is the main menu button and controls for adjusting white balance, image quality and sensitivity (ISO), with each button having an alternate function when reviewing images. There's also a fifth button in this area for quick switching between Picture Control colour saturation presets.

To the right of the LCD sits a standard four-way control pad for navigating the menu system. It's easy enough to use, but is slightly on the small side, and Canon users may miss the fluidity of a rear control dial. Below the navigation pad you'll find a switch for choosing between stills or video capture that surrounds the Live View selector button.

Atop the body is a mode dial layout straight from the D7000, though now with a central locking button. This means you get two customisable shooting preset modes to rival the custom settings on Canon's 5D Mark II and III. Beneath the main mode dial is a secondary ring for selecting shutter release options such as single, continuous or remote shooting.

The D600 is equipped with a good array of output sockets, including

Meet the rivals...

See how the D600 stands up against the competition



Nikon D7000
£700 (body only)
A highly-capable DX-format camera with a feature set that will please both amateurs and pros alike.
Our score: 3/5
Issue reviewed: 107



Nikon D800
£1,962 (body only)
The D800 tops the tables when it comes to resolution, but is a bulkier and more complicated device.
Our score: 5/5
See page: 26

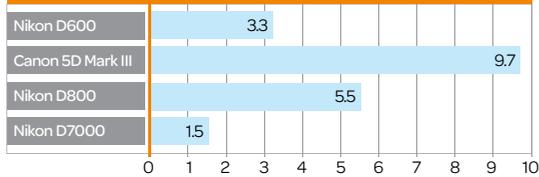


Canon EOS 5D Mark III
£2,309 (body only)
Exceptional image quality and usability makes this an outstanding buy if your budget can stretch.
Our score: 5/5
See page: 42

SLR BENCHMARKS

See how the D600 fared in our lab tests

COLOUR ERROR Closest to zero is best

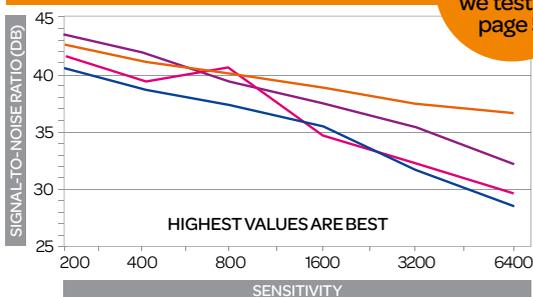


COLOUR ERROR RESULT: JPEG images straight from the D600 show good natural colour, with plenty of tonal graduation

KEY
■ Nikon D600
■ Nikon D800
■ Canon EOS 5D Mark III
■ Nikon D7000

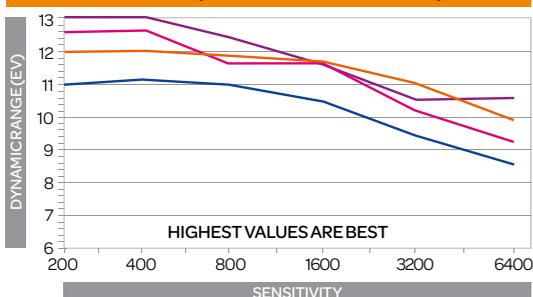
WHAT'S THIS?
Find out how we test on page 5

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Signal-to-noise ratio is better than that of the other Nikons, and compares well against Canon's 5D Mark III up to ISO800

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: The D600 compares well at lower ISOs, and for the larger part beat the D800 and 5D Mark III for dynamic range

OVERALL BENCHMARK RESULT

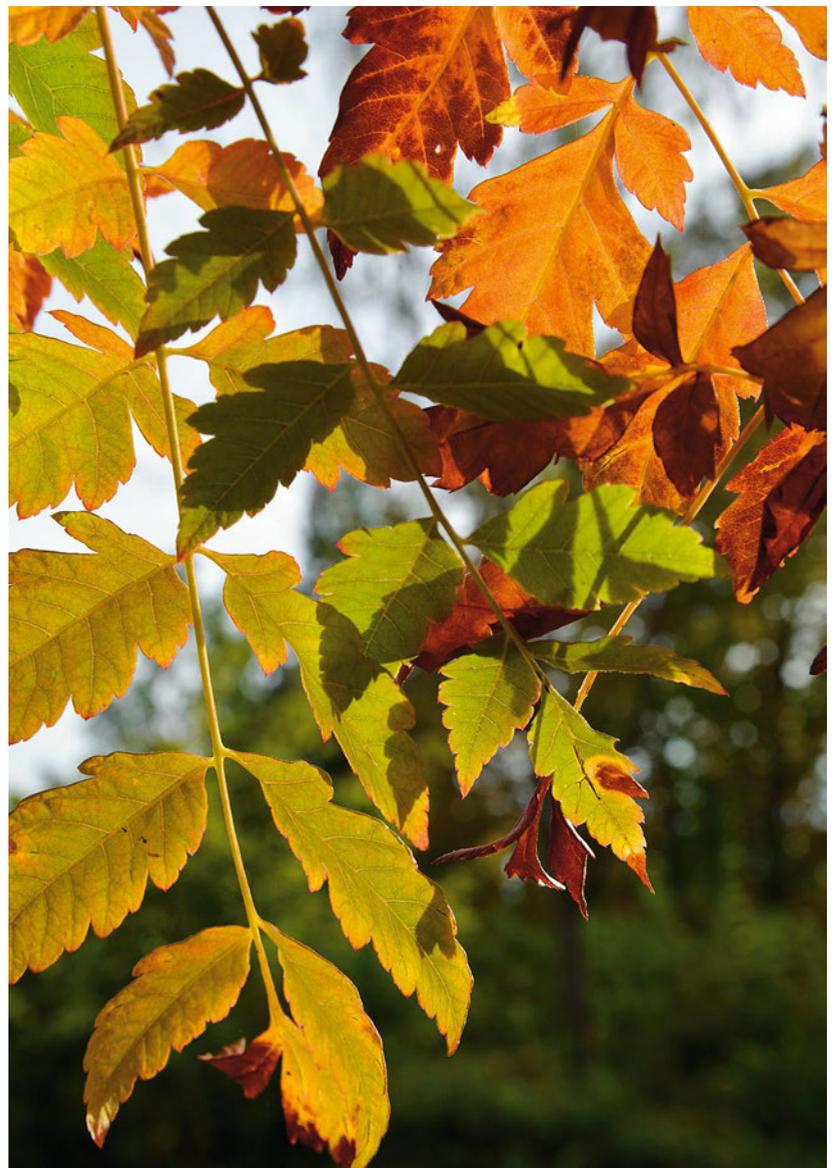
Lab-testing the D600 reveals its new 24.3Mp sensor to be a real gem. Raw images (after conversion to TIFF) have a better signal-to-noise ratio than even the D800, and almost match the D4 and Canon EOS 5D Mark III. The dynamic range graph shows a similar story, but here the D600 actually leads the pack at lower ISO settings. Above ISO800 the D4 and 5D Mark III perform slightly better, but the D600 still outshines the more expensive D800.

- headphone and external microphone ports, plus the usual USB and HDMI connectors. There's also a dedicated accessory socket for connecting a wireless adaptor, remote shutter release or GPS module.

PERFORMANCE

Recent Nikon SLRs have been outstanding performers, and the D600 is no exception. The 24.3Mp sensor is a very close match for those

Above The D600 made light work of capturing the colour of these autumn leaves, with great levels of detail



in the D800, D4 and 5D Mark III in the key areas of dynamic range, colour depth and noise suppression. Images shot up to ISO1600 are largely noise-free, with even ISO3200 producing minimal artefacts. Only at ISO6400 and above does image quality deteriorate noticeably, but the D600 is still capable of producing usable images at these settings, providing you don't pixel-peep too much.

Keep the sensitivity below ISO3200 and images stand up to the closest scrutiny. On paper, the D600 can't match the D800 for detail resolution, but then its pixel count is 30% lower. In the real world though, 24.3Mp is easily enough for any scenario, and images have masses of detail. Factor in the higher continuous shooting rate and more manageable file sizes of the D600 and it shapes-up well against the D800.

The performance of the D600's autofocus system doesn't disappoint either. We tested it in a variety of conditions and were impressed by its speed and accuracy. Only shooting fast dancing in a dark, harshly lit disco setting provoked any obvious focus hunting, though the final images were still correctly focused.

These results aren't that surprising given the D600 shares the same autofocus system as the D7000, and we had few issues with that camera. However, the downside of the transplant into the D600 is that the 39 AF points still occupy the same space, meaning that on the D600's full-frame sensor there's a much larger peripheral area not covered by any autofocus points. It's rarely a problem, but can make shooting subjects that are considerably off-centre trickier than necessary.



Tech Briefing

Time-lapse photography



The web is awash with captivating time-lapse sequences, but making one has traditionally required additional software to compile the images.

The D600 has a basic intervalometer that can capture images for a set duration and at a predefined rate, but it can also automatically combine the image selection into one full HD video with no extra editing required.

Letting the camera do the rendering is a great time-saver and means time-lapse videos can now be created in the field without a laptop. Results are smooth and not overly compressed, but you'll still need additional software if you want to add a different audio track.

Another common element between the D600 and the more modest D7000 is the 2,016-pixel exposure metering sensor, though fortunately there's no problems to report here. Any early issues with the D7000 having a tendency to slightly over-expose images seem to have been ironed out, and in the

Above Here, the Nikon has captured a great balance of shadow and highlight detail

Below Despite its compact size, the D600 sits well in the hand, with a sensible layout

D600 metering is reliably accurate. Naturally, the default matrix metering can be fooled in certain shooting situations, but switching to Spot metering or dialling in some Exposure Compensation easily fixes this.

Combine the accurate metering with the excellent dynamic range of the D600's sensor and resulting images display plenty of shadow and highlight detail, with seamless tonal graduations. Nikon does include an in-camera HDR function to further boost dynamic range, though like the D800, it's only available in JPEG mode. However, Nikon's Active D-Lighting does a great job of retaining highlights while lifting shadows, and often avoids the need to capture multiple exposures.

As such, it makes for a compelling upgrade for those seeking the benefits of full-frame photography without the complexity or physical bulk usually associated with such cameras.

Whilst it won't hurt your neck, the D600's £1,400 price tag is still quite a strain on the pocket. True, when compared to the current full-frame options it is relatively good value, but the D7000 now retails for well under half the price and, sensor aside, is a very similar camera.

Now the D600 has seen the kind of price reductions that the D800 has undergone, it's great value. But Nikon no longer has this sector to itself. Canon's full-frame 6D undercuts the D600 on size, weight and price. Let battle commence... 📷

OUR VERDICT

Put simply, the new D600 is terrific. To produce a full-frame sensor with comparable image quality to the likes of Nikon's D4 and D800 and Canon's 5D Mark III is no mean feat in itself; but to house it in a body that's almost as small and light as a cropped-sensor SLR is barely believable.

It certainly fulfils its brief of being an easy to use full-frame camera, with a control layout and menu design based on consumer rather than professional models.

Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The superb sensor, extensive yet accessible features and small size make the D600 a truly user-friendly full-frame SLR. Shame that the larger sensor commands such a price premium over the D7000.



> THE SPECS

Sensor	36.3Mp FX (35.9x24mm) full-frame CMOS sensor
Focal length conversion	1x
Memory	SD/SDHC/SDXC and CF
Viewfinder	100% field of view optical pentaprism
Video resolution	1,920x1,080p at 30, 25 or 24fps
ISO range	100-6400 (expandable to 50 and 25600)
Autofocus	51, with 11 cross-type
Max burst rate	4fps for 100 Fine Quality JPEGs, 40 raw or 27 simultaneous raw and JPEG files
LCD	3.2-inch, 921,000-dot
Shutter speeds	1/8000-30 sec, plus Bulb
Weight	Approx 900g (body only)
Dimensions	146x123x81.5mm
Power supply	Li-ion EN-EL15 battery (supplied)

Nikon's D800 has to be one of the most hotly anticipated cameras of recent years, and the excitement surrounding

its launch has been unprecedented. The key topic of conversation? It's class-leading effective pixel count of 36.3 million, which perhaps proves that the megapixel race is not over, and that numbers really do matter.

But could such a high pixel count be the D800's undoing? Until recently Nikon's mantra had been that 12Mps is enough if the images are clean, and Nikon has a strong reputation for its cameras' low-light performance and noise control. Could 36Mp pixels be a step too far, too soon?

FEATURES

Although it has a more densely populated sensor, the D800 utilises many of the new features of the previously announced 16.2Mp D4 in a smaller body and at half the price. These include the same EXPEED 3 processor, the same Multi-Cam 3500 FX autofocus system, which offers 51 AF points, and the same 91k-pixel metering system. It's also capable of autofocus right down to -2EV, which coupled with its ability to shoot at up to ISO25600 (at the Hi 2 setting), should make this a promising camera for low-light shooting if image noise is at an acceptable level.

Given its effective pixel count, it's no surprise that the D800 has a lower maximum continuous shooting rate than the D700; but at 4fps (the D700 manages 5fps) at full resolution with the standard battery and 5fps (the D700 shoots 8fps) with a battery grip,



FULL-FRAME SLR Nikon D800 > £1,962 > www.nikon.com

High-res wonder

The full-frame, 36Mp D800 has attracted plenty of headlines. **Angela Nicholson** and **Amy Davies** look behind the hype

it's no slouch. As with the D4, the D800's central 11 AF points are able to function at f/8 (see example below). This means the AF system will work when teleconverters are used to extend the reach of telephoto lenses, so you don't have to worry about packing multiple long optics.

For instance, a 200-400mm f/4 lens fitted with a 2x teleconverter effectively becomes a 400-800mm f/8, and unlike with the Canon EOS 5D Mark III (see page 110), the D800's autofocus will still function.

The D800 offers full HD video functionality. It can record 1080p video at 30, 25 and 24fps frame rates, along with 60 and 50fps rates at 720p for shooting slow-motion movies. Both FX and DX crops are available in video mode, although the D800 lacks the D4's 1920x1080 crop mode.

The camera features dual memory card slots. Unlike the D4, this SLR makes use of existing memory card

Above The Nikon D800 boasts a headline-grabbing 36.3 million pixels

formats – Compact Flash and SD. The decision to include two formats might frustrate some pros, who will now have to carry two sets of cards.

The shutter has been tested to 200,000 cycles, and the battery is good for around 850 shots (including the flash being fired) at the industry-recognised CIPA standard. While the D700 was capable of 1,000 shots, the D800's battery has been made to comply with a new Japanese law, hence the reduction in shot output.

The D800 will be available in two versions: a 'standard' body, plus a special edition – the D800E. This has a modified filter over the sensor that has no anti-aliasing qualities, and costs an extra £300.

BUILD AND HANDLING

In terms of size, shape and weight, the differences between the D800 and D700 are subtle. It's 10% lighter than the D700 and the body has a more



The viewfinder provides 100% coverage, so image edges have no surprises



The AF options have their own menu screen, for easy adjustment



Some settings, such as ISO, change depending on which mode you're in



The card bay takes two different card types, instead of two of the same

Zooming in on the... Nikon D800

A quick tour of the camera's key features



This ten-pin remote connection can be used to connect a GPS unit to record geographical info while shooting, or a remote-control unit

Closing the viewfinder shutter prevents stray light from entering and spoiling the exposure in low-light situations



When the Live View mode is set to Video, pressing this red button activates movie recording



This rear command dial falls conveniently near the thumb for quick settings adjustments



FEELING CHEATED

'contoured' look and feel. Like the D4, the shutter release has been moved for better ergonomics, while a number of the controls have been tweaked.

There's a video record button near the shutter release and a switch to the right of the rear screen that enables you to toggle between stills and video Live View. You can capture a still image when the Stills/Video switch is set to Video, but video recording can only be started when the switch is on Video.

Just to the left of the lens mount are a focus mode control switch and button, which is used in conjunction with the camera's two control dials.

"The D800 is 10% lighter than the D700 and the body has a more 'contoured' look and feel"

Rotating the rear dial enables switches between single and continuous AF, while the front dial can be toggled between the AF point selection options available in each mode.

Although it may be surprising to hear that such a video-focused camera doesn't come with an articulated screen, the D800's fixed 921k-dot, 3.2-inch LCD is very good.

As with the D4, it features automatic monitor brightness control, and we found it provides a clear view of images. Reflections aren't a major issue, even in quite bright light.

One disappointment is that an odd mix of camera settings remain constant in stills and video modes. The Picture Control mode set when shooting stills, for example, is the same when the camera is switched to shooting video, but the sensitivity will be at whatever value was last used in video mode. This means if you move from one lighting condition to another and want to shoot both still images and video you will have to reset the sensitivity twice. This is something that could probably be resolved with a firmware upgrade.

Anyone familiar with Nikon SLRs, especially the D700, or D3 S/X pro series, will be at ease with the menu and operation. There are no major changes other than the addition of video recording options, and the change to the D7000-style focus mode switch and button. While the AF system is advanced and there are lots of AF-point selection modes available when shooting continuously, 

Meet the rivals...

See how the Nikon D800 stands up against the competition



Canon EOS 5D Mark III
£2,324 (body only)
 With 22.3-million effective pixels, this full-frame camera provides excellent images and handling.
Our score: 5/5
See page: 42



Nikon D700
£578 (body only)
 This 12.1Mp full-frame SLR turns in high-quality images, but its viewfinder only gives a 95% view.
Our score: 5/5
Issue reviewed: 77

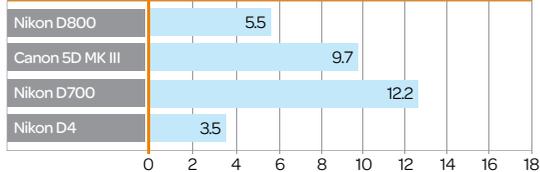


Nikon D4
£4,239 (body only)
 The D4 has an FX sensor with 'just' 16.2Mp, but it offers superb performance in low light.
Our score: N/A
Review due in issue: TBC

SLR BENCHMARKS

See how the D800 fared in our lab tests

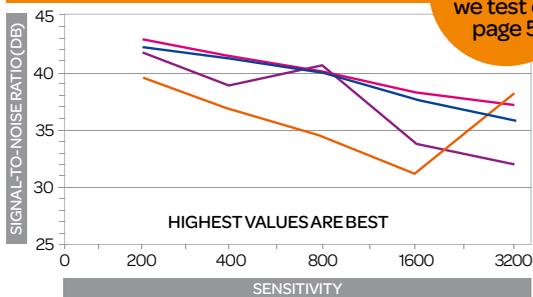
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The D800 is only beaten by the D4, which has a considerably lower pixel count and costs around twice as much

KEY Nikon D800 (purple), Canon EOS 5D MK III (pink), Nikon D700 (orange), Nikon D4 (blue)

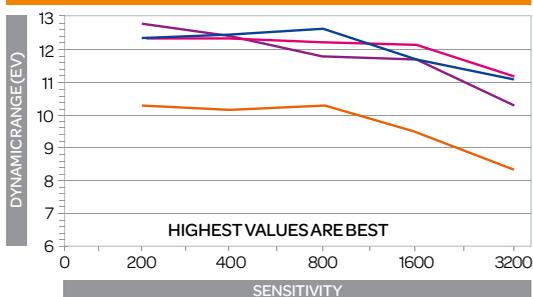
RAW NOISE (AFTER CONVERSION TO TIFF)



WHAT'S THIS?
Find out how we test on page 5

NOISE RESULT: While it has a very respectable signal-to-noise ratio, the Nikon D800 can't quite match its competitors in this aspect

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Despite its high pixel count, the D800 has a surprisingly wide dynamic range – way ahead of the older D700

OVERALL BENCHMARK RESULT

Raw (after conversion to TIFF) and JPEG images from the Nikon D800 have a signal-to-noise ratio that compares well with the Canon EOS 5D Mark III. As the graph above shows, the latter has a higher raw dynamic range above ISO400, but the D800's JPEGs (not shown) have a higher dynamic range up to ISO3200, beyond which the 5D Mark III wins out.

the options are made very clear in the viewfinder and in the top-plate LCD. However, it's about time that the autofocus points were spread a bit further across the frame and not clustered within the DX crop area.

PERFORMANCE

Our tests reveal that the D800 is capable of resolving a huge amount of detail – in fact it's not far behind the medium-format Pentax 645D, which has a 40-megapixel sensor

Above That huge full-frame sensor and good noise control makes the D800 a superb SLR for portraits



that measures 44x33mm. This is an impressive feat, as although it's full-frame, the D800's sensor is considerably smaller at 35.9x24mm.

One risk with packing so many photosites onto a sensor is that the photosites have to be very small, and this can lead to more image noise. The good news is that Nikon has struck a successful balance between resolution and noise. However, we would recommend sticking within the native sensitivity settings (ISO100–6400) wherever possible, and reserving the upper expansion sensitivity values (equivalent to ISO12800 and ISO25600) for needs-must situations.

The visibility of coloured speckling (chroma noise) varies depending upon the lighting conditions. In low-light areas lit exclusively by sodium light, noise is an issue at around ISO2500, but in other situations it is visible in the shadows from around ISO3200 when images are viewed at 100%

on a computer screen. On the whole though, ISO3200 images look good when sized to make A2 prints.

We might expect dynamic range to suffer as a result of the sensor having such a high pixel count, but the D800 impresses here too. Images have a good range of tones straight from the camera, but ironically this means that many of them benefit from a slight boost to the contrast.

Given that it has the same Multi-Cam 3500 FX autofocus system as the D4, which is a tweaked version of the system in the D3S, it's no surprise that the D800 is capable of focusing quickly and accurately, even in low indoor light.

When shooting moving subjects, it's worth investing a bit of time thinking about the subject and the shooting conditions, as the D800 has a wealth of continuous shooting options. When following a moving subject around an area where objects such as pillars or posts may

Head to head
D800 vs 5D Mark III



A pixel count of 22.3 million used to cause a stir, but the 36.3Mp D800 has turned heads, and there's no question that it can resolve more detail than the 5D Mark III. The dynamic range is also good, at lower sensitivity values, but that may in part explain why the images benefit from a contrast boost.

The 5D offers an improvement in terms of autofocus, having 61 points, but the AF point selection options are less clearly defined. The D800's 51-point system is also sensitive down to f/8.

The choice may come down to price, and at several hundred pounds less, the D800 is a no-brainer for Nikon fans.

III as the D800's natural competitor (see our head-to-head box, top left). While the average serious enthusiast photographer is likely to think hard about switching manufacturer, professional photographers are less loyal and will go with whichever option works best for them.

The D800 will be very attractive to photographers who need a comparatively light camera that is capable of capturing a lot of detail and producing large prints. Since it's an especially good choice for those who shoot in normal or daylight conditions or at low sensitivities, we think the D800, or perhaps the D800E, will be a big hit with landscape and studio photographers.

Meanwhile, Canon's 5D Mark III is perhaps a bit more of an all-rounder that will appeal to enthusiast photographers who want to shoot a range of subjects in lots of different conditions. A close-run thing! 📷

Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The D800 delivers images that compare well with pricier and larger-format cameras. It excels at low sensitivities and is a great choice for landscape, portrait, still-life and macro photographers.

From the makers of Digital Camera magazine



momentarily obscure it, for example, it may be sensible to set the camera to respond relatively slowly in order to avoid the lens from focusing on the obstruction and then having to refocus on the subject.

Nikon isn't new to producing digital SLRs, and the D800 uses the company's considerable know-how to ensure that white balance and colour are good straight from the camera in most shooting situations. One small criticism is that it is strange that such

Above At ISO200, the D800 records even tiny details, so you may need to choose your subjects carefully

Below The D800 is feature-packed and very good value

an advanced camera as the D800 should have an HDR (high dynamic range) mode that only actually operates when shooting JPEG images. Furthermore, the only image that is saved is the merged version. Canon's approach with the EOS 5D Mark III is much more useful to advanced photographers, because the three images that make up the final HDR image are recorded, and raw file shooting is also possible.

OUR VERDICT

It's great to find that the D800 isn't just a triumph of numbers, and that the 36.3-megapixel sensor does actually deliver on its promise – capturing bags of detail. The surprise bonus is that image noise is actually pretty well controlled and the dynamic range is very impressive.

For those interested in stepping up to a full-frame camera, the D800 represents a good investment. You get pretty much all of the best features of the D4 in a more compact and lighter body, with a much higher pixel count for less than half of the price. Many see the Canon EOS 5D Mark



> THE SPECS

Sensor	18 million pixel APS-C CMOS sensor (22.3x14.9mm)
Focal length conversion	1.6x
Memory	SD/SDHC/SDXC
Viewfinder	Optical viewfinder, 95% coverage, 0.87x magnification
Video resolution	Full HD (1920x1080)
ISO range	100-12800 (25600 extendable)
Autofocus points	9
Max burst rate	4fps
LCD screen size	Touchscreen 3-inch, Clear View II TFT, approx 1040k dots
Shutter speeds:	1/4000 sec - 30 seconds
Weight	407g (body only, including battery and memory card)
Dimensions	116.8x90.7x69.4mm
Power supply	LP-E12 rechargeable Li-Ion battery



SLR Canon EOS 100D > £449 (with 18-55mm lens) > www.canon.co.uk

Tiny temptress

The EOS 100D is one diminutive SLR, but small doesn't necessarily mean beautiful. **Amy Davies** sees if size really does matter

Over the past couple of years, the interchangeable lens market has shifted significantly. Where once the DSLR was the undisputed king of the world, compact system cameras are making headway and threaten to steal their crown.

Although Canon finally introduced its own CSC in the shape of the EOS M last year, it failed to excite consumers, making little impact on now well-established brands like Panasonic and Olympus.

Perhaps in response to that, it has introduced the EOS 100D, the world's smallest and lightest DSLR. With a body size that's roughly 25% smaller, and 28% lighter, than the EOS 650D, Canon's engineers have really gone to town in miniaturising this model.

FEATURES

Pretty much all of the interior electronics have been shrunk down to fit the slimline chassis, while the sensor, although thinned, remains APS-C sized with 18 million pixels. It's a hybrid CMOS AF II sensor, the second generation of the type of sensor which was found in the 650D and EOS M. This has phase detection pixels to assist with autofocus when shooting video or using Live View.

Aiming this camera somewhere between the M and the 650D, there's a range of fun features on board. A number of digital filters have also been included, but you can now see how these effects will be rendered on the screen (when shooting in Live View) before the shot is taken.

Despite being roughly the same size as some of the compact system cameras on the market, the 100D still has room for an optical viewfinder that boasts 0.87x magnification and 95% coverage.

It has a smaller battery than the 650D, which Canon says is capable of around 380 shots. The in-built flash has a guide number of 9.4, compared with the 650D's number of 13.

Like the 650D and the EOS M, the 100D has a capacitive touchscreen. It is fixed, unlike the 650 and 700, which have articulating screens.

Although it is a lot smaller than Canon's other DSLRs, it still retains the standard EF-S lens mount, making it compatible with the company's huge range of optics, as well as those from third party manufacturers. Of course, unlike CSC optics, these remain quite large – in other words, don't expect the entire system to be smaller just because the 100D has been shrunk down.

Above The EOS 100D weighs just 407g, including the battery and the memory card

BUILD AND HANDLING

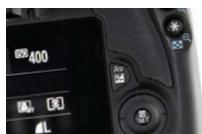
The first thing to obviously notice about the 100D is its size and weight. Compared with other entry-level cameras at this price point, it is indeed very small, with a body size roughly the same size as something like the Panasonic G5.

That said, despite its small size, the button layout of the camera is very good – it doesn't feel too cramped or awkward. There's a good chunky grip, making it feel secure in the hand, even when shooting one-handed. The majority of the buttons can be accessed with the thumb, and if you've ever used a Canon DSLR before, you'll be immediately at home.

A mode dial on top of the camera can be used to quickly flick between the different shooting modes, including fully automatic, fully manual and semi-automatic (such as Aperture Priority and Shutter Priority) modes.

Zooming in on the... Canon EOS 100D

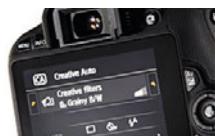
A quick tour of the camera's key features



You don't have to use the touchscreen if you prefer buttons



Switch to video shooting mode to capture those off-the-cuff moments



Filters can't be shot in raw, but you can use Extra Effect Shot mode



Overall system size isn't reduced, due to large optic compatibility

◀ FEELING TREATED

◀ FEELING CHEATED



Despite its small size, Canon has managed to include a traditional optical viewfinder – good news for those who dislike EVFs



During Live View, the 100D uses hybrid autofocus for better accuracy. You can preview digital filters when shooting in this way



Press this button to quickly access the Quick Menu to make changes to common settings, such as white balance

The 100D has 9 autofocus points, but only the centre is the sensitive cross-type



Here you'll also find Creative Auto, which is intended as a guide for beginner photographers, providing a way to achieve effects such as background blur, without using photographic language.

Movie mode, which used to be incorporated onto the mode dial of older Canon DSLRs, is now accessed via the on/off switch, to save pushing the mode dial all the way around.

As you might expect, there are fewer buttons on the back of the 100D to directly access certain settings. However, there is a button to access a Quick Menu, which enables

“Everything that can be done via the touchscreen is also possible using physical buttons”

you to scroll through the most commonly used settings, such as white balance and metering. You can use a combination of the arrow keys and the scroll dial on front of the camera to make changes or, if you prefer, a combination of the touchscreen and the scroll dial.

The touchscreen element perhaps really comes into its own when

reviewing images, enabling you to swipe through shots and pinch to zoom to quickly check accurate focus. When shooting in Live View, you can also use the touchscreen to change the focus point and activate the shutter release – something which is particularly useful when creating movies, or using the camera from a more awkward position.

One of the great things about the 100D's design is that if you don't like the touchscreen, you don't have to use it. Everything that can be done via the touchscreen is also possible using physical buttons.

Canon has incorporated a number of digital filters on the EOS 100D, but accessing them is a little idiosyncratic. When operating in the majority of shooting modes, such as Aperture Priority, you can only use them when in Live View. You're also unable to shoot with them when raw format is enabled. Filters are more quickly accessible from the Creative Auto mode, but then you lose control over other elements, such as shutter speed.

A number of Picture Styles are included as presets, such as Landscape and Monochrome. These

Meet the rivals...

See how the EOS 100D stands up against the competition



Nikon D3200
£429 (with 18-55mm lens)
Almost the perfect SLR for beginners, there are minor niggles with the colour accuracy of the rear LCD.
Our score: 4/5
See page: 10



Sony a58
£429 (with 18-55mm lens)
This fixed translucent mirror DSLT is a good option for a first time interchangeable lens camera buyer.
Our score: 4/5
See page: 54

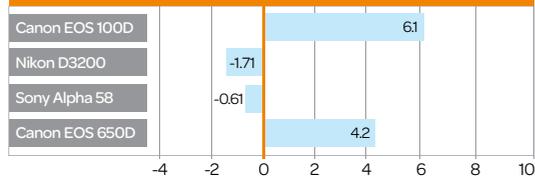


Canon 650D
£580 (with 18-55 mm lens)
With its touchscreen, Hybrid AF and other functions, it transforms the way you use an SLR.
Our score: 4/5
Issue reviewed: 129

SLR BENCHMARKS

See how the 100D fared in our tests

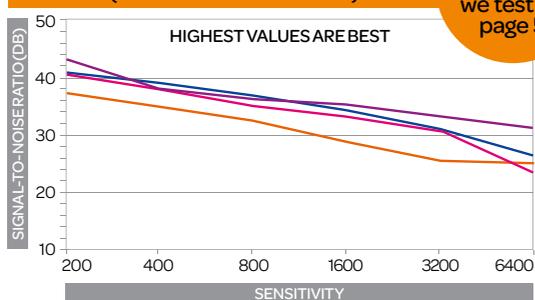
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: Good natural colour with a touch of vibrance, JPEGs direct from camera need very little enhancement.

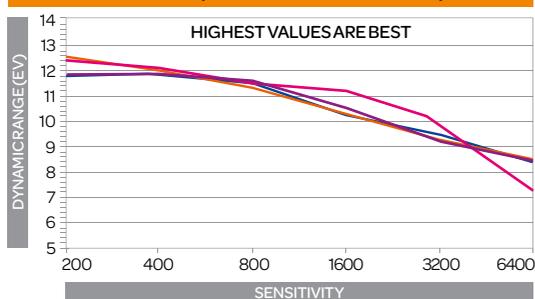
KEY Canon EOS 100D (purple), Nikon D3200 (pink), Sony Alpha 58 (orange), Canon EOS 650D (blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Despite its small size, the 100D not only compares well, but actually outperforms all cameras here at higher sensitivities.

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: While beaten at some sensitivity across the range, the 100D produces results that closely relate to the others.

OVERALL BENCHMARK RESULT

The 100D's JPEGs have a similar signal-to-noise ratio to those from the 650D, producing slightly greater ratios than the Nikon D3200 at every sensitivity and slightly weaker than the Sony a58 at ISO400 and above. The raw signal to noise ratio results are almost identical to the 650D and better than the D3200 and a58. Raw images show the a58 beats the 100D at the lowest sensitivities, but above ISO800 the Canon comes out on top.

- can be accessed via the quick menu, and unlike digital filters, they can be shot in both raw format and when using a standard shooting mode. There's also space for up to three of your own custom preset modes, if you want to create your own style, such as high contrast black and white.

PERFORMANCE

What the Canon engineers have achieved in shrinking down the key

Above That 18 million pixel sensor puts in a very similar performance to the EOS 650D

WHAT'S THIS?
Find out how we test on page 5



components of the DSLR is pretty remarkable, and we haven't been disappointed by the 100D's image performance. That 18 million pixel sensor is capable of resolving lots of detail, with minimal evidence of image smoothing at lower sensitivities.

Colours from the camera are also excellent, being nice and vibrant without going over the top. Having the ability to experiment with Picture Styles also gives you the opportunity to boost elements such as saturation if you think the scene requires it.

Automatic white balance does a good job in the majority of conditions, but it does tend to favour slightly

warmer tones when faced with artificial lighting. Switching to a more appropriate white balance setting is quick enough, though, if you're not satisfied with its performance.

The 100D uses Canon's iFCL metering. Evaluative metering, as general-purpose metering is known on Canon DSLRs, is a reasonable performer, helping the camera to produce balanced exposures in the majority of conditions. However, if a scene has high contrast the camera struggles and it will under- or over-expose depending upon the brightness of the active AF point. In some ways it acts more like



Tech Briefing Hybrid AF focusing



Debuting last year on the 650D, the hybrid autofocusing system works by combining phase detection and contrast detection for a system that is supposed to utilise the best factors of both. Generally, phase detection is quicker, while contrast detection more accurate. It works by incorporating certain pixels on the camera's sensor, working first to get the subject in focus, then fine-tuning with contrast detection. The hybrid autofocusing system is only used when shooting in Live View mode.

In the 100D, phase detection pixels now cover around 80% of the sensor's surface, which should make it better in terms of speed and tracking performance.

centrewighted, or even spot metering because the exposure is significantly skewed towards getting the subject under the AF point just right.

Noise performance is very good, with lots of crisp detail even at mid-range sensitivities such as ISO400. From around ISO1600, the amount of luminance and colour noise does increase, but it's not particularly noticeable at printing and normal web sizes. Even images shot at ISO3200 are usable in small sizes, though if you zoom in 100%, noise is apparent, along with a loss in detail.

Autofocus performance while shooting through the viewfinder is excellent, locking onto subjects quickly and easily. Only the central AF point is a cross-type, so this is more sensitive – you might want to keep the focus point to this central point and focus and recompose if you're attempting to capture rapidly unfolding action.

Above Shooting in Landscape picture style emphasises the greens and blues in a scene

Unfortunately, autofocus speed drops dramatically when using Live View, despite the hybrid autofocusing system. You could be waiting for a few seconds for the camera to finish hunting around for focus, and it's certainly no match for the likes of the Olympus PEN E-PL5 or Panasonic G5 with their near instant autofocusing capabilities.

Those put off by electronic viewfinders will enjoy the OVF on the EOS 100D. Although quite small, it still gives a clear and bright view. It's worth bearing in mind that it doesn't give a 100% field of view, unlike the majority of EVFS. Although not articulating, the 100D's 3-inch screen gives a reasonable angle of view if you need to shoot from awkward angles.

It's nice to see Canon considering its audience by including filter effects on the 100D, and a few here are good fun to play with – it's certainly worth experimenting if you like that kind of thing. We particularly like Grainy Black and White and Toy Camera effect.

Below The standard kit lens comes complete with STM autofocusing

VERDICT

What Canon has managed to produce in the EOS 100D is pretty special – a very small body that retains the same DSLR stylings, and more importantly, produces a similarly impressive image quality to its siblings. However, the problem remains that although the

camera itself is small, the overall system is not. By the time you attach the 18-55mm kit lens, it's not too much smaller than other, cheaper, cameras in Canon's range. Furthermore, if you're intending to use several lenses, you will still need a pretty large kit bag.

It's worth looking into the 40mm pancake lens as an accompaniment, since its incredibly small size makes it a reasonable combo for street shooting – albeit with a longer (equivalent) focal length than we'd usually recommend for such work.

The new 18-55mm STM kit lens is also a very good performer, and if this is your first SLR then it's worth buying the standard kit box, rather than going for the body only. 📷



Digital Camera

FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The 100D produces excellent images and is a fantastic choice for the first-time DSLR buyer. However, with large lenses and accessories, downsizing the camera doesn't really mean too much.

> THE SPECS

Sensor	20.2 million pixel APS-C CMOS sensor (22.5mm x 15.0mm)
Focal length conversion	1.6x
Memory	SD/SDHC/SDXC
Viewfinder	Optical pentaprism, 98% coverage, 0.95x magnification
Video resolution	Full HD (1920x1080)
ISO range	ISO 100-12800 (expandable to 25600)
Autofocus points	19
Max burst rate	7fps
LCD	3 inch, 1040k dots, touchscreen
Weight	755g
Dimensions	139.0 x 104.3 x 78.5mm
Power supply	LP-E6 Li-ion battery

The announcement of any Canon SLR usually creates a lot of buzz, but when that camera launches a new sensor with a new pixel count (for the manufacturer) and is aimed at enthusiasts, it ups the ante. Naturally there's been quite a buzz surrounding the new Canon EOS 70D, which has a 20.2 million-pixel CMOS sensor coupled with a DIGIC 5 processor.

FEATURES

The Canon 70D also has a dedicated phase-detection sensor for use when your images are composed in the viewfinder. This has 19 AF points, all of which are cross type, just like the Canon 7D's AF system. However, the two cameras AF systems aren't identical, as the 70D only has three AF point selection modes.

While the 60D has a maximum continuous shooting speed of 5.3fps, the 70D can shoot at up to 7fps at full resolution for up to 65 JPEGs or 16 raw files. This is very useful when shooting sport.

Meanwhile, sensitivity may be set in the native range of ISO 100-12,800 with an expansion setting allowing the equivalent of ISO 25,600. The top native setting, ISO 12,800, is an expansion setting on Canon's other enthusiast SLRs.

Canon was the first manufacturer to give an SLR a touch-sensitive screen and the 70D has a three-inch 1,040,000 dot LCD that can be used to make settings adjustments and scroll through images. Canon hasn't added the touchscreen functionality at the expense of buttons or dial controls as the 70D has all the



SLR Canon EOS 70D > £1079 (body only)

> www.canon.co.uk

Bigger and better

The upgrade to the EOS 60D is an enthusiast SLR with an intriguing new sensor, articulating touchscreen and Wi-Fi. **Angela Nicholson** tests the new 70D

physical controls that you'd hope for. Then there is Wi-Fi. Wi-Fi connectivity is fast becoming one of the must have features for cameras, and the 70D does not disappoint.

Canon has also included a few features to enable more creative images to be captured. There's a built-in speed light transmitter, for example, which gives wireless control over multiple Canon EX flashguns, a multi-exposure mode and an HDR mode that combines three images to create one with a greater range of tones. There's also a collection of Creative Filters that can be used to give JPEG's particular look when shooting in live view mode. While it's disappointing that these can't be used when shooting raw simultaneously, or when using the viewfinder, they can be applied post capture in review

Above The 70D is a very worthy upgrade, packed with new features

mode, so it's possible to retain a 'clean' image as well as one with the filter effect.

BUILD AND HANDLING

Some photographers get a bit worked up about Canon's choice to use polycarbonate rather than metal – but this new camera feels nice and solid, and seals ensure that it should survive some exposure to the weather.

Not surprisingly there are no major changes to the overall shape and feel of Canon's replacement to the 60D. The buttons and dials are sensibly arranged and the deep grip has a textured coating that makes it feel secure. Canon has opted to use capacitive technology for the touchscreen and this ensures that it's very responsive. We suspect that even those who don't intend to use the

Zooming in on the... Canon 70D

A quick tour of the camera's key features



The vari-angle touchscreen makes awkward angles a cinch.



Inbuilt Wi-Fi enables remote control of the 70D – a real bonus.



Note digital filters are only available in Live View or post capture.



Built-in Wi-Fi lets you shoot and adjust settings remotely

FEELING TREATED



Use the mode dial to switch between different exposure modes, including aperture priority and shutter priority.



Press this button to activate Live View shooting, or to start video recording when in movie mode.

Press this to switch between AF modes, then use either the dial or touchscreen to select an AF point.



Access the quick menu in Live View by pressing start and then pressing the Q button. It's really very easy!



touchscreen will find that they do gradually, starting with swiping from image to image in review mode, perhaps progressing to pinch-zooming to check sharpness and eventually progressing to taking more control over the camera via the screen. One downside to a touchscreen is that the screen inevitably gets covered in fingerprints and this makes the image harder to see, especially in bright light.

The touchscreen is particularly useful for setting the AF point quickly in Live View and movie mode. It can also be used to set the AF point when

“The touchscreen is particularly useful for setting the AF point quickly in Live View”

shooting with the camera held to the eye, just press the AF point selection button on screen (or use the navigation keys).

Because the 70D has a new, faster AF system in Live View mode, we think that users far more likely to compose images on the LCD screen than they may have been in the past. However, it's quite a bulky camera

compared with a compact system model and it doesn't feel totally natural to hold it away from your face to compose images on-screen. However, it's very useful when shooting with the camera on a tripod or composing images at awkward angles – it's here that Touch-shutter mode comes into its own as it allows you to set the AF point, focus the lens and trigger the shutter with a single touch on the screen.

One advantage that electronic viewfinders offer is the ability to display the image as it will be captured, naturally as an optical finder the 70D's viewfinder can't do this, but it does have an electronic overlay that displays key settings. There are also three new icons at the top of the viewfinder that indicate the AF point selection mode. It's also easy to change the mode because Canon has introduced a new button just to the side of the shutter release. A single press activates the system, and subsequent presses toggle through the selection mode options. Alternatively, a single press of the new button followed by presses of the navigation keys selects the AF point

Meet the rivals...

The 70D is good, but good enough to see off these rivals?



Nikon D7100
£800 (body only)
Gives you sharp images with bags of detail, but some fine-grained noise creeps in from ISO 400.
Our Score: 4/5
See page: 18



Pentax K-30
£399 (body only)
The K-30 can produce high-quality results, is easy to use and has plenty of features. Waterproof too!
Our Score: 5/5
See page: 131

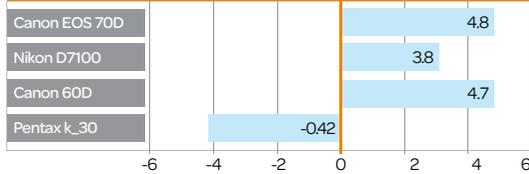


Canon 60D
£578 (body only)
The older model's got an 18Mp sensor, HD video and a useful articulated screen. Good deals ahoy!
Our Score: 4/5
See issue: 130

SLR BENCHMARKS

See how Canon's 6D fared in our tests

COLOUR ERROR Closest to zero is best

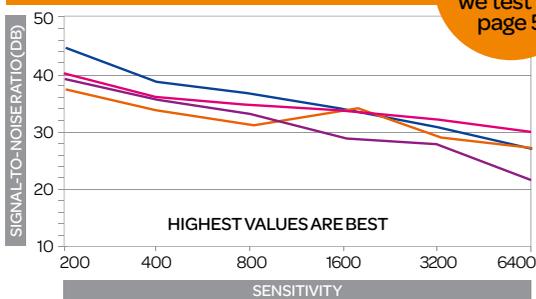


COLOUR ERROR RESULT: The 70D's colours are warmer than other cameras in the test, so very pleasing to the eye.

KEY
 Canon EOS 70D (Purple)
 Canon EOS 60D (Pink)
 Nikon D7100 (Orange)
 Pentax K-30 (Blue)

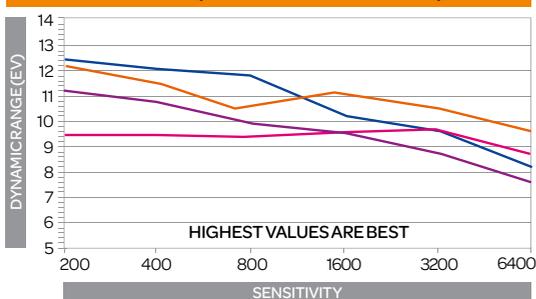
WHAT'S THIS?
 Find out how we test on page 5

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: The 70D shows a consistent signal to noise ratio, performing better than the rival Nikon at lower sensitivities.

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



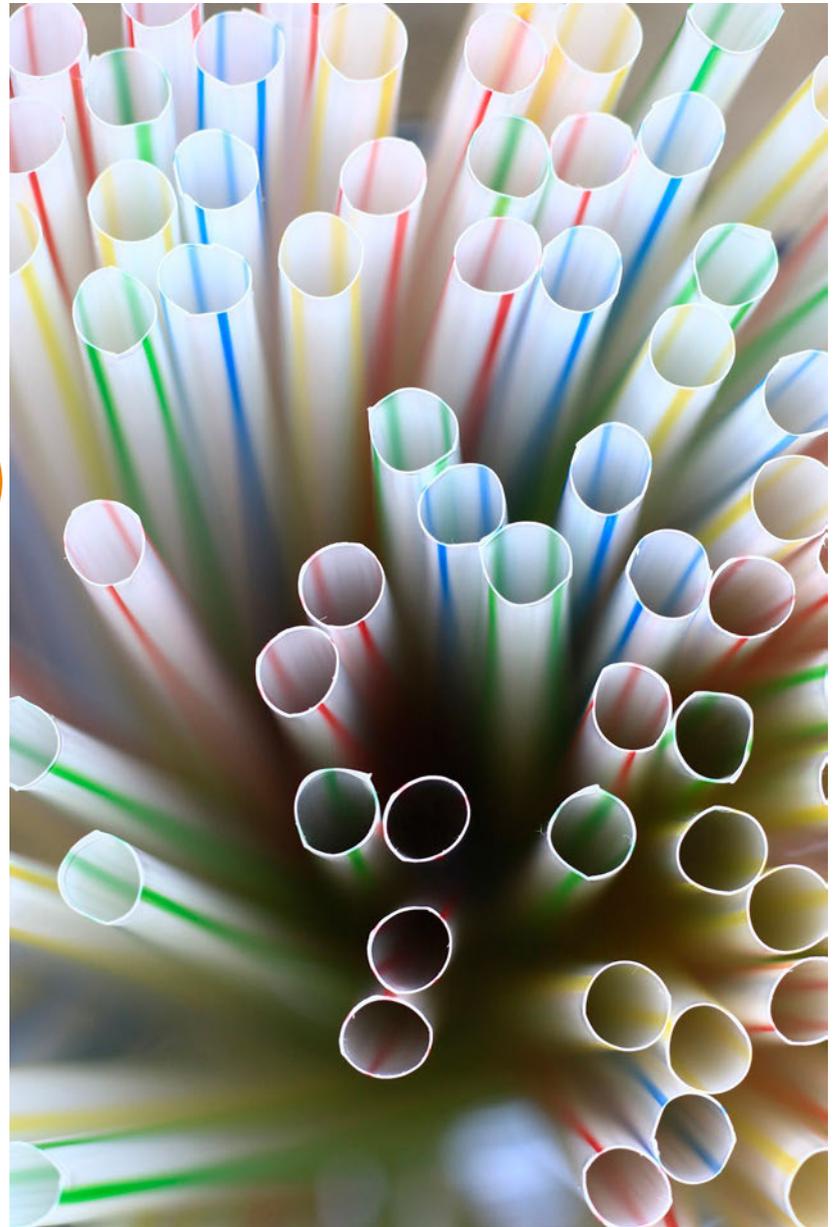
DYNAMIC RESULT: When it comes to dynamic range, the 70D is only slightly less capable than the Nikon D7100 and Pentax K-30

OVERALL BENCHMARK RESULT

JPEGs from the 70D perform very similarly to the 60D in terms of signal to noise ratio. It's also a pretty close match to the Nikon D7100. For raw files, the 70D is a more consistent performer than the 60D, but it is beaten at higher ISOs by the Nikon. For dynamic range, the 70D's JPEGs perform very well, only being beaten at the very lowest sensitivities by the D7100. TIFF images are beaten by Nikon's D7100 at every sensitivity.

to use. It's a great system. Meanwhile, the viewfinder can also display an electronic level. In the past Canon has used the AF point display for its electronic level, but this has the disadvantage of switching off the minute the shutter release button is pressed. While this level is still available, Canon has also given the 70D the option to display a new icon at the bottom of the viewfinder, and this remains visible even when the

Above Detail straight from the camera is excellent, while noise is kept to a minimum throughout the sensitivity range.



shutter release is pressed. It's a much better system, but it takes a little while to get used to how sensitive the level is. As the level icon isn't illuminated it's also quite hard to see when shooting dark subjects.

PERFORMANCE

Although Canon's new Dual Pixel AF system is faster than its previous Live View AF systems, it isn't quite as fast as the contrast detection systems in Panasonic's recent G series compact system camera is like the G6 and GX7, or Olympus's Pen range including the E-PL5 and E-P5. However, it's not that far off and it's sufficiently fast for the camera to be used hand-held when composing images on screen – at least in normal daylight conditions – and it means that the

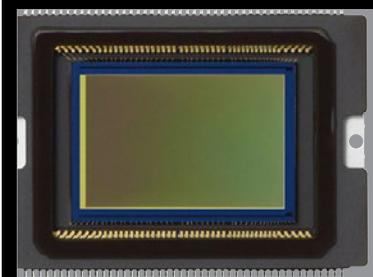
articulating joint on the screen is much more useful. When light levels fall however, the focusing slows and a backwards and forwards adjustment becomes noticeable.

While the Dual Pixel AF system may have grabbed many of the headlines, it is only used in Live View and movie mode. When images are composed in the viewfinder the 19-point AF system is on hand along with manual focusing. This AF system uses all cross-type points for greater sensitivity and it's excellent, very fast and accurate. In comparison with Nikon's 51-AF point system, however, 19-points doesn't seem that impressive, but the centre of the frame is well covered. In comparison with the coverage that you get with the average compact system camera it





Tech Briefing Dual Pixel CMOS



As well as having a higher pixel count than Canon's other recent APS-C format sensors, the EOS 70D sensor is a Dual Pixel CMOS device, which enables faster focusing during Live View and video mode. There are two photo diodes for every pixel site (strictly speaking pixels don't exist until an image is created) on the sensor, and each of them can read light independently to enable a form of phase detection autofocus to be used to focus the lens.

While the diodes are read separately for autofocus, they are read together to form the image, and this means the Canon 70D creates 20.2 million-pixel images. Our test images show it performs very well.

seems rather poor as the points are clustered around the centre. This means that off centre subjects require the focus-and-recompose technique.

Canon has one of the best automatic white balance systems around and on the whole it does a good job of capturing pleasant looking colours. The images sometimes err on the side of warmth, but the results are generally very pleasant.

Above Colours are pleasing directly from the camera, but shooting in raw format gives you more control over the final result.

Below The 70D feels very good in the hand

There are no surprises with the 70D's 63-zone iFCL metering system. It generally performs well, but because of the weighting that it gives to the brightness of the subject and that the active AF point, it is prone to over or under exposing in high contrast conditions. This can be a pain when shooting sun-lit landscapes as you need to be careful where you set the AF point. If it's positioned over a patch of pale grass in full sun the chances are that rest of the image will be underexposed, whereas positioning the active AF point over a shadow area will mean most of the image is overexposed.

One way around the problem is to shoot in manual exposure mode, taking a spotmeter reading (Partial, Spot and Centrewighted metering are available in addition to Evaluative) from a midtone.

Our tests show that the 70D is capable of capturing plenty of detail. However, even at the lowest sensitivity settings there's a clear benefit to shooting raw files as out of focus areas in JPEGs sometimes have a slightly watercolour appearance at 100% on screen. Even images taken at ISO 100 have a slight texture visible at 100%, but chroma noise (coloured speckling) isn't a major issue throughout the native sensitivity

range (ISO 100-12,800). As usual, however, in-camera noise reduction takes its toll on detail as sensitivity rises. We'd recommend keeping below ISO 6400 where possible.

VERDICT

This is a very well-rounded camera for the photography enthusiast. The new Dual Pixel AF system for live view and movie mode is particularly impressive. In bright light it's fast and decisive, being quickest in still mode and smoothest in movie mode. In lowlight, however, there's often some of the backwards and forwards adjustment that is typical of contrast detection systems rather than phase detection. This a relatively minor niggle, however.

Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: This upgrade to the 60D is very desirable. If Canon follows its usual pattern, we can expect to see the EOS 70D's sensor appearing throughout the range, so that is great news for the consumer.



> THE SPECS

Sensor	20.2Mp full-frame (36x24mm) CMOS
Focal length conversion	1x
Memory	SD/SDHC/SDXC
Viewfinder	Optical (with 97% coverage)
Video resolution	1920x1080p
ISO range	100-25600 (expandable to 50-102400)
Autofocus points	11 (1 cross-type)
Max burst rate	4.5fps
LCD	Three-inch, 1,040,000-dot Clear View TFT
Weight	755g
Dimensions	144.5x110.5x71.2mm
Power supply	Rechargeable Li-ion LP-E6 battery (supplied)

The Canon EOS 6D is in many ways Canon's first true enthusiast-level full-frame digital camera.

This is because its design and handling are far closer to that of the APS-C format 60D below it than the 5D Mark III and 7D above it in Canon's current SLR line-up.

While it may not have quite such an impressive specification as the 5D Mark III and 7D, Canon has given the 6D Wi-Fi and GPS technology – a first for an SLR camera. These features are very handy for recording your location and taking wireless control of your camera, or uploading your images directly to your computer or your Facebook account without having to carry cables in your bag.

But is the 6D a savvy buy for budget-conscious enthusiast photographers who want to step up to full-frame shooting, or does its pared-down specification leave them feeling a bit short changed?

FEATURES

Inside the 6D is a 20.2-million pixel full-frame CMOS sensor, which combined with the DIGIC 5 processor, allows a native sensitivity range of ISO100-25600. This range is fine for landscape photographers and low-light work, but it can be extended to ISO50-102400 if necessary.

Confusingly, the 6D has a total of 11 autofocus points, two more than the 60D below it, but whereas the 60D has nine cross-type points, the 6D has just one – the centre point. This doesn't mean that the AF system is completely dumbed-down though, as there are some advanced controls that have migrated from the 5D Mark



SLR Canon EOS 6D > £1,429 (body only)

> www.canon.co.uk

Little and large

The EOS 6D is Canon's most affordable full-frame SLR yet. **Ali Jennings** finds out whether it has enough features to keep enthusiast photographers happy

III. These controls enable you to adjust the tracking sensitivity and the tracking of accelerating or decelerating subjects, which is really useful when shooting moving targets.

At 4.5 frames per second (fps), the 6D's maximum continuous shooting rate is also slower than the 5.3fps of the 60D. Even given the 60D's 2Mp lower resolution this seems odd, because it also has the older DIGIC 4 processor.

Another key difference between the 6D and the 60D, of course, is that the APS-C format model has an articulating LCD screen. In other respects, however, the screens are the same, and both cameras have a three-inch, 1,040,000-dot device.

It's also worth pointing out that Canon has a free app that enables smart phones and tablets to be used

Above The Canon EOS 6D houses a 20.2Mp full-frame CMOS sensor

as a remote viewfinder and controller via Wi-Fi, so many users won't be concerned about the fixed LCD.

Full HD video capture is possible, but as with both the 7D and 60D, there's no headphone socket for you to monitor the sound while you're recording. However, hitting the camera's Info button when shooting in Movie Live View mode switches between the different overlay and info screens. One of these includes a visual audio level that enables visual monitoring of the sound levels when recording, as well as allowing you to make manual adjustments.

BUILD AND HANDLING

Although the 6D's weight is the same as the 60D's, it has half a centimetre more on its height and slightly less depth, which means that the grip is

Zooming in on the... Canon EOS 6D

A quick tour of the camera's key features



You can control the 6D via a smart phone with the EOS Remote app



The GPS system means you can geotag images as they are taken



There's no PC sync socket for connecting lights or a pop-up flash



The viewfinder covers 97% of the frame, not 100% like the Nikon D600



The mode dial has a lock to prevent it moving out of position between shots. There are shooting options for less experienced photographers, as well as enthusiasts



Pressing the Info button in Live View mode allows the audio levels to be assessed visually and adjusted



The ISO button can be identified with your finger when the camera is held up to your eye



As on the 7D, this switch goes one way for stills Live View mode and the other for video Live View mode

FEELING CHEATED

deeper. This makes a surprising amount of difference to handling, and gives the grip better purchase.

A thoughtful button layout gives quick access to many of the camera's main features, and settings changes can be made quickly, although a Spartan viewfinder display means its often necessary to take the camera away from the eye while doing so.

The navigation control on the back of the camera features the same functionality as the 60D's, with a rotating outer ring to adjust settings such as aperture or shutter speed, a central directional pad for navigating

"The 15 different screens seem a bit much, but this is due to Canon deciding against scrolling screens"

menus and an inner Set button for confirming settings changes. Its position is ideal when you're reviewing images and making settings changes, and when you're shooting with the camera to your eye, as it's within easy reach of your thumb.

We also like that images can be magnified by pressing the button to the left of the Quick Menu button,

and then rotating the front control dial, instead of using the two zoom buttons that featured on the top right on the 60D and 7D.

Canon's menus have been expanding, and the 6D features a huge assortment of options. Initially, the 15 different screens seem a bit much, but this is due to Canon deciding against scrolling screens and giving a full list of options under each menu tab. This makes locating the feature you want far easier.

As with other Canon EOS models the final menu tab is a My Menu screen. This is where you can place all of your most commonly-used features – we used it to access the camera's custom white balance, image quality, Mirror Lock-up and ratings controls.

PERFORMANCE

With 11 AF points grouped around the centre of the frame there is a fair amount of choice, but only the centre one is cross type. This means that although the camera can focus quickly when the peripheral points are used, it doesn't track moving subjects quite so well as when the centre point is

Meet the rivals...

See how the 6D stands up against the competition



Nikon D600
£1,327 (body only)
This full-frame SLR has a higher resolution, more AF points and a built-in flash, but no integral Wi-Fi.
Our score: 5/5
See page: 22



Canon EOS 7D
£995 (body only)
Although it has an APS-C format sensor, the 7D has more advanced features and handling than the 6D.
Our score: 5/5
Issue reviewed: 93

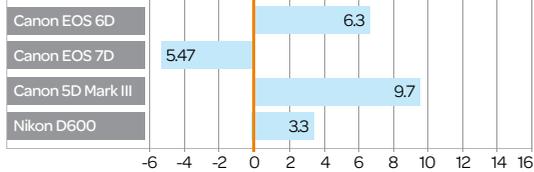


Canon EOS 5D Mark III
£2,309 (body only)
An all-rounder and better built than the 6D, but with no built-in Wi-Fi and a much higher cost.
Our score: 5/5
See page: 42

SLR BENCHMARKS

See how Canon's 6D fared in our tests

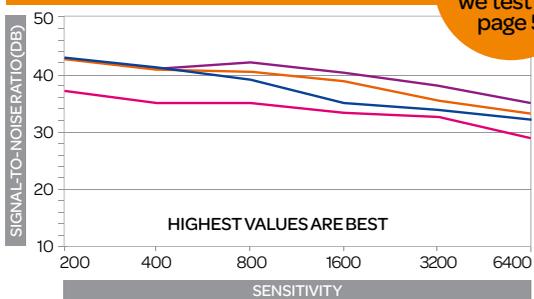
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: Although the colour score isn't as near to technical perfection as the D600's, the results look pleasing

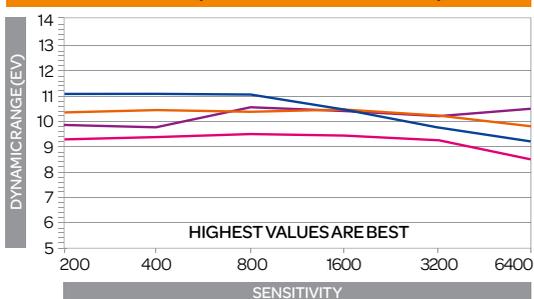
KEY Canon EOS 6D (purple), Canon EOS 7D (pink), Canon 5D Mark III (orange), Nikon D600 (blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Here, the 6D is on a par with the 5D Mark III and better than the D600 at higher sensitivities

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Although not a match for the D600 below ISO800, above this the 6D leads the way by some measure

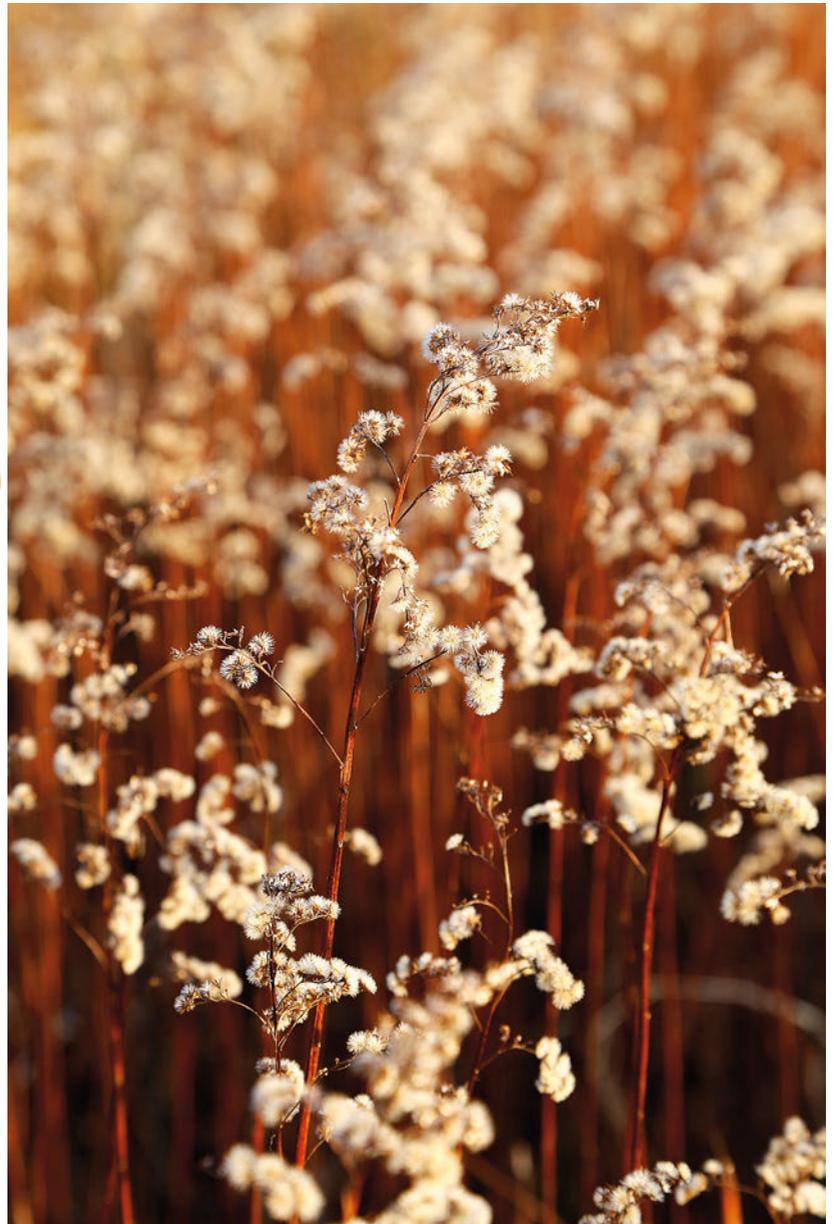
OVERALL BENCHMARK RESULT

The EOS 6D produces well-saturated JPEGs with warm tones direct from camera. Signal-to-noise ratio results show noise is handled well throughout the sensitivity range. At the lower range noise is hard to spot, but at ISO25600 coloured speckling can be seen. At first the dynamic range results for the JPEG files seem disappointing, but the images have good tone and contrast. Raw images have a high tonal range too.

activated. When photographing deer we had a near 100% success rate when using the centre point, but many of the images benefitted from cropping to improve composition.

As with both the 60D and 7D, the 6D uses the iFCL metering system with a 63-zone dual-layer metering sensor. As we've seen on previous EOS bodies, this system is extremely accurate, taking into account the focus point, colour within the scene

Above The full-frame sensor is capable of capturing rich colour with plenty of detail



and the amount of available light. In practice this works well, but in high-contrast situations a little positive or negative Exposure Compensation is sometimes required, depending on the brightness of the subject under the active autofocus point.

WHITE'S RIGHT

Shooting wildlife against a flat sky in relative low light really put the metering to the test, and while a small amount of positive Exposure Compensation was dialled in to lift the darker details, the camera's iFCL metering again proved that it was able to read the scene and subject well to capture the shot we wanted.

The 6D's colour rendition is excellent, adding slight but not overwhelming warmth to images, so

JPEGs are pleasing to the eye direct from the camera. Helpfully, the LCD screen's representation of the final image is spot-on, enabling you to accurately gauge whether or not you have captured the image you want.

During part of this test we shot landscapes from dawn 'til dusk, through the different levels of light, and the metering and auto white balance systems performed well. There were no situations in which more than a small adjustment to the Exposure Compensation was needed. White balance throughout was accurate, and even in the low light of the setting sun the camera reproduced the colours with a good amount of vibrance and clarity.

There are no visible signs of noise at the lower end of the sensitivity





Tech Briefing Wi-Fi



Wi-Fi technology is slowly appearing in compact cameras, but the 6D is the first SLR to feature it built in. Canon's engineers have produced a solution that's easy to set up and is beautifully executed. As well as allowing a smart phone to control the camera, it's possible to use the Wi-Fi to upload to the phone and then Facebook and Twitter, transfer files between camera bodies or computers, or to your printer or a WiFi enabled TV.

Pairing a camera and an iPhone takes a couple of minutes, then you can adjust the settings via your iPhone's screen. The app enables you to select a focus point, zoom in on the image preview and adjust the exposure before firing the shutter.

range. By ISO800 there is a small amount of luminance noise, but it is only at ISO25600 that chrominance noise can be seen, and then only slightly. However, the detail smoothing to combat noise in JPEG files is apparent, and while noise is subdued, some of the detail is also lost, although images are still usable.

There is quite a difference between the appearance of JPEG and raw files, and Canon has done an excellent job with the JPEG processing – these

Above The Canon EOS 6D copes well under tricky lighting conditions, needing little compensation to expose the shot

Below The layout of the buttons and dials has been well thought out

images are instantly pleasing direct from camera. Our lab tests reveal the 6D's JPEGs have a relatively average dynamic range, but the images have good contrast and punchy colours. The raw files, by comparison, contain a good two stops of extra shadow and highlight detail that can be recovered in post-processing.

OUR VERDICT

There's no doubt who the 20.2Mp 6D is aimed at. With some pro features stripped, you're left with a camera finely tuned to the needs of the enthusiast. The full-frame sensor captures images that are rich in colour and tone, with JPEGs direct from camera needing only a slight tweak, if that. Raw files contain plenty of detail, and their dynamic range enables you to pull back highlights and shadows with minimal introduction of noise.

Although focus speeds are slower than those of the 7D, they're not sluggish, with the centre point AF locking on target and finding focus with good accuracy even in low light conditions (especially when a top-notch L-series lens is used). Outside of the centre point autofocus is by no means slow, and although grouped quite tightly around the centre of the frame, there's still decent flexibility.

It would be nice to be able to

customise the weighting that the iFCL metering system gives to the brightness of the subject under the active AF point, as in high-contrast lighting conditions this can have a significant impact upon the image. In some instances it appears to work more like Centre-weighted metering than Evaluative.

The 6D is an excellent choice for the enthusiast looking for a full-frame SLR. It may take a while to get to grips with the subtleties of the camera's AF system, and you'll have to remember some of the basics of metering when using the iFCL evaluative system in high-contrast conditions, but you will appreciate the end results. This is a camera well worth considering and a great introduction to full frame. **📷**

Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The Canon EOS 6D is an excellent choice for enthusiast photographers looking for a full-frame SLR. It gives you just about everything you need and produces great images straight from the camera.

From the makers of **Digital Camera** magazine



> THE SPECS

Sensor	22.3-million effective pixel full-frame (36x24mm) CMOS
Focal length conversion	1x
Memory	CF and SD/SDHC/SDXC
Viewfinder	Pentaprism, with 100% coverage
Video resolution	Full HD (1920x1080 pixels) at 24, 25 and 30fps
ISO range	100-12800 (expandable to 50 and 102400)
Autofocus points	61 (41 cross-type, five dual cross-type)
Max burst rate	6fps
LCD	3.2-inch, 1040,000-dot Clear View II TFT
Shutter speeds	30 to 1/8000 sec, plus Bulb
Weight	950g (body only)
Dimensions	152x116.4x76.4mm
Power supply	Rechargeable Li-ion LP-E6 (supplied), 1x CR1616 for date and settings



FULL-FRAME SLR Canon EOS 5D Mark III > £2,309 (body only) > www.canon.co.uk

Pro quality, premium price

Apart from its pixel count, the specification of the Canon EOS 5D Mark III seems similar to the Mark II, but there's still plenty to get excited about, says **Angela Nicholson**

The original Canon EOS 5D was the first SLR to really bring full-frame digital photography within the reach of enthusiast photographers. Then its replacement, the 5D Mark II, kick-started the trend for shooting video on an SLR, and now the 5D Mark III has lots to offer the enthusiast too.

FEATURES

With 22.3Mp effective pixels, the 5D Mark III's sensor only has 1.2 million pixels more than the 21.1Mp Mark II it replaces, but that's still 4.2Mp more than the 18.1Mp EOS-1D X, which sits at the top of Canon's SLR line-up.

The Mark III has a DIGIC 5+ processor, which in combination with its eight-channel readout means it has a top continuous shooting speed of six frames per second (fps).

This processor also enables sensitivity to be set in the ISO range of 100 to 25600, and it can be expanded to include L: ISO50, H1: ISO51200 and H2: ISO102400.

In addition, the camera has the same 61-point wide-area AF system as the flagship EOS-1D X. Of these 61 points, 41 are cross-type and five are dual cross-type, which is good news for accuracy. The customisable AF presets introduced in the EOS-1D X are also available. However, it doesn't offer the f/8 sensitivity of Nikon's latest system; it only extends to f/5.6, which means slower lenses won't autofocus with some teleconverters.

Existing 5D Mark II users may find the Mark III's iFCL metering takes

a little getting used to, because it reacts in a similar way to Centre-weighted metering and puts greater emphasis on the subject under the active autofocus point.

Video capability was one of the big successes of the 5D Mark II, and there are some improvements in the Mark III. Firstly, there's the introduction of a Live View/Movie switch on the rear, as on the 7D, to speed up movie activation. There's also a headphone socket for monitoring the stereo audio, which can be adjusted in-camera, as on the EOS-1D X.

The 5D Mark III is also capable of recording and merging three shots to

Above The 5D Mark III's familiar shell is packed with powerful features

produce a high dynamic range (HDR) image. This is extremely useful, because it records all three shots as well as the processed HDR image, and if you shoot raw and JPEG images simultaneously, you'll find you have a total of seven images, including three raw files that you can process yourself if you wish. The 5D Mark III also has two card ports – one for CompactFlash and the other for SD format cards, but there's no XQD card port.

BUILD AND HANDLING

According to Canon, the 5D Mark III has better weatherproofing than the Mark II. This is something that's

Zooming in on the... Canon EOS 5D Mark III

A quick tour of the camera's key features



Press this button when reviewing images to add a star rating out of five



Sound input can be adjusted – something Mark II users asked for



Canon's full-frame cameras don't have a pop-up flash built-in

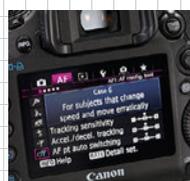


The AF point mode selection options are difficult to distinguish

Use this switch to swap between stills and video modes. Pressing the central button in video mode starts recording, while in stills mode it activates Live View

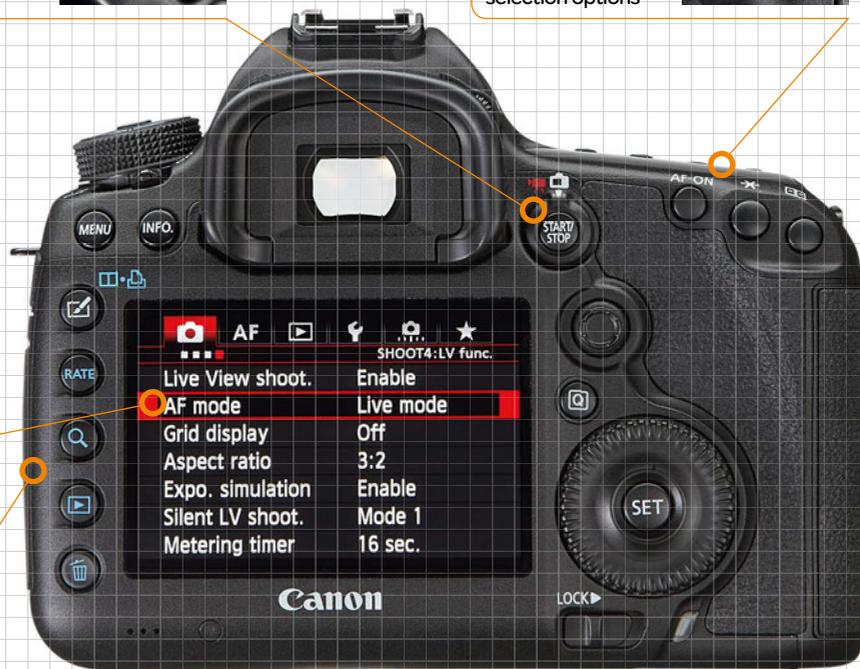


This button on the top of the camera is used to toggle through the AF point selection options



Canon suggests some AF system arrangements – to specify response times for specific shooting conditions, for example

There's a headphone port for monitoring audio quality, and the sound levels can be adjusted in-camera



difficult to test in the short term, but it's reassuring to know.

The camera is large and the finger grip is covered in a textured rubber-like coating that helps it feel secure in your grasp, and the contours make it comfortable to hold. The Mark III's body is largely unchanged from the Mark II's, but there are a few key differences. The pentaprism lump on the top, for example, is a little larger and more rounded to accommodate the AF module, which is 2.5x larger than that seen on the Mark II.

There's also the Live View/Movie switch on the back of the camera,

“Pressing the Creative button in playback mode allows two shots to be compared next to each other”

which is within easy reach of the right thumb. In addition, Canon has added a couple of new buttons. The first of these is used to access three creative options: Picture Styles, Multiple Exposure (up to nine images can be combined) and the HDR modes.

Another new button is marked Rate, and pressing it in playback mode allows you to rate your images – one

press for one star, two for two, and so on. These ratings are logged in the EXIF data and are visible in Adobe Bridge and Elements. We found the Rate feature extremely useful when reviewing images taken during this test, because it makes chimping on the bus or train home from a shoot productive. You may not use it to make your final image selection, but it's useful for working out which are the best images to consider.

Helpfully, pressing the Creative button in playback mode allows two shots to be compared next to each other. It's rather odd that the image that's selected when the button is pressed is highlighted in blue as the one to change – using either the main dial on the back of the camera or the smaller one on the front, near the shutter release. However, pressing the Set button at the centre of the main dial switches to the second image. The Magnify and Rate buttons also function during the comparison view and act upon the selected image only.

Pleasingly, Canon has given the 5D Mark III the same three-inch 1,040,000-dot LCD as the 1D X. The gap between the screen and its glass

Meet the rivals...

See how the Canon EOS 5D Mark III stands up against the competition



Nikon D800
£1,962 (body only)
This has class-leading detail resolution and dynamic range, but images aren't as clean as the 5D Mark III's.
Our score: 5/5
See page: 26



Canon EOS 5D Mark II
£1,595 (launch, body only)
With 21.1-million effective pixels, the Mark II isn't too far behind. Still available second-hand.
Our score: 4/5
Issue reviewed: 82

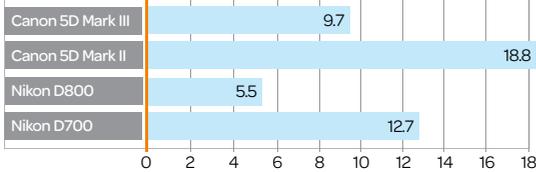


Nikon D700
£1,625 (launch, body only)
Both the D700 and the newer D7100 (page 18) are a good alternative for sports enthusiasts.
Our score: 4/5
Issue reviewed: 77

SLR BENCHMARKS

See how the 5D Mark III fared in our lab tests

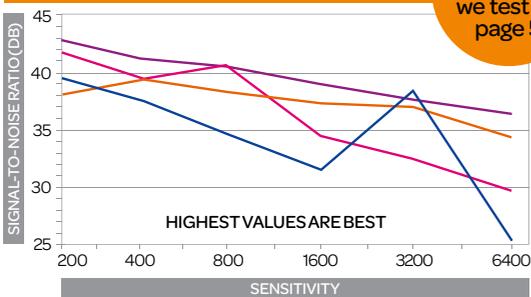
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The Mark III's JPEGs have more natural colours than the Mark II's, but they are still pleasantly saturated

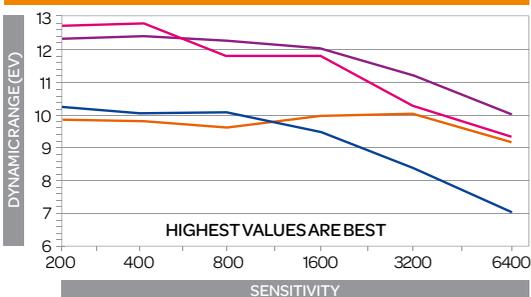
KEY Canon EOS 5D Mark III (Purple), Canon EOS 5D Mark II (Orange), Nikon D800 (Pink), Nikon D700 (Blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: This graph demonstrates the 5D Mark III's ability to control noise and produce detail-rich images

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Its high dynamic range means that images from the 5D Mark III contain subtle tonal gradations

OVERALL BENCHMARK RESULT

Our in-house tests reveal that the 5D Mark III's image quality is generally higher than that of the 5D Mark II it replaces. Raw images (after conversion to TIFF) have a higher signal-to-noise ratio, indicating that they are cleaner, and their dynamic range is over 2EV higher at the low to middle sensitivity range.

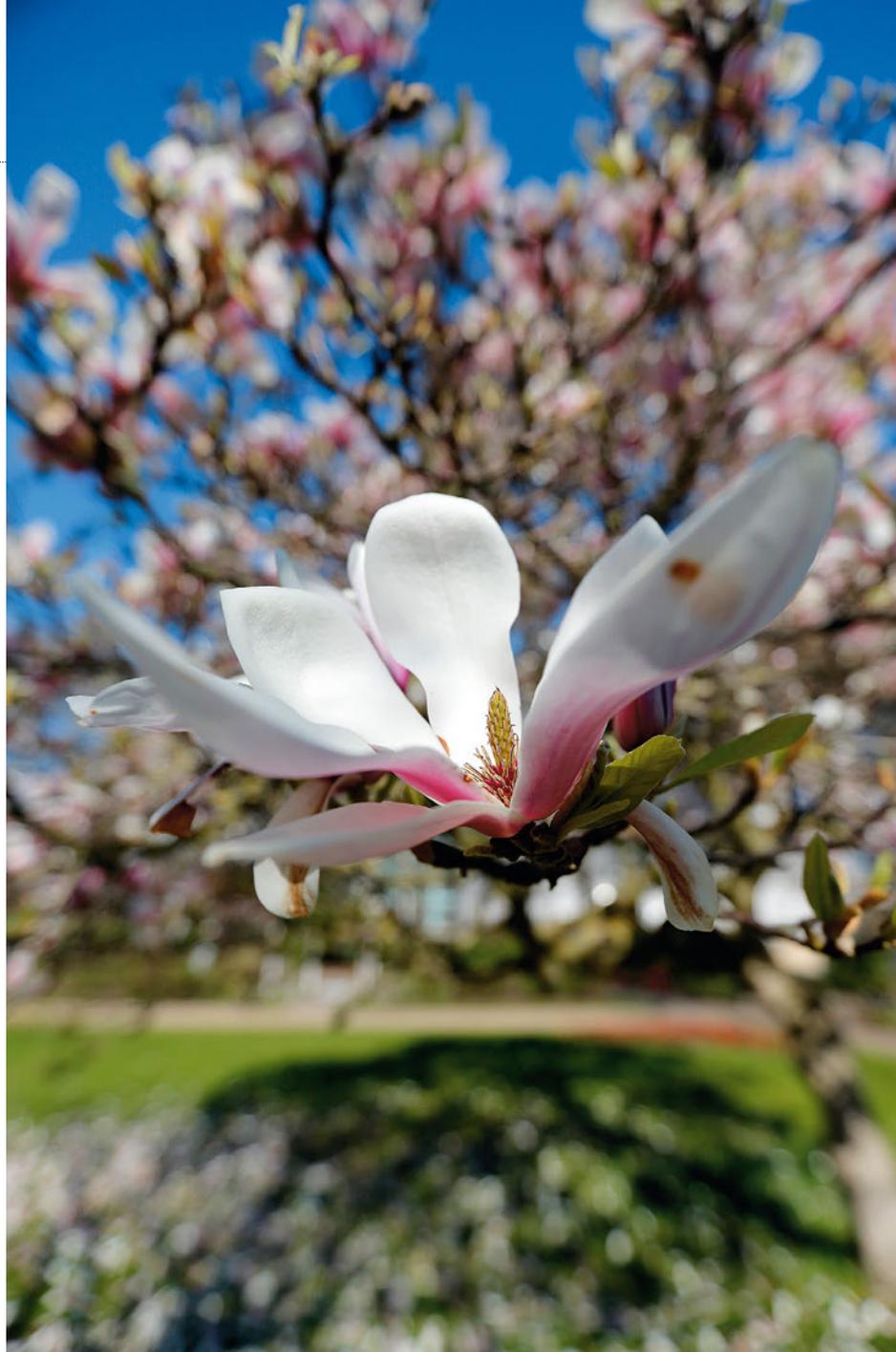
The JPEG results are also generally much better, although the 5D Mark II's JPEG images scored slightly better for signal-to-noise ratio up to around ISO200. Our colour analysis confirms our real-world shooting results, which show that the 5D Mark III produces natural-looking images with good overall saturation.

cover has been filled with an optical gel, and this helps to keep reflections at bay. In our tests, we found that the screen provides a sharp, clear view, even when shooting outside in bright sunlight.

Given the 5D's reputation as a video camera, it's a shame that Canon wasn't bold enough to give the

Above Both raw and JPEG images deliver delicious levels of resolution and detail

WHAT'S THIS?
Find out how we test on page 5



Mark III a fully articulating screen. Perhaps the hinge is considered too much of a weak point, or maybe Canon thinks that dedicated stills photographers aren't ready for such a feature yet.

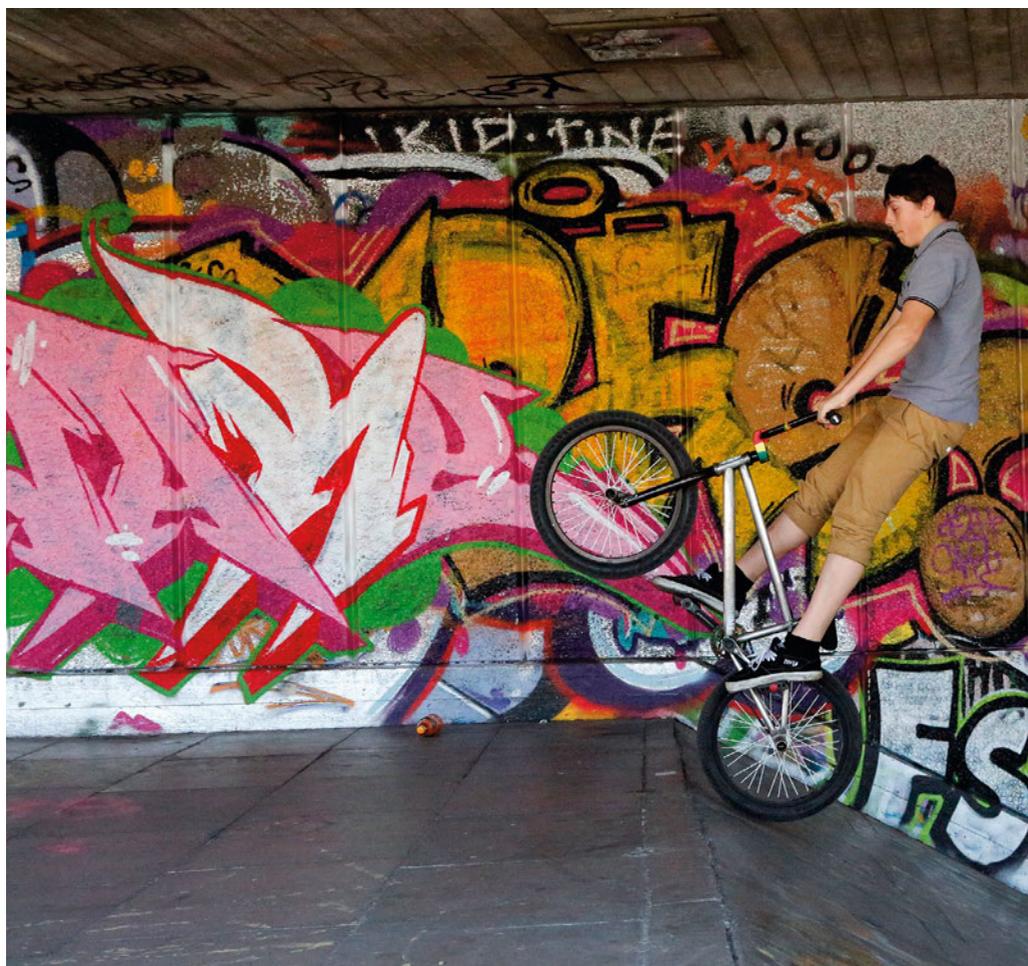
PERFORMANCE

Nikon's D800 is viewed by many as the natural competitor to the 5D Mark III. Its class-leading pixel count means the D800 is capable of resolving more detail than the 5D Mark III. What is a little surprising, however, is that the Nikon camera also produces raw and JPEG images that have a higher dynamic range when the lower sensitivity images are used. We might have expected this to be the other way around given that the pixels on the Canon camera's sensor have more space. It's only when the sensitivity of raw files is

pushed to ISO800, or the JPEG sensitivity is ISO3200 or higher, that the Mark III's dynamic range is higher than the D800's. Nevertheless, the 5D Mark III is very capable, and it resolves a high level of detail in both raw and JPEG files, which only really starts to dip when the sensitivity is pushed to ISO25600.

Our tests also show that from around ISO100 and above the 5D Mark III has a slightly higher signal-to-noise ratio than the D800, so images have less noise. However, as is usually the case, noise becomes quite noticeable when the upper sensitivity expansion settings (ISO51200 and ISO102400) are used, and they are best reserved for emergencies.

We also found that at the top settings it can struggle to render tonal gradations in some red subjects, and small patches of uniform tone appear,



giving some parts of the image a posterised appearance.

Despite these issues, the 5D Mark III produces impressive results in low light. When shooting BMX riders in dim conditions, for example, the sensitivity was pushed to ISO12800, and the JPEGs look great at A3 size. Even at 100% on a computer screen, images look respectable, with only a

Above The AF system had no trouble keeping up with this BMX bandit

little mottling of luminance noise and slight softening of fine details.

Canon produces one of the best white balance systems around, and the 5D Mark III's doesn't disappoint. When set to the Automatic setting, images look natural, and generally retain the atmosphere of the shooting conditions. Standard Picture Style is a great option for most situations, but others – such as Neutral, Faithful, Monochrome and Landscape – are on hand, along with three custom options, if you want a different look.

There are six AF Area Selection modes available. It takes a while to be able to distinguish between them all, and to remember which icon represents each one. On top of this, the AI Servo (continuous AF) mode's characteristics – such as tracking sensitivity, acceleration/deceleration tracking and AF-point switching – can be adjusted. Although it's complex, we found the AF system to be extremely fast and accurate.

OUR VERDICT

Images are generally well exposed thanks to Canon's iFCL metering,

Tech Briefing
Silent Shooting mode



Wildlife photographers may find the 5D Mark III's Silent Shooting mode useful, because unlike other quiet modes, it doesn't rely on the mirror being held up after the shot has been taken until it is manually dropped. Instead, the mirror moves more slowly, and a new mechanism dampens its movement to reduce the noise. The end result isn't totally silent, but it's much quieter than in normal shooting mode, and it's far less likely to spook wildlife. We found it could be used next to a sleeping baby without waking it.

Unlike most quiet modes, which only allow single images to be taken, the 5D Mark III's allows a sequence of images to be taken, with a maximum continuous shooting rate of three frames per second.

and the white balance and Picture Styles deliver the colour and tones that we have come to expect from a top-end Canon. The HDR system is also the best on the market.

Raw and JPEG image quality throughout the native sensitivity range is excellent, noise is well controlled and there's plenty of detail. The AF system has been given a serious upgrade from the Mark II, and it puts in an excellent performance. For this test, it did a good job of keeping up with skateboarders and BMX riders photographed in subdued light.

So, a great camera, and much more tempting now that prices have fallen since its launch. 📷

Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: Don't let the minor increase in pixel count fool you into thinking that this is a minor upgrade; the 5D Mark III delivers on many fronts, and corrects some of the weaknesses of the camera it replaces.



Below The 5D's top-plate LCD makes it easy to make adjustments on the fly

> THE SPECS

Sensor	APS-C format CMOS with 16.28 million effective pixels
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	Pentaprism type with approx 100% field of view
Video resolution	1920x1080 at 30/25/24fps
ISO range	100-12800 (expandable to 25600)
Autofocus points	11 (nine cross type)
Max burst rate	6fps for JPEGs
LCD	Three-inch, 921,000 dots
Shutter speeds	30-1/6000 sec, plus Bulb
Weight	650g (with Li-ion battery and SD card)
Dimensions	128.5x96.5x71.5mm
Power supply	Rechargeable Li-ion battery (supplied) or four AA batteries with optional D-BH109 holder



SLR Pentax K-30 > £399 (body only) > www.pentax.co.uk

Quality photos in any weather

With a weather-proof, rugged little body and a shiftable sensor, **Angela Nicholson** thinks the Pentax K-30 has a lot to offer

One of the benefits to photographers of Canon and Nikon being so dominant in the market is that companies like

Pentax have to work harder to offer prospective buyers something different. In several cases this has resulted in manufacturers turning to compact system cameras (CSCs) and abandoning SLRs altogether.

However, Pentax is still interested in SLRs and has introduced the K-30. With a weather-sealed body, high-resolution LCD and a pentaprism 100% viewfinder it seems like quite a compelling option – sitting below the K-5II and K-5IIs in Pentax's three-camera SLR line-up.

FEATURES

Inside the K-30 is an APS-C format CMOS sensor with 16.28 million effective pixels. This sensor is able to shift to correct camera shake with just about any mountable lens and can be set to the correct focal length if the camera can't automatically detect the information. In addition, when the Shake Reduction system is activated, the camera can rotate the sensor automatically by up to 1° to avoid a sloping horizon. There's also a digital level display option for the viewfinder and LCD screen.

The same system allows image composition to be adjusted up, down or left or right by up to 1mm over 16 steps. It's hard to imagine this being used very often, but a 1mm movement at sensor level could prove useful with critical still-life or macro set-ups.

The sensor is coupled with the PRIME M processing engine that is

claimed to enable JPEG images to be captured at a maximum continuous shooting rate of 6fps (frames per second), or eight raw files at 3fps, and sensitivity to be set in the range of ISO100-25600 with expansion enabled. In addition, full HD videos can be recorded at 30, 25 or 24fps in clips of up to 25 minutes. These can be cut and joined together in camera.

Autofocusing is handled by the new SAFOX IXi+ AF module, which has 11 AF points, nine of which are cross-type. Pentax says that the system takes the lighting conditions into account when calculating the focus, and there's a new select-area expansion function that's great for tracking moving subjects.

Above The WR on the lens stands for Weather Resistant

Pentax was quick to introduce automatic HDR shooting in its SLRs, and the K-30 has several options for combining three images with bracketing of up to +/-3EV. Shadow and Highlight Correction is also available to boost the dynamic range of images as they are taken, and there are seven digital filter effects that can be applied to JPEG images in camera. Enthusiast shooters may prefer the 11 Custom Image options, which can be used when capturing raw or JPEG files, with aspects such as saturation, contrast and sharpness being customisable.

BUILD AND HANDLING

Although it replaces the Pentax K-r, the K-30 has a very different shape



With the optional holder, the K-30 can get power from four AA batteries



Shake Reduction extends the safe handheld shutter speed by 4EV



AF performance isn't great with lenses that lack a focusing motor



The digital filter effects can only be used when shooting JPEG images

◀ FEELING TREATED

Zooming in on the... Pentax K-30

A quick tour of the camera's key features

Unlike most entry-level cameras, the viewfinder covers approximately 100% of the scene



This deep, angular grip provides excellent hold



Pressing the Info button brings up this screen, which allows quick and easy settings adjustments



Pressing and holding OK briefly activates the option to change AF point, as shown by this screen



◀ FEELING CHEATED

— it's a bit more angular and has a bigger grip (one of the most comfortable we've used). This is coated with a textured rubber-like material to give it more purchase.

The K-30 also feels a little more robust than the K-r it replaces, and this is underlined by the fact that it has 81 seals to keep moisture, dust and sand at bay. During this test we took it out for a couple of hours in the pouring rain, and it still worked perfectly well even when there was water running down the camera.

Unusually for an entry-level SLR, the K-30 has a pentaprism rather

“The robust K-30 has 81 seals to keep moisture, dust and sand at bay. It still works in pouring rain”

than a pentamirror viewfinder, which covers approximately 100% of the scene. Despite these credentials, it seems a bit dim, especially in low light. But at least there shouldn't be any surprises around the edges of the frame when images are reviewed.

While the screen layout looks a little simplistic, it's up to the minute resolution-wise — a three-inch device

with 921,000 dots that provides a clear view in all but very bright light.

All the usual shortcut buttons are on-hand, giving access to the sensitivity, drive mode, white balance and flash options. Helpfully, the screen displays a graphic of the navigation buttons on the back of the camera, making clear what shortcut options are on offer. This could be useful when shooting in poor light.

Pressing the Info button brings up the information screen, which displays 15 of the key settings. Changing any of them is simply a question of navigating to it and then scrolling through the options using the rear control dial. Alternatively, pressing the OK button brings up the options for the selection.

The entire menu is spread across 13 screens, and although they are sensibly grouped with a tab system, it isn't always easy to find exactly what you need quickly. It's a shame that there's no option to save the most commonly used features to one screen for quick access.

Small niggles aside, the K-30 is an enjoyable camera to use. It feels very well made and the knowledge

Meet the rivals...

See how the K-30 fares against the competition



Canon EOS 650D
£485 (body only)
This 18Mp model is the first SLR with a touch-sensitive screen and hybrid AF in Live View and video mode.
Score: 4/5
Issue reviewed: 129



Nikon D3200
£302 (body only)
Slick and very beginner friendly SLR with lots of features for more experienced users.
Our score: 4/5
See page: 10

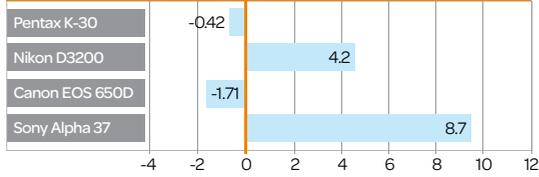


Sony Alpha 37
£249 (body only)
Thanks to its translucent mirror, this 16.1Mp SLT has full-time phase-detection AF in Live View and video.
Our score: 3/5
Issue reviewed: 129

SLR BENCHMARKS

See how the K-30 fared in our lab tests

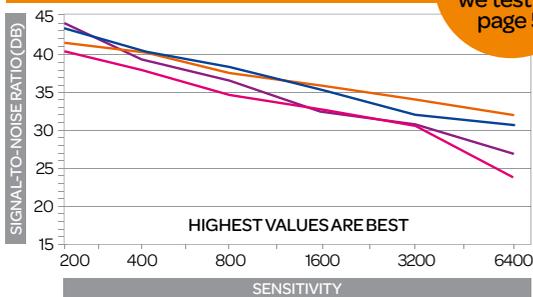
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The K-30 gets an almost perfect score, indicating very accurate colour reproduction

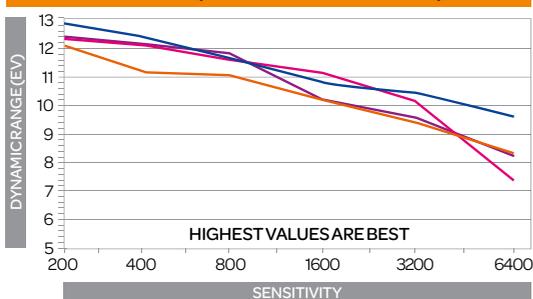
KEY
 Pentax K-30 (Purple)
 Nikon D3200 (Pink)
 Canon EOS 650D (Orange)
 Sony Alpha 37 (Blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: At ISO100 the K-30 is very impressive, but above this setting it drops down, and images are a bit noisier

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Below ISO800 the K-30 has a very respectable dynamic range. It can record tonal variations in shadows and highlights

OVERALL BENCHMARK RESULT

At the lowest sensitivity setting, the K-30 matches or outperforms the competition's raw files (after conversion to TIFF). The JPEG files are also very good, especially for signal-to-noise ratio. At the higher sensitivity settings, however, its lab results are more average.



images captured at the upper value and at the expansion setting (25600) have lots of chroma noise, which is visible in the shadows at normal printing sizes. There is no particular pattern or banding to the noise, so the images are ripe for post-capture editing, but we would try to avoid these two values.

The best results are produced at ISO3200 and below, and this gives the photographer plenty of scope for shooting with the sensitivity set to auto with this as the upper limit.

Another area where the K-30 impresses is with its white balance. We used the Auto White Balance setting in a range of conditions and it performed extremely well, even coping with artificial lighting indoors. That's not to say that you won't want to make the occasional adjustment, but on the whole the colours are good.

We enjoyed using the digital filters and combining them with the Custom Image modes, but it's frustrating that they can't be employed with raw files. Ideally, we'd like to be able to use the filters when shooting raw and JPEG files simultaneously to produce one 'filtered' JPEG and one 'clean' raw file.

The 77-segment general purpose metering system does a good job in many situations. There is a slight tendency to under-expose when faced with a scene that has bright areas, but it isn't quite so pronounced as with earlier Pentax cameras, and at least it protects the highlights a little.

The Highlight and Shadow Correction options are useful for drawing a little more out of the shadows and highlights. Meanwhile, the in-camera HDR produces effects that range from very subtle to overtly HDR, depending on which settings

that it won't be damaged by a downpour is very reassuring.

PERFORMANCE

In line with Pentax's earlier SLRs, the K-30 tends to capture plenty of detail at the risk of showing a little noise. We prefer this approach, because it's easier to remove noise post capture than it is to add detail.

Although the native sensitivity settings run from ISO100-12800,

Above Taken using the Bleach Bypass effect, this image needed a little post-capture brightening



Tech Briefing Shake Reduction



Rather than being fixed into the body, the K-30's sensor is mounted on electromagnets that enable it to move. Sensors built into the camera detect movement, then the electromagnets shift the sensor to correct for it.

This system is present whatever lens is mounted. As well as keeping the price of optics down, this means that the system is even compatible with old Pentax lenses. Because camera shake is more of an issue as focal length increases, the compensation needs to be tailored to the lens. In many cases the camera obtains this data electronically from the camera, but it can be entered via the menu for non-electronic optics.

you choose. It's a shame that only the composite image is saved though; it would be nice to have the constituent bracketed images to work on later.

With the 18-55mm f/3.5-5.6 DA WR kit lens mounted, the autofocus system is best described as adequate. In good light it's pretty quick, but as soon as light dips it becomes hesitant and indecisive. The situation is much improved when a lens such as the DA

Above Even at ISO1600, the K-30 captures plenty of detail

Below The K-30's autofocus struggles in low light with the 18-55mm kit lens mounted

18-135mm f/3.5-5.6 ED AL [IF] DC WR with an internal focusing motor is mounted, however, and focusing becomes much quicker and significantly quieter. Fortunately, the K-30 is also available as a kit with an 18-135mm lens, and we recommend this option over the 18-55mm kit.

Although the K-30 has a claimed maximum continuous shooting rate of 6fps, in our tests we were only able to achieve 5fps when recording the highest-quality JPEGs.

OUR VERDICT

It may not be perfect, but there's plenty to like about the Pentax K-30. For a start, its 16Mp sensor is capable of recording an impressive level of detail, especially if you record raw files, which helpfully are in DNG format. There's also lots of room to experiment and try different options to create more interesting images.

Those on the move and without access to mains electricity to charge the supplied Li-ion battery will also appreciate the dual-form battery compartment that can accommodate four AA batteries (with the optional D-BH109 holder, which costs £29).

The fact that the body is weatherproofed is a huge bonus, as water damage is one of the main reasons cameras are sent for repair.

Of course, to get the full benefit of the K-30's weatherproofing it needs to be matched with one of Pentax's WR (Weather Resistant) lenses. Given this camera's 'outdoor' credentials, the smc DA 18-135mm f/3.5-5.6 ED AL [IF] DC WR is a better pairing, giving greater flexibility, reducing the need to change lens in hostile environments and offering much better autofocus performance.

While the self-levelling sensor is a great idea, it really needs to work beyond 1° to be useful. As it stands, it's better to use the electronic level in most situations. The digital filters are lots of fun, but when you want to get serious about image quality the results from the raw files taken at ISO100 and 200 are hard to beat. 📷



Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: Pentax has a strong contender for the entry-level SLR market in the new K-30. It's a robust, weatherproof, easy-to-use camera that is capable of producing very high-quality images.

> THE SPECS

Sensor	16.3Mp CMOS with incorporated Shake Reduction system
Focal length conversion	1.5x
Memory	Single SDHC card slot
Viewfinder	Pentaprism, approx 0.92x magnification, 100% field of view
Video resolution	Full HD 1960x1080 at 25fps
ISO range	ISO 100-12800, expandable to 80-51200
Autofocus points	11 (9 cross type)
Max burst rate	7.0fps
LCD	3-inch, 921,000-dot
Shutter speeds	1/8000-30s, bulb
Weight	760g inc battery & SD card
Dimensions	131x97x72.5mm
Power supply	Li-ion rechargeable battery, 1860mAh

Two years ago Pentax revamped its top-end APS-C format DSLR, the K-7, with the K-5, and in doing so produced one of the best cameras in its class. So given the original K-5 was such a well-rounded performer, it's perhaps of little surprise that Pentax didn't want to alter the K-5 recipe too much for its replacement.

Externally the K-5 II is virtually identical to its predecessor, and you'll still struggle to differentiate the two after a tech spec comparison. Aside from a slightly improved LCD and an allegedly revamped sensor, the most notable development is the K-5 II's new SAFOX X autofocus system, which claims to offer a noticeable speed and accuracy boost over the original K-5.

One obvious difference with the second generation K-5 is that it comes in two flavours; K-5 II and K-5 IIs. The latter is an identical camera but forgoes an anti-aliasing filter in an attempt to improve image sharpness. Great in theory, but it adds £150 to the asking price as well as a greater risk of moiré interference when shooting densely-patterned subjects.

FEATURES

The original K5 had a considerably improved sensor over the old K7, but the new K-5 II doesn't move things on to the same degree. Pentax has stuck with a 16.3Mp CMOS, and while it offers marginally improved low-light performance, you'll be hard pressed to notice any real world improvements in image quality.

Sensitivity remains unchanged, ranging from ISO100-12,800 and

expandable to 80-51,200. You also get the option to preselect the amount of in-camera noise reduction the K-5 II applies at each sensitivity setting, enabling you to perfectly balance detail retention and noise reduction.

One element which is completely new for the K-5 II is the SAFOX X autofocus system. Pentax claims this provides much improved speed and accuracy, as well as making the K-5 II the first APS-C format camera to focus in lighting conditions as low as -3 EV. As with the old K-5, you still get 11 well-spread autofocus points, nine of which being the cross-type.

Other in-camera image tweaks include automatic chromatic aberration compensation to reduce (although not eliminate) purple fringing in high-contrast areas, and distortion correction to remove wide-angle barrel distortion or telephoto pincushion effects. Although both of these features do produce decent results, they add on a

Above The K-5 II's small size makes it easy to fit into a bag or backpack

frustrating couple of seconds of processing time per shot.

Pentax's Dynamic-range expansion feature is more useable and it does a great job of brightening shadow areas whilst maintaining highlight detail for more balanced exposures. If this isn't enough, then the camera also has an extensive multi-shot HDR capability with four preset strengths plus an automatic mode. Results look the part, but are only available when shooting JPEG, and again, processing time is lengthy, this time being a whopping 20 seconds per shot.

Continuous shooting to a maximum speed of 7fps keeps the K-5 II on a par with the competition, but it's no faster than the original K5. Likewise the K-5 II's Full HD movie recording ability is also unchanged, apart from the addition of some extra post-processing effects.

These effects can also be applied to still images, via a dedicated rear button. Options range from subtle



SLR Pentax K-5 II > £649 (body only) > www.pentax.co.uk

DSLR Déjà vu?

It looks, operates and performs almost identically to its predecessor, so is the K-5 II worth the upgrade? **Ben Andrews** finds out

Zooming in on the... Pentax K-5 II

A quick tour of the camera's key features



A sensor-shift stabilisation system is a welcome feature



Although 'only' 16Mp, the performance of the CMOS sensor is excellent



A total of 11 autofocus points now trails more precise systems



The K-5 II may be a new model but you'd never guess to look at it



This horizontal and vertical level in Live View mode ensures you always get straight shots



Unlike many APS-C cameras, the K-5 II's viewfinder has a 100% field of view enabling perfect compositions



Easily switch between automatic, centre point or selective focusing modes with this collar control



The upgraded LCD features an internal resin layer to reduce reflections and boost brightness



contrast and saturation tweaks to enhance portraits or landscapes, through to more blatant effects like 'bleach bypass' which desaturates the final image. Each one is customisable, and while such effects are of arguable usefulness in an enthusiast's camera, they're a quick and easy way to add some basic image customisation.

BUILD AND HANDLING

The K-5 II retains the same high quality magnesium alloy casing and rugged stainless steel chassis as the original K5. Also carried over is the advanced 77-seal weather proofing to

“As the K-5 II utilises the same chassis as the K-5, both cameras have exactly the same layout”

prevent dust and moisture intrusion. The K-5 II is also rated to operate in temperatures as low as -10°C.

As the K-5 II utilises the same chassis as the K-5, naturally both cameras have exactly the same control layout. This is no cause for concern, however, as there's little to find fault with the button placement and control design. You get the usual front

and rear control wheels, with a sizable thumb grip area thanks to the location of the rear control wheel. This wheel also doubles as the playback zoom controls, doing away with the need for additional zoom buttons.

Atop the body sit two well-sited buttons for adjusting ISO sensitivity and exposure compensation, and on the left-hand side the main mode dial. Apart from the usual automatic, programmable and manual modes, Pentax also gives you a combined shutter and Aperture Priority mode, where the camera only adjusts the sensitivity to maintain correct exposure. There's also a dedicated Bulb Exposure mode, and a user programmable setting in which you can store five custom preset modes selectable by the rear control wheel.

One control element which could really have benefited from a re-design is the metering adjustment collar beneath the mode dial. Its stiffness and tiny thumb grip mean it's unlikely to be accidentally moved, but it's quite difficult to adjust when you need to.

Another annoyance from the original K5 design that's present on the new model is the tiny screw-in

Meet the rivals...

See how the K-5 II stands up against the competition



Nikon D7100
£801 (body only)
The Nikon D7100 has a 24.1Mp sensor and a similar build, but the K-5 II offers a few more features.
Our score: 4/5
See page: 18



Canon EOS 60D
£578 (body only)
An 18Mp sensor gives the 60D the edge on resolution, but the K-5 II is a better low light performer.
Our score: 4/5
Issue reviewed: 106/109

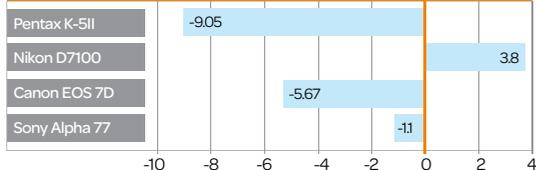


Sony Alpha A65
£539 (18-55mm kit)
Packed with features, including a similar sensor-shift stabilisation system and a movie mode.
Our score: 5/5
Issue reviewed: 122

SLR BENCHMARKS

See how the K-5 II fared in our tests

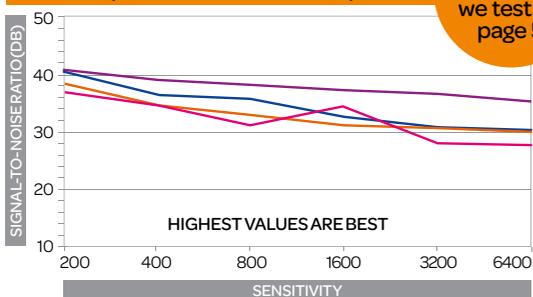
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The K-5 II produces rather unsaturated colours, but this is ideal for post-capture adjustment

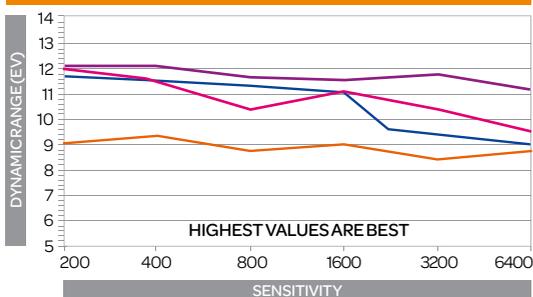
KEY Pentax K-5II (purple), Nikon D7100 (pink), Canon EOS 7D (orange), Sony Alpha 77 (blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Perhaps helped by its comparatively low pixel count, the K-5 II produces class leading signal to noise ratio

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: The raw file dynamic range is high throughout the sensitivity range, indicating it can capture shadow and highlight detail

OVERALL BENCHMARK RESULT

The K-5 II leads the way for dynamic range and signal to noise ratio. However, its lower pixel count means it can't resolve as much detail as the Nikon D7100. Though it didn't score too well for colour accuracy in the lab, in the real world the K-5 II gives natural looking images. The wide dynamic range, low noise level and comparatively low saturation colour means the raw files can be subjected to extensive adjustment post-capture.

cap for the PC flash sync port. It's virtually impossible to remove, and once out is unlikely to be seen again.

The only external change Pentax has made to the K-5 II is its new LCD monitor. The 3-inch, 921,000 dot panel is equipped with an internal resin layer between the outer glass and the LCD screen, which improves brightness and reduces unwanted reflections. Results are generally comparable to most current DSLR

Captured at ISO1000, there's impressively low image noise, even in the shadow areas

WHAT'S THIS?

Find out how we test on page 5



monitors, but the K-5 II screen is indeed vibrant, with excellent viewing angles and easily viewable in all but the harshest direct sunlight.

PERFORMANCE

Here the K-5 II pretty much picks up the baton where its predecessor left off, which is definitely no bad thing considering the original K-5 was a stellar performer.

Sure, these days a 16.3Mp sensor is never going to steal the thunder from the likes of Nikon's latest megapixel monsters, but look beyond sheer resolution, and the sensor in the K-5 II produces terrific quality images. Colour depth and dynamic range are still class-leading, especially when the Dynamic Range Enlargement feature is enabled.

Image noise or lack thereof is another area where the K-5 II excels. There's rarely ever a need to ramp a camera's sensitivity to ISO12,800, but even here little if any chroma noise (colour speckling) is evident, and although there is a fair amount of luminance noise (grain) visible, it's by no means distracting. Of course if you push on up to the K-5 II's maximum sensitivity of ISO51,200 things don't look so pretty, but image quality is still good enough for prints up to around 9x6 inch.

Pentax is particularly proud of the new SAFOX X autofocus system in the K-5 II, and with good reason. The system manages to focus almost instantly even quite dark environments and in many instances does so without the aid of the AF



Tech Briefing Shake Reduction



Unlike Canon and Nikon DSLRs which use a stability system into the lens, the CMOS sensor in the K-5 II is capable of being automatically shifted within the camera body to compensate for camera shake. It's effective enough to allow a 3-stop reduction in shutter speed and works in conjunction with any KAF2-mount Pentax lens, old or new.

The movable sensor can also be shifted manually using the D-pad buttons and rear control dial. Dubbed 'Composition Adjustment', this makes it easy to achieve subtle horizontal, vertical or rotational tweaks to a composition. It's a neat trick which comes in handy for fine-tuning compositions taken on a tripod.

assist lamp. Switch to Live View and, unlike many DSLRs, the K-5 II still delivers speedy autofocus and gives you the option to choose from three autofocus methods depending on your subject. But whether the autofocus performance is that much of an improvement over the original K-5 is less obvious, as this camera was still no slouch in this department.

The camera's 77-segment exposure metering system is largely unchanged from its predecessor, and in the majority of situations this reliably hits upon correct exposure settings. But,

Above Colours are usually pleasingly rendered, but watch out for issues with overexposure

Below The 3-inch LCD with 921,000 dots of resolution is scratch resistant

and this is really the only significant issue with the K-5 II, the system is still prone to overexposure. It's only really a problem in low light, high contrast situations where the camera plumps for a more balanced exposure at the expense of highlight detail. Sometimes this does give true-to-life results, but often highlights can be blown by as much as two stops, with mid-tones and shadows looking unrealistically bright. Switching to spot metering or dialling in some exposure compensation does solve the problem, providing you have time.

We found the K-5 II's auto white balance system is by and large consistently accurate, with only a couple of instances in mixed artificial lighting where an unexpected colour cast tainted the final image.

OUR VERDICT

Considering the technological advances made by the original K-5 over the old K-7, we can't help but be a little disappointed that the new K-5 II is a much more subtle, evolutionary step forward. That said, it's refreshing to see that Pentax hasn't attempted to set the K-5 II apart by giving it a needlessly high pixel count, or festooning it with gimmicky features.

Like its predecessor, the K-5 II succeeds where it matters most: high

image quality, autofocus performance, build quality and ease of use. It is a pity we can't add the camera's exposure metering to the list of superlatives as, capable though it is, the few occasions where overexposure does occur can frustrate.

However the biggest problem the K-5 II faces is actually the old K-5. While the specification and performance of the newer model is marginally better, the price difference is far more pronounced.

This means that if you're in the market for a high-performing APS-C format DSLR with a great all-round ability, the original K-5 could well be a more tempting proposition at the right price to the slightly more capable K-5 II. 📷



Digital Camera

FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The Pentax K-5 II is very easy to use, built to last and based around a terrific sensor. All in all it's a great value DSLR. It's just a pity it's so close in specification to its predecessor the K-5.

> THE SPECS

Sensor	120.1Mp Exmor APS-C CMOS sensor
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	Electronic 1.44 million dot OLED Tru-Finder
Video resolution	Full HD (1080p)
ISO range	100-16000
Autofocus points	15 (three cross-type)
Max burst rate	8fpst
LCD screen size	2.7-inch, 460,000 dot
Shutter speeds:	1/4000-30 secs (and Bulb)
Weight	492g (body only)
Dimensions	128.6x95.5x77.7mm
Power supply	NP-FM500H

Now it's been a few years since Sony first introduced its SLT, or translucent mirror cameras, it seems that consumers and the industry are comfortable with the idea. Sony generally updates its entry-level line-up once a year, and has this time streamlined the range by replacing both the A37 and the A57 with the Alpha 58.

The A58 is very similar to the A57, featuring a newly designed 20.1 million pixel sensor, compared with the A57's 16.1 million device.

FEATURES

It also features an improved electronic viewfinder (EVF), which boasts OLED technology for improved brightness and contrast. As SLTs, the Alpha range can only use EVFs, and as such it seems Sony has been working hard to improve their performance.

Although some don't favour EVFs, there are some distinct advantages to using them. For starters, it's helpful to see changes you make to settings displayed in real time via the viewfinder. You also spend less time removing the camera from your eye to glance at the LCD screen as the image pops up in the viewfinder, helping you quickly determine whether or not you've nailed the shot.

The camera uses a 15-point AF system. It's capable of shooting at 5fps when shooting at the camera's highest resolution, or 8fps at lower resolutions, giving it one of the fastest burst rates in the entry-level market.

Auto Object Framing is an interesting new feature (see page 94 for more info). As befits the intended consumer of this camera, Sony has included a number of other fun and simple features. These include Sweep



SLT Sony Alpha 58 > £309 (with 18-55mm lens) > www.sony.co.uk

Two become one

Sony replaces two entry-level SLTs with a camera with an impressive host of features. **Amy Davies** sees if it's worth the upgrade...

Panorama and a range of Picture Effects and Picture Styles. Another appealing feature is Clear Zoom – Sony's name for digital zoom. This uses By Pixel Resolution Technology, which is designed to effectively double the focal length of whichever lens you're using, while maintaining the same resolution. Anybody who doesn't want to shell out for additional lenses may find this especially useful.

Sony has launched a new 18-55mm kit lens which comes as standard with the A58. Although they don't have as many proprietary lenses as Canon and Nikon, the number of A-mount optics now tops 50, with seven premium lenses manufactured by Carl Zeiss.

BUILD AND HANDLING

The A58 has a large chunky grip, which is particularly useful when shooting one-handed. The camera feels like it could withstand the odd knock or scrape, and is of a more

Above The Sony Alpha 58 is only a slight upgrade from its predecessors the A37 and A57, but almost perfect for first time SLT users.

premium construction than the A37. On the top of the camera is a dial for switching between modes, such as fully automatic, semi-automatic and fully manual. One new addition to this dial is Picture Effects. These effects can also be accessed when shooting in other modes, such as aperture priority, enabling you to keep control over other settings.

Built into the hand grip is a scrolling dial that can be used to alter aperture or shutter speed, depending on the mode you're in. When in fully manual, the dial controls shutter speed when used on its own, but if you hold down the exposure compensation button and use the scroll dial, aperture is altered.

Dedicated buttons on the back provide quick access to key settings, including ISO and exposure compensation, and like other cameras in the Sony Alpha range, there's some customisation that can be enjoyed. The function button accesses a quick

Zooming in on the... Sony SLT-A58

A quick tour of the camera's key features



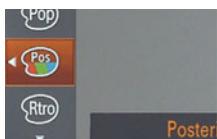
High resolution EVF makes it almost possible to forget it's not optical.



The chunky grip helps when holding the camera one-handed.



The screen only tilts, making it less handy for portrait format shots.



Low raw functionality means you'll keep diving into the main menu.

◀ FEELING TREATED



A sensor placed on the electronic viewfinder automatically detects when the camera is lifted to the eye.

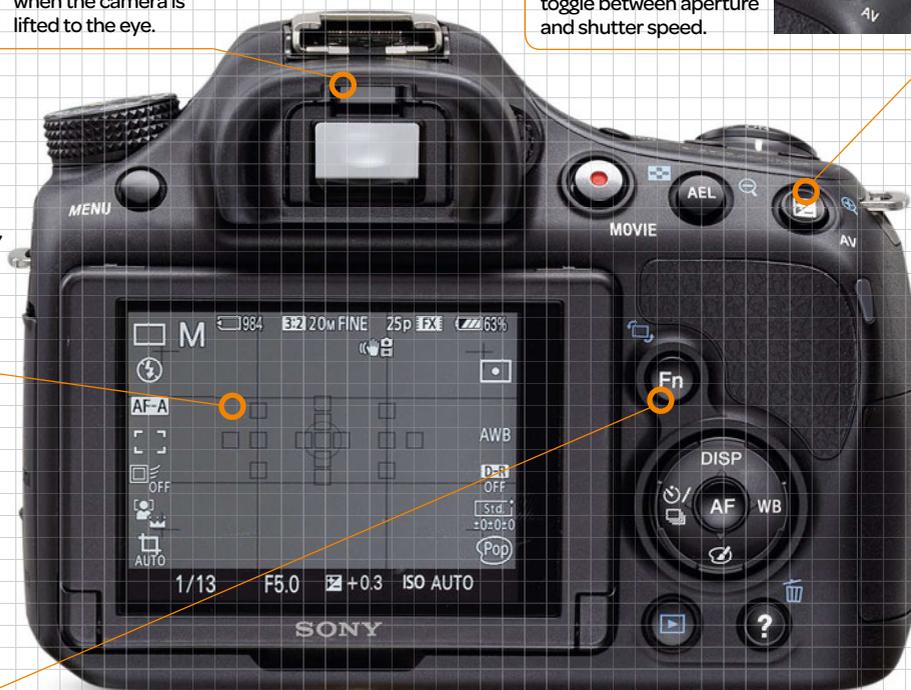


As the A58 doesn't have a touchscreen, first hit the AF button, then use the directional keys to move the AF point as required.



This button brings up a quick menu that gives you access to the most commonly used settings on the A58.

The exposure compensation button is used in manual mode to toggle between aperture and shutter speed.



menu that features most commonly used settings, such as Drive Mode, Metering and Creative Style. Sadly, a number of the most interesting options available on the A58, such as Auto Object Framing, Clear Zoom and Picture Effects, can't be used when shooting in raw format. Not only does this make it difficult to keep a clean image to work with, it also requires a frequently tedious delve in and out of the main menu to switch to JPEG-only shooting.

A dedicated button for the digital zoom feature can be found on top of the camera. Press this and then use

“We had reasonably high expectations for the Alpha 58, and we weren't disappointed”

either the left and right keys to zoom incrementally, or the up and down keys to zoom in steps.

Like its predecessor, the A58 has a moveable screen, which is handy for shooting at awkward angles. However, Sony has chosen to make this a tilting device, rather than a fully articulated unit, meaning you can't tuck it away, and it's less useful when

shooting portrait format images. It's also still not a touchscreen, which would have been handy for setting the autofocus point.

Helpfully, an eye sensor is included to automatically turn off the screen and activate the EVF. There is also a physical button that can be used to switch off automatic detection – useful if you want to exclusively use either the EVF or LCD for a particular length of time.

PERFORMANCE

We had reasonably high expectations for the Alpha 58, and happily we weren't disappointed. Images contain plenty of fine detail, display good colours without being over the top, and are generally well exposed.

JPEG images straight from the camera are pleasing, although in some circumstances the camera can produce slightly underexposed images, especially where the scene is quite dark. You might find yourself having to dial in exposure compensation to combat this problem.

Bright colours, such as reds and oranges, are displayed well. The A58 represents general scenes with more

Meet the rivals...

See how the A58 stands up against the competition



Canon EOS 700D
£649 (with 18-55mm lens)
 With its touchscreen and Hybrid AF, the 700D transforms the way you use an SLR and take pictures.
Our score: 5/5
Issue reviewed: 140



Nikon D3200
£369 (with 18-55mm lens)
 With 24-million-pixels, Guide Mode and multiple exposure options, it's the perfect beginners' DSLR.
Our score: 4/5
See page: 10

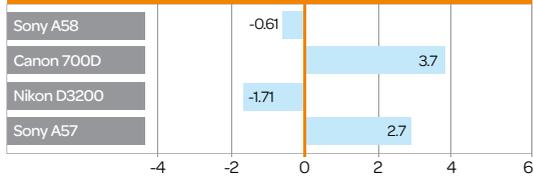


Sony A57
£379 (with 18-55mm lens)
 A robust body, accessible controls and a high-resolution LCD screen, and not obsolete yet.
Our score: 4/5
Issue reviewed: 137

SLT BENCHMARKS

See how the Sony A58 fared in our lab tests

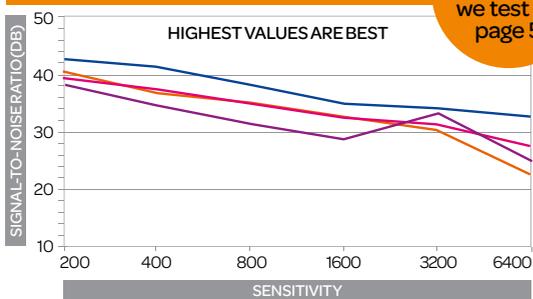
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: Similarly to its predecessor the A57, the A58 produces vibrant, well saturated colours.

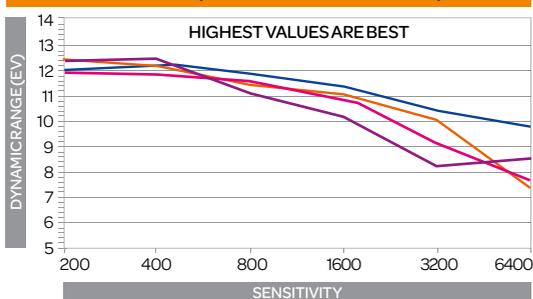
KEY Sony Alpha 58 Nikon D3200
Canon 700D Sony A57

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Though the A58 can resolve plenty of detail, its signal to noise ratio is lower than the competition.

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: At low sensitivities the dynamic range of the A58 offers especially good results.

OVERALL BENCHMARK RESULT

JPEGs from the A58 contain reasonable signal to noise ratios, outperforming the 700D and D3200 at mid-range ISOs and above. The same can't be said of raw format files, which are beaten by all the others. For dynamic range, JPEGs are solid performers, beating the 700D at most sensitivities, and putting in a similar performance to the D3200. TIFF images are again solid, beating the 700D at low to mid-range sensitivities.

⦿ muted colours well, although perhaps with slightly less punch than the colours straight from its Canon and Nikon counterparts.

General purpose metering, known as Multi-segment metering on Sony cameras, does a good job in most conditions, helping to produce balanced exposures. However, in high contrast situations it can struggle a little, and you'll need to switch either

Above Plenty of lenses are available for the Sony A-mount system, including the 50mm f/1.8 optic, which is great for portraits

to centre weighted or spot metering, depending on the situation you're in. Similarly, the A58's automatic white balance system performs well in the majority of conditions we tried it in, erring slightly towards warmer colours under artificial lighting – but switching to a more appropriate white balance setting is easy enough if you're finding it a problem.

The newly packaged kit lens is a good performer overall, and is certainly worth investing. Sometimes the lens can hunt around to attain focus for several seconds, and when you're using the kit lens, this can be a fairly noisy process. If you're shooting somewhere quiet this can be a little distracting. This problem is made worse when lighting levels drop slightly, or if you're attempting to photograph something relatively close to the lens, such as portrait.

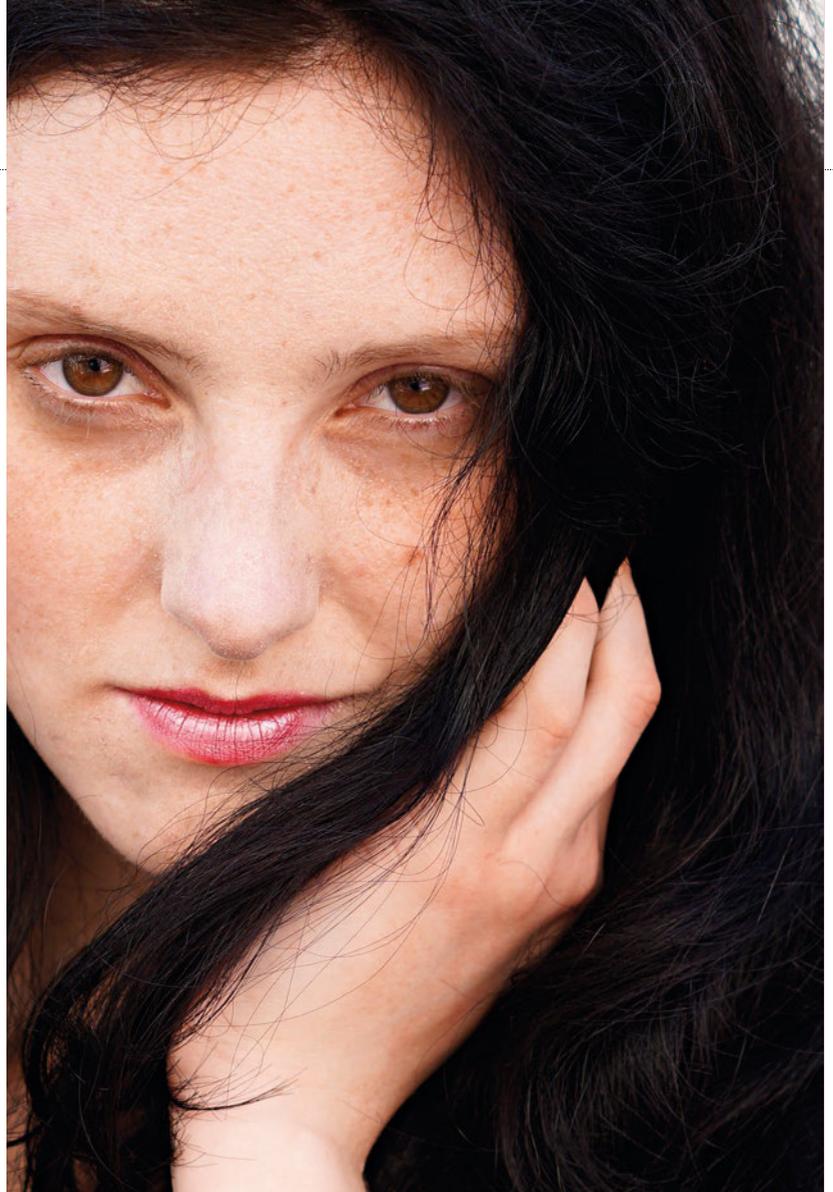
At very high sensitivities, such as ISO2500 and ISO3200, the A58 puts in an impressive performance, with a good amount of detail retained and noise well controlled. There's some evidence of smudging if you zoom in to 100%, but at normal printing sizes the images are fine.

There are a wide number of digital filters available on the Sony A58, and it's worth experimenting with them. We particularly liked Toy Camera and High Contrast Monochrome. As you can't use filters when shooting in raw format, you may find using Creative Styles give you more flexibility.

The A58's screen is fairly low resolution at just 460,000 dots, but it doesn't suffer too badly from glare or reflections. The tilting element helps if the sun is particularly strong, enabling you to get a better view. The most notable improvement to the camera though comes in the shape of the EVF, which is now an OLED device. It's significantly brighter than the previous version and is very easy to use. There's barely any time lag visible, and it's almost good enough to make you forget you're using an electronic viewfinder at times. You may find, however, that when it's very sunny you may need to shade the EVF with your hand to get a better view.

OUR VERDICT

Once again, Sony has produced a very capable SLT that should find favour with anybody looking for their first



Tech Briefing
Phase Detection
and Live View



The Sony A58 uses a translucent mirror. Unlike SLRs, which use a traditional mirror which flips out of the way, the A58's mirror is fixed in place. SLTs are essentially always shooting in Live View Mode, with Sony using the speedier Phase Detection system. Although some SLRs have now started to include Phase Detection pixels on their sensors (such as the Canon EOS 700D), they're still incapable of reaching the same autofocus speeds as cameras such as the A58 while shooting in Live View. This makes this camera much quicker to use when you want to compose on the screen, in comparison to SLRs, but slower in comparison to SLRs shooting with an optical viewfinder.

We have to admit that we're a little disappointed not to see a touchscreen incorporated on this camera. With the Canon 100D and others showing how useful these can be on a DSLR (type) camera, we'd expect an electronics giant like Sony to have this technology at its disposal. That said, for the time being, this camera is significantly cheaper than its main Canon rivals, so perhaps it was more of a cost issue than an oversight.

Overall, Sony has produced a very good camera in the Alpha A58 and we're sure that anybody that buys one will be very pleased with its performance. At its current retail price it also offers extremely good value for money, especially when compared with its closest rivals. 📷

Digital Camera

FEATURES ★★★★★	BUILD/HANDLING ★★★★★
IMAGE QUALITY ★★★★★	VALUE ★★★★★

Overall ★★★★★

WE SAY: The A58 represents great value for money, and is a worthwhile purchase for anybody looking for their first SLT style camera. A37/A57 owners should consider sticking with what they've got, though.

From the makers of **Digital Camera** magazine



Above The Picture Effects create some neat looks, as with Pop Colour here

Below It's worth investing in the A58 with the 18-55mm kit lens if this is your first Sony SLT

camera of this kind. Having said this, however, if you're already a Canon or Nikon user, it's unlikely to tempt you away from the longer established brands. But for those without any previous loyalties (or kit), the Sony is a very tempting proposition.

Although many people will be put off by the thought of an electronic viewfinder, devices such as that found on the A58 go a long way to convince the dubious that EVFs are not the terrible compromise they once were.

If you're not that interested in raw format shooting, there's a wide choice of fun and interesting features on offer here. There's a much more extensive range of Picture Effects, while beginners may be tempted by functions such as Auto Object Framing, and Sweep Panorama is a fun feature that could easily appeal to the holidaying photographer.



> THE SPECS

Sensor	24.3Mp, 23.5x15.6mm, APS-C 'Exmor' HD CMOS
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC/ MemoryStick Pro Duo
Viewfinder	Eye-level, fixed XGA OLED, 1.3cm (0.5" type) electronic viewfinder, 2,359,296-dot resolution, 100% frame coverage
Video resolution	NTSC & PAL: AVCHD 1920x1080, MP4 1440x1080
ISO range	100-16000 (ISO50 & ISO25600 expandable), multi-shot NR mode
Autofocus	19-point phase-detection AF system
Maxburst rate	12fps (high-speed mode)
LCD	Three-inch TFT tilt
Shutter speeds	30-1/8000 sec, plus Bulb, Flash X-sync 1/250 sec
Weight	653g (body only)/732g (with card and battery)
Dimensions	143x104x81mm
Power supply	NP-FM500H Lithium-ion rechargeable battery



SEMI-PRO SLR Sony SLT-A77 > £695 (body)

> www.sony.co.uk

When Sony introduced the Alpha 700, its first foray into the semi-pro SLR category, in 2007, it made little impact on the market shares of Nikon and Canon. Now Sony's trying a different tack: taking on the powerful prosumer SLRs that currently set the benchmark for semi-pro cameras by bringing its revolutionary TMT (Translucent Mirror Technology) to the advanced photographer.

FEATURES

It's impossible to be unimpressed by the specs. A new 24.3Mp APS-C format CMOS sensor, 19-point AF system, 12fps continuous shooting, full HD (1080p) movie recording and the highest-resolution electronic viewfinder we've seen to date – it's clear Sony isn't taking any prisoners.

Sony is looking to capitalise on the benefits its SLT (Single Lens Translucent) technology affords, namely fast full-time AF in video and Live View mode, and continuous shooting. The A77's mirror is semi-translucent and splits the light entering through the lens between the imaging sensor and separate phase detection AF sensor. This means that, unlike the mechanism inside an SLR, the mirror doesn't have to swing out of the way for a shot to be recorded, resulting in new breakthroughs in terms of speed and performance. Although the technology isn't new

SLR killer?

Sony's A77 has an impressive feature set, but can SLT technology compete against a mighty pro SLR? **Josie Reavely** finds out...

(Canon first featured a Pellicle mirror in its analogue Pellix in 1965), Sony's implementation of it in a semi-professional camera is.

The A77 features an electronic viewfinder (EVF) in place of the traditional optical version. One of the main disadvantages of the SLT system is that less light makes it onto the sensor, resulting in a dimmer view of the scene through the lens (as well as potentially hampering low-light shooting performance). EVFs have been met with their fair share of criticism over the years; however, recent developments mean we've seen significant improvements in their level of sharpness and clarity. The A77's offering is leaps and bounds ahead of anything we've experienced, with an impressive 1.3cm, 2,359,296-dot resolution OLED EVF that provides the closest performance to that of an optical viewfinder that we've had the pleasure of using.

Above Sony is once again turning its attention to the semi-pro sector of the camera market

In addition, the A77 provides automatic, scene, and a whole raft of manual exposure modes, a superb Sweep Panorama mode and 3D shooting capability. Built-in GPS, a three-inch, high-res, 921,000-dot three-way tilting LCD and SteadyShot INSIDE image stabilisation bolster the feature-set even further. Add an extensive range of customisable features and the A77 looks well equipped to take on its SLR rivals.

BUILD AND HANDLING

Sporting a rugged plastic-clad outer shell wrapped around a magnesium alloy chassis, and with seals around important controls and dials to help guard against water and dust ingress, the A77 looks and feels every inch the semi-professional camera. On a par with the competition in terms of design and build quality, it features a generous, ergonomically-shaped front grip, with neatly carved out grooves



The high-res sensor is capable of producing beautifully detailed stills



The 19-point AF system is fast and accurate, even in low light



Noise performance at high ISOs doesn't quite match the competition



AF fine-tuning capability isn't up to the level rivals have to offer

FEELING CHEATED

Zooming in on the... Sony SLT-A77

A quick tour of the camera's key features



The highly impressive EVF is large, clear and bright, offering 100% frame coverage and a great user experience

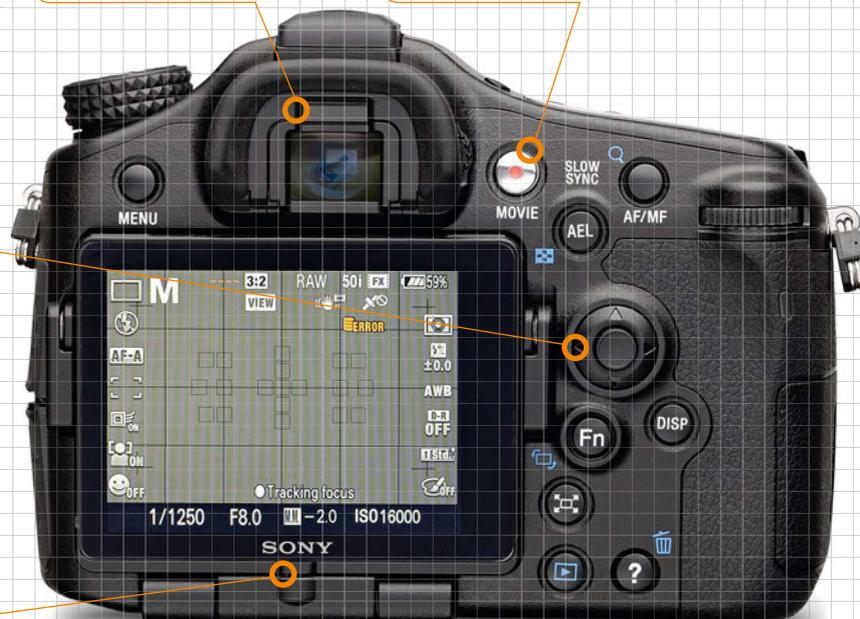


A dedicated button provides fast, direct access to the A77's excellent full HD movie mode

The joystick is easy to use, helping you to whizz through all the different menu options and make selections at speed



The articulated LCD can be manipulated into all manner of positions and angles, increasing its flexibility



to comfortably accommodate your digits. A large rubberised area on the back panel also curves outwards to give your thumb somewhere to rest.

At 732g fully-loaded, the A77 certainly isn't light, but it's still roughly 100g less than main rivals, without feeling any 'cheaper' or less robust. Roughly the same size and overall shape as a traditional SLR camera, the A77 features all of the usual controls and dials that you'd expect to find on a camera of this calibre, benefiting from a more organic-looking design than its utilitarian-looking predecessor.

"The A77 is roughly 100g lighter than main rivals, without feeling any 'cheaper' or less robust"

The front panel hosts only a few components, namely a small focus-mode dial in the bottom right-hand corner, along with a bright AF-assist lamp above and to the left (looking at the camera face-on). There's an IR receiver for the optional remote you can purchase separately and a depth of field preview button below and to the left.

The undulating top panel houses a well-stocked mode dial to the left of the camera's hotshoe. Chunky and clad in textured rubber, the dial is tactile and easy to grip and operate. Exposure modes are clearly marked on top, with options comprising Auto, Auto+ (which analyses the frame and selects the appropriate settings to suit), eight scene modes, Sweep Panorama, 3D mode, high-speed burst and HD movie modes, as well as Program, Aperture Priority, Shutter Priority and Manual modes. Finally, there's a user-customisable Memory Recall slot, which allows you to store your own settings 'recipes'.

The built-in pop-up flash sits flush to the top of the viewfinder hump, and rapidly springs into life to sit high above the lens as soon as it's activated. To the right, there's a secondary LCD for keeping tabs on your settings at a glance, along with a button for toggling between the EVF and LCD, plus dedicated controls providing access to the camera's drive mode, white balance, exposure compensation and ISO settings.

The back panel is littered with further controls, including a silver

Meet the rivals...

See how the A77 stands up against the competition



Canon EOS 7D
 £1,029 (body only)
 Canon's burly APS-C SLR is getting on a bit now, but still matches up well when compared to rivals.
Our score: 4/5
Issued reviewed: 93



Nikon D300s
 £849 (body only)
 Rugged build quality and good low-light performance, but continuous burst mode doesn't match Sony's.
Our score: 4/5
Issued reviewed: 92

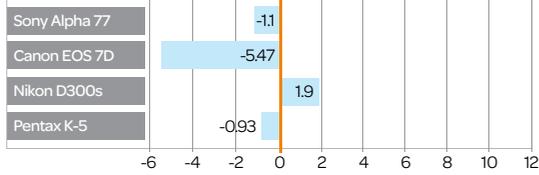


Pentax K-5
 £439 (body only)
 The K-5 is a well-built camera and its 16.3-megapixel sensor records lots of detail.
Our score: 4/5
Issued reviewed: 109

SLR BENCHMARKS

See how the A77 fared in our lab tests

JPEG COLOUR ERROR Closest to zero is best



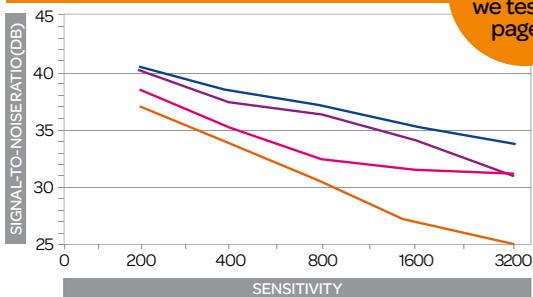
COLOUR ERROR RESULT: The A77 produces slightly under-saturated colour, resulting in natural tones

KEY Sony Alpha 77 (Purple)
Canon EOS 7D (Pink)

Nikon D300s (Orange)
Pentax K-5 (Blue)

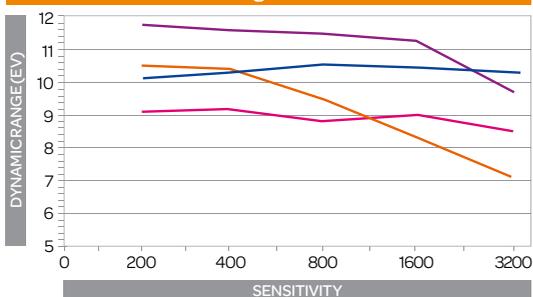
WHAT'S THIS?
Find out how we test on page 5

TIFF NOISE Highest values are best



NOISE RESULT: Noise is handled well across the sensitivity range, and is only just bettered by the Pentax K-5

TIFF DYNAMIC RANGE Highest values are best



DYNAMIC RESULT: The A77 is capable of capturing a wide dynamic range in raw files (converted to TIFF) up to a sensitivity of ISO6400

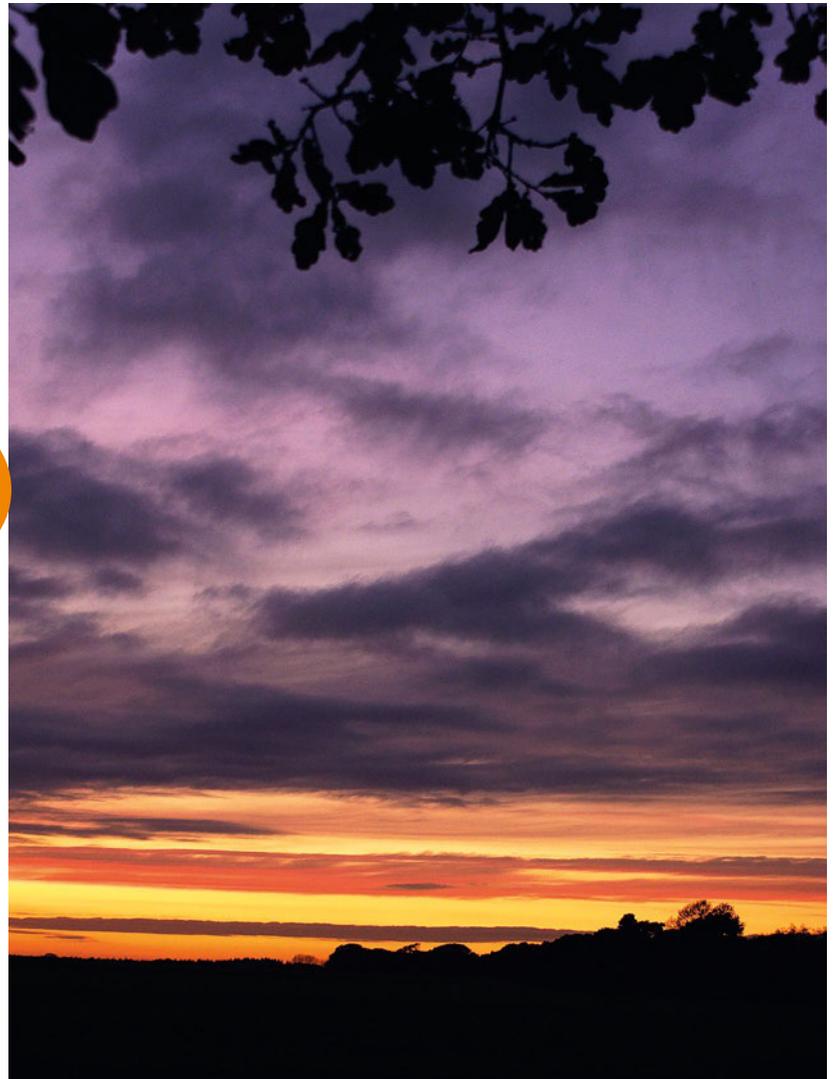
OVERALL BENCHMARK RESULT

JPEG images direct from camera show good natural colour tone, with results revealing slight under-saturation. TIFF (after conversion from raw) signal-to-noise ratio across the sensitivity range is handled well, showing that noise only becomes an issue at the higher end of the sensitivity range.

one-touch movie button that gives you direct access to HD movie mode. Further dedicated buttons include an AF/MF control that also zooms in to play back images for fast focus-checking, in addition to AEL, display, function, playback, help/delete and Smart Teleconverter controls. Some of these buttons are customisable: a handy feature that brings the A77's interface into line with its rivals.

The articulated LCD design is something of a novelty, with the

Above Low-light performance from the A77 is pretty good when images are reviewed alone, only falling a little short when comparing them to the competition



screen first tilting forwards and down, then it can be swivelled left or right, as well as being pulled away from the body on a hinged arm-like mechanism that allows it to perform further acrobatics. The screen itself is clear, crisp and bright, with an effective anti-reflective coating and wide viewing angle, making it usable under all manner of lighting conditions.

For situations where using the LCD is undesirable, the EVF offers a viable alternative. It's clear, detailed and bright, providing 100% coverage of the frame, and an added bonus is the option to display an array of shooting information and/or a digital spirit level, live histogram and the ability to navigate the menu system through the EVF, tricks no optical viewfinder can perform. However, while the refresh rate is good enough in most situations, there's some ghosting when ambient light changes in intensity or when panning quickly. We also found the lag between raising the EVF to your eye

and it activating frustrating at times.

The lag between the LCD turning off and the EVF on is minimal, but it does highlight its limitations in comparison to an optical viewfinder. Nonetheless, it's still streets ahead of any other EVF on the market.

The menu sticks with the tried-and-tested Sony format, with white text on black and orange highlighting to indicate which option you've selected. Options are split across tabs for easier navigation and – although there is quite an extensive range of options and settings to explore – the menus remain simple to navigate.

PERFORMANCE

The A77's real forte is speed. The autofocus system is quick to establish a lock, with near-instant focusing in most lighting conditions. The bright AF-assist lamp on the front of the camera prevents it from becoming sluggish in low light, too. The class-leading 12fps burst



mode is a joy to use, keeping up with fast-moving action with ease. The compromise, though, is the loss of manual control: if you want to maintain power over aspects such as aperture and shutter speed, you'll need to switch to 'regular' 8fps continuous shooting mode.

Full-time AF while working with Live View activated results in a slick performance with no screen blackout between frames (when shooting stills), including when you're making use of the camera's Subject Tracking feature. HD movies benefit from this

Above Detail and sharpness in JPEGs straight out of the camera are both very pleasing

Below The A77 looks and feels every inch the semi-pro camera

feature too, as well as offering full manual control over settings if you switch to manual focus.

Overall, image quality is impressive. The 1,200-zone metering system produces consistently accurate exposures that need little manual correction. Dynamic range is good by default, but can be expanded further using Sony's proprietary D-Range Optimiser feature to pull additional detail from extreme highlights and shadows when shooting JPEGs. Auto white balance generally produces slightly warm images across a range of different lighting situations. Sharpness and detail are both very good in JPEGs straight out of the camera, while raw files provide huge scope for manipulating everything from tonal balance and dynamic range to colour and sharpness.

There's a price to be paid at high ISOs. The camera produces perfectly usable images right up to around ISO3200, but beyond this noise increases rapidly and some overly aggressive noise reduction robs shots of fine detail. As a result, we'd only recommend pushing the sensitivity

SLT TEST

SONY ALPHA 77

Tech briefing Translucent Mirror Technology



Translucent Mirror Technology (TMT) refers to Sony's incorporation of a pellicle mirror into its cameras. This mirror differs from that found inside an SLR, in that it's semi-translucent. Instead of reflecting light entering through the lens up into a pentaprism (and AF sensor) to allow the photographer to view the frame through an optical viewfinder, then swinging out of the way once the shutter release is depressed to allow the light to hit the camera sensor, the A77's mirror splits the light between the image sensor and AF sensor.

There's less light making it onto the CMOS sensor, which can impair low-light performance, and there's no scope for having an optical viewfinder. On the other hand, the fact that the mirror remains static means shot-to-shot times, shutter lag and AF response can be accelerated, leading to the A77's speedy performance.

as high as 12800 or beyond to avoid losing out on an unmissable shot.

OUR VERDICT

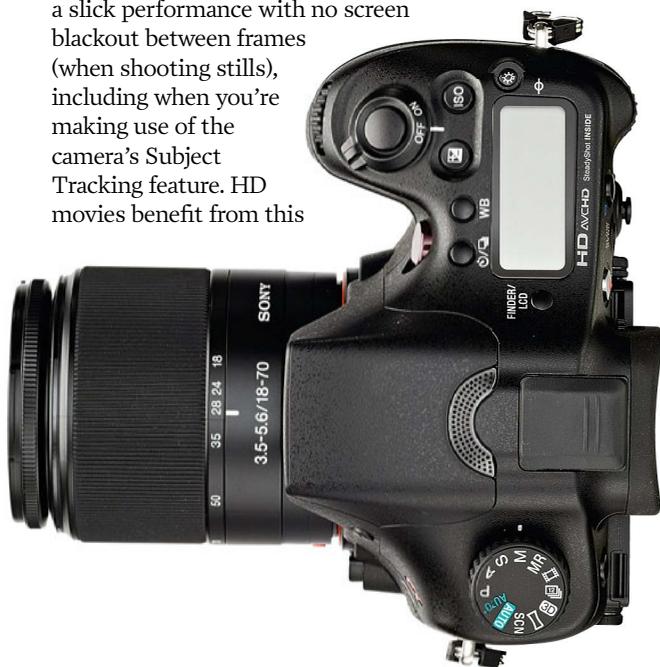
Sony has created something unique here. The camera's 12fps burst mode, sweep panorama feature, 3D shooting capability and the inclusion of a built-in GPS unit set it apart from its rivals, albeit at the expense of the longevity of the battery when using the latter. Overall, there are only a few minor niggles, and we have little trouble with recommending this outstanding camera. 📷

Digital Camera

FEATURES ★★★★★	BUILD QUALITY ★★★★★
IMAGE QUALITY ★★★★★	VALUE ★★★★★

Overall ★★★★★

WE SAY: There's a lot to love about the A77: it looks, feels and handles just like a semi-pro SLR and comes equipped with a comprehensive feature set that compares favourably to rivals' offerings.



PhotoPlus CANON EDITION

THE BEST-SELLING MAGAZINE FOR CANON D-SLR OWNERS



100% D-SLR
100% CANON

The best-selling magazine for
Canon digital SLR owners

www.photoplusmag.com



CSCs

Tired of hauling around a bulky SLR but still want high image quality and a good choice of lenses? We have just what you need...

A compact system camera (CSC) is essentially a hybrid camera with interchangeable lenses – in other words, a camera that combines the convenience of a compact camera with the imaging quality and versatility of an SLR. They're also known as 'mirrorless' cameras, because they eschew the mirror technology used in conventional SLRs, relying instead on some very sophisticated electronics. Panasonic and Olympus, and more recently Sony, Fujifilm and Samsung, have pioneered system cameras, in an attempt to break the iron grip of Canon and Nikon on the camera market, and this bold move seems to have paid off; sales of system cameras have been growing steadily, and SLR stalwarts Canon and Nikon have now joined the party. In this section, you'll find in-depth tests of the finest system cameras money can buy, from easy-to-use models for a few hundred pounds, through to high-end SLR alternatives such as the Olympus OM-D. Obviously, the big appeal of system cameras is that they are so compact, while being able to make use of a growing arsenal of lenses. The downsides are their (still) relatively high cost, and the lack of an optical viewfinder in some models may also deter purists. But so long as you know the limitations of what you're buying, system cameras are now serious rivals to traditional SLRs, as we'll see...



CANON	
Canon EOSM	64
NIKON	
Nikon 1 V2	68
FUJIFILM	
Fujifilm X-E1	72
Fujifilm X-PRO1	76
OLYMPUS	
Olympus E-PM2	80
Olympus E-P5	84
Olympus OM-D	88
PANASONIC	
Panasonic GF6	92
Panasonic G6	96
SONY	
Sony NEX-6	100
SAMSUNG	
Samsung NX300	104

> THE SPECS

Sensor	18Mp APS-C format (22.3x14.9mm)
Focal length conversion	1.6x
Memory	SD/SDHC/SDXC
Viewfinder	None
LCD	Three-inch, 1,040,000-dot touchscreen
Max video resolution	1920x1080 at 30, 25 or 24fps
ISO range	100-12800 (expandable to 25600)
Autofocus	31-point Hybrid system
Max burst rate	4.3fps
Dimensions	108.6x66.5x32.3mm
Weight	298g (including battery and card)
Power supply	Li-ion battery LP-E12 (supplied)



CSC Canon EOS M > £349 (with EF-M 18-55mm IS STM lens) > www.canon.co.uk

Has it been worth the wait?

Finally, Canon brings out its first CSC, the EOS M. **Angela Nicholson** sees if it's too little too late, or better late than never

Canon hasn't exactly been quick out of the blocks in the race to launch compact system cameras. Its first, the EOS M, comes four years after Panasonic kicked off the whole shebang back in September 2008 with the launch of the Lumix G1.

Unlike some compact system cameras, however, the Canon M has an APS-C format sensor. In fact, it has the same 18Mp CMOS sensor and DIGIC 5 processor as the Canon EOS 650D, so in theory it could be capable of matching one of Canon's most recent SLRs for image quality. This could set the EOS M ahead of cameras like the Nikon J2, Nikon V2, Pentax Q, Pentax Q10 and even the Panasonic G5 and Olympus E-PL5 (see page 106), which have smaller sensors.

FEATURES

Canon has given the EOS M many of the features that the 650D has for use in Live View mode, and in addition to the same 18Mp APS-C format (22.3x14.9mm) CMOS sensor and DIGIC 5 processor, there's the 31-point Hybrid AF system that was debuted by the 650D. This system is intended to combine the speed of phase-detection with the accuracy of contrast-detection AF.

The screen is also the same three-inch 1,040,000-dot touch-sensitive device as is found on the 650D, but it's fixed rather than mounted on an articulating hinge. This is the only means of composing and reviewing images on the M, because it doesn't have a viewfinder and there's no port to attach an external electronic viewfinder (EVF).

There's also no built-in flash on the M, but it does have a hotshoe that is compatible with all of Canon's current flashguns. There's even a new Speedlite 90EX flashgun that is very compact and specifically designed to complement the M. In the UK this is included in the box with the camera and 18-55mm lens kit.

In addition to the Picture Style options that we see with Canon's SLRs and that tailor the colour of JPEG files to suit a particular subject (Landscape, Portrait and so on), the EOS M has a collection of Creative Effects that give JPEG images a particular look as they are captured.

Similar effects are possible with the 650D, but they can only be

Above The EOS M shares the 31-point Hybrid AF system and many other features with the Canon EOS 650D

applied post-capture. It's worth noting here that although the Picture Style options can be used in whatever the file format you choose to store images, the Creative Effects options can only be selected when the M is set to shoot JPEGs and not raw files.

BUILD AND HANDLING

Appearance and size-wise, the M is like one of Canon's mid-range PowerShot compact cameras with a bigger than usual lens. Its stainless steel, magnesium alloy, polycarbonate and glass fibre construction also gives its body a solid, high-quality feel.

This high build quality is complemented well by the new EF-M 18-55mm kit lens, which has a metal



An APS-C sensor means high image quality and depth of field control



The touchscreen is very responsive and the controls sensibly arranged



Fun filters like Grainy Black & White can only be used with JPEG files



The screen suffers from reflections, and there's no viewfinder

Zooming in on the... Canon EOS M

A quick tour of the camera's key features

Most key features are located in the Quick Menu, accessed by pressing this button or touching the Q icon on-screen



This dial selects the shooting mode. Camera mode houses all the advanced exposure modes, along with the automatic scene modes



You can register some of the most useful menu options to the My Menu screen for quick and easy access

Touching this icon toggles between activating and deactivating Touch Shutter mode



FEELING CHEATED

FEELING TREATED

barrel and feels superbly built with smoothly rotating zoom and focusing rings that have just the right friction. Interestingly, although this lens is smaller than the Canon EF-S 18-55mm f/3.5-5.6 IS II sold in the 650D kit, at 210g it's 10g heavier.

Unfortunately, the M only has a shallow ridge of plastic to serve as a finger-grip, and this doesn't give much purchase – especially with the 18-55mm kit lens mounted.

The strap is needed unless you are happy to carry the camera by the lens, or by holding the top and bottom of the camera.

“Canon’s capacitive screen is one of the most responsive screens we have ever seen on a camera”

Although it doesn't have the same number of button and dial controls as an SLR, all the key features are within quick and easy reach via the touchscreen. Thankfully, Canon has opted for a capacitive screen (like an iPhone's) so it doesn't rely on pressure and instead responds to a touch of a finger. It is one of the most responsive screens we have ever seen

on a camera and it makes quick work of making setting changes via the main menu and Quick Menu.

There are still navigation buttons and a wheel on the back of the camera, so they can be used to scroll through settings options and make changes, but using the touchscreen is quicker and more intuitive.

A switch around the shutter-release button allows the user to choose between Scene Intelligent Auto (green square), Camera and Video mode. In Camera mode a touch of an icon on the screen brings up the various options, including Manual, Aperture- and Shutter Priority, as well as Creative Auto and scene modes.

In most situations the screen provides a very clear view of the scene, but it suffers from reflections in direct sunlight, making composing images a bit trickier. With SLRs like the 650D you would usually employ the viewfinder in such conditions, but this option isn't available with the M.

PERFORMANCE

The APS-C format sensor and DIGIC 5 processor show their mettle in the quality of the images that the M

Meet the rivals...

See how the Canon EOS M fares against the competition



Panasonic GF5 £374
(with 14-42mm kit lens)
Compact, but high image quality, and the Micro Four Thirds (MFT) mount means there are lots of lens options.
Score: N/A
See issue: N/A



Olympus E-PL5 £599
(with 14-42mm kit lens)
An MFT camera with 16Mp, tilting touchscreen and a collection of fun filter effects.
Score: 5/5
See issue: 128

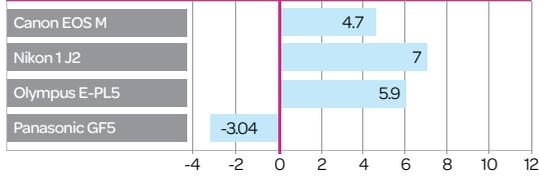


Nikon 1 J2 £289
(with 10-30mm kit lens)
Has a smaller sensor than the M, with just 10.1Mp, but its predecessor, the J1, was a best-selling CSC.
Score: 4/5
See page: 68

CSC BENCHMARKS

See how the EOS M fared in our lab tests

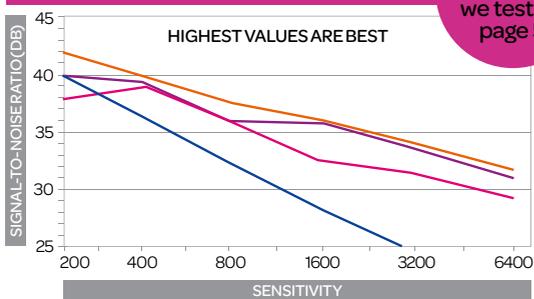
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The GF5 produces the most accurate colours, but the M isn't far behind, with nicely saturated tones

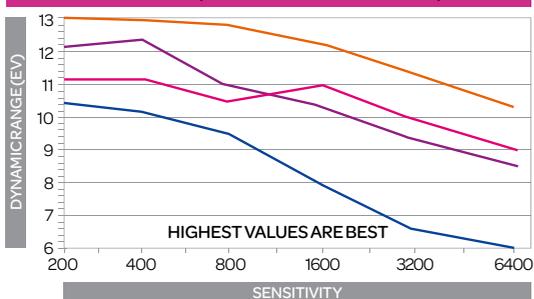
KEY Canon EOS M (Purple), Nikon 1 J2 (Pink), Olympus E-PL5 (Orange), Panasonic GF5 (Blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: The EOS M wins at ISO100, but at higher sensitivities it's a close run contest between it, the 650D and the Olympus E-PL5

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: None of the cameras here can quite match the E-PL5 for dynamic range, but a dynamic range of 12EV at ISO100 is good

OVERALL BENCHMARK RESULT

The Canon EOS M put in a very similar performance to the Canon EOS 650D in our lab tests. Its raw files (after conversion) compare well for signal-to-noise ratio with those from the Olympus E-PL5, Panasonic GF5 and Nikon J2. The JPEGs, however, don't quite match those from the Olympus E-PL5 and the Nikon J2 from ISO800 upwards, indicating the benefit of shooting raw images that you process yourself using Canon's excellent Digital Photo Professional software (supplied).

produces. They have plenty of detail and noise is controlled well from ISO100-3200. Above this value JPEGs start to look a little soft at 100% on screen and are best restricted to around A4 size.

As we'd expect, better results are possible at ISO3200 and 6400 if raw files are recorded and processed with bespoke noise reduction to preserve details. We recommend staying within the native sensitivity range

Above The EOS M puts in a worthy rather than really great performance



(ISO100-12800) and only using the ISO25600 (equivalent) expansion setting for emergencies.

Maintaining image quality to the corners of the frame is more of a challenge for the M than for SLRs like the 650D because the lens is closer to the sensor and this increases the likelihood of coma distortion, vignetting and chromatic aberration at the peripheries of the image.

However, our tests reveal that with the EF-M 18-55mm lens mounted, the M captures better image quality across the frame than the 650D with the EF-S 18-55mm kit lens mounted. Doubtless, this is the result of the superior build (and we assume better optics) of the EF-M lens.

Canon cameras' Automatic White Balance systems can usually be relied upon to capture colours that reflect the atmosphere of the scene, with a tendency towards warm notes. The EOS M is no exception, and even shots taken in overcast conditions can

look a little on the warm side, whether they were taken using the Auto or Daylight white balance setting.

While this may not be a completely accurate representation of the scene, it usually results in pleasant images and the colour shift is likely explained by Canon's perception of its target audience's preferences.

We also found that the M's real-time Evaluative metering system does a good job in most situations, only faltering in very high-contrast conditions when there is a tendency to under-expose in order to protect the highlights.

Canon's new STM lenses use a stepper motor, which gives slower, smoother focusing when shooting video. Unfortunately this has a knock-on effect for the M when shooting stills, as when the 18-55mm kit lens is mounted the autofocus system lacks the speed of some competing cameras, such as the Panasonic GF5. In low light there's



Tech Briefing
EF-M mount



Compact system cameras don't have a mirror like an SLR, which means the lens mount can be moved closer towards the sensor to make the camera smaller. As a result, Canon's existing EF and EF-S lenses can't focus light on the M's sensor and they aren't compatible with the new camera without an adaptor to move them further away from the sensor.

There are currently just two lenses with the EF-M mount, the EF-M 18-55mm f/3.5-5.6 IS STM and the EF-M 22mm f/2 STM. There is a 1.6x focal length magnification factor when they are mounted on the M.

The STM in the lens name stands for Stepper Motor, and this is used to produce a slower, smoother focusing transition during video recording. These lenses are not compatible with Canon's SLRs.

a pronounced back-and-forth adjustment of focus. This is sometimes discernible in good light as well and it slows down the M's Touch Shutter feature, which sets the camera to focus and fire the shutter with a touch of the finger on the LCD.

VERDICT

Despite being very late to the CSC market, Canon has managed to produce a camera that isn't too far off the pace in many respects, and it should give the Nikon J2 (the upgrade from the top-selling J1) a serious run for its money. Thanks to the combination of the 18Mp

Above The Canon EOS M captures quite vibrant, but natural colours

Below Handling feels unbalanced as there's not very much grip

APS-C format CMOS sensor, DIGIC 5 processor and the high-quality EF-M 18-55mm kit lens, the M is capable of producing superb quality images that even outperform those taken on the Canon EOS 650D with the EF-S 18-55mm f/3.5-5.6 IS II mounted.

The touchscreen controls are also very good, and it doesn't take long to get to know the camera. There's plenty of control for experienced photographers as well as fully automated and 'hand-holding' modes for less experienced photographers.

However, there are a few problems with the M. Most significantly its Hybrid AF system isn't as fast as Panasonic's or Olympus's contrast-detection systems – or Sony's Hybrid AF system. This means that the M isn't suited to shooting anything other than stationary subjects.

The camera feels a little unbalanced, as it doesn't have much of a grip and the 18-55mm kit lens is quite heavy. Plus, as it doesn't have a viewfinder, the reflections on the LCD in bright sunlight can be a pain.

Although there is a mount adaptor, sold in the UK in the M and 22mm

lens kit (£792), which allows Canon's huge range of EF and EF-S lenses to be mounted on the M, there are only two directly compatible lenses for the M.

Canon is staying very tight-lipped about its plans for the EOS M system and some users may be biding their time and waiting for the announcement of additional bodies and more accessories and lenses before they make the decision to invest. It's a chicken and egg situation though, because Canon is actually far more likely to expand the system if it proves popular. 📷



Digital
Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The M offers superb image quality and an excellent control arrangement, but the camera is let down by its sluggish AF system and the unbalanced feel when the 18-55mm lens is mounted.

> THE SPECS

Sensor	14.2-million pixel CX format CMOS (13.2x8.8mm)
Focal length conversion	2.7x
Memory	SD/SDHC/SDXC
Viewfinder	0.47-inch approx. 1,440k-dot colour TFT LCD
Video resolution	Full HD (1920x1080)
ISO range	160-6400
Autofocus points	135
Max burst rate	60fps
LCD	7.5cm (three-inch) approx. 921k-dot TFT
Shutter speeds	1/4000 to 30 secs
Weight	338g (with battery and memory card)
Dimensions	107.8x81.6x45.9mm
Power supply	Li-ion EN-EL21 battery

Although the Nikon J1 (since superseded by the J2 and J3) proved to be an incredibly popular compact system

camera, its larger sibling, the V1, was never as popular. Perhaps seen as not serious enough for advanced photographers, its high asking price put off the beginners who were busy investing in the Nikon J1.

Now, however, Nikon has replaced the Nikon 1 V1 with the V2, which promises to be an evolution of the existing camera and is what Nikon hopes will attract those lucrative serious customers – the ones who are more likely to buy additional lenses and other accessories down the line.

FEATURES

The Nikon 1 V2 has a 14.2-million pixel CX-format (one-inch) CMOS sensor. This is accompanied by a new processing engine dubbed Expeed 3A. According to Nikon, this sensor and processor combination has enabled it to push the sensitivity range of the V2 a stop higher than before, extending it from ISO160 to ISO6400 instead of ISO100-3200, which should be useful in low light.

Low-light capability has been further extended by the addition of a pop-up flash unit, as well as a hotshoe that's compatible with the new Speedlight SB-N7 and existing SB-N5 flashguns. Previously, the Nikon 1 V1 had only a hotshoe, while the J1 and J2 had a pop-up flash and no hotshoe.

One of the V2's most interesting features is its continuous shooting ability. Thanks to that Expeed 3A engine, Nikon promises that the camera is capable of producing up to 45 full-resolution images at up to 15



CSC Nikon 1 V2 > £619 (with 10-30mm lens) > www.europe-nikon.com

The 1 for you?

The Nikon 1 series has finally got serious. The V2 is a compact system camera with SLR stylings and advanced modes, but how does it perform? **Amy Davies** finds out...

frames per second (fps) in continuous autofocus mode and for 40 images at 60fps when the focus mode is set to single AF and the focus point and exposure are fixed from the first frame onwards. This makes it a great camera for capturing brief bursts of action.

Lots of its specification is very similar to its predecessor's. It features the same three-inch 921,000-dot LCD and 0.47-inch 1.4-million dot electronic viewfinder (EVF) for composing and reviewing images, for example. The EVF is a key distinguishing feature between this camera and the Nikon 1 J series, and should appeal to more serious photographers, as well as making it easier to use in bright sunlight.

The hybrid AF system is also the same as the V1's, with it switching between using the 73 phase-detection

Above Unlike the Nikon V1, the new Nikon V2 has a pop-up flash built in

points and the 135 contrast-detection points as it deems necessary. However, with an asking price of around £800 with the 10-30mm kit lens included, it's not the most competitively priced compact system camera around.

BUILD AND HANDLING

One of the V2's key distinguishing features is its large grip, which makes it look much more akin to a miniature SLR than the V1 does. The pronounced grip makes it much easier to hold, and the camera feels secure in the hand, especially when shooting one handed.

Another big improvement is the addition of a mode dial at the top of the camera. This enables quick changes between the camera's automatic, semi-automatic and manual modes. Previously, you needed to delve into



The chunky grip makes this great to hold, especially one-handed



A mode dial makes it quick to access different shooting options easily



There are Picture Styles for creative effects, but no digital art filters

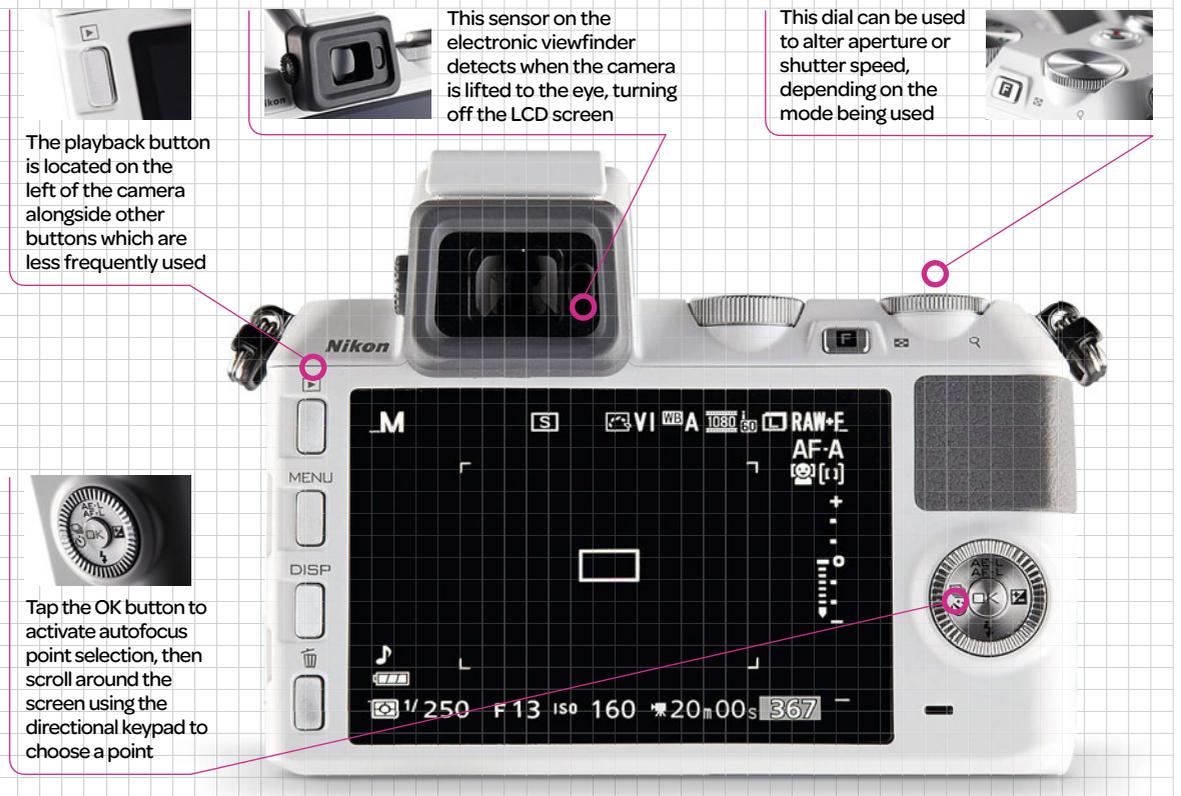


The screen isn't touch-sensitive, so it slows down some operations

FEELING TREATED

Zooming in on the... Nikon 1 V2

A quick tour of the camera's key features



The playback button is located on the left of the camera alongside other buttons which are less frequently used



This sensor on the electronic viewfinder detects when the camera is lifted to the eye, turning off the LCD screen

This dial can be used to alter aperture or shutter speed, depending on the mode being used



Tap the OK button to activate autofocus point selection, then scroll around the screen using the directional keypad to choose a point

FEELING CHEATED

the menu to access PASM modes. This was one of the main gripes about the Nikon 1 V1 that gave it less appeal to serious photographers.

Also on this dial, you'll find some of the Nikon 1's unique features, such as Motion Snapshot and Best Photo Selector. Like the Nikon 1 J2, the Nikon 1 V2's Best Photo Selector has been reworked for the latest version to include the new Slow View mode.

There are two options for switching the camera on. The first is a small switch around the shutter button, which is akin to a zoom lever on a compact camera and can be a

"The Nikon 1 V2's Best Photo Selector has been reworked to include the new Slow View mode"

little confusing at first. The second is via the lens itself, and makes it quick to capture moments as they happen.

A dial on the top of the camera can be used to alter the aperture in Aperture Priority mode, and control the shutter speed in Shutter Priority mode. Exposure Compensation is controlled by first tapping on the four-way control pad, and then

scrolling around with a dial around the pad. It would have been nice to see another dial, or a more direct way to control Exposure Compensation, but it's not too tricky to use.

Near the aperture/shutter speed scroll dial is a small function button for accessing some of the key parameters, such as white balance and autofocus mode. It would have been nice to have a few more features included here, or the ability to customise which features can be accessed from the Function button.

The V2 doesn't have a touchscreen, which is a shame, since that would have made it much quicker to set the autofocus point. As it is, it's not too laboured a process, requiring first a tap of the central OK button on the four-way keypad, then use of the directional keys to position the autofocus point. Alternatively, you can have the camera select points automatically for you.

On the back left of the camera is a row of buttons, including the Menu button for accessing the more extensive settings of the camera. These buttons can't be reached when using the camera with one hand,

Meet the rivals...

See how the V2 stands up against the competition



Canon EOS M
£349 (with 18-55mm lens)
Canon's first CSC features the same 18Mp sensor as the EOS 650D and offers superb image quality.
Our score: 3/5
See page: 64



Olympus PEN E-PL5
£449 (with 14-42mm lens)
With the 16.1Mp sensor in the OM-D E-M5 providing top image quality, this is a great addition to the PEN range.
Our score: 5/5
See page: 86

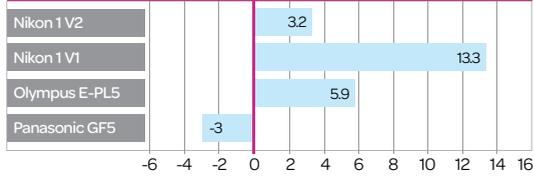


Sony NEX-5R
£460 (with 18-55mm lens)
With a large APS-C sized sensor, a touchscreen and lots of features, the NEX-5R is a great CSC.
Our score: N/A
Issue reviewed: N/A

CSC BENCHMARKS

See how the Nikon 1 V2 fared in our tests

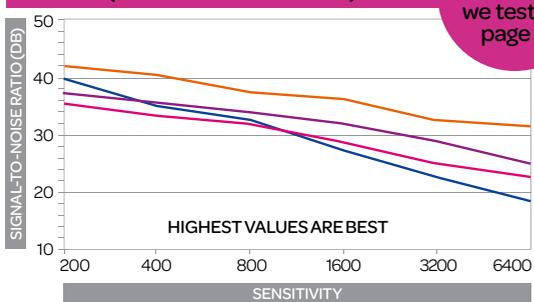
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: JPEGs show pleasant colours direct from camera, and they're more accurate than from the V1

KEY Nikon 1 V2 (purple), Nikon 1 V1 (pink), Olympus E-PL5 (orange), Panasonic GF5 (blue)

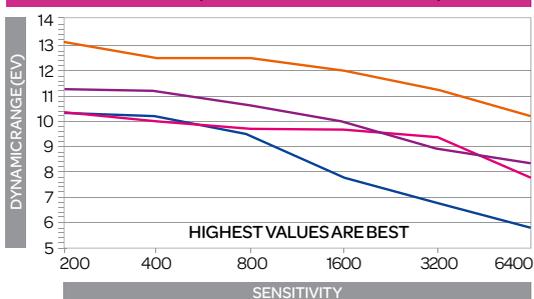
RAW NOISE (AFTER CONVERSION TO TIFF)



WHAT'S THIS?
Find out how we test on page 5

NOISE RESULT: The V2 puts in a great performance here, beating the V1, but not quite managing to outdo the Olympus E-PL5

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Results here are respectable, but several other cameras, including the E-PL5, are able to beat it

OVERALL BENCHMARK RESULT

The V2's JPEG files have a stronger signal-to-noise ratio than those from the V1 throughout the sensitivity range, and stronger than the Panasonic GF5 at every setting but ISO160 and ISO400. Dynamic range results are stronger, with the V2 giving better results than the Panasonic GF5 and V1 throughout the sensitivity range, but below the E-PL5 at every ISO setting.



had relatively high hopes for the Nikon 1 V2. So far, we've been pleased with what the Nikon system can produce. Images are punchy and vibrant, with excellent colour reproduction and plenty of detail, especially in low-noise shots.

The V2's autofocus speeds are pretty quick in good light, but this drops when the light starts to fall. In several instances during our testing where the light was very poor, the camera struggled to find focus, in some cases failing altogether.

Unlike the Nikon 1 J2, there are no digital filters that can be applied with the V2. This seems a great shame, since it surely wouldn't be too difficult to port these over from the Nikon 1 J2. However, if you're feeling a little creative, you can always choose

to alter the Picture Style. Options here include Monochrome (which also encompasses sepia and cyanotype, along with other colour tints), Vibrant and Landscape.

The good thing about using Picture Styles while shooting in raw format is that a clean version of the image is preserved should you change your mind down the line. Although it's a great shame not to see more options, the black-and-white option is rendered well and there's plenty of scope for customisation, especially with regards to contrast.

We found the automatic white balance system does a good job of judging the scene to produce accurate colours, even under artificial indoor lighting. If you do find that it struggles slightly, you can change the

which isn't too much of a problem, thanks to the Function button.

The menu itself is reasonably well laid out, with most parameters where you'd expect them to be. If you've used a Nikon camera before, it's likely you'll be familiar with the set-up.

PERFORMANCE

With the promise of improved performance from the new sensor, we

Above You can customise Picture Styles – this is an increased contrast Monochrome shot



Tech Briefing
Best Moment Capture



Best Moment Capture is one of the Nikon 1's unique features. This has been reworked for the V2 to include the new Slow View mode. When the camera's dial is set to Best Moment Capture, pressing the Fn button enables you to choose between two options – Smart Photo Selector and the new Slow View.

In essence, in Slow View, the camera records 40 full-resolution images at 15fps from the moment that the shutter release is half pressed. While the release remains half-pressed, the camera plays back these 40 images in slow succession so you can decide which one you want to keep. When you reach that image, pressing the shutter fully home records it to the SD card.

WB setting via the Function button. The metering system does a good job of accurately assessing the scene to produce nice exposures.

The high-resolution screen on the back of the camera doesn't suffer from glare and reflections in all but the very brightest of sunlight. The EVF is also very good, again having a high enough resolution to appeal even to those used to optical viewfinders.

Despite its comparatively small size, the one-inch sensor on the Nikon 1 V2 is still capable of producing attractive shallow depth of field effects. The widest aperture

Above Shallow depth of field from the sensor helps with portraits

Below The shape of the camera makes it very easy to hold



the standard 10-30mm bundled kit lens can achieve is f/3.5, but some nice effects can still be achieved with this optic. Focus drop off is good, with out-of-focus areas rendered well.

OUR VERDICT

It's clear that Nikon has put some considerable thought into the upgrade of its Nikon 1 V1 camera. What we have now is a more sophisticated CSC that is more likely to appeal to advanced photography enthusiasts than the previous iteration, thanks to the addition of a mode dial and the improved ergonomics.

The new shape of the camera makes it much easier to hold and helps it feel sturdier, especially when shooting one-handed. Something as simple as adding a mode dial to the top of the camera makes it a much nicer experience when you want to quickly change between modes.

It's a shame that digital filters couldn't have made their way onto the camera for those looking to be a bit more creative with their photos, but Picture Styles are a good back-up.

Whether this camera will tempt anyone away from the slew of larger-sensored compact system cameras currently on the market seems questionable, especially at the relatively high price. While it does

produce good images, those looking for something a little more advanced will probably be more at home with the likes of the Panasonic G5, Sony NEX-5R or Olympus PEN E-PL5.

That said, it's nice and small, making it ideal for carrying around with you. Unique modes, such as Motion Snapshot and Best Photo Selector, do elevate it that little bit higher, especially if you're upgrading from a compact camera.

Nikon has done a good job, and while it probably still won't overtake the J series in terms of popularity, the images from the V2 are a step up for those looking to get a little more serious with their photography. This camera is a good introduction to the world of CSCs. 📷

Digital Camera	
FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: Nikon has clearly thought a great deal about the direction it wants to take the Nikon V series, and the V2 is a great little camera, albeit with drawbacks when it comes to the feature set and the price.

> THE SPECS

Sensor	16.3Mp X-Trans CMOS APS-C
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	0.5 inch approx, 2,360,000-dot OLED
Video resolution	1920x1080 (full HD)
ISO range	200 to 6400 (100 to 25600 expanded)
Autofocus points	49
Max burst rate	6fps
LCD	2.8 inch, 460,000 dot
Shutter speeds	1/4000 to 30 secs
Weight	300g (body only), 350g (inc. battery and memory cards)
Dimensions	129x74.9x38.3mm
Power supply	NP-W126Li-on battery



CSC Fujifilm X-E1 > £849 (with 18-55mm lens) > www.fujifilm.com

An X-cellent buy

The Fujifilm X-E1 has the same sensor as the X-Pro1 in a smaller, cheaper body. **Amy Davies** finds out what else it has to offer

Fujifilm has enjoyed great critical success in recent years with its premium range of X-series cameras. The X-E1 is the second in the line-up to feature interchangeable lenses, and is an addition to, not a replacement for, the X-Pro1 (reviewed on page 76).

Technically, the X-E1 sits below the X-Pro1, both in terms of specifications and cost, and as such there are a few notable differences between the two models. Widely praised by both critics and consumers, the X-Pro1's sensor is comparable to some full-frame sensors, and the good news is that it's this 16.3-million pixel device that is also housed within the X-E1.

FEATURES

One of our biggest criticisms of the X-Pro1 was its autofocus speed, which was disappointingly sluggish. However, Fujifilm has now issued a firmware upgrade, which goes a long way towards solving that particular problem. This newer firmware is included as a standard feature on the X-E1, so autofocus should be quick.

Along with the sensor, some of the other specs from the X-Pro1 are also shared, such as the image processor. This tells us that image quality should be more or less identical from the two models, which is good news.

Unlike the X-Pro1 though, the X-E1 doesn't use a hybrid optical and electronic viewfinder (EVF), instead it relies on an electronic device only. This does, however, have a higher resolution. Its 2.36 million dots makes it comparable with the Sony NEX-7's, and it's therefore one of the best EVFs currently on the market. This missing optical

viewfinder also makes the overall camera body smaller.

BUILD AND HANDLING

Once again, Fujifilm's designers have done a great job, producing an extremely attractive body design that also packs some serious photographic punch. With a body size roughly the same as the compact X100, the X-E1 manages to somehow not look unbalanced with a lens attached to it, side-stepping a common problem with compact system cameras (CSCs).

That said, it's still not a very pocketable camera, but it's a good weight that gives it the same quality feel as its older sibling.

There's a textured grip around the front, which is helpful, especially when using the camera one-handed. Fujifilm has also introduced an optional grip, which can be attached to the camera if you require more purchase.

Above The X-E1's good-looking body is about the same size as the X100's

Anyone familiar with the X-Pro1 will of course find lots of similarities when using the X-E1. The top plate is almost identical, being just a little smaller and with the addition of the flash. Two dials to control Exposure Compensation and shutter speed sit on the top of the camera, along with a customisable Function button.

Aperture is controlled via a ring around whichever lens is attached. All prime optics have aperture values written on the ring, while the new 18-55mm zoom lens is text-free, since the maximum aperture is dependent on the focal length used.

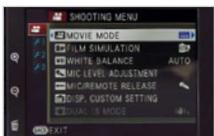
There's no fully automatic mode as such, but by switching both the shutter speed dial and aperture dial to A you get a close approximation. When using the new zoom lens it can be quite easy to accidentally grab the aperture ring instead of the zoom mechanism, leading to errors in the



With 2.36 million dots, you forget you're using an electronic viewfinder



A maximum aperture of f/2.8 elevates the kit optic above others



The screen has a lower resolution than the Pro1 and isn't a touchscreen



It can be a tricky to find the recessed Q button when using the EVF

Zooming in on the... Fujifilm X-E1

A quick tour of the camera's key features

This button raises the in-built flash, which can be found on the top plate of the camera



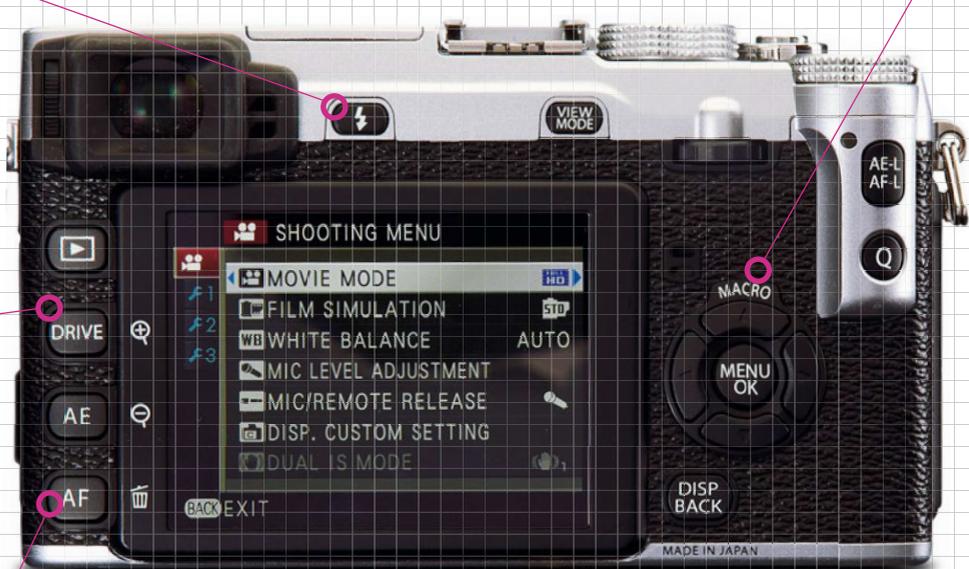
Tapping this button activates Macro mode, no matter which lens you're using. This allows you to get closer to the subject



This allows you to choose single or continuous shooting, as well as bracketing, Panorama mode and – hidden away – movie recording



Hit this before scrolling around the screen with the arrow keys to select the AF point you require



◀ FEELING CHEATED

aperture setting if you don't pay careful attention while shooting.

Many of the parameters of the X-E1 can be controlled via direct buttons. For instance, there's a dedicated button for Drive Mode, AF point and Macro mode. You can also press a Q button recessed into the thumb grip at the back of the camera to bring up commonly used settings, such as white balance and ISO.

Once you've found your way around the back of the camera, using it with the EVF becomes a lot easier. The Q menu also offers the fantastic benefit of storing up to seven sets of

“An eye sensor to the side of the X-E1's EVF detects when the camera is lifted to the eye”

custom settings, which can be quickly accessed. So, for instance, if you find yourself regularly shooting low-light scenes and landscapes, you could save one group with a high sensitivity selected, and the other with a low setting.

Selecting one of the 49 autofocus points is done by pressing the AF button on the back of the camera,

and then moving the point around with the navigation keys. It's easy, and relatively quick, to do, although of course it would be much quicker with a touchscreen.

The Drive mode enables switching between single image or continuous shooting, panoramic mode, various bracketing modes and – curiously hidden away – movie recording. We can only assume that Fujifilm doesn't believe that users of its cameras are avid videographers, since there's no dedicated button to activate it. If you do want to create videos regularly, it might be a good idea to assign the Function button at the top of the camera to Video mode.

As with the X-Pro1, an eye sensor to the side of the X-E1's EVF detects when the camera is lifted to the eye, automatically switching between the LCD screen and the EVF. Handily, you can switch off the eye sensor via a dedicated button if you only want to use the EVF, or only use the LCD.

PERFORMANCE

We had very high hopes for the X-E1 when it was announced, mainly because it shares the same sensor and

Meet the rivals...

See how the X-E1 stands up against the competition



Olympus OM-D
£940 (with 12-50mm lens)
Great all-round performance with a stylish design and an impressive amount of advanced features.
Our score: 4/5
See page: 88



Sony NEX-7
£870 (with 18-55mm lens)
Highly specified and aimed at serious photographers who require high-quality images and lots of control.
Our score: 4/5
Issue reviewed: 120

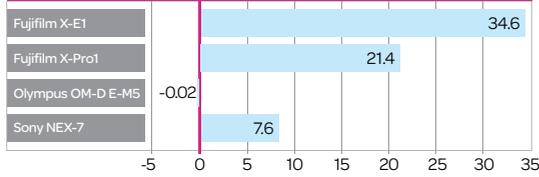


Fujifilm X-Pro1
£1,308 (with 18mm lens)
Enjoyable to use, has traditional controls and produces great images. This is close to perfection.
Our score: 4/5
See page: 76

COMPACT BENCHMARKS

See how the Fujifilm X-E1 fared in our lab tests

COLOUR ERROR Closest to zero is best

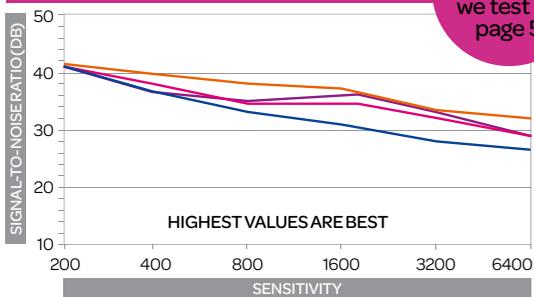


COLOUR ERROR RESULT: The X-E1's high scores reflect the high saturation, punchy images, which are generally pleasing to the eye



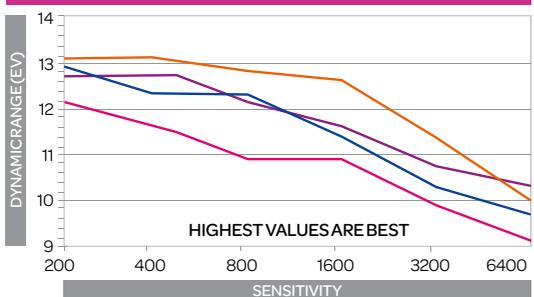
WHAT'S THIS?
Find out how we test on page 5

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Although not the best performer, the X-E1 produced respectable lab results, especially at higher ISO settings

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: The X-E1's raw files (after conversion to TIFF) compete well, with a maximum range of almost 13EV

OVERALL BENCHMARK RESULT

The X-E1's JPEG files have the strongest signal-to-noise ratio of all the cameras tested here, with the exception of the Panasonic GH3 at ISO200. The X-Pro1 is the next strongest performer, followed by the OM-D and NEX-7. TIFF (after conversion) images show the X-E1 doesn't compare quite as well as the JPEGs, coming behind the OM-D and GH3 at lower sensitivities. JPEG results show strong dynamic range, only overtaken by the GH3 at ISO6400 and beyond.



while if you have to take a shot of a scene with bright colours that you want to emphasise, Velvia is a good choice. The ability to shoot in raw format means you have a clean image too, should you decide against the film simulation further down the line.

Film bracketing modes enable you to shoot three images at once, each with a different film simulation mode applied. Unfortunately, raw shooting is disabled when shooting in this mode, which is a bit of an oversight.

Panoramic mode can also be found in the Drive menu, enabling you to shoot an ultra-wide-angle image by sweeping the camera across a scene and stitching the images together in-camera. This mode is quick to use, but unfortunately, unless you're using a tripod to keep the camera on

a perfect level, it's likely you'll see evidence of the stitching in the finished image.

Even though it has a lower resolution than the X-Pro1's, the LCD screen is still a good performer, not suffering too badly from glare or reflections. Even though it's not an articulating or tilting screen, it's still fairly easy to use when shooting from more unusual positions, giving a good angle of view.

Meanwhile, the EVF is a real joy to use. Its high resolution makes it preferable in many cases to using the optical device from the X-Pro1, which is prone to inaccuracy. It's almost good enough to make you forget you're using an electronic device, with the added benefit of the taken image flashing up in the viewfinder for an

processor as the excellent X-Pro1. Happily, our initial optimism proved to be well-founded.

Colours are rich and punchy without being garish, and each shot contains bags of detail. For those hankering after analogue, film simulation modes enable you to recreate classic film stock, such as Velvia, Provia and Astia. Shooting in Provia mode is the standard option,

Above With its large sensor, the X-E1 makes it easy to achieve creative background blur



Tech Briefing
X-Trans CMOS Sensor



Technology adapted from analogue film has been used to create the X-E1's sensor, which features a unique colour filter arrangement. Unlike most cameras that use a Bayer pattern of red, green, green and blue receptors (RGGB) arranged in a 2x2 grid, the X-Trans CMOS device uses a 6x6 RGGB filter array pattern, with a random arrangement of colour filters within each block of 36 photo receptors.

Fujifilm claims this avoids moiré patterns resulting from the fine grid structure that makes up a Bayer pattern sensor. As a result, the X-E1 doesn't have an anti-aliasing filter, so it should produce sharper images.

instant assessment of whether you got the shot or not. However, in very bright sunlight, you might find that you need to shield the EVF to get the best possible view.

Leaving many of the camera's options in automatic mode is great for relaxed shooting. The automatic white balance system does a very good job of accurately reproducing colours in the majority of situations, except under extremely yellow artificial light. Similarly, multi-purpose metering (referred to as Photometry) performs well in most conditions, only struggling a little in areas of very high contrast.

Above Taking mono shots is easy the film simulation modes, and you can set crop ratio too

Below Want to shoot video? Assign it to the X-E1's Function button



Because the X-E1 uses an EVF only, it would be reasonable to expect the battery life to be poorer than the X-Pro1's. We found that after using the camera almost constantly for around three hours and over 300 shots, the battery was more or less drained. This is a bit of a concern for heavy users, but it's worth noting that less frequent use should see the camera last at least a full day.

Autofocus speeds with the new firmware are very quick, particularly in bright sunlight. Fujifilm claims that pairing the camera with the 18-55mm f/2.8-4 lens produces autofocusing speeds of up to 0.1 seconds, which our tests prove to be about accurate.

It's still the case that some of the other lenses, especially the 60mm macro, suffer from slower speeds, sometimes hunting around before locking onto focus.

OUR VERDICT

Overall, the X-E1 is an extremely interesting proposition that we can see being top of many photographers' wishlists. Combining the fantastic technology of the X-Pro1 with a more consumer-friendly price and a smaller, more streamlined CSC body will surely appeal to a wide range of people, but a touchscreen would have inched it closer to perfection.

Adding a new 18-55mm kit lens to the line-up of the X range is also a smart move by Fujifilm. This lens is again likely to appeal to a new crowd that is looking for something a little more versatile. It's great to see that Fujifilm's premium quality and build has gone into the design of the kit lens, and this elevates it far above the realms of the usual bundled optic offered by the competition.

The improved autofocus speeds that Fujifilm's new firmware brings, coupled with the new lens, make this a fantastic and reasonably priced little camera that will easily take on its SLR rivals. Although the current lens line-up is fairly limited, Fujifilm has promised that more will be announced later this year. 📷

Digital
Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: With the X-E1, Fujifilm has introduced the next evolution of the X series of interchangeable lens cameras. As the system is set to expand this year, this camera's appeal will grow and grow.

> THE SPECS

Sensor	16.3-million pixel X-Trans CMOS
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	Hybrid optical and 0.47-inch, approx. 1,440,000-dots electrical
Video resolution	1920x1080p at 24fps
ISO range	100-6400 (expandable to 25600)
Autofocus points	49
Max burst rate	6fps
LCD	3-inch, 1,230,000 dots (fixed)
Shutter speeds	30-1/4000 sec, plus Bulb (to 60 mins)
Weight	450g (including battery and memory card)
Dimensions	139.5x81.8x42.5mm
Power supply	NP-W126 Li-ion battery (included)



COMPACT SYSTEM CAMERA Fujifilm X-Pro1 > £1,308 > www.fujifilm.eu/uk

Yesterday's style, tomorrow's tech

Fujifilm's 16Mp X-Pro1 combines traditional styling and control with advanced digital technology, and it's turning heads throughout the photographic world. **Angela Nicholson** puts it to the test

The X-Pro1 is Fujifilm's first interchangeable lens camera since the S5 Pro, which dates from September 2006.

While the S5 Pro is an SLR that accepts Nikon F-mount lenses, the X-Pro1 is a compact system camera (CSC) that debuts Fujifilm's X mount. To coincide with the release of the X-Pro1, Fujifilm has introduced three compatible XF lenses; the Fujinon XF 18mm f/2 R, XF 35mm f/1.4 R and XF 60mm f/2.4 R Macro.

Like its popular X100 and X10 compact cameras, Fujifilm has designed the X-Pro1 to appeal to enthusiast photographers, and consequently its latest model melds traditional exposure controls with cutting edge digital technology. At its heart lies a 16.3-million pixel X-Trans CMOS sensor, which produces images of up to 15.89 million pixels. This means that when images are printed at 300ppi, they are just a fraction shy of full A3 size – ideal for most photographers. Or is it?

FEATURES

Traditionalists will love the fact that the XF lenses have an aperture ring for adjusting exposure. Similarly, the camera's top plate has a shutter speed dial to set the shutter speed in whole stops from 1/4000 to 1 sec.

Both the lens's aperture ring and the shutter speed dial have an A (Automatic) setting. Setting both to A switches the camera to Program mode, while setting only one or the other to A selects Aperture Priority or Shutter Priority mode. There are

no scene modes, but the X-Pro1 isn't designed to attract the kind of novice photographers who would use them.

Like the Fujifilm X100, the X-Pro1 has a hybrid viewfinder that combines a direct optical viewfinder (OVF) with an electronic viewfinder (EVF). A small lever positioned on the front of the camera allows the user to switch between the two finders.

Images can also be composed on the three-inch, 1,230,000-dot LCD on the back of the camera. This is one of the highest-resolution camera screens around, but unlike the units

Above It's not especially compact, but the X-Pro1 has old-school charm

on many recent CSCs, it's not touch sensitive, which is a shame.

Fujifilm is well-known for making film, and it's hardly surprising that the company is underlining this in the form of the camera's Film Simulation modes. In total, there are ten of these modes, with names such as Provia (the standard JPEG setting), Velvia, Astia, Pro Neg H and Pro Neg S, all ringing bells with photographers who started shooting on film.

While in many ways the X-Pro1 looks and feels like a traditional rangefinder camera with the addition



Traditional exposure controls are perfect for experienced shooters



This menu provides fast access to 16 key adjustment features



In Continuous mode the AF point is locked at the centre. Focus is slow too



The viewfinder lacks the resolution to allow really positive manual focusing

Zooming in on the... Fujifilm X-Pro1

A quick tour of the camera's key features

Because it's located on this thumb ridge, the Q button is easily pressed by accident when you're handholding the camera



The Exposure Compensation dial is slightly recessed to help reduce the likelihood of it being knocked



The eye sensor is useful, as it switches off the LCD and activates the EVF when the camera is held up to your face



This three-inch, 1,230,000-dot screen provides a clear, detailed view



FEELING CHEATED

FEELING TREATED

of an LCD screen, it has just about all the features you'd expect from a modern digital camera, including a virtual horizon display to help keep shots level, plenty of control over white balance, a range of bracketing options, dynamic range optimisation settings, a Motion Panorama mode and full HD (1920x1080 pixels) video shooting. There's no built-in flash, but there is a hotshoe mount that accepts flashguns such as Fuji's EF-20 TTL, or the larger EF-42 TTL.

Given its relatively large size, retro styling and traditional control arrangement, the X-Pro1 isn't so

"The X-Pro1 has a virtual horizon display to help keep shots level and a range of bracketing options"

much a CSC competitor as an advanced SLR or rangefinder rival, and when the promised M-mount adapter comes to market, Leica users wanting a digital camera will have a more affordable alternative to the M9.

Despite its overall rectangular shape, which is typical of traditional rangefinder cameras, the Fuji X-Pro1 feels reasonably comfortable in

the hand thanks to the textured rubberised grip on its front. It lacks the bulk of the average SLR's grip, but it makes the camera feel secure in your grasp.

BUILD AND HANDLING

Although the X-Pro1's body looks similar to the X100's, Fujifilm has made a few changes to improve the new camera's handling. First up, there's a Q button that activates the Quick menu, giving access to 16 key camera features, including the sensitivity, dynamic range optimisation, white balance, file format and Film Simulation mode settings, to name just a few.

Any of the features within the grid can be selected simply by navigating to them, and then adjusted using the command dial near the thumb rest. It would be even better if you could specify which features you access from the Quick menu though.

One issue we have with the Quick Menu is with the button itself. This sits on the ridge that forms the thumb rest, and when the camera is turned to shoot in upright orientation it's very easy to press it accidentally.

Meet the rivals...

See how the Fujifilm X-Pro1 stands up against the competition



Fujifilm X100
£699
It has a very similar design to the X-Pro1, but the lens is fixed on this APS-C format, 12.3Mp compact camera.
Our score: N/A
Issue reviewed: N/A



Leica M9
£4,945
Costing nearly £5,000 without a lens, the full-frame 18Mp Leica M9 is a digital rangefinder camera.
Our score: 3/5
Issue reviewed: 117

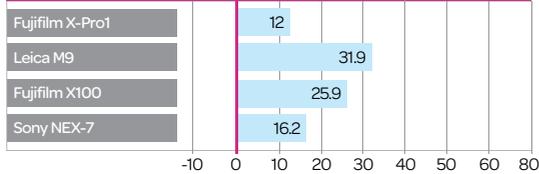


Sony NEX-7
£999
With 24-million effective pixels, this out-resolves the X-Pro1. It also has a top EVF and a faster AF.
Our score: 4/5
Issue reviewed: 120

CSC BENCHMARKS

See how the X-Pro1 fared in our lab tests

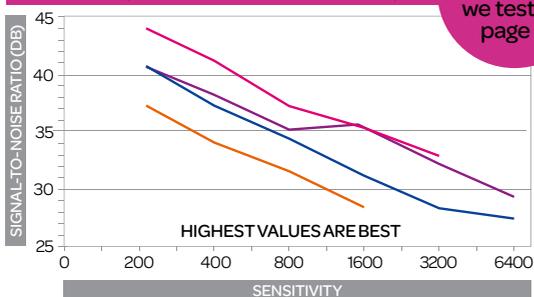
JPEG COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The X-Pro1 is the most accurate camera here. It produces naturally-coloured images with good saturation

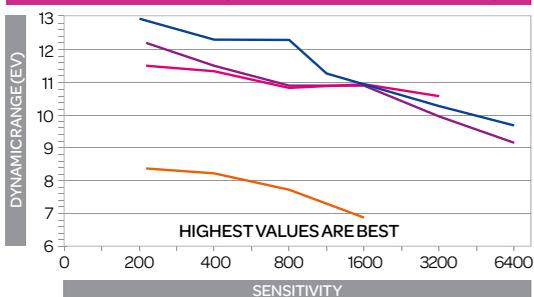


RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: These results indicate that the X-Pro1 produces cleaner images than the full-frame Leica M9 and the Sony NEX-7

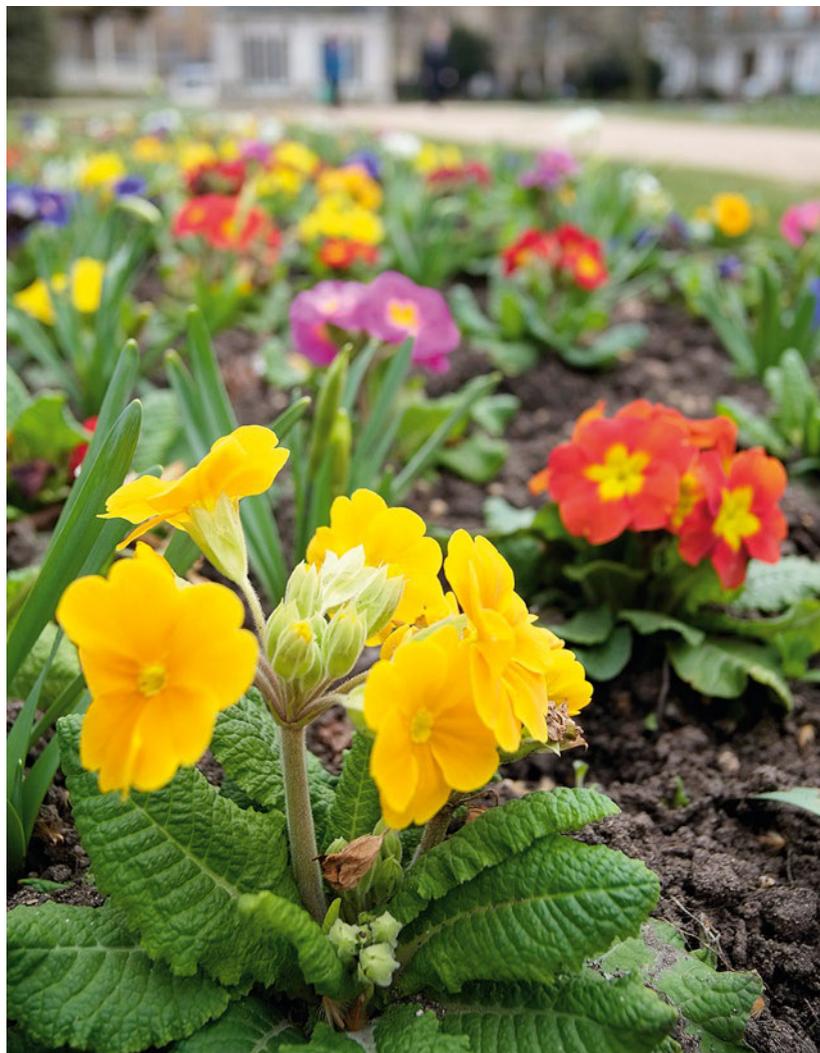
RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RANGE: The X-Pro1's dynamic range result is impressive, beating the full-frame Leica M9, but not the Sony NEX-7

OVERALL BENCHMARK RESULT

Fujifilm claims the design of the X-Pro1's sensor enables it to capture better images than a full-frame camera. Our tests show that although it can't match full-frame models like the Leica M9 or Canon EOS 5D Mark II for detail resolution, the X-Pro1 competes well for dynamic range and signal-to-noise ratio. Both raw (after conversion to TIFF) and JPEG files have a higher dynamic range than the M9 across the sensitivity range, and while the NEX-7's raw dynamic range results are better than the X-Pro1's, the latter's JPEGs have higher dynamic range at most settings.



selection lever. Generally, however, the EVF is brighter and more contrasty than the OVF. Aside from one or two niggles, the X-Pro1 is a delight to use.

PERFORMANCE

At normal viewing sizes images from the X-Pro1 look natural and not overtly digital. There's a smooth graduation of focus, and out-of-focus areas look naturally soft. Meanwhile, in-focus areas have plenty of detail. There's not quite the same level of detail that we have seen from full-frame SLRs, but it really isn't that far off, and moiré patterning doesn't seem to be an issue, despite the lack of an anti-aliasing filter.

Zooming into JPEG images reveals that strong edges are over-sharpened, and the best results (as expected) are achieved by processing raw images post capture. We found that the standard Film Simulation mode, Provia, is a good option for many situations, and Velvia is good for boosting colours, though spring grass

looks unnaturally vibrant. As with most cameras, the basic Monochrome option produces fairly muddy-looking images that benefit from a contrast boost. While it's fun to use the Film Simulation bracketing option to record three shots with different looks, we were a little disappointed to discover that only JPEG files are recorded, and there isn't an unprocessed raw file available, even if the camera was originally set to record raw files.

On the whole, the Auto White Balance system does a good job, capturing colours as they should be, but it struggles a little under warm lighting indoors. This can be addressed by setting Custom white balance manually, but unfortunately the option is located on the second page of the main menu. It would be nice if this could be accessed via the camera's Quick menu.

While the X-Pro1 isn't the ideal camera for shooting sport and action, for most day-to-day pursuits

With 1.44 million dots, the X-Pro1's electronic viewfinder can't compete with the resolution of the units in the Sony Alpha 77 or Sony NEX-7, but it nevertheless offers a clear, smooth view.

As the same data is visible in the optical viewfinder as the EVF, it is sometimes only possible to work out which is active by flicking the

Above The bright, overcast sky proved tricky here, and +1.33 EV Exposure Compensation was required to bring out the details



the speed of the 49-point contrast detection autofocus system is perfectly adequate. The lens usually makes a little backwards and forwards adjustment (with accompanying noise), but focus is typically achieved pretty quickly. That said, it's not as fast as on the Panasonic GX1.

In continuous autofocus mode the AF point is fixed in the centre, which has obvious limitations, and it can only really keep up with fairly slow-moving subjects. Manual focusing seems like a natural option

Above Used with a fast lens you can get great creative blur

Below Unusually, exposure is entirely controlled by dials

with a camera like the X-Pro1, but we found it is sometimes difficult to access critical sharpness in the EVF.

The ability to enlarge the view by pressing the command dial helps a lot, but the LCD view is clearer than the EVF image. However, unless the camera is mounted on a tripod, using the LCD feels an unnatural way of accessing manual focus.

OUR VERDICT

If you are an experienced photographer who's not concerned about having scene modes and ultra-fast autofocus bells and whistles, then there really is lots to like about this camera. Setting the exposure via an aperture ring and a shutter speed dial seems to come naturally, and the combination of excellent noise control and fast lenses means that you are able to shoot with the ISO set to automatic without any serious concerns. Fujifilm's Quick menu system is one of



Tech briefing X-Trans sensor



Although the X-Pro1's sensor is APS-C sized, Fujifilm claims that its cunning design enables the camera to produce images that are superior to a full-frame alternative's. The secret behind this quality is in the arrangement of the pixels.

Unlike most cameras, which use a Bayer pattern of red, green and blue receptors (usually referred to as RGBG) arranged in a 2x2 grid, X-Pro1's X-Trans CMOS device uses 6x6 RGBG filter array, with a random arrangement of colour filters within each block of 36 photo receptors.

Fujifilm claims this avoids the issue of moiré patterning, which can occur as a result of the fine grid structure that makes up the average Bayer pattern sensor. As a result, Fujifilm has not fitted the X-Pro1 with an anti-aliasing filter, which means it should be able to produce sharper images from the outset.

the best and fastest to use that we have come across. If it could be made customisable then it would be just about perfect. The hybrid viewfinder is also excellent, although it doesn't work as well as we'd hope when focusing manually.

Most importantly, however, the images from the X-Pro1 are superb. They may not have quite the level of detail that some of the current full-frame SLRs are capable of capturing, but they can certainly beat these bigger beasts when it comes to dynamic range and noise control. 📷

Digital Camera

FEATURES



BUILD QUALITY



IMAGE QUALITY



VALUE



Overall ★★★★★

WE SAY: If you want a camera that is enjoyable to use, has traditional controls and modern niceties, and produces great images, then the Fujifilm X-Pro1 isn't far off perfection, but it's still not cheap.

> THE SPECS

Sensor	16.1-million pixel Four Thirds Live MOS
Focal length conversion	2x
Memory	SD/SDHC/SDXC
Viewfinder	None
Video resolution	Full HD (1920x1080)
ISO range	200-25600
Autofocus points	35
Max burst rate	8fps
LCD	Three-inch, 460,000 dots
Shutter speeds	1/4000-60 secs
Weight	269g (inc. battery and memory card)
Dimensions	109.8x64.2x33.8mm
Power supply	BLS-5 Li-Ion battery

Launched at last year's Photokina trade show, the PEN E-PM2 (PEN Mini) sits at the bottom of the Olympus system camera range, but takes much of its technology from the OM-D, the company's premium offering.

Most notably, the OM-D's 16.1-million pixel sensor and TruePic VI processor make an appearance on the PEN Mini, meaning it should have the same image quality, but with the advantage of a much smaller body.

It's actually one of the smallest compact system cameras currently on the market, having fewer dials and direct-access buttons than the Olympus PEN Lite E-PL5 that sits above it in the range. It also doesn't have a tilting LCD screen, but unlike its predecessor its touchscreen is a capacitive device.

FEATURES

Unlike the OM-D, the PEN Mini doesn't have an electronic viewfinder (EVF), but there is a port for connecting an optional extra EVF should you find you need one.

Both Olympus and Panasonic claim that their cameras have the fastest autofocus speeds in the world, and speeds of 0.1 seconds have been quoted for the new PENs.

Anyone who has used an Olympus CSC before will already know of the company's love for digital art filters. The new PEN range contains the widest selection yet, with 12 to choose from. There are several here that weren't found on its predecessor, including Cross Process and Key Line, along with others that have been around for a little longer, such as Pop Colour. Art filters can be used when shooting both stills photographs and HD video.



CSC PEN Mini E-PM2 > £384 (with 14-42mm lens) > www.olympus.co.uk

A mini marvel

With a beefy sensor tucked into a tiny body, is the Olympus E-PM2 the perfect CSC for beginners? **Amy Davies** finds out

Olympus, along with Panasonic, uses the Micro Four Thirds format for its compact system cameras. This makes use of sensors that are smaller than the APS-C devices currently found on the Canon EOS M, Sony NEX range, Samsung NX range and Fujifilm X range.

Although there are downsides to using a smaller sensor, it does mean that these cameras, and their compatible lenses, tend to be a bit more compact. The Micro Four Thirds format has been around since 2008, and it currently has the biggest range of proprietary optics. And, since Panasonic shares the format, lenses from both companies – and popular third parties such as Sigma – are compatible with PEN cameras.

Despite its smaller size, Olympus is very confident about this camera, claiming that the sensor technology inside its cameras is class-leading, and capable of taking on those with larger devices.

Above The PEN Mini small body and pared-back controls make it an attractive camera

Other notable specifications of the PEN Mini include sensitivity capability up to ISO25600, full HD video recording and 8fps shooting.

BUILD AND HANDLING

The PEN Mini is the smallest camera in the Olympus range, achieved by not having many dials and buttons for direct access to key settings. It's not aimed at advanced photographers, who might find it a little frustrating to use, especially when compared with those cameras higher up in the range.

As there's no mode dial on the top plate to navigate through the various modes the camera offers, this is done via the LCD screen after a press of the Menu button. Here you can choose between fully automatic, semi-automatic and fully manual modes, along with art and scene modes.

Although it's small, a textured grip on the front of the camera combined with a well-positioned thumb rest around the back makes it feel secure

Zooming in on the... Olympus PEN Mini

A quick tour of the camera's key features



The touchscreen speeds up key functions such as AF selection



A wider range of digital filters is now available on the PEN Mini



Altering aperture and shutter speed is fiddly, with no dedicated dial



No mode dial means you have to dive into the menu to switch modes



There's no EVF or built-in flash, but accessories can be slotted into the camera's hotshoe



A thumb rest makes it easy to grip the camera, even when you need to shoot one-handed



This scroll dial is used to set the aperture and shutter speed when in the appropriate mode



Tap the OK button to quickly access the most commonly used settings, such as white balance, ISO and aspect ratio

in the hand, even when you're shooting one handed.

In terms of usability, the addition of a touchscreen on the PEN Mini is a big improvement, making it easy to alter the focus point or even release the shutter for ultra-quick shots. As the touchscreen is capacitive, it's very responsive to light touches, making it great to use. Although the screen is not tilting, it boasts a good angle of view from a variety of positions, meaning you can still just about use it in some pretty awkward positions.

The size of the autofocus point can be altered to make it easier to select a

"The touchscreen makes it easy to alter the focus point or release the shutter for ultra-quick shots"

small target by moving a slider up and down on the touchscreen after selecting an autofocus point.

It's a shame there's no on-screen quick menu that can be used via the touchscreen, because this would have made navigating the settings much quicker. We found the mechanism for altering aperture or shutter speed a little annoying. It requires first a

press of the up button on the directional keypad, and then further presses up or down to make the necessary changes. This can get a little frustrating if you find yourself wanting to alter the exposure.

There's no flash built in to the body of the camera, but an alternative flash that slots into the hotshoe comes in the box as standard. This is another aspect that helps keep the overall size of the camera down.

Unlike some other cameras currently on the market, the Olympus PEN Mini doesn't have in-built Wi-Fi, but it is compatible with Toshiba's FlashAir Wireless LAN cards. A free app is available for iOS and Android smart phones and tablets, which enables image transfer between devices. Disappointingly though, you can't control the camera via the app – but perhaps this is something Olympus can work on in the future.

PERFORMANCE

Images look great straight from the camera, with lots of detail, vibrant, punchy colours and low image noise. There's a good range of shooting modes to help you get the most from

Meet the rivals...

See how the E-PM2 stands up against the competition



Olympus PEN E-PL5
£580 (with 14-42mm lens)
Has the same sensor and processor, but the tilting touchscreen and extra dials will appeal to enthusiasts.
Issue reviewed: 133
Our score: 5/5



Panasonic DMC-GF5
£370 (with 14-42mm lens)
Offers a balance between size and image quality, and a solid feature set makes this a great option for beginners.
Issue reviewed: 128
Our score: 4/5

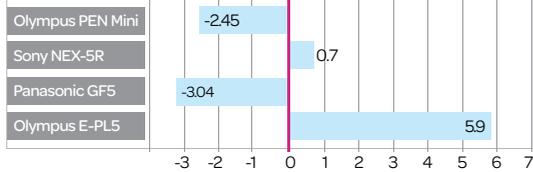


Sony NEX-5R
£570 (with 18-55mm lens)
With the inclusion of Wi-Fi and apps, the 5R shows the evolution of CSCs and is great for both beginners and enthusiasts.
Not yet reviewed

CSC BENCHMARKS

See how the PEN Mini fared in our tests

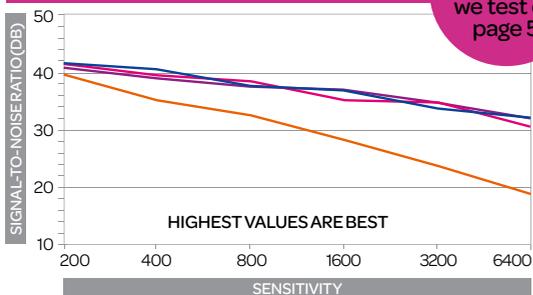
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: Olympus has a good reputation for image colour, and this is borne-out by the Mini's colour error results

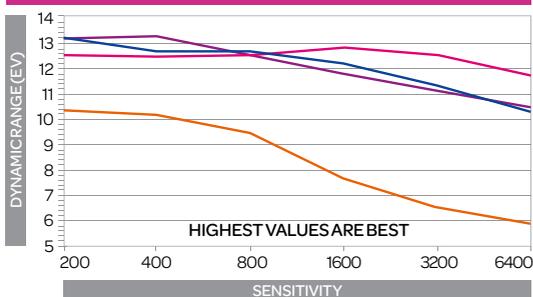
KEY Olympus PEN Mini (Purple)
Sony NEX-5R (Pink)
Panasonic GF5 (Orange)
Olympus E-PL5 (Blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: The Mini controls noise across the range, dropping off at around ISO6400 – similar to the NEX-5R but better than the GF5

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Dynamic range is high up to ISO1600, the Mini performing similarly to the E-PL5 and NEX-5R. Again it beats the GF5

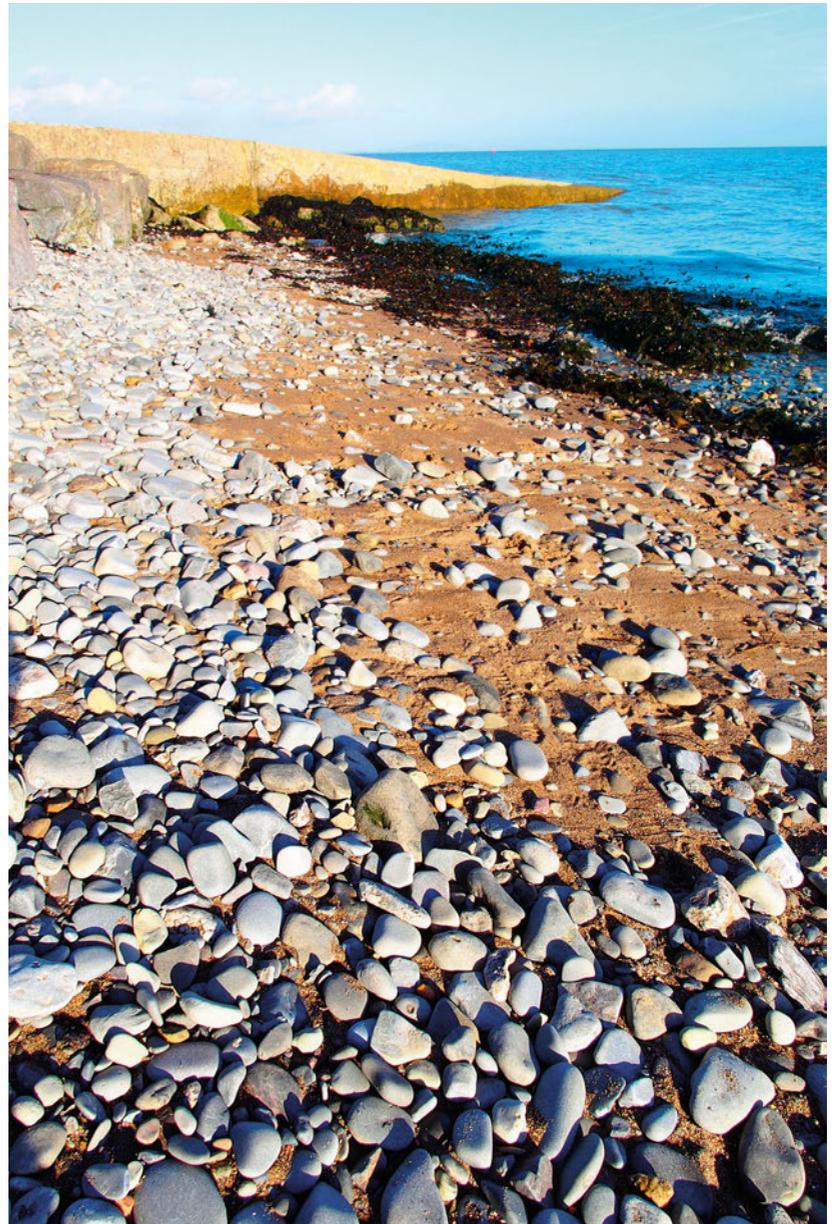
OVERALL BENCHMARK RESULT

Predictably, the Olympus PEN Mini's results are pretty much identical to the PEN Lite E-PL5's. JPEG files have a relatively low signal-to-noise ratio, while raw images are also pretty impressive. Dynamic range results across the sensitivity range are impressive, with images captured at the lower end of the range capturing a large amount of tonal gradation in both shadow and highlight areas.

that excellent sensor. For instance, you could choose to shoot in Vibrant mode if you want to emphasise colours and contrast, or in Neutral when you want more accurate colours – such as when shooting portraits.

Autofocusing speeds are one of the key selling points of cameras like this, and as already mentioned, Olympus and Panasonic have ongoing debates about who has the fastest. The difference is probably microseconds,

Above Shot with the Pop Art digital art filter, the colours and contrast in this image have been boosted



and needless to say, the Olympus PEN Mini does indeed deliver extremely quick speeds, especially in good light.

We've found in previous cameras that the sensor inside the Mini is capable of delivering some incredibly detailed shots, and the same is true here. JPEGs straight from the camera are very sharp, and you can apply your own sharpening to raw format files if you choose to capture them.

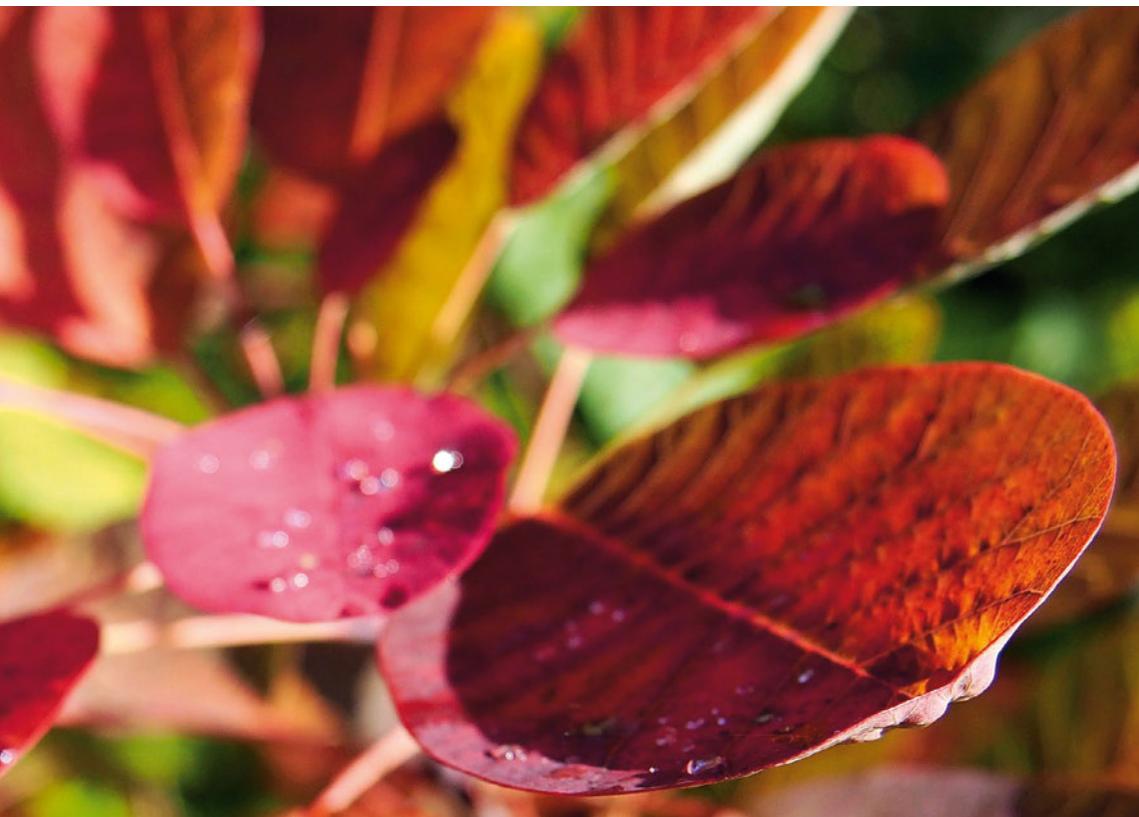
In the majority of instances, the camera's automatic white balance setting does a good job of accurately reproducing colours. It struggles ever so slightly when indoors under artificial lights, but changing the white balance setting is a relatively speedy process using the Quick menu.

Olympus pointed out the improvements it had made to sensor

technology when the OM-D was first launched, which it claimed significantly boosted the low-light performance of the camera. Since this is the same sensor, we can report very similar low-light capabilities.

Image quality does start to drop off from about ISO1600, but some images shot all the way up to ISO10000 and beyond are certainly good enough to be used online or when printing at small sizes. Noise control at ISO1600 – the probable top end of the most commonly used range – is more than acceptable.

Fans of digital art filters will find plenty to like about this camera. When Olympus launched the original PEN Mini E-PM1, it was light on some of the filters found on other cameras in the range. Now, however,



Tech Briefing
Live Time



First introduced on the OM-D, the Live Time feature is used to create long-exposure shots. To access it, you need to switch the camera to Manual, and then set the shutter speed to the Live Time option. Then, when you press the shutter release, the screen displays the image building up, so you can stop it when the exposure is about right, rather than having to guess. Previews of the image are displayed at intervals as the exposure builds. These intervals can be adjusted, depending on the sensitivity you've selected. At ISO200 you can view up to 24 'previews' of the image, while at ISO1600 this reduces to nine. Intervals can be set to display between every 0.5 secs and every 60 secs.

the PEN Mini has all of those on the OM-D, with the addition of a new Watercolour filter. This brings the total up to 12, with many of them being customisable or having different options to expand that number further. Of course, digital filters are usually a matter of taste, but there are some here that are particularly good, such as Cross Process, Pinhole and Dramatic Tone. The new black-and-white version of Dramatic Tone is our favourite.

One of the best features about the Mini is that these digital filters can be deployed when shooting in the raw quality

Above Like the other PEN series cameras, the E-PM2 generates rich and vibrant colours

format, meaning you keep a 'clean' version of the image should you change your mind later down the line.

It's also great that you can still retain full manual/semi-automatic control when using art filters, something that isn't true of any of Panasonic's cameras.

The new touchscreen LCD is a good performer in all but the brightest of sunlight, effectively minimising glare and reflections, and making the need for a separate electronic viewfinder fairly minimal.

OUR VERDICT

The announcement of the new PEN cameras was particularly exciting, because they used the same fantastic technology we'd already evaluated and loved in the OM-D. To see that make its way into a smaller, much cheaper camera is pretty special.

Although the Olympus PEN Mini isn't really aimed at enthusiast photographers, there's still a lot here to love for those who are used to an advanced camera, such as full manual modes, raw shooting and the innovative Live Time feature (see box above). For those with extensive camera experience, this could make for a great second shooter.

On the other hand, for beginners, or those looking to buy their first

compact system camera, this is also an ideal candidate, because you get a lot of bang for your buck.

You can choose to shoot in fully automatic mode and learn with the camera – using more of its features as you expand your expertise. Or you may decide never move on from fully automatic mode, and that would be just fine too.

It's great that this camera now includes a touchscreen, making changing the autofocus point particularly easy. However, since there are so few buttons and access dials, making changes frequently can be a bit of a pain. It would have been better if Olympus could have found room for a small scroll dial for changing aperture and shutter speed at least. 📷



Above The 14-42mm kit lens retracts for easier storage and transportation

Digital
Camera

FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: For those looking for their first CSC, or an excellent second camera, the PEN Mini is the ideal option. With a fantastic sensor and compact size, you get a lot of value for money in this miniature offering.

From the makers of Digital Camera magazine

> THE SPECS

Sensor	16.1 million pixel Four Thirds Live MOS sensor (17.3 x 13.0mm)
Focal length conversion	2x
Memory	SD/SDHC/SDXC
Viewfinder	None
Video resolution	Full HD (1920 x 1080)
ISO range	ISO 100 (expandable) - 25600
Autofocus points	35
Max burst rate	9fps
LCD screen size	Tilting 3 inch, 1.037k dot TFT LCD
Shutter speeds:	1/8000 - 60 seconds / Bulb
Weight	420g (including battery and memory card)
Dimensions	122.2 x 68.9 x 37.2mm
Power supply	BLN-1 Li-Ion battery



CSC Olympus E-P5 > £969.99 (with 14-42mm lens) > www.olympus.co.uk

Retro fantastic

Packing the fantastic OM-D sensor into a sexy and stylish new body – is there anything not to love about the E-P5? **Amy Davies** finds out

As one of the early innovators in the compact system camera market, Olympus has enjoyed great success with its PEN range of Micro Four Thirds cameras. The retro designs of the PEN series have strong appeal to photographers hankering after the golden age of photography, and this newest model doesn't disappoint on the looks front.

The original digital PEN camera, which was launched all the way back in 2008, was a bit of a game-changer. In terms of camera tech, five years is a long time, so expectations are high for the fourth generation of the top-of-the-line series.

FEATURES

Olympus says it has pretty much gone back to the drawing board for this PEN, but there's no denying that it takes its lead from both the PEN cameras of old, and the fantastic Olympus OM-D, which made its debut at the beginning of 2012.

Inside the E-P5 is the same 16.1 million pixel sensor and TruePic VI image sensor as in the OM-D, which should mean that it's capable of the same impressive image quality.

Although a follow up to the E-P3, in some ways the E-P5 also surpasses the OM-D. Aside from the processor and sensor, it boasts an impressively fast maximum shutter speed of 1/8000 second. That's something currently offered by professional SLRs the likes of the Nikon D4, so to see it in a CSC priced at under £900 for the body alone is quite something.

Olympus knows it is a brand enjoyed by the creative photographer,

so it's no surprise to see a high number of digital filters (such as Cross Process and Dramatic Tone) make a reappearance on the latest model of the camera.

Live Time, the innovative way of shooting long exposures introduced on the OM-D, is also found on the E-P5. This enables you to shoot very long exposures while watching the scene build up on screen. Taking the guesswork out of this kind of photography, Olympus has now also included a histogram to further assist the user with the process.

Another feature brought across from the OM-D is the 5-axis image stabilisation system. Compensating for pitch, rolling, yaw, plus horizontal and vertical movement, the results of this stabilisation can now be seen in Live View thanks to improvements in battery technology.

Improving the speed of the camera is something Olympus appears to have worked very hard on. The E-P5

Above is the new Olympus E-P5 the best PEN camera ever made?

boasts a switch-on time of just 0.5 seconds, while the quick processor also promises fast shot-to-shot and refresh times.

While the E-P3 had a fixed capacitive touchscreen, the E-P5 has a tilting device. It's the same 3-inch unit as found on the OM-D, so it should be very responsive and easy to use. The touchscreen enables the autofocus point to be altered, or the shutter itself fired.

BUILD AND HANDLING

Olympus has used a very similar design to the previous incarnation of the camera, but with some very noticeable and welcome improvements. Unlike the E-P3, the E-P5 uses a switch rather than a button to power on and off. This may seem like a trivial point, but it enables quicker start-up, and it's also been recessed slightly into the body of the camera to prevent accidentally switching it on.



The tilting touchscreen is useful for shooting from awkward angles



Built-in Wi-Fi is a great for remote shooting and sharing shots online



There's no viewfinder, but an external device is available as an extra



The standard 14-42mm kit lens doesn't get the most from the camera

Zooming in on the... Olympus PEN E-P5

A quick tour of the camera's key features



The E-P5's built-in flash button can be a little sensitive, leading to the odd accidental pop-up of the flash



The magnifying glass button allows you to check critical focus, which is handy for manual focusing

Move the position of this switch to change the function of the front and rear dials on the camera when you need to



Press this button to bring up a quick menu for speedy navigation of the most commonly used settings



One of the most noticeable improvements is that the capacitive touchscreen is now tiltable, which is useful for angling away from any disturbing glare or reflections. It sits so flush against the back of the camera that at first glance you might not even realise it's a tilting device at all. While an articulating screen would be more useful for portrait format shots, it would undoubtedly also have added bulk.

As it is, you can use the screen to help frame shots from the hip, or when holding the camera above you. It's also useful if you want to place the

“Putting the excellent OM-D sensor inside the new retro styled body is a winning addition”

camera on the floor, angling the screen up to get a better view of the scene you're trying to capture.

On top of the camera is a mode dial, enabling quick transitions between modes, such as fully automatic, semi-automatic and manual modes. There's also space for art modes, scene modes and – new to the PEN range – Photo Story mode.

Also on top of the camera is a Function button, which can be customised to suit your particular requirements. The previous version of the PEN required delving into a menu to change settings such as ISO or white balance, but a much simpler new way of working has been devised for the E-P5.

A small switch around the movie record button marked with positions 1 and 2 enables you to alter the function of the two dials at the back and front of the camera. Position 1 gives you control over aperture/shutter speed and exposure compensation (depending on the mode you're shooting in), while flipping to Position 2 changes the modes to ISO and white balance. It's a quick system that really speeds up basic operation of the camera.

For accessing other commonly used settings, something in the style of a quick menu can be found by pressing the OK button in the centre of the four-way navigational pad. If you need to delve further into the system to change more complicated settings, you can do this via the main menu. But much like with the other

Meet the rivals...

See how the E-P5 stands up against the competition



Panasonic GH3
£1,079
Has a decent EVF, an articulating capacitive touchscreen, Wi-Fi and a fast autofocus system.
Our Score: 5/5
Issue Reviewed: 139



Olympus OM-D
£769 (body only)
Sharing a lot of the E-P5's specs, the OM-D's built in viewfinder may be more appealing to traditionalists.
Our Score: 4/5
See page: 88

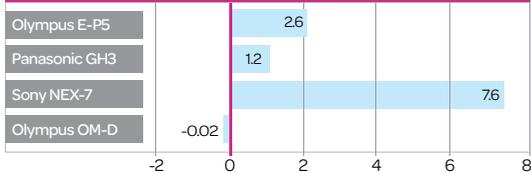


Sony NEX-7
£769
Appeals if you hate the weight of an SLR, but it doesn't compromise on image quality, either.
Our Score: 4/5
Issue Reviewed: 120

CSC BENCHMARKS

How does the E-P5 measure up?

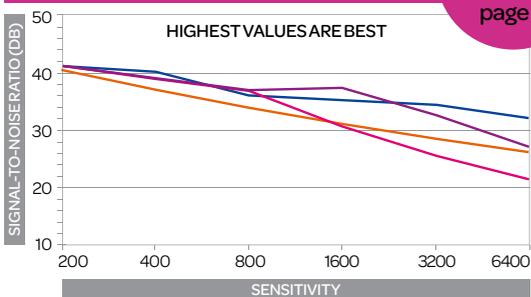
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: JPEG images display excellent colours that are natural and vibrant. The GH3 displays slightly better accuracy.

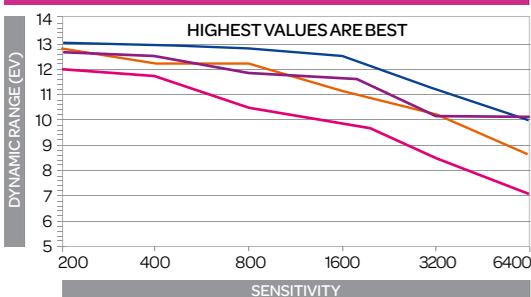
KEY Olympus E-P5 (purple)
Panasonic GH3 (pink)
Sony NEX-7 (orange)
Olympus OM-D (blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: The E-P5's noise result shows a similar result to its sibling the OM-D, beating the competition from Sony and Panasonic.

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Again, a similar result to the OM-D puts the E-P5 ahead of its rivals for dynamic range at every sensitivity.

OVERALL BENCHMARK RESULT

The E-P5 also puts in a very good noise performance with its JPEG files, showing stronger signal to noise ratio than the Sony NEX-7 and the GH3 at almost every sensitivity. JPEGs are also pretty strong for dynamic range, easily beating the E-P3, NEX-7 and GH-3 at almost every sensitivity. The E-P5 puts in a similar performance in terms of noise and dynamic range to the OM-D, with which it shares a sensor and processor.



camera and the connection will be made, taking away the need to have to enter fiddly long passwords.

Once connected, you can use the app to remotely control the camera, although disappointingly, only fully automatic mode is compatible here, so you'll lose control over the more advanced settings. Hopefully Olympus will consider upgrading the app's capabilities in future. You can also save your photos from the camera directly to your device for uploading to social networks.

PERFORMANCE

The Olympus E-P3 was an extremely capable camera in its own right, but putting the proven excellent OM-D sensor inside the new, even-more-retro styled body is a winning

addition – and dare we say it, even better than the OM-D itself.

We'd already witnessed how well the camera's sensor can perform in the OM-D as well as E-PL5 and E-PM2, so we were pretty excited about testing this camera.

Happily, we've been extremely pleased with what this camera is capable of. The images it takes are very bright and punchy, while that 16.1 million-pixel sensor can resolve a fantastic amount of detail.

As we've seen on other Olympus cameras, there's plenty of shooting modes to help you get the most from every situation. So, if you're photographing something with particularly vibrant colours you could use Vivid mode, while Portrait mode could be more suited to producing

- PEN cameras, this main menu may seem a little disjointed when you're not used to it.

The Wi-Fi functionality is very easy to use. A virtual button on the touchscreen can be pressed for instant access. Once you've downloaded the iOS or Android app for your smartphone or tablet it's very easy to connect the camera. All you need to do is scan a QR code generated by the

Above Olympus is well known for its filters, and this one is Dramatic Tone Black and White.



Tech Briefing
1/8000 shutter speed



A very fast shutter speed means that not only should a camera be capable of capturing fast-moving subjects, it can also shoot at wide apertures in bright sunlight. Combine that with the new low sensitivity setting of ISO 100 (expanded) and you've got a recipe for some really creative outdoor work. It's fairly unusual to see such a fast shutter speed available on what is a comparatively cheap camera – others with it include the Nikon D4 (RRP £5000) and the Canon 5D Mark III (RRP £3000). Within the compact system camera market there are no rivals for this speed, with other high-end models, such as the Panasonic GH3 and Sony NEX-7 capable of 1/4000.

neutral skin tones. Speed is one of the key boasts that Olympus is making about this camera, and we have been extremely impressed by its swift performance. Start-up, focus acquisition and shutter release can be achieved in just a couple of seconds from cold, and once the camera is on, operation is very swift indeed.

What's more, the fast processor inside the camera means that even when it is busy applying 12 different art filters while in art bracketing

Above Colours straight from the camera are natural and vibrant, without being too saturated

mode, you can still continue to shoot. Autofocusing speeds are equally impressive in our tests, being almost instantaneous in good light, and only dropping slightly once the light fades.

Speaking of low light, detail is impressively crisp throughout the sensitivity range. Although noise does start to appear from around ISO 800, it only starts to become particularly noticeable once you get higher up the scale, while even images shot at ISO 3200 remain usable at small printing and internet sizes.

For the majority of shooting conditions, automatic white balance does a good job of reproducing accurate colours, tending towards warmer tones under artificial light. Similarly ESP (all-purpose) metering does a similarly good job in the majority of conditions to produce a balanced exposure. If you're shooting very high contrast scenes you may want to switch to spot metering for best results.

OUR VERDICT

The E-P5 is one of the most intuitive and fun cameras we've used recently and, which is obviously crucial, boasts superb image quality.

At this point in time the camera is a little on the expensive side – but you do get quite a lot for your money.

Consider functions such as 5-axis image stabilisation, 1/8000 second shutter speed, plus that superb screen and you can begin to understand where your money is going.

We'd be tempted to recommend omitting the kit lens when purchasing this camera and going instead for the 17mm pancake optic, which is available in a different package. With an equivalent focal length of 34mm, it's an ideal street photography lens, and makes sense if you already have other lenses in your bag (or plan to buy some soon), to get the most out of the camera.

Overall, this is a tremendous piece of kit, and certainly one of the hottest system cameras of the moment. Olympus has raised the bar. 📷

Digital Camera

FEATURES ★★★★★	BUILD/HANDLING ★★★★★
IMAGE QUALITY ★★★★★	VALUE ★★★★★

Overall ★★★★★

WE SAY: This is a very exciting camera, matching a stylish exterior with an impressively specced interior. We think it could be a contender for camera of the year, and it's certainly a cracking PEN.

Above The lens range for Micro Four Thirds cameras is extensive, with the 14–42mm kit lens being supplied here as standard



> THE SPECS

Sensor	16.1-million effective pixel Live MOS Four Thirds (17.3x13mm)
Focal length conversion	2x
Memory	SD/SDHC/SDXC
Viewfinder	1,440k-dot EVF with 100% coverage
Video resolution	1920x1080
ISO range	200-25600
Autofocus	35 focus points
Max burst rate	9fps
LCD	Tilting three-inch, 610k-dot touchscreen
Shutter speeds	1/4000 sec to 60 secs
Weight	425g, including battery and memory card (373g body only)
Dimensions	121x89.6x41.9mm (without protrusions)
Power supply	Lithium-ion BLN-1 rechargeable battery and charger

Four years after unveiling its retro-styled PEN compact system cameras, Olympus has again raided its back catalogue for its OM-D E-M5. Thought to be the first in a new-line up, with its premium price tag and range of advanced features, it weighs in against the likes of the Sony NEX-7 and the Fujifilm X-Pro1 (reviewed on page 76).

Inside the camera are an all-new 16-megapixel Live MOS Four Thirds sensor and TruePic VI image processor, which are claimed to give improved low-light performance and higher dynamic range. A new image stabilisation system uses a five-axis system to combat body shake in a variety of shooting situations.

BUILD AND HANDLING

If your only exposure to the OM-D so far has been through print ads, you might be forgiven for thinking it's larger than it actually is. It's not quite as wide as its older brother, the E-P3, and about the same height. Despite its small size, it still feels like a solidly built camera, with extra confidence coming from weather-proofing. The camera's angular body also makes it easy to hold and access the various buttons, which have been sensibly laid out for the most part.

On the top plate, two dials provide the mechanism for altering shutter speed/aperture and Exposure Compensation. These are easily accessed when using the LCD screen to compose an image, but those with

larger hands may struggle to make any alterations when using the camera's electronic viewfinder.

There are two Function buttons that can be customised to perform different operations – by default, the Fn2 button at the top of the camera gives you direct access to the Highlights and Shadows control. The buttons themselves are one of the few disappointing features, feeling a little cheap for a camera of this price.

The buttons can sometimes be a little unresponsive too, occasionally requiring a double press to get the desired result. Similarly, when using the scroll dials to make adjustments via the Quick Menu, these can be a little laggy. For settings not accessed

Above It may look like an SLR, but the E-M5 is actually a CSC packed with advanced features

via a direct control, a Quick Menu is provided that can be accessed by hitting the OK button. Here you'll find the most commonly changed parameters, such as White Balance and ISO. For the first time on an Olympus camera, these can be selected via the touchscreen, though you'll still need to use the scroll dials to make changes.

The touchscreen can also be used to alter the focus point and trigger the shutter release. We found the touchscreen very responsive, and with the ability to tilt the screen, Olympus has combined the best features of the E-P3 (touchscreen) and E-PL3 (tilting screen) for the O-MD monitor. While it's a shame that the screen doesn't



COMPACT SYSTEM CAMERA Olympus OM-D E-M5 > £769 (body only) > www.olympus.co.uk

Olympus's great all-rounder

The OM-D E-M5 is Olympus's digital version of its iconic OM-series cameras, but will it prove as popular, asks **Amy Davies?**



The bright, 100% coverage EVF is one of the best we've used



Customisable buttons enable you to use the camera how you want



Plastic buttons on a £1,000 camera feel like a bit of an oversight



Images sometimes look sharp in the viewfinder when they're not in focus

Zooming in on the... OM-D E-M5

A quick tour of the camera's key features

There's no in-built flash, but an accessory flash – which can be clipped into the hotshoe – is included in the box



An optional battery grip can be added to make portrait shooting easier and it effectively doubles the operation time of the camera via an extra battery

The 1.44-million dot EVF offers a 100% field of view, displays key shooting information and plays back images



Both a tilting and touchscreen, the monitor manages to combine the best elements of both the E-P3 and E-PL3, allowing for touch focus and composition from odd angles



FEELING CHEATED

articulate fully, having the ability to tilt it is useful for certain awkward angles, and for shooting 'from the hip'. It doesn't help much when shooting in upright format though.

A sensor fitted within the eyecup can detect when the camera has been lifted to the eye, and activate the EVF, which is a useful addition that saves having to mess around with buttons.

An optional vertical battery grip (shown attached above) can also be purchased, providing considerable extra bulk, but fortunately not too much additional weight. It comes with an extra set of scroll dials and

“Offering an impressive 100% field of view, the viewfinder refreshes quickly and feels natural”

buttons, as well as a shutter release to make shooting in portrait orientation easier – and of course the extra battery effectively doubles the camera's operation life.

Art filters can be scrolled through via the Quick Menu. Although this enables quicker changes than on the E-P3, an extra button to quickly turn off (or on) an art filter without having

to scroll through the options would be a welcome addition.

The new 12-50mm kit lens can be bought as standard with the O-MD, and it makes a great combination with the camera. In addition to enabling you to change quickly and easily between a standard zooming mechanism, a power zoom and a new 'macro' mode, it is conveniently weather and dustproof.

The only slight complaint we have about this lens is that switching to macro mode is really a two-handed operation, and it would be better if the necessary button was positioned on the left side of the lens rather than on the right.

Electronic viewfinders suffer from a bad reputation, but the device found on the OM-D is certainly one of the best we've used, if not quite matching up to the clarity of that found on the Sony NEX-7's. Offering an impressive and highly useful 100% field of view, the viewfinder refreshes very quickly and feels natural to use.

However, we found on a couple of occasions that the image appeared to be in focus through the viewfinder, only to discover on closer inspection

Meet the rivals...

See how the O-MD fares against the competition



Fujifilm X-Pro1
£934 (body only)
If you're experienced and not fazed by a lack of scene modes, or need ultra-fast AF, there's lots to like.
Our score: 4/5
See page: 76



Sony NEX-7
£695 (body only)
Highly specified and aimed at photographers who need high-quality images and easy access to exposure controls.
Our score: 4/5
Issue reviewed: 120

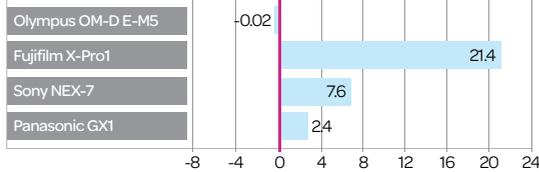


Panasonic GX1
£261 (body only)
At the time, a new direction for Panasonic that's still tempting for advanced users.
Our score: 4/5
Issue reviewed: 122

CSC BENCHMARKS

See how the OM-D E-M5 fared in our lab tests

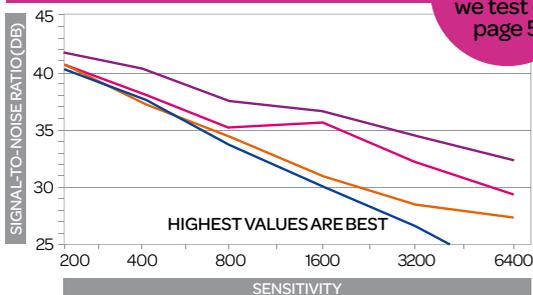
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: JPEGs show almost 100% accuracy, which gives good natural tone, especially for portraits direct from camera

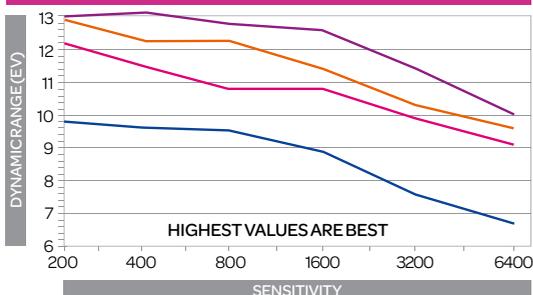
KEY Olympus OM-D E-M5 (Purple)
Fujifilm X-Pro1 (Pink)
Sony NEX-7 (Orange)
Panasonic GX1 (Blue)

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Results show the E-M5 keeps noise under control across the range, with noise only really apparent from ISO6400

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: Between ISO200 and 1600 dynamic range is high – the E-M5 captures good tonal graduation in shadows and highlights

OVERALL BENCHMARK RESULT

JPEG images from the Olympus OM-D E-M5 show good natural colour accuracy. Noise at all sensitivities is handled well, out-performing the comparison cameras and showing that even in low-light situations images can be relatively noise-free.

Dynamic range results across the sensitivity range are impressive, with images captured at the lower end of the range capturing a large amount of tonal graduation in both shadow and highlight areas.

- either on the LCD or on a computer that the focus was actually soft.

PERFORMANCE

Image quality is very good, and a noticeable improvement over the 12-million pixel output from Olympus's older PEN series – making a fantastic argument for CSCs in general. The level of detail captured is particularly impressive, especially when shooting in natural light and

Above A new variation on the Dramatic Tone filter has been included, which produces monochrome HDR-style images

WHAT'S THIS?
Find out how we test on page 5



using low sensitivity settings, while JPEGs straight from the camera are very sharp indeed.

In most situations, the O-MD's Automatic White Balance (AWB) setting does a good job of producing accurate colours, although it struggles a little indoors under artificial or mixed light – tending to favour warm tones. Switching to Incandescent white balance mode is easy though, and it performs well.

As we have found before with Olympus cameras, the multi-purpose 324-zone ESP metering on the O-MD is pretty consistent, and the system judges the exposure accurately in most situations. There is also the option to switch to Spot and Centre-weighted metering, which we used in a couple of tricky lighting situations and found worked well.

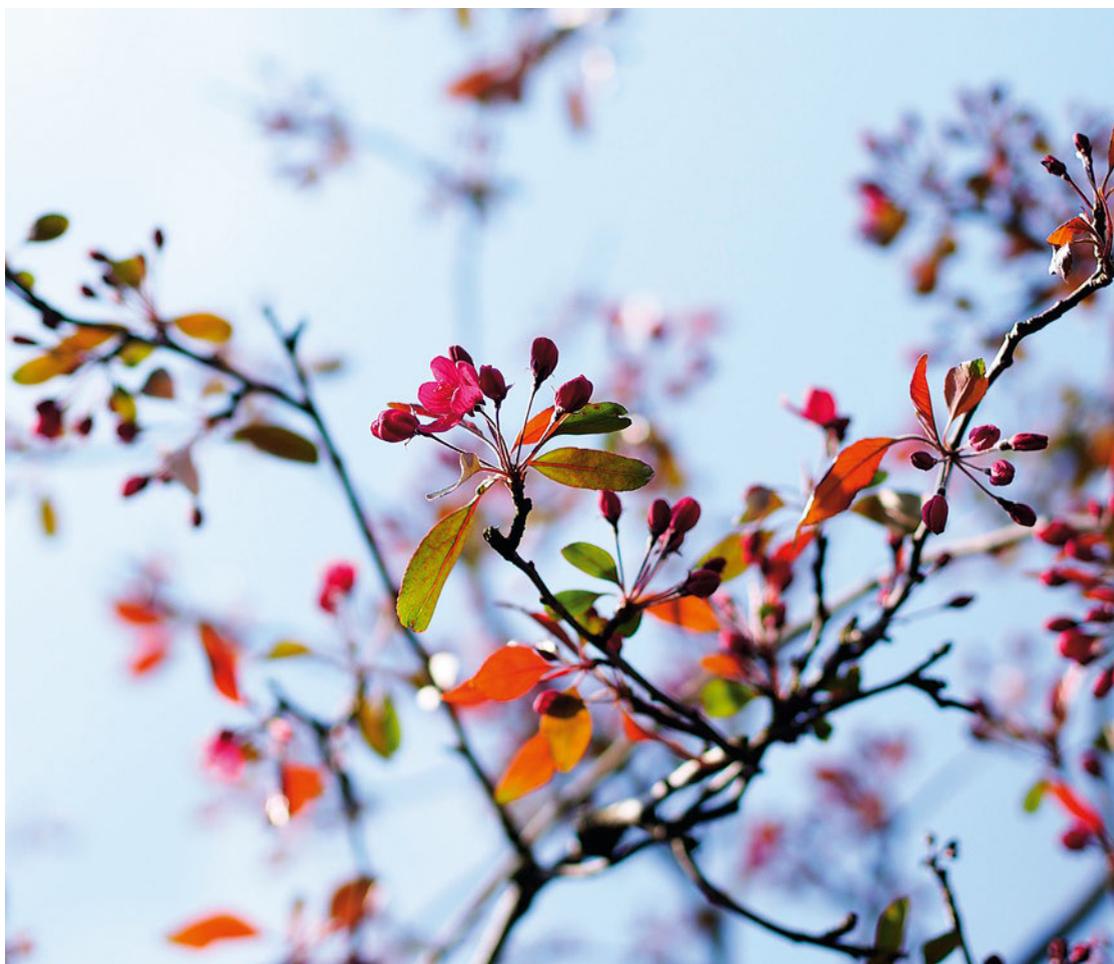
Olympus is keen to emphasise improvements it has made to high sensitivity (ISO) performance. We found that although image quality

starts to drop off from about ISO1600, some images captured all the way up to ISO10000 are perfectly usable, especially when printing at relatively small sizes.

Another key feature is the reworked image stabilisation system. This is designed to help keep images sharp across the frame, and it consistently performs well, although in our tests it struggled when shooting a low-light macro image at a high ISO.

We're impressed by the speed of the autofocus, but can't honestly say that we've noticed a marked improvement from the E-P3 (which was also claimed to be the fastest at its launch). Given that we are talking about microseconds of difference, it's probably not worth quibbling about, but needless to say it is very fast, locking on to the target in almost every situation when the light is good.

Colours are generally represented well, and the O-MD produces bright images that aren't overly vibrant.



Tech Briefing
Art filters



As with the PEN series, art filters can be deployed when shooting in the camera's P, A, S and M modes, allowing creative control over parameters such as aperture to be retained. The Olympus OM-D E-M5 also enables the art filters to be used with raw and JPEG files, and its software, Olympus Viewer, allows you to change the filters post-capture. This offers a distinct advantage over its biggest competitor, Panasonic, because its software doesn't have this capability.

We can't see the new Key Line feature (which is supposed to replicate the look and feel of Manga-style Japanese cartoons) being especially popular outside of Asian countries. However, the new variations on Cross Process and Dramatic Tone are a welcome addition – especially the latter, which produces an impressive HDR-style monochrome image.

However, on occasion we found some benefit in boosting the saturation in post-processing.

Olympus is well known for its wide array of art filters, and has added some new functionality to those on the O-MD. One new filter – Key Line – is joined by two new variations to those brought over from the E-P3, a black-and-white Dramatic Tone mode and another version of Cross Process.

Live Time is a new feature for the O-MD, which helps with the composition of long exposures (often tricky). This is a very exciting piece of technology, and it will surely be appreciated by

Above Shot with the Olympus 45mm f/1.8 lens, a lovely fast piece of glass for your OM-D

Below The sparse layout includes two Function buttons that can be used to customise controls

landscape and low-light shooters who will be able to gauge how successful an image is as it is captured. However, for such a revolutionary function, we're surprised this is not more prominent – it's relatively hidden away in the shutter speeds menu.

Although overall the camera's processing is very fast, it's worth bearing in mind that it can be a little tardy at times, such as when shooting with art filter bracketing, using the Live Time mode and shooting several continuous sequences.

A number of basic edits can also be made in-camera – a feature that's growing in prevalence in the digital camera market. These include things like processing raw files to JPEG, converting to sepia and adjusting saturation levels.

OUR VERDICT

The wide range of compatible Micro Four Thirds lenses now available – not forgetting those made by Panasonic and third-party manufacturer Sigma – make purchasing a Micro Four Thirds camera a very interesting proposition. It's when using different

optics that the versatility of the O-MD is truly revealed.

It's pricey at around a grand for body only, but when you consider all of the improvements, we think the extra expense when compared with an E-P3 is just about worth it. That said, one of its biggest rivals, the Fujifilm X-Pro1, is retailing for around the same price body-only, so the OM-D has more competition.

To conclude, the OM-D is undoubtedly an exciting camera series, but it hasn't quite reached its full potential yet. 📷



Digital Camera

FEATURES	BUILD QUALITY
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: A great all-round performer with a stylish body and an impressive number of advanced features. The OM-D E-M5 has the potential, along with its high-end CSC siblings, to be a real game-changer.

> THE SPECS

Sensor	16 million pixel Four Thirds Live MOS sensor (17.3 x 13.0mm)
Focal length conversion	2x
Memory	SD/SDHC/SDXC
Viewfinder	None
Video resolution	Full HD (1920 x 1080)
ISO range	ISO 200-25600
Autofocus points	23
Max burst rate	7fps
LCD screen size	Tilting 3-inch, 1040k dot touchscreen TFT LCD
Weight	323g (including battery and memory card)
Dimensions	111.2 x 64.8 x 38.4mm
Power supply	Li-ion battery



CSC Panasonic Lumix DMC-GF6 > £396 (with 14-42mm lens) > www.panasonic.co.uk

Well-connected

Panasonic's GF6 is an entry-level system camera with Wi-Fi and a tilt touchscreen. Enough to stand out, asks **Amy Davies?**

Panasonic is known for quickly refreshing its camera line-up, especially at the budget end of the range. The GF series – the company's beginner option – was last upgraded about a year before the GF6 made its debut.

Although the GF1 was incredibly popular, Panasonic admits that it has struggled to capture the same amount of interest for subsequent follow ups. Perhaps this is due to increased competition, both within the company – from the likes of the GX1 – and outside it, with more companies now entering the compact system camera market.

On the other hand, perhaps it's because the GF line never really found its audience, being a little simple for the advanced photographer, and too complicated for those stepping up from a compact. Panasonic has therefore given the Lumix GF6 a more complete overhaul than previous upgrades.

FEATURES

The GF6 features a 16-million-pixel sensor, the same device found in the GX1. Along with the sensor is a brand-new Venus Engine (Panasonic's proprietary image processor), built-in wireless communication, a mode dial on top of the camera and a new tilting 180° touchscreen. Keen to appeal to a beginner audience, Panasonic has included more digital filters than before. These are likely to find favour with the Instagram crowd, boosting the GF6's offering up to 19 effects.

Like other cameras in Panasonic's line-up, the GF6 boasts Light Speed AF. Both Panasonic and Olympus, its Micro Four Thirds partner, have claimed the quickest AF speeds in the past, but it's likely to be microseconds

of difference. Either way, the contrast detect system that the GF6 uses claims to provide near-instant autofocus speeds.

BUILD AND HANDLING

Perhaps the biggest difference between this camera and its predecessor is its chunkier exterior, which accommodates a mode dial and a tilting screen. Because it comes with a standard, manual 14-42mm zoom lens, rather than the ultra-slim power zoom bundled with the GF5, it looks more akin to the GX1 than the GF5.

The addition of a mode dial makes it easier to switch quickly between various exposure modes, which previously required a delve into the menu. To activate fully automatic mode, there's a dedicated button just next to the shutter release. On the dial you'll find a choice between semi-automatic (Shutter Priority and Aperture Priority), fully manual, scene and digital filter modes.

There's also space for two groups of custom settings, which is very useful if you often find yourself

Above The GF6 brings superior technology into an accessible design

shooting with one particular setting, such as monochrome.

Panasonic has expanded the range of digital filters available on the GF6. Unfortunately, these can only be accessed via the dedicated filter mode, meaning you lose control over other shooting elements such as aperture or shutter speed. Olympus cameras enable you to use filters in P/A/S/M modes, which is more flexible.

On the plus side, however, unlike with Sony cameras, filters can be used when shooting in raw format, leaving you with a clean version of the image should you need it.

As with other G-series cameras, most of the commonly used settings can be accessed via a Quick Menu. Here you have the choice to use either the touchscreen to navigate through the different settings or, for those who prefer it, the arrow keys on the back of the camera.

Panasonic has also found room to include an additional function button at the back of the camera, which you can assign a number of different options to. Much of the rest of the

Zooming in on the... Panasonic Lumix DMC-GF6

A quick tour of the camera's key features



Panasonic has the widest range of digital filters available on any CSC



Wi-Fi enables sharing along with remote control from your smartphone



There's no electronic viewfinder and no way to attach one either



The kit lens is larger than the power zoom bundled with the GF5

FEELING TREATED

FEELING CHEATED



A mode dial is a new addition for the GF6 and helps when quickly switching between modes



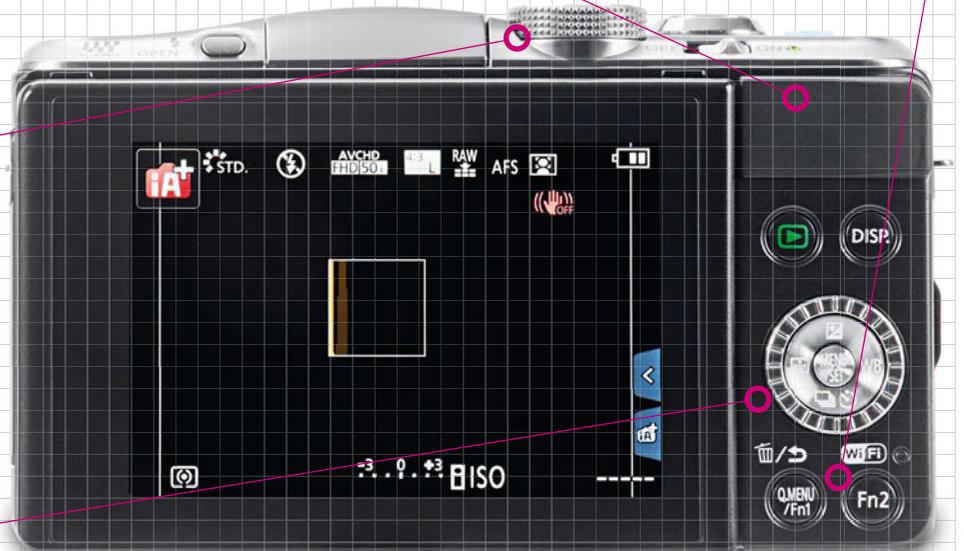
This scrolling dial can be used to alter aperture or shutter speed, depending on the mode you're in



The thumb rest helps to give good grip when holding the camera one-handed



By default the Fn2 button activates Wi-Fi connectivity, giving you quick access to sharing



navigation remains the same as previous GF cameras, with a sensibly laid-out menu that's easy to scroll through to find the options you need.

The front of the camera has a grip attached to it, which is moulded to the shape of a finger gripping it. This makes it feel comfortable and secure in the hand, especially when you're shooting one-handed.

The GF6 is one of the only system cameras on the market to feature Near Field Communication connectivity. With this, you only need to touch the camera to an NFC-compatible device, such as a smartphone or tablet, to

"Images are full of detail, while colours are bright and punchy without being overly vibrant"

have images and videos instantly transfer across.

If you don't have NFC, the GF6 also has standard Wi-Fi connectivity, including support for password-protected networks. You can also control the camera remotely via a free app available for Android and iOS. Setting up Wi-Fi is relatively painless, but if you want to upload directly to

services such as Facebook and Twitter, it's not a particularly straightforward operation.

One of the most appealing features of the Panasonic GF6 is its new tilting screen. Although it doesn't offer quite the same flexibility as a fully articulating device (such as on the G6, for example), it does keep the overall size down. When the screen is flipped to 180° to face the front, it's rather useful for self-portraits.

PERFORMANCE

Since the GF6 utilises the same sensor as the excellent GX1, we had fairly high hopes for this camera. It's good to see the company using technology from higher up its range to boost the appeal of its beginner cameras. Considering that the sensor is matched with an improved Venus Engine, performance from the GF6 should be better than the GX1. The fact that it has 16 million pixels also makes it more competitive with the likes of the Sony NEX-3N.

Happily, we've been impressed by the image output of the Panasonic GF6. Images are full of detail, while colours are bright and punchy without

Meet the rivals...

See how the GF6 stands up against the competition



Sony NEX-3N
£318
A great camera for beginners, it offers fantastic image quality in a compact and reasonably priced body.
Our score: N/A
Issue reviewed: N/A



Olympus E-PM2
£384
The smallest of the PEN breed, the EPM2 features a touchscreen and the excellent OM-D sensor.
Our score: 4/5
See page: 80

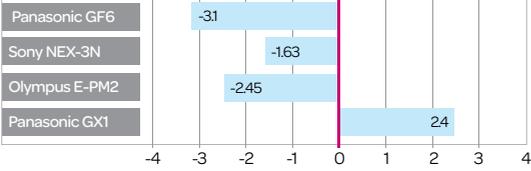


Panasonic GX1
£469
It's got the same sensor as the GF6, but with more advanced controls and a hotshoe for accessories.
Our score: 4/5
Issue reviewed: 122

CSC BENCHMARKS

How does the Panasonic GF6 measure up?

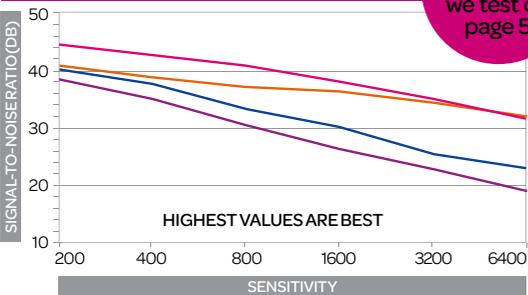
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The GF6 produces vibrant and well-saturated colours, although others may be slightly more accurate.

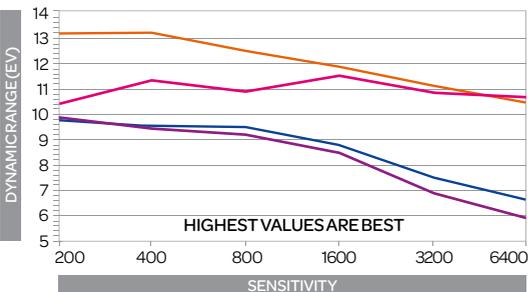
KEY Panasonic GF6 (purple), Sony NEX-3N (pink), Olympus PEN E-PM2 (orange), Panasonic GX1 (blue)

TIFF NOISE Highest values are best



NOISE RESULT: The GF6's raw files don't perform as well for signal to noise ratio as JPEGs, being beaten by the others at every sensitivity.

RAW DYNAMIC RANGE Highest values are best



DYNAMIC RESULT: JPEG results are better for Dynamic Range than raw, with the GF6 showing a weaker output than its competitors.

OVERALL BENCHMARK RESULT

Although the GF6 hasn't performed as well as the other cameras in the test for its raw format files, for JPEGs it fares much better, which, when considering the target audience of this camera is perhaps more important. Both Dynamic Range and Signal to Noise ratio in JPEG images are consistent, especially at lower sensitivities. From the mid-range and up, the large sensor Sony NEX-3N performs slightly better.

being overly vibrant. Automatic white balance does a good job of accurately judging the scene to provide spot-on colours, even when shooting in mixed or under artificial lighting. Similarly, all-purpose metering is a good performer, helping to produce balanced exposures in the majority of conditions – even when confronted with high contrast situations.

One of the most appealing features

Above Smart metering makes for great portraits



in both Olympus and Panasonic cameras is the speed at which they are able to focus. The GF6 is no different, quickly and accurately locking onto the relevant subject with ease. The fact that the screen is touch-sensitive is a huge bonus, since you can speedily change the point you want to use.

The touchscreen uses capacitive technology and is responsive to use, and soon becomes an integral part of the way in which you use the camera. If you prefer physical buttons, the GF6 has enough of those to keep you satisfied too.

Because the camera has a new Venus Engine image processor, one of the key improvements we were looking for was in low-light performance. Although noise does begin to appear at mid-range

sensitivities, such as ISO 800, it is very fine noise and not too intrusive in pictures, unless you're viewing them at 100%.

As the sensitivity range increases, more noise naturally starts to creep in, but images remain usable up to around ISO 3200. After this point, image quality reduces significantly, but it's certainly better than not being able to get the shot at all. If you're keeping images to very small printing or web sizes, you can still use them pretty adequately.

The Panasonic GF6 comes bundled with SilkyPix software, which enables you to get more out of raw format images. Although this program is not as flexible or as useful as others, including Canon's Digital Photo Professional, it is useful to use if you





Tech Briefing
Tilting touchscreen



Like the GF5, the GF6 features a touchscreen, and this can be used for a variety of functions including navigating through the various settings and handily changing the autofocus point and firing off the shutter release if you want it to.

This is a capacitive touchscreen, which are more responsive and easier to use than their resistive counterparts – it's the same type used by iPhones and iPads.

New for the GF range is the ability to tilt the touchscreen downwards or upwards. It can be pulled fairly far from the body to help with shooting from awkward positions, or moved to face completely forward, which is useful for shooting self-portraits or recording movies.

want to apply your own noise reduction, for instance if you're shooting something that has a rather fine texture.

The bundled 14-42mm lens is a new version of the old kit lens, which is smaller than the previous version. With an equivalent focal length of 28-84mm, there's a great deal of flexibility here for shooting a wide variety of subjects.

One of the claims that Panasonic makes about its Micro Four Thirds range of cameras is that edge-to-edge sharpness is better than from APS-C

Above Using the tilting screen is useful when you compose from an awkward angle

Below The GF6 is bundled with a standard zoom 14-42mm kit lens

equivalents. Happily, those claims seem to be well-founded: our images show a good level of sharpness right the way across the frame, even when shooting with the kit lens.

A few new filters have been added to the Panasonic GF6, including Bleach Bypass and Sunlight. As always, some filters are better than others, but it's certainly worth experimenting with for different effects. We think Panasonic currently offers the best range of filters on any system camera.

OUR VERDICT

Although the overall size of the GF6 has increased from the GF5, it does come with improvements that make the bulk-up worthwhile – most notably the tilting touchscreen. Because there's no viewfinder – and no way to attach one as there's no hotshoe present – having a highly flexible and responsive screen is extremely useful, and solves the problem of awkward angles preventing you from capturing the shot that you want to get.

We expected the image quality to be good, and we weren't disappointed. Images are very pleasing indeed. If you're shooting in good light for the majority of time then you'll

probably never have any cause for concern with this camera. In lower light conditions where you're forced to shoot at higher sensitivities, you might find that images are of a lower quality, but if you're printing them at smaller sizes they're still more than usable.

With the largest proprietary lens range available for Micro Four Thirds cameras, investing in a camera from Panasonic or Olympus is a more flexible option than their counterparts from Sony, Nikon or Canon.

With added flexibility coming from the fact that Olympus and Panasonic both use the same lens mount, the GF6 adds up to a very exciting proposition. There has never been a better time to buy a CSC! 📷



Digital Camera

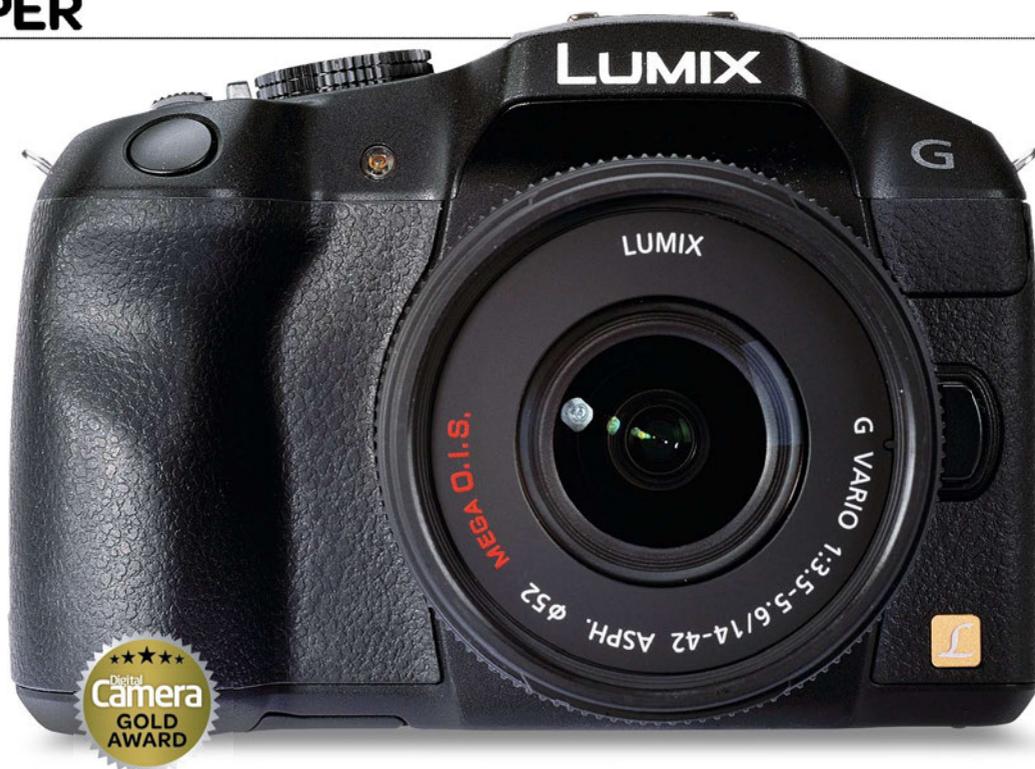
FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: The Panasonic GF6 is one of the best compact system cameras on the market, especially for beginners. The wide range of proprietary optics for Micro Four Thirds also makes this a savvy investment.

> THE SPECS

Sensor	16.05MP Micro Four Thirds format (17.3x13.0mm)
Focal length conversion	2x
Memory	SD/SDHC/SDXC
Viewfinder	OLED electronic viewfinder (EVF) with 1,440,000 dots (approx 100% cover)
Video resolution	Full HD (1920x1080p)
ISO range	160-25600
Autofocus system	Contrast detection system with Face detection, AF Tracking, 23-area-focusing, 1-area-focusing, Pinpoint
Max burst rate	7fps
LCD screen	Vari-angle 3-inch 1,036,000-dot touchscreen
Weight	340g (body only)
Dimensions	122.45x84.6x71.4mm
Power supply	Rechargeable lithium ion battery (supplied)



CSC Panasonic Lumix DMC-G6 > £531 body only, £579 with 14-42mm lens > www.panasonic.co.uk

Panasonic introduced the world's first compact system camera (CSC) back in September 2008 and the G6 is the fifth generation in the G-series of its Micro Four Thirds mirrorless line.

The new camera sits below the Panasonic GH3 in the company's CSC line-up and is aimed at enthusiast photographers who want to shoot a range of subjects with a lighter camera system than the average SLR kit. To this end, the G6 affords a similar level of control over images to an SLR and it has the usual exposure modes, including manual, aperture priority and shutter priority, as well as a collection of automatic options for less experienced photographers.

FEATURES

Like their other CSCs, the G6 is built following the Micro Four Thirds standard, making it compatible with Olympus MFT lenses, and a growing collection from third party manufacturers such as Sigma, too.

Although Panasonic has stuck with the same 16.05 million effective pixel Live MOS sensor in the G6 that it used in the G5 (and GH2), it has used a new, more powerful Venus Engine, a better touchscreen and an improved electronic viewfinder (EVF).

According to the makers, the new processing engine enables the G6 to produce better quality images, and in turn enables a wider extended sensitivity range of ISO 160-25600 and faster autofocus, especially in

The all-rounder

Panasonic's upgrades from the G5 may seem subtle, but they make a big difference. **Angela Nicholson** explains what's changed

low light. In addition, the maximum continuous shooting speed is 7fps (frames per second), although you'll have to drop to 5fps if you want to use continuous AF mode.

Like the G5, the G6 has a collection of Creative Control modes accessed via the mode dial, with options such as Toy Camera and Impressive Art, as well as a number of Photo Styles (Standard, Natural, Monochrome, Vivid, Scenery, Portrait and Custom). Both can be used when shooting raw and JPEG images to save a clean file along with the JPEG with the effect applied, but it's not possible to control key features such as exposure when using the Creative Control options. The Photo Styles, however, can be used in any of the exposure modes apart from Creative Control.

Panasonic has also given the G6 Wi-Fi connectivity, and an NFC chip means it's possible to connect easily to other NFC devices such as an Android smartphone or tablet. As yet

Above The new features on the Panasonic G6 make it feel almost like a new camera rather than an upgrade

Apple hasn't included an NFC chip in its devices, but rumours are rife that one will feature in the iPhone 5S/6.

BUILD AND HANDLING

The G6 looks and feels a little more serious than the G5. The silver controls of the older model are now black, the viewfinder bump is less pronounced and the texture of the body surface has changed. There are also a couple of additional function buttons, bringing the total number on the back of the camera to five. These enable greater customisation, making it quicker and easier to use the camera once you've set it to your preferences.

However, we were surprised to find that Panasonic hasn't continued with the customisable format of the Quick Menu. This is now fixed, which is a shame because the main menu doesn't have a customisable screen.

On the plus side, most of the options that you need to access regularly can be reached via physical



A 1,440,000-dot OLED electronic viewfinder (EVF) is built-in



The screen is a very responsive and quick touch-sensitive device



While the Wi-Fi system is a bonus, it isn't intuitive to set-up



Unlike the G5, the G6's Quick Menu isn't user-customisable

Zooming in on the... G6

A quick tour of the camera's key features



There are five physical customisable buttons and two on-screen buttons, giving plenty of options to personalise the camera

This Function Lever can be used to change focal length with a power-zoom lens, or to adjust the exposure



Pressing this button in any shooting mode sets the G6 to Intelligent Auto mode instantly



Touch Shutter mode allows you to set the AF point and trip the shutter with just a touch of the screen



FEELING CHEATED

buttons or the Quick Menu, so you don't need to delve into the full menu very often once the camera is set up.

One issue we had with the G6's control arrangement was that we occasionally changed the on-screen display by accidentally pressing the Display button under the thumb-rest. We also initially found the navigation controls on the back of the camera a bit hard to identify when holding it to your eye. However, after a short time they become easier to locate.

While the G6's OLED 1,440,000-dot electronic viewfinder is excellent (the G5 has an LCD with the same

“Panasonic’s most complete and well-rounded enthusiast-level compact system camera to date”

dot-count), its faint grid-texture and contrast shift mean that you're aware you're using an EVF rather than an optical device. But it is very good and provides a very clear view, with lots of sharp detail and natural colours.

Another key upgrade made for the G6 is the switch to a 3-inch electrostatic touchscreen, which is much more sensitive than the

resistive touchscreen on the G5. This makes setting selection and adjustments quicker than before, putting the G6's screen's response on a par with the Panasonic GH3's.

It's especially useful when using Touchpad AF, which enables the AF point to be selected by touching the screen while composing images in the EVF. It's a significant improvement.

We found the screen also provides a clear view even in quite bright light, and because it is mounted on an articulating hinge, it makes shooting from awkward angles much easier than usual. It would be helpful if the on-screen digital level could be made a bit clearer, though, because it's not always easy to see it when the screen is being viewed from an angle.

PERFORMANCE

Our images from the G6 generally look very good. They're well exposed, have good, natural colours and plenty of detail. After testing the Canon 700D and 100D recently it was nice to use the Panasonic G6's 1728-zone Intelligent Multiple zone metering system, which gives more consistent results in high contrast situations.

Meet the rivals...

See how the G6 stands up against the competition



Sony NEX-6
£585 (with 16-50mm lens)
An excellent 16.1MP APS-C format CSC with built-in Wi-Fi, but no viewfinder or touchscreen.
Our score: 5/5
Issue reviewed: 134



Olympus E-P5
£969 (with 14-42mm lens)
This 16.1MP Micro Four Thirds sits at the top of the Pen range. It has no EVF built-in, but there's Wi-Fi.
Our score: 5/5
See page: 84

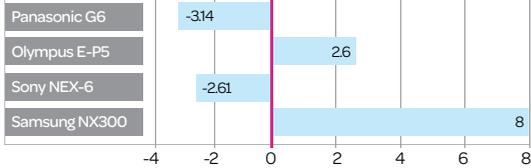


Samsung NX300
£600 (with 20-50mm lens)
This 20MP APS-C format CSC has a 3.1-inch AMOLED touchscreen and Wi-Fi, but no built-in EVF.
Our score: 4/5
Issue reviewed: 104

CSC BENCHMARKS

How the Panasonic G6 fared in our lab tests

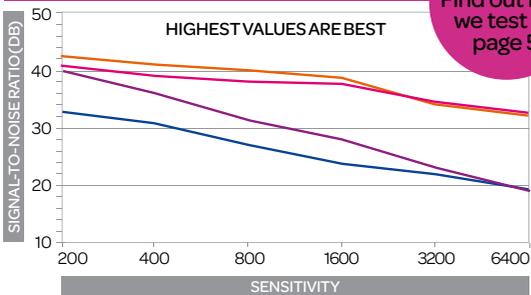
COLOUR ERROR Closest to zero is best



COLOUR ERROR RESULT: The Panasonic G6's colour error score is respectably low, and images offer up some pretty nice saturation.

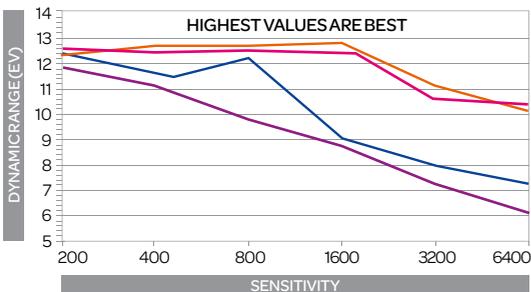
KEY
■ Panasonic G6
■ Sony NEX-6
■ Olympus E-P5
■ Samsung NX300

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: At the lower sensitivity settings the G6 performs very well, but it drops off a little as sensitivity rises.

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: A dynamic range above 11EV is good, but the competing cameras manage to go a little further.

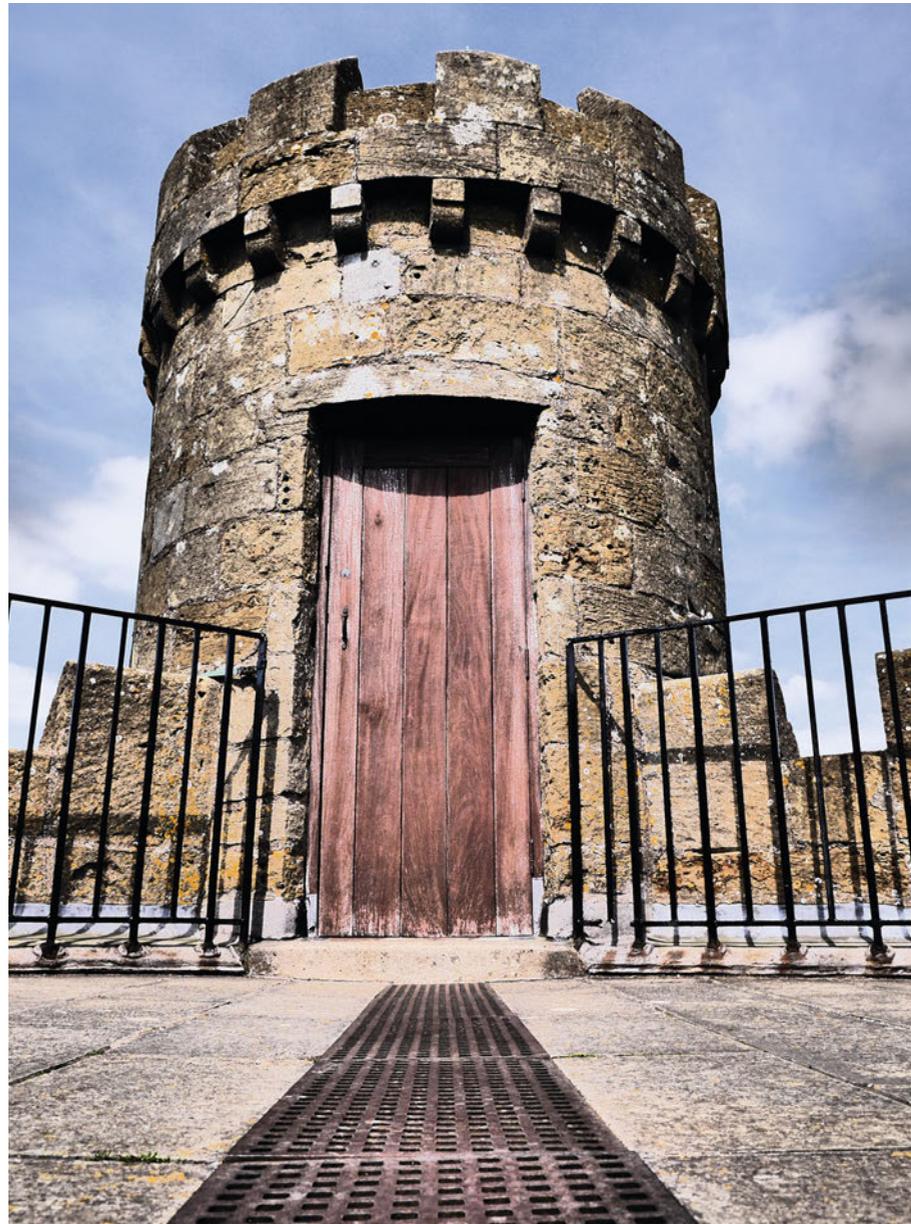
OVERALL BENCHMARK RESULT

These results confirm that the G6 competes well with the 20MP APS-C format Samsung NX300 for signal to noise ratio, but the 16.1MP Sony NEX-6 and Olympus E-P5 perform even better. The G6 performs well in normal conditions, capturing more detail than the NX300 at most sensitivity settings and keeping noise under control. Colours are also accurate, but vibrant and well-saturated without going too over the top.

● In fact during this test we found little reason to use centre weighted or spot-metering, because the general-purpose multiple-zone system does so well. That said, it's not completely foolproof, and we occasionally had to adjust the exposure compensation – but it was usually only by 1/3EV.

Although the G6 lagged some way behind the Olympus PEN Lite E-PL5, PEN E-P5, and in some cases the Sony NEX-6 in our dynamic range lab tests,

Above This shot uses Impressive Art mode, one of the G6's Creative Control options



its images look natural, with a wide range of tones and smooth gradations. A dynamic range of around 10EV in JPEGs taken at up to ISO 800 is good, and the end result is images that have a good level of contrast.

Colours are also good straight from the camera, and the automatic white balance system copes well in most lighting conditions, only struggling in dim artificial light. While there's a range of preset white balance settings, it's so easy to set a custom white balance value that it makes sense to use this in artificial light.

Panasonic has used the same sensor in the G6 as it has in the G5. However, it has been able to eke out a little more detail from the G6's files, and it achieves higher resolution scores from ISO 800 and above.

Our JPEG images taken at ISO 1600 have lots of detail, with very little sign of noise and just a hint of smoothing visible at 100% on the screen. Pushing up to ISO 6400 increases the amount of smoothing that's visible at 100%, but images still look very good when sized to make A3 (16.5 x 11.7-inch) prints. Raw files can be processed to reveal more detail than the JPEGs, but this is at the expense of noise, which becomes more visible.

Panasonic supplies SilkyPix Developer Studio software for raw conversion. While it's a good image-editing package, it isn't tailored to the camera in the same way that the software that comes with Canon and Nikon SLRs is. So you can't make in-camera-like changes to raw files.



Tech Briefing
Remote control app



Panasonic's new Image App is free to download, and it enables G6 users to control the camera remotely via their iPhone, iPad or Android device. Unlike some other apps which only act as a remote release, Image App gives the photographer remote control over the exposure, white balance and drive mode settings and the focus point can be set with the touch of a finger on the tablet or phone screen. It's especially useful for anyone who wants to be able to shoot while they are away from their camera, with a Live View image being displayed on the phone or tablet screen. Wildlife photographers, for example, can use the app to shoot their subject from a distance to avoid frightening off nervous creatures.

However, in reality many G6 users are only likely to use the Silkipix software until the raw file conversion component of their favourite editing software has been updated, so it's not a major deal. G6 raw files editing is already supported by Photoshop CC, Elements 11 and Lightroom 5.

Panasonic's claims for the G6's AF system are borne out. As well as being fast and accurate it is better able to

Above The G6 handles colours well, and copes well with high contrast and varied lighting

Below The controls on the G6 are easy to find, but you can easily trigger some of them by mistake

focus in low light and follow moving subjects than its predecessor. It only struggles to find its target in very low lighting situations that would trouble any entry or enthusiast level SLR's phase detection AF system.

The AF Tracking mode still isn't able to keep up with subjects moving faster than walking pace. But if 1-Area AF and continuous AF mode is selected and you keep the active AF over the subject, it can focus the lens quickly and keep up with fast moving subjects. It may not be our first choice of camera for shooting sport and fast moving action, but it can still produce some great results.

VERDICT

We liked the G5 because as well as producing high quality images, it had all the headline features we want from a modern compact system camera: a good built-in electronic viewfinder, a vari-angle touchscreen, the ability to shoot raw and JPEG images when using the Creative Controls, and a sensible control arrangement with some novel thinking.

So while Panasonic hasn't done anything so radical as increasing the pixel count of the sensor, the G6 has some good enhancements over the G5. The touchscreen is much more sensitive, which makes it faster and

more inviting to use. The improved AF system also makes the camera a better alternative to an SLR, and more able to shoot moving subjects.

The G6 is the most complete and well-rounded enthusiast-level Panasonic compact system camera to date. It may lack the rugged build and a few of the features of the Panasonic GH3, but it's significantly smaller, too, making it a much more attractive option to carry around with you. It's also more affordable and very capable, capturing high-quality images with plenty of sharp detail at the lower sensitivity settings.

Using the Wi-Fi connectivity isn't quite as slick an experience as we'd like, but the additional functionality is useful – and fun. 📷



Digital Camera

FEATURES ★★★★★	BUILD/HANDLING ★★★★★
IMAGE QUALITY ★★★★☆	VALUE ★★★★★

Overall ★★★★★

WE SAY: Panasonic has produced its best enthusiast-level CSC to date. With a viewfinder, articulating touchscreen, lots of physical controls and Wi-Fi connectivity it has just about everything you could want.

> THE SPECS

Sensor	16.1Mp APS-C (23.5x15.6mm) format CMOS
Focal length conversion	1.5x
Memory	Memory Stick PRO Duo, Memory Stick PRO-Hg Duo, SD/SDHC/SDXC
Viewfinder	2,359,000-dot OLED Tru-Finder EVF
Video resolution	1920x1080 at 50p, 50i and 24p
ISO range	100 to 25600
Autofocus points	99 phase detection and 25 contrast detection
Max burst rate	10fps in Speed Priority mode
LCD	Three-inch, 921,600-dot tilting
Shutter speeds	1/4000 to 30 sec, plus Bulb
Weight	287g (body only)
Dimensions	119.9x66.9x42.6mm
Power supply	Lithium-Ion NP-FW50 battery (supplied)



CSC Sony NEX-6 > £585 (with 16-50mm lens) > www.sony.co.uk

Taking cameras to the NEX level

With a tilting screen, built-in viewfinder, pop-up flash and app compatibility, Sony's NEX-6 is trying to steal the CSC crown.

Angela Nicholson sees if it's worthy...

Sitting between the high-end 24Mp NEX-7 and beginner-to-enthusiast level 16.1Mp NEX-5R, the 16.1-million pixel NEX-6 is a compact system camera aimed at SLR and SLT customers who are looking for high image quality in a much smaller body. It's designed to give the enthusiasts the level of control they want, but at a more affordable price than the NEX-7.

FEATURES

Like the NEX-5R, the NEX-6 has Wi-Fi technology built in, which allows images to be shared direct from the camera to a computer or Smart Device. The camera is also compatible with applications that can be downloaded from Sony's PlayMemories camera apps service.

At present there's a fairly limited collection of apps available, but options such as Picture Effects, Remote Control and Direct Upload (to Facebook or PlayMemories Online) add extra functionality and flexibility, and Sony is planning to bring more out over time (see page 106 for more).

A couple of features distinguish the NEX-6 from the 5R that sits below it. First up there's a 2,359k-dot OLED electronic viewfinder (EVF) built in, offering an alternative to the three-inch 921,600-dot LCD screen for composing and reviewing images. There's also a pop-up flash (GN6 at ISO100) that can be used to provide a little extra illumination when needed, as well as a hotshoe that uses a standard design instead of Sony's proprietary fit so that it can accept

third-party flashguns. Extra contacts at the back of this shoe also make it useful for accepting other accessories.

Being aimed at enthusiast photographers, the NEX-6 features Program, Aperture Priority, Shutter Priority and Manual exposure modes, but there are also other options to suit less experienced photographers, including a collection of scene modes. Enthusiasts will appreciate that images can be saved in raw and/or JPEG file formats.

There's a collection of digital filter effects (Picture Effects) that can be applied to images as they are captured (with a preview in the EVF or on the

Above The Sony NEX-6 features a 2,359k-dot OLED electronic viewfinder

LCD), but disappointingly they can only be used when shooting JPEGs.

Videos can be shot in any exposure mode and it's possible to change aperture during filming, but you can expect to pick up the sound of settings changes being made, because there's no external microphone port.

BUILD AND HANDLING

Sony has employed its now familiar flat body and deep grip styling, making the NEX-6 instantly recognisable as an NEX camera. There's also the high-quality feel that we have come to expect from this level of camera.



A physical mode dial enables you to switch exposure modes quickly



The camera has a standard hotshoe as well as a pop-up flash



If you want to use the Picture Effects you can only shoot JPEGs



The tilting screen is no help when shooting upright images

Zooming in on the... Sony NEX-6

A quick tour of the camera's key features

◀ FEELING TREATED



This sensor detects when the camera is held to the eye, and the EVF is turned on while the LCD is switched off



This dial under the mode dial can be used to make quick settings adjustments



These buttons are customisable, so you can access all your favourite functions quickly



The metering, white balance, dynamic range optimisation, Creative Styles and Picture Effect settings are found in the Brightness and Colour section of the menu



◀ FEELING CHEATED

The textured covering across the grip and the back of the camera is very effective, and along with the deep finger-hold, this makes the NEX-6 extremely comfortable to hold one handed. In fact, we carried the camera by only the grip for a few hours during one stage of this test and had no use for the strap.

Unlike the NEX-5R, the NEX-6 has a mode dial on its top-plate for selecting the exposure mode. This dial has a high-quality feel, and although it doesn't have a lock its action is stiff enough to prevent it being from being knocked easily.

“Three disappointments with the LCD: it's a tilting unit, it can't flip over and it's not touch-sensitive”

Beneath the mode dial is another dial for adjusting settings such as aperture and shutter speed. This falls within reach of your right thumb and has click-stops that make it clear when you have made a setting change, but you may find your thumb rubs on the mode dial when you're using it.

Although image colour and contrast in the 2,359,000-dot EVF

doesn't always match the three-inch 921,600-dot LCD's, it provides a pretty decent view in most situations and is very useful in bright sunlight.

That said, we found the screen provides a clear view, and when set to its brightest level or its Sunny Weather option, it's even possible to see images on it in direct sunlight (at least in UK winter sunlight). However, we struggled to see the active AF point on several occasions as it doesn't stand out very well on the display in bright light.

It's worth noting that as well as brightening the screen, the Sunny Weather setting increases the LCD's local contrast, boosts its saturation and warms the image to the extent that we had to double-check that there wasn't a Picture Effect selected.

There are three disappointments with the LCD. Firstly, it's a tilting unit rather than a fully articulating device, so it's no help when shooting upright images from awkward angles. Also, it can't flip right up over the camera like the 5R's screen, so it doesn't allow you to compose self-portraits (there is a remote viewfinder app available if you have a smart phone though).

Meet the rivals...

See how the NEX-6 stands up against the competition



Olympus PEN E-P3
£599 (with 14-42mm lens)
A 12.1Mp Micro Four Thirds camera with a fixed touch screen, fast AF and raw and JPEG compatible Art Filters.
Issue reviewed: 116
Our score: 4/5



Sony NEX-7
£789 (with 18-55mm lens)
This CSC has 24.3Mp on its APS-C format sensor and superb build quality with lots of customisation options.
Issue reviewed: 120
Our score: 4/5

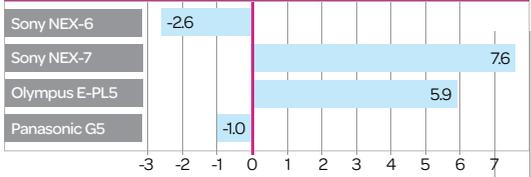


Panasonic G5
£429 (with 14-42mm lens)
A very capable 16Mp mini-SLR-styled Micro Four Thirds camera with articulating touchscreen.
Issue reviewed: 132
Our score: 4/5

COMPACT BENCHMARKS

See how the Sony NEX-6 fared in our tests

COLOUR ERROR Closest to zero is best



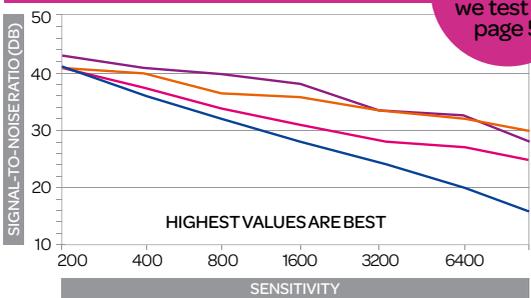
COLOUR ERROR RESULT: The NEX-6's colours may not always be accurate, but the images are pleasing straight from the camera

KEY

- Sony NEX-6
- Sony NEX-7
- Olympus E-PL5
- Panasonic G5

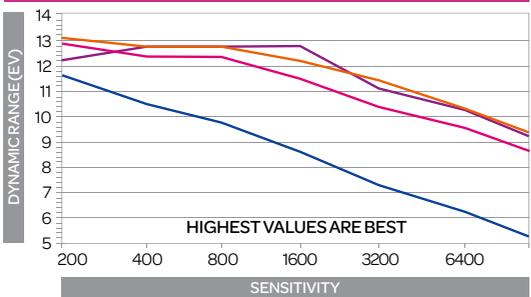
WHAT'S THIS?
Find out how we test on page 5

RAW NOISE (AFTER CONVERSION TO TIFF)



NOISE RESULT: Having a lower pixel count helps the NEX-6 beat the nevertheless impressive NEX-7 for signal-to-noise ratio

RAW DYNAMIC RANGE (AFTER CONVERSION TO TIFF)



DYNAMIC RESULT: The NEX-6's raw files compare better than its JPEGs for dynamic range, but neither disappoint

OVERALL BENCHMARK RESULT

The NEX-6's raw files (after conversion to TIFF) have a high signal-to-noise ratio, indicating that images are comparatively clean from noise. The JPEGs are more similar to images from the Panasonic G5, Sony NEX-7 and Olympus E-P3 at lower to middling sensitivities, perhaps reflecting the smoothing out of detail to reduce the impact of the noise that is present. At ISO1600 and above, however, the NEX-6 takes a clear lead.

⦿ The final issue is that the camera's screen is not touch-sensitive. This seems very strange given that the NEX-5R's screen is. It would be most useful for inputting Wi-Fi and Facebook passwords, as well as for setting the focus point.

The menu is typical NEX and pretty extensive, so it takes some getting to grips with, but it is generally logically arranged and divided into six sections.

Above Colours are vibrant, so vibrant purists might find them oversaturated

A Function (Fn) button next to the shutter-release can be used to access up to six commonly used settings. As it's not possible to use the Picture Effects when shooting raw files, we assigned the Picture Effects and Image Quality options to the function menu so that we could quickly make changes. We also accessed the HDR and Dynamic Range Optimizer (DRO) options via this route.

PERFORMANCE

On the whole images direct from the camera impress. They are well exposed, vibrant and full of detail. Image noise is well controlled up to around ISO3200, but we wouldn't recommend going above this value if you want to make A3 prints unless you are prepared to process the raw

files post capture. At ISO6400 JPEGs look slightly soft at A3 size and inspection at 100% on screen confirms the noise reduction system has smudged out some details. If the raw file is processed post-capture it's possible to produce a sharper image with a gritty texture that's preferable.

The hybrid autofocus system does a good job of locking onto the subject quickly, only struggling occasionally with particularly low-contrast subjects.

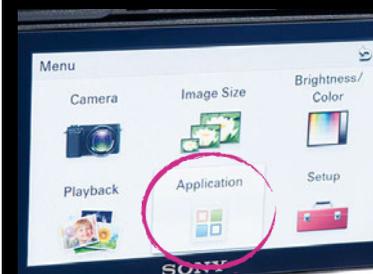
During this test we primarily used the 1,200-zone metering in its multi-purpose Evaluative mode and found it very reliable. It's not easily fooled into under- or over-exposure and manages to produce correctly exposed images even when there are quite large bright areas within the scene. That's not to say we didn't





Tech Briefing

Apps



Apps are applications that can be added to a device after sale to add extra features. They can be downloaded to the NEX-6 directly from Sony's PlayMemories camera app service using its built-in Wi-Fi technology, but you must create an account there first.

Six apps are currently available: Picture Effect+ (free), Bracket Pro (£3.99), Multi Frame NR (£3.99), Photo Retouch (free), Smart Remote Control (free) and Direct Upload (free). Direct Upload is good for uploading images to Facebook direct from the camera, while the Remote Control app allows you to compose images on your smart phone screen and adjust Exposure Compensation remotely.

occasionally resort to using the Exposure Compensation control, but no more often than we'd expect to.

When the scene has very high contrast the DRO and High Dynamic Range (HDR) modes come in handy. The DRO can be left to its own devices or you can specify the level, but even pushing it to Level 5 results in natural-looking images.

It has the strongest impact on the shadows, brightening them quite dramatically. In some instances we saw no impact at all on the brighter parts of the image, or they got a little brighter still.

Setting the HDR exposure difference to its maximum setting of 6EV produces a more classic

Above Using Auto HDR gave a natural result here, but it needed brightening

Below The textured covering of the grip and back of the camera works well

HDR effect, but it's pretty well done and a hand-holdable option despite the multiple image capture.

Colours are vibrant straight from the camera, and although they may be a little too saturated for some traditionalists, they suit the current vogue for punchy images. The Auto white balance system copes well with most conditions, but we found it best to use a custom shaded conditions and in mixed light.

Video from the NEX-6 has high visual quality, but the sound is limited by the internal mic, which is prone to picking up camera and operator noises.

OUR VERDICT

Sony had lots of critical success with the NEX-7, while the cameras in its NEX-5 range have always proven quite popular. Here, the company appears to be combining the high quality of the 7 with the popularity of the 5.

The NEX-6 extracts a lot of information from its 16.1-million pixel sensor and delivers images with lots of detail and attractive colours.

It's also an enjoyable camera to use, with the EVF providing an alternative means of composing images for those who prefer it, or when the lighting conditions dictate it. However, the fact that the LCD screen isn't as

versatile as the one on the NEX-5R is odd. It's also a shame that it's not a fully articulating device. Having a tilting screen encourages you to shoot from more interesting angles, but only helps with landscape-format images.

Sony has produced a very likeable, capable camera that's complemented well by the new powerzoom lens. Its controls can be customised to suit the photographer, it has helpful technology borrowed from a smart phone and it delivers images of impressively high quality. For many photographers that's more than enough, but some (like us) may look at the likes of the Panasonic G5 and ask why it can't have a similar screen. We want all the toys, so let us hope that Sony takes note for next time. 📷

Digital Camera

FEATURES



IMAGE QUALITY



BUILD QUALITY



VALUE



Overall ★★★★★

WE SAY: The NEX-6 is a great camera. The only thing holding it back from being bang up to date is that the screen only flips up rather than twisting around, and it's not touch-sensitive either.

> THE SPECS

Sensor	20.3MP APS-C format (23.5x15.7mm)
Focal length conversion	1.5x
Memory	SD/SDHC/SDXC
Viewfinder	No
Video resolution	Full HD (1920x1080p)
ISO range	ISO 100-25600
Autofocus points	352 (105 phase detection + 247 contrast detection)
Max burst rate	8.6fps (full-resolution)
LCD screen size	Tiltable 3.31-inch 768,000-dot AMOLED touchscreen
Shutter speeds	30-1/6000 sec plus bulb to 4 min
Weight	284g (body only)
Dimensions	122x63.7x40.7mm
Power supply	Rechargeable Li-ion (BP1130) supplied



CSC Samsung NX300 > £529 (with 18-55mm lens) > www.samsung.com

Mini marvel

The NX300 has an excellent user interface, slick handling, a 20.3MP sensor and Wi-Fi. **Nik Rawlinson** sees if it all hangs together

There's lots of action right now in the compact system camera (CSC) segment, which pairs compact camera bodies with interchangeable lenses for a DSLR-like experience without the internal mirror or associated bulk. It's an area where Samsung has been making steady headway with an expanding range of lenses and cameras with a few novel features.

The NX300 bears more than a passing resemblance to its older siblings, the NX210 and NX1000, having the same flat-top and curved front grip. However, inside is a 20.3MP sensor and a combined contrast and phase detection auto focus system, which Samsung claims can fix on your subject in 0.08 seconds. In addition, there's a maximum shutter speed of 1/6000 second, as well as raw shooting and an articulated touchscreen. It all sounds impressive, so let's take a closer look.

FEATURES

Samsung has put together two bundles – one with a traditional 18-55mm i-Function lens (equivalent to a 27.7-84.7mm range in 35mm terms) and one with a slightly shorter 20-50mm lens (30.8-77mm equivalent). We used the former in our tests.

The regular auto, scene and P/A/S/M modes are supplemented by Samsung's own Lens Priority. Experienced photographers will recognise this as a simpler rebranded Aperture Priority mode, which enables novices to forget all about f/stops. Instead, you work with a

simple defocus/sharpen slider, which you can drag on the touchscreen or move by twisting the focus ring on an i-Function lens. See the Tech Briefing box for more about this.

Sensitivity kicks off at ISO 100 and runs through to ISO 25600, with three stops of compensation in each direction, in 1/3EV steps. In the Samsung NX210 and NX1000, sensitivity was capped at ISO 12800, so this is an improvement.

Beginners will also appreciate that there are 14 scene modes, with the usual suspects – landscape, macro, panorama and so on – supplemented by more creative options for blurring moving water and shooting streaking headlights at night.

There's no dedicated movie mode, which is a plus in our book. You can shoot movies in any regular stills mode and won't risk missing a one-time shot the next time you switch back on because you left it set to the wrong mode.

Best-quality footage hits 60fps at 1920 x 1080, unless you've opted for Samsung's optional EX-S45ADW 3D lens (£399), in which case it's halved

Above A brushed metal top plate and provides some retro chic from the front

to 30fps. If that's a bit rich, you can trim the resolution as far as 320 x 240, and the frame rate to 24fps.

One notable omission from the NX300 is a built-in viewfinder, but owners of selected Samsung smartphones can use their mobile as a remote viewfinder and trigger the shutter without touching the camera.

BUILD AND HANDLING

The Samsung NX300 may be slightly heavier than its predecessors, but the body has a reassuring rigidity to it. It's capped by a brushed aluminium top plate. Access to the battery and card slot is through a flap beneath the grip, which is sufficiently offset from the mount point not to foul a tripod head, so you can change your battery or card without detaching it.

Around the back, the bright AMOLED screen is easy to use in direct sunlight. It's larger than most rivals' screen, stretching to 3.31 inches corner to corner. It's also mounted on a bracket, so you can tilt it up and down to reach more creative angles – and it's the first touch-sensitive screen in Samsung's enthusiast CSC

Zooming in on the... Samsung NX300

A quick tour of the camera's key features



A Wi-Fi connection allows images to be downloaded wirelessly



Samsung's control layout and interface are very well thought out



There's a flash in the box, but unfortunately it's not integrated



There's no viewfinder, nor a compatible external EVF

FEELING TREATED



This tilting 768,000-dot AMOLED screen provides a clear view seen in quite bright light

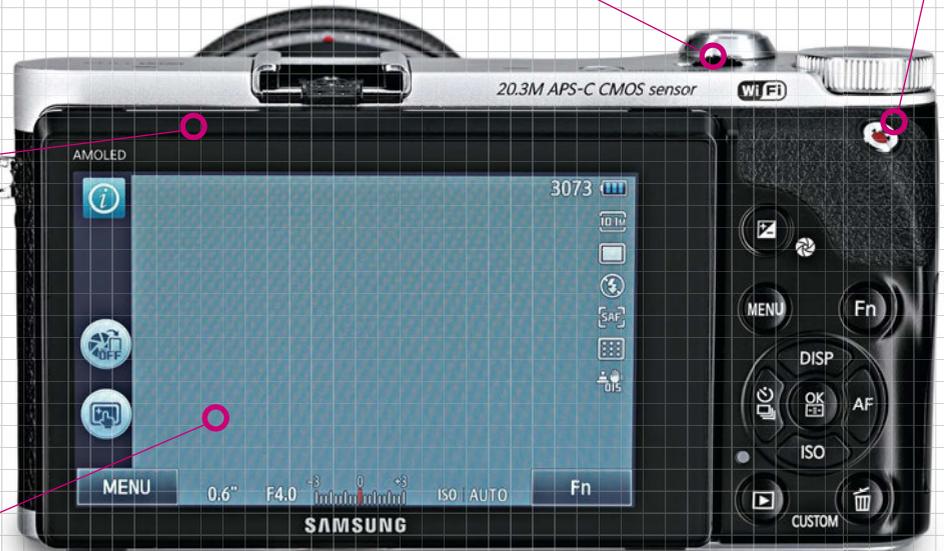


This dial is within easy reach for making quick settings adjustments and zooming in and out of images when they're reviewed

Pressing this easily accessible button starts and stops movie recording in any of the stills shooting modes



This screen gives speedy access to the Wi-Fi features including Mobile Link, Remote Viewfinder, Auto Back-up and Email



FEELING CHEATED

lineup. The screen mechanics feel like they should withstand plenty of folding in and out; Samsung has found a balance between making the screen smooth enough to easily adjust and firm enough to stay in place.

The regular full menus are clearly structured and organised across tabs. Each of the entries is large enough to accurately target with a fairly chunky finger, and any controls that need to be dragged are responsive.

As there's no external charger, the battery must be charged using the bundled adaptor, plugged in to the micro USB port on the side of the

“A dedicated Wi-Fi position on the mode dial enables you to access a range of functions”

body just below the accompanying HDMI output.

There's no reason why you also need to use the USB port to retrieve your images from the camera as, like the Samsung NX210 before it, the NX300 features Wi-Fi connectivity. Perhaps not surprisingly for a company with so much experience in building smartphones, it's been

extremely well implemented here. There's a dedicated Wi-Fi position on the mode dial that enables you to access a range of functions, including backing up shots to Microsoft SkyDrive or shooting direct to your PC or Mac. A direct link button on the top plate enables you to shortcut this mode, since you can program it to activate Wi-Fi and launch your preferred wireless function with a single press. For those with a suitably equipped tablet or smartphone, there's built-in Near Field Communication for contactless image sharing too.

The NX300's button and control layout can't be faulted, with the most commonly used options falling pretty much right beneath your fingers. However, although you can directly drag left and right on the screen to move through your images when playing them back, we miss the thumbwheel on the rear of the Samsung NX210, which required less lateral movement, and was a faster solution to navigating through shots.

The NX300 is capable of resolving lots of detail, but the kit lens doesn't make the best of the camera's pixel count. Generally, the camera produces

Meet the rivals...

See how the NX300 stands up against the competition



Sony NEX-5R
£479 with 16-50mm lens
This superb 16.1MP APS-C format CSC has a hybrid AF system, tilting touchscreen and Wi-Fi connectivity.
Our score: N/A
Issue reviewed: N/A



Olympus E-PL5
£449 with 14-42mm lens
This is uses the same 16.1MP Micro Four Thirds sensor as the excellent OM-D and has a tilting touchscreen.
Our score: 5/5
Issue reviewed: 133

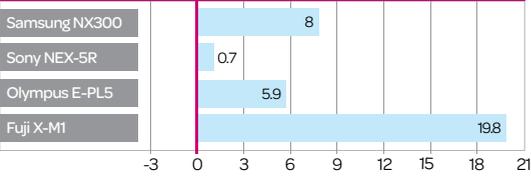


Fujifilm X-M1
£679 with 16-50mm lens
This CSC combines a 16.3MP low-pass filterless APS-C format sensor with a classic, solid design.
Our score: N/A
Issue reviewed: N/A

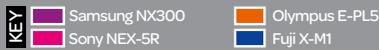
CSC BENCHMARKS

How does the NX300 fare against its rivals?

COLOUR ERROR Closest to zero is best

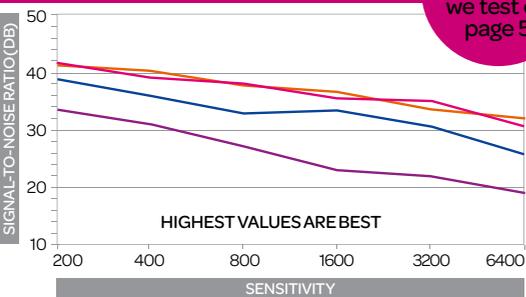


COLOUR ERROR RESULT: Although not the most accurate camera in the lab, the NX300 produces pleasant, vibrant looking images.



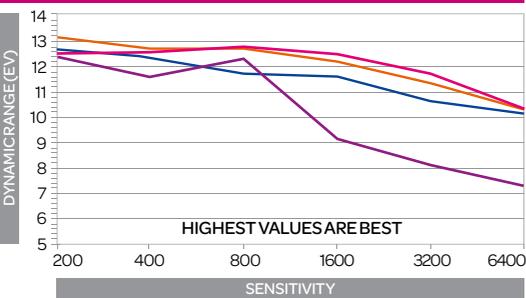
WHAT'S THIS?
Find out how we test on page 5

TIFF NOISE Highest values are best



NOISE RESULT: The NX300's relatively high pixel count appears to have a negative impact on its ability to control noise.

RAW DYNAMIC RANGE Highest values are best



DYNAMIC RESULT: Although good at lower sensitivities, the NX300's dynamic range drops sharply at ISO 1600 and above.

OVERALL BENCHMARK RESULT

The NX300 doesn't achieve much benefit from its higher pixel count sensor, as it is unable to resolve more detail than its 16MP competition at most sensitivity settings. Its 20.3 million pixels are also probably the reason why it is unable to beat the other cameras for signal to noise ratio and dynamic range: smaller photosites in sensors generally create weaker signals, which results in more noise and less dynamic range.

colours that are spot-on, whether images are shot in well-lit conditions or under overcast skies. Samsung claims a maximum autofocus speed of 0.08 seconds, courtesy of the NX300's combined phase detection and contrast AF system. This has 105 phase detection focus points and 247 contrast focus points, and performs well in general use, even in poor light. It was certainly fast out in the field, and up to the job of fixing on a

Above
Smart metering and other clever tech translates into some great shots



speeding rally car. The option to tap the screen to set the point of focus is much quicker than stepping between a limited number of points using buttons, so well done Samsung.

PERFORMANCE

The camera enables multi, centre-weighted and spot metering, with 221 metering points arranged across the frame. We found that the multi-metering system is generally accurate, performing well under both overcast and clear skies. It isn't foxed by strong contrasts such as a dark subject in front of an overcast sky. And even when the darker matter was the metered point, the sky remained textured and wasn't burned out.

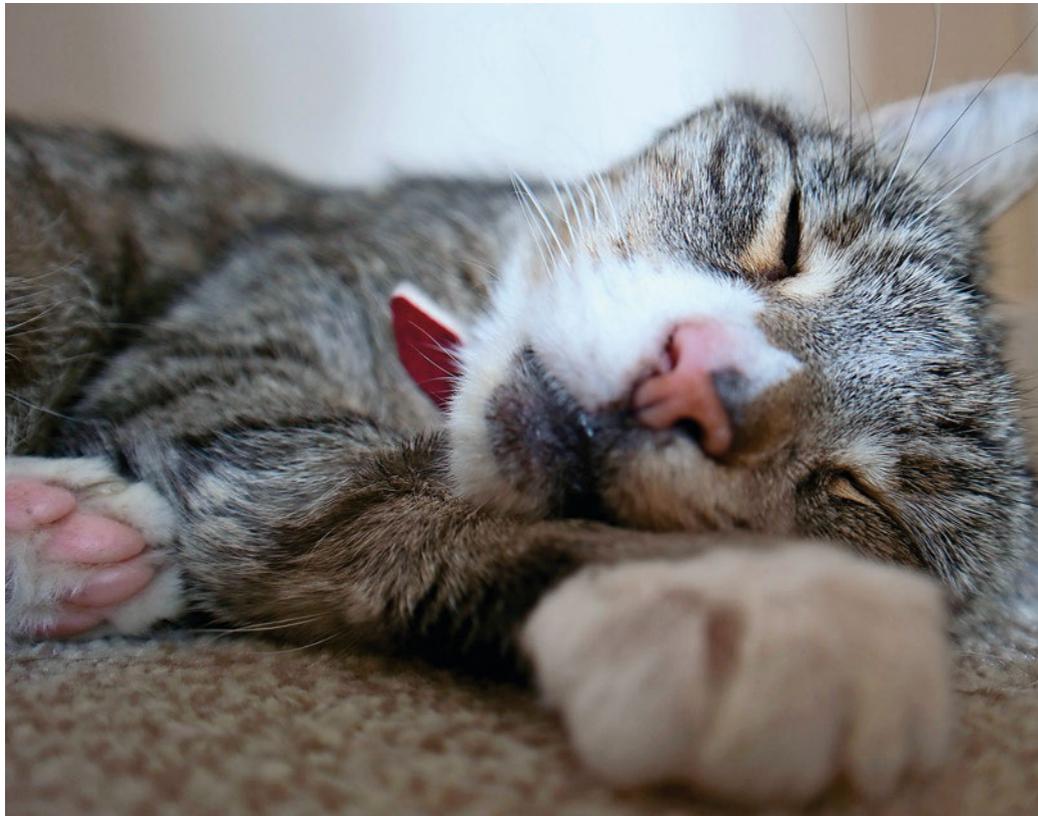
White balance is easily controlled through the lens using the iFn button

and focus ring. There are eight predefined light sources, including three different fluorescent settings, plus custom and manual options.

We performed the majority of our testing with the Samsung NX300 set to auto, but shot several frames with the camera set to the appropriate white balance option for comparison. The results were barely distinguishable from those achieved in auto, indicating that the camera does a good job on its own.

If you wish, the presets may be tweaked by adjusting the bias on a four-way scale for green, blue, magenta and amber, through seven steps in each direction.

The maximum sensitivity setting on the NX300 is ISO 25600, at which point there's naturally considerable



Tech Briefing
i-Function lenses



Samsung offers several i-Function lenses, including the 18-55mm lens available with the NX300. These optics have an iFn button on the side of the barrel. Pressing it calls up a context-sensitive menu, controlled by a twist of the focus ring at the end of the lens, through which you can dial in changes to shutter speed, aperture, white balance and so on.

Although not new, this is a great feature that puts all of the control functions in your left hand while leaving your right free to fire the shutter. Furthermore, you don't need to change how you're holding the camera body to navigate the shooting options. It's also key to the NX300's Lens Priority mode.

texture across the frame. However, you can comfortably take it to ISO 800 before you'll start to see any grain at 100% on screen – and even at ISO 3200, fine detail remains clear.

In most situations, it's therefore generally safe to leave the camera to make up its own mind about sensitivity and only restrain it manually if you're trying to achieve

Above Samsung's Lens Priority mode is essentially with a Aperture Priority in a simpler form using a sliding control

Below The i-Function lens system achieves impressive results

a particular outcome, such as forcing a long exposure at a wide aperture in gloomy surroundings.

If you're shooting raw and JPEG files side by side, you'll notice some slight smoothing taking place as part of the in-camera JPEG processing, which helps to reduce noise at middling sensitivities, but also softens off some of the detail at the shadow end of the scale.

VERDICT

Samsung has thrown just about every feature and top-end spec it could at the NX300, and it's really paid off. A large, vibrant screen, 20.3-million-pixel sensor, 1/6000 sec maximum shutter speed and best focus time of just 0.08 seconds should be more than enough to satisfy all but a very small number of ultra high-end users.

Image quality is also generally great and colours are accurate, although the kit lens doesn't get the best from the high pixel count.

Low-light performance is impressive too, which gives you the freedom to shoot in situations that might otherwise have given you pause for thought.

It's very clear that a lot of consideration has gone

into not only what the Samsung NX300 should do, but also how it should do it. You're never more than a couple of screen taps away from any particular setting.

Samsung's i-Function lens system continues to impress, with the new Lens Priority function allowing you to create spectacular images of the world around you and opening up a whole host of attractive short-depth-of-field photography options to less experienced users.

Don't assume this means that Samsung is dumbing down, though. This compact system camera will appeal just as much to the professional user as the beginner – and so should the bundled copy of the superb Lightroom software. 📷



Digital
Camera

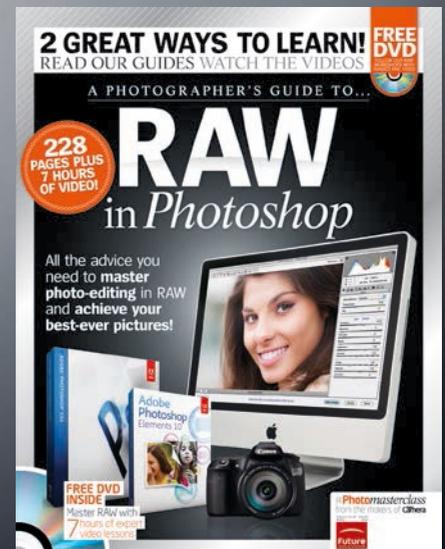
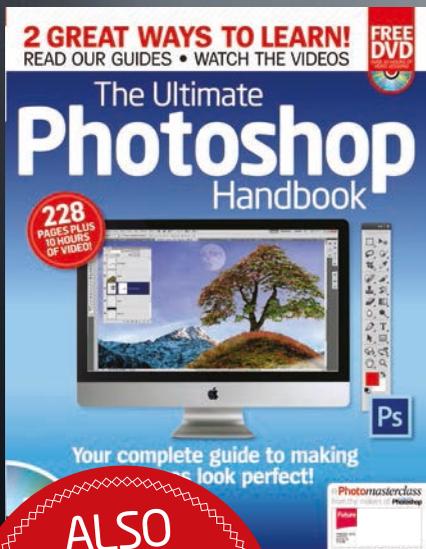
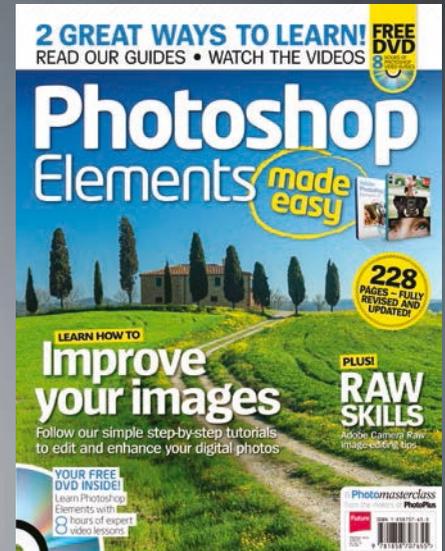
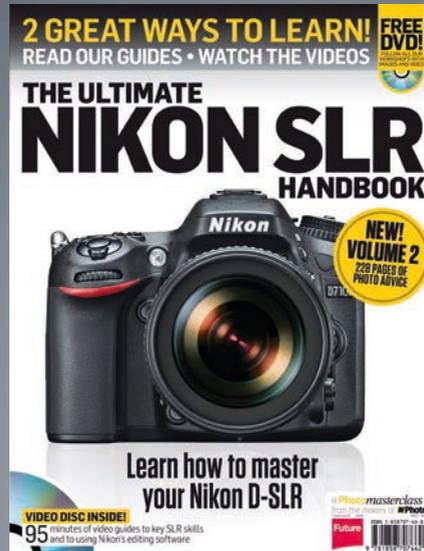
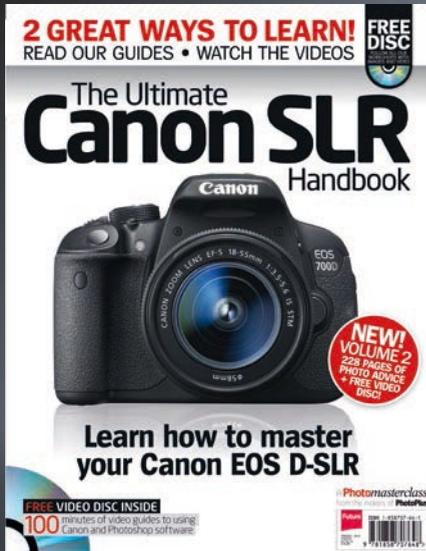
FEATURES	BUILD/HANDLING
★★★★★	★★★★★
IMAGE QUALITY	VALUE
★★★★★	★★★★★

Overall ★★★★★

WE SAY: Samsung has formulated the perfect combination of ease of use and great image quality inside an attractive, powerful camera, and packaged it all up with some great bundled software.

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Lenses and Accessories

Get kitted out with our guide to the best specialist lens for your SLR, not to mention memory cards, bags and much more!

An SLR without a lens is like a car without wheels – an exercise in unfulfilled potential. Indeed, serious photographers usually end up spending more on their lenses than they did on their original camera body. Even if you're a beginner, one of the best things you can do to improve the standard of your photography is to invest in a few decent specialist lenses. The 'kit' lenses that are supplied with cheaper SLRs are real jacks-of-all trades and masters of none; if you want to take better landscape shots, for example, or better portraits, you'll have to take the plunge and invest in the best kind of lens for these genres. So, in this section of the magazine, we reveal some of the best specialist lenses for enthusiast photographers. We kick off with ultra-wide angle lenses, which are great for capturing sweeping landscapes or large buildings, before moving on to 50mm portrait lenses. These are great value at the moment, and make it easy to blur the background while keeping your subject sharp. Finally, we find the best 'macro' lenses for detail-packed close-up shots, and the best superzooms. Superzooms are a great compromise if you don't want to lug around a heavy bag of lenses, as they offer both wide-angle and telephoto zoom capabilities. Last but not least, we reveal some of the best accessories, from memory cards to photo backpacks and beyond...



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Get the bigger picture

For landscape photographers keen to squeeze in more of the scene, an ultra-wide angle lens is a must buy. Matthew Richards is your guide

SLRs

Compact System Cameras

Jesse Wild

Lenses and Accessories



THE CONTENDERS

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- 8 Tokina 11-16mm f/2.8 AT-X 116 Pro DX AF, £530

MOUNT KEY



See which lens is available for your camera with this handy key. C is a Canon mount, N is Nikon, 4/3 is Four Thirds, P is Pentax, S is Sony and Sg is Sigma

SPECIAL AWARDS



To make this test as relevant as possible, we've created a special award to tell you which lens is best

5

4

Switch from the standard zoom on your SLR to an ultra-wide lens, put your eye to the viewfinder and prepare to be amazed. You can see so much more of the world around you, it's like ditching a pair of blinkers. From a photographic point of view, the creative possibilities are almost endless.

Let's start with the great outdoors. An ultra-wide lens enables you to capture sweeping landscapes complete with a vast expanse of dramatic sky, adding a real

wow factor. Indoors, they're equally useful. When you have literally got your back up against the wall and still can't squeeze enough into your shot, an ultra-wide lens allows you to see the bigger picture. But the advantages aren't just about shoehorning more of a scene into an image...

Ultra-wide lenses are able to dramatically alter perspective, which you can use to great creative effect. They can massively exaggerate the apparent distance between close foreground objects and the

background, which is ideal for making principal points of interest really stand out in a shot. Receding parallel lines also get a hugely pronounced converging appearance so, for example, you can shoot upwards in a cityscape and make skyscrapers look like they're leaning in for a huddle. But what are the key factors that you need to consider when choosing an ultra-wide lens?

KEEP IT SHORT

Differences of mere millimetres in focal length can have a big impact with this type of lens. This is especially true when you take the focal length multiplier (or crop factor) of most SLRs into account. For the lenses in this test group, Nikon, Pentax and Sony bodies have a crop factor of 1.5x, Canon has 1.6x and Olympus has 2x. For example, a 10-20mm lens will have an effective focal-length range of 15-30mm on a Nikon, 16-32mm on a Canon and 20-40mm on an Olympus.

Unlike with standard and telephoto lenses, every millimetre counts at the wide-angle end, as it can significantly broaden the angle of view. The Olympus 9-18mm has the outright shortest focal length of any lens in the group but, with the camera's 2x crop factor, the maximum angle of view is a relatively disappointing 100°. Meanwhile, a lens that zooms out to 10mm will give a wider angle of view, of about 109°, when

Kit anatomy Straight but not narrow

All the lenses on test are classed as 'rectilinear'. Distortions and perspective effects aside, this means that they aim to reproduce straight lines within a scene as straight in the image. For example, shoot a square box and it should look square in your picture. The alternative is a 'curvilinear' wide-angle lens. This is more commonly called

a fisheye lens, which gives a pronounced curvature to straight lines.

While almost all ultra-wide rectilinear lenses for APS-C and Four Thirds cameras are zoom lenses, fisheye optics are generally prime lenses. An exception is the Tokina 10-17mm fisheye zoom lens, which is available in Canon and Nikon mount options for APS-C bodies.

Right All of the lenses feature internal focusing, which means the front element won't rotate – essential if you want to attach an ND grad filter

Below The Tokina 10-17mm fisheye lens is one of the few fisheyes with a variable focal length



mounted on a Nikon, Pentax or Sony APS-C body.

A greater zoom range generally gives more versatility. However, most photographers tend to use ultra-wide lenses at or near their shortest focal length, where the wide-angle effect is most dramatic. The larger zoom range of, say, a 10-24mm lens

compared with a 10-20mm lens is therefore fairly superfluous. Even so, it's worth bearing in mind that when shooting at around 18mm with an ultra-wide lens, you're likely to get better image quality with less barrel distortion, compared with using a standard kit standard zoom lens at the same focal length.

How we test lenses Advice you can trust

We use a two-stage testing procedure for all lenses, which includes lab tests carried out under controlled conditions, as well as 'real-world' shooting.

Firstly, all lenses are fitted to mid-range cameras and used to take images of two test charts under studio lights. The results are processed using Imatest Master, so that we can quantify optical performance in terms of sharpness, chromatic aberrations and distortion. Image quality is assessed at the centre, edge and corners.

For real-world conditions, we use each of the lenses

under widely varying indoor and outdoor lighting conditions. Overall handling is checked, as well as the smoothness and precision of zoom and focus rings, and the operation of all the switches.

In addition to the aforementioned tests, we carefully check the speed and accuracy of autofocus systems, complete with operation of full-time manual override where available.

Once all this is complete, ratings are given for features, build quality, image quality and value for money.



INNER BEAUTY

All the lenses in this group feature fully internal focusing. This means that the front element neither rotates nor extends during autofocus or when focusing manually. Non-rotation of the front element is a bonus when using a graduated Neutral Density (ND) filter to darken skies, especially as there's often so much sky in ultra-wide landscape shots.

The same is true for polarising filters but, because the angle of view is so wide, the polarising effect can vary greatly in strength across the resulting image.

It's generally best to avoid polarisers with these lenses, especially at the wider end of the zoom range. Unlike the even wider-angle Sigma 8-16mm lens that we've reviewed previously, all these lenses



Above An ultra-wide angle lens can help to exaggerate the apparent distance between foreground objects and the background

can accept screw-in filters or adaptors for square filters.

As well as internal focusing, the Canon 10-22mm and Tokina 11-16mm lenses also have internal zoom mechanisms, so the lens doesn't extend at all throughout the entire zoom range. For other lenses in the group, there's only a minimal extension of a few millimetres as you go through the zoom range. It's certainly very much less than with most standard and telephoto zoom lenses. It's a good thing, because you can often be shooting very close to objects, to accentuate the perspective effect, so limited or no extension of the lens during zoom and focus helps to avoid any knocks, as well as minimising the risk of casting a shadow over what you're shooting.

Yet another bonus of internal focusing is that you can use a highly efficient, petal-shaped lens hood. A decent hood is a must for outdoor shooting because the wide angle of view, and the close proximity of the bulbous front element to the front edge of the lens, make these lenses particularly susceptible to extraneous light entering from oblique angles. This adds to the risk of ghosting and flare. All the lenses in this group come complete with a petal-shaped hood, apart from the Canon 10-22mm.

EQUIPMENT KNOW-HOW

FEATURES TO LOOK FOR

Check out the finer points of an ultra-wide zoom

Mounting plate

A step up in quality compared with many 'kit' zoom lenses that are supplied with entry-level SLRs, the mounting plate is made from metal rather than plastic in all of the lenses in this group test

Zoom range

Extra zoom range adds versatility, especially in standard and telephoto lenses, but it's relatively unimportant in ultra-wide lenses, which are most often used at or near their shortest focal length

Filter thread

Every lens in this group can take screw-in filters, or adaptors for square filter systems. The filter thread tends to be quite large, usually 77mm, and as much as 82mm in the case of the Sigma 10-22mm lens



Distance scale

A focus distance scale printed on the focus ring or beneath a viewing window is featured on all but the Olympus lens. It's useful for setting the hyperfocal distance in ultra-wide shooting (see below)

Autofocus system

Ring-type ultrasonic autofocus is quieter and generally faster than a basic electric motor. Some lenses have no built-in autofocus motor at all, and rely solely on a screw-drive from the camera

Lens hood

An efficient petal-shaped lens hood can be used because the front elements of these lenses don't rotate during focusing. As well as improving image quality, it helps to protect the front element from knocks

Hyperfocal distance Explained

Towards their shortest focal lengths, ultra-wide lenses can give an enormous depth of field, especially when using medium to small apertures. To maximise front-to-back sharpness in a scene as much as possible, manually adjust the focus to the hyperfocal distance. For example, shooting at a zoom setting

of 10mm and an aperture of f/11 with a Nikon, Pentax or Sony body, the hyperfocal distance would be 45cm. This will keep everything sharp from a distance of 22.5cm to infinity.

For a quick and easy way to calculate hyperfocal distances online, take a look at www.dofmaster.com (see page 123).



1 CANON EF-S 10-22MM F/3.5-4.5 USM

£499

Lightweight but with lots of features

Despite being one of the larger lenses in this test group, the Canon is also one of the lightest in weight. Thankfully, any ounces shed in its design haven't been at the expense of missing features, and build quality feels reasonably robust. Finery includes ring-type ultrasonic autofocus, Canon's 'Super Spectra' coatings to minimise ghosting and flare, and fully internal zooming and focusing.

Canon boasts that the circular aperture, based on rounded diaphragm blades, gives a pleasing background blur, although blurring the background can often be a challenge with any ultra-wide lens. There's no hood supplied with the lens and the genuine EW-83E hood will add £30 to the overall price. While the lens has got cheaper of late, this still grates.

PERFORMANCE

Handling is a dream, with a super-smooth action of the zoom and focus rings. Autofocus performance is amazingly fast and highly accurate, as well as being whisper-quiet. It also comes with full-time manual override in the One Shot autofocus mode on Canon bodies.

Image quality is less impressive, especially at the all-important 10mm end of the zoom range. Sharpness at the centre of the frame is the poorest of any lens in the group, and drops off even more towards the corners, where colour fringing can also be quite noticeable. Vignetting is also very evident at the largest available aperture throughout the zoom range.



Tech focus...
13 elements in ten groups, six diaphragm blades, closest focus distance of 24cm, 77mm filter thread, ring-type ultrasonic autofocus, physical dimensions of 84x90mm, weight 385g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★



2 NIKON AF-S DX 10-24MM F/3.5-4.5G ED

£660

A high-spec lens with a solid feel

Take a quick glance at this Nikon lens and it looks like a carbon copy of the Canon equivalent. There's the same arrangement of large zoom ring at the front end of the barrel, small focus ring at the rear, and handy distance scale neatly positioned beneath a viewing window. Further similarities include fast, practically silent ring-type ultrasonic autofocus, complete with full-time manual override.

Look closer and the most notable difference is the Nikon's bigger zoom range of 10-24mm. Even so, it's not a major difference once you take the crop factor of the respective manufacturers' APS-C bodies into account. The Nikon gives an effective zoom range of 15-36mm, whereas the Canon delivers 16-35mm. The physical size of the two lenses is similar, but the Nikon is 75g heavier and feels sturdier.



Tech focus...
14 elements in nine groups, seven diaphragm blades, closest focus distance of 24cm, 77mm filter thread, ring-type ultrasonic autofocus, physical dimensions of 83x87mm, weight 460g

PERFORMANCE

Despite its generous zoom range, vignetting is minimal throughout the zoom range, even at the largest apertures. Sharpness is excellent when shooting wide open at any zoom setting, which makes the Nikon ideal for handheld indoor and low-light photography. Sharpness doesn't increase much at medium apertures, but there's plenty of contrast and retention of fine detail.

Barrel distortion can be noticeable at the shortest focal length, as is often the case with lenses that have a larger-than-average zoom range. Autofocus is fast and accurate. This lens is a joy to use on any Nikon APS-C body.

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★



OLYMPUS ZUIKO DIGITAL 9-18MM ED F/4-5.6, £490

A downsized delight?

A common theme to Olympus lenses is that they're small and lightweight. This is due to the relatively small image circle required by Four Thirds sensors fitted to Olympus SLRs, which have a 2x focal length multiplier, or crop factor. As such, this 9-18mm weighs-in at 280g, just half the weight of the Tokina 11-16mm lens. It's a mere 73mm in length and has a smaller filter size than any other lens on test, at 72mm.

Features include an electronically linked, fly-by-wire-style focus ring. This enables full-time manual override of autofocus, the mode being selected via the camera body. Even so, the autofocus motor itself is of a basic micro-motor design. Disappointingly, a distance scale is completely lacking in the focusing system. Build quality feels solid, but the main letdown is the lens's effective zoom range of 18-36mm, which lacks ultra-wide potential.

PERFORMANCE

Autofocus is fairly quiet, but very slow in operation, especially compared with the ring-type hypersonic systems featured on the Canon and Nikon lenses. The manual focus ring works well to enable very precise adjustments.

Sharpness is poor at the largest apertures, which rise from f/4-5.6 through the zoom range. The lens gets into its stride at f/8, giving excellent resolution, and performance is good at very small apertures. Distortion is minor at the wide-angle end of the zoom range and almost non-existent at the longest 18mm focal length.



Tech focus...
13 elements in nine groups, seven diaphragm blades, closest focus distance of 25cm, 72mm filter thread, electric autofocus motor, physical dimensions of 80x73mm, weight 280g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

PENTAX SMC DA 12-24MM F/4 ED AL (IF), £750

One of life's constants

Like the Sigma and Tokina on test, the Pentax is a constant-aperture lens, so the largest aperture of f/4 remains available throughout the zoom range. That said, the Sigma is marginally faster at f/3.5 and the Tokina's maximum aperture is a whole stop faster at f/2.8.

Considering the high price of the Pentax, it's surprising there's no built-in autofocus motor. Instead, autofocus relies on a screw-drive from the camera body on which it's mounted. In other respects, there doesn't seem any skimping on build quality, as the lens feels very rugged and well put together. The zoom and focus rings are very smooth and precise, the latter linking to Pentax's Quick-shift system that enables full-time manual override of autofocus.

The minimum focus distance of 30cm doesn't let you get as close to subjects as other lenses in the test group, which all boast close-focusing to either 24cm or 25cm. A bigger disappointment is the poor maximum angle of view, with the shortest effective focal length of 18mm being the joint poorest in the group, along with the Olympus 9-18mm lens.

PERFORMANCE

For a screw-drive autofocus system, focusing is rapid, but it's very noisy and bangs into the end-stops quite alarmingly. Sharpness is average but consistent throughout the zoom and aperture ranges. However, barrel distortion is pronounced at ultra-wide zoom settings and colour fringing is very noticeable.



Tech focus...
13 elements in 11 groups, eight diaphragm blades, closest focus distance of 30cm, 77mm filter thread, no built-in autofocus motor, physical dimensions 84x88mm, weight 430g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★



° SIGMA 10-20MM F/3.5 EX DC HSM

£490

King of the independents

Packed with SLD (Super Low Dispersion), ELD (Extraordinary Low Dispersion) and aspherical lens elements, there's no shortage of quality materials in the Sigma lens. Like the Canon and Nikon lenses, it features ring-type ultrasonic autofocus, complete with full-time manual override and a distance scale beneath a window. Unlike on the Canon and Nikon lenses, the zoom and focus rings are reversed, so the zoom ring is at the rear of the lens barrel.

Available in a wide range of mount options, the lens gives an effective zoom range of 15-30mm on Nikon, Pentax and Sony bodies, 16-32mm on a Canon, and a less impressive 17-34mm on a Sigma body. A fairly fast maximum aperture of f/3.5 is available throughout the zoom range, the trade-off being that the filter thread is an oversized 82mm, compared with 77mm for nearly all the other lenses here (and 72mm for the Olympus).

PERFORMANCE

Despite having ring-type ultrasonic autofocus, focusing speeds are a little slow compared with the Canon and Nikon lenses. Operation of the focus ring is also quite stiff, both in manual focus mode and when overriding autofocus.

The Sigma delivers plenty of sharpness, which only really drops off towards the corners when using the largest aperture. Colour fringing is also impressively low, although there's a noticeable swing from barrel to pincushion distortion as you zoom from 10-20mm.



Tech focus...
13 elements in ten groups, seven diaphragm blades, closest focus distance of 24cm, 82mm filter thread, ring-type ultrasonic autofocus, physical dimensions of 87x88mm, weight 520g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★



SONY ALPHA DT 11-18MM F/4.5-5.6

£520

A bit of a bare-bones affair

Sony's 11-18mm lens hardly sets the world alight in terms of design and features. The modest 11-18mm zoom range is equivalent to 16.5-27mm on the company's SLR and SLT (translucent mirror) cameras. It lacks the ultrasonic autofocus system used in some of Sony's lenses and has no built-in autofocus motor. Like the Pentax lens, it relies on a screw drive from the camera body for autofocus actuation, but this model has no full-time manual override.

The largest available aperture shrinks at longer focal lengths, and at the widest zoom setting, this is the slowest lens in the group at f/4.5. On the plus side, it's quite a lightweight lens at 360g, despite using more optical elements in its construction than the others here.

PERFORMANCE

Autofocus is disappointingly slow and noisy. In manual focus mode the focus ring lacks smoothness and precision, giving you the feeling that you're still wrestling with the autofocus mechanism. Unlike the previous sample of this lens that we tested, this one fared much better in terms of sharpness at large apertures, throughout the lens's zoom range.

Colour fringing is poor and most noticeable at either end of the zoom range. Distortions are also clearly visible, which is disappointing considering the Sony's relatively small zoom range. There's better news when it comes to vignetting, as there's only minimal darkening of corners, even at the largest aperture settings.



Tech focus...
15 elements in 12 groups, seven diaphragm blades, closest focus distance of 25cm, 77mm filter thread, no built-in autofocus motor, physical dimensions of 83x81mm, weight 360g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★



TAMRON SP AF 10-24MM F/3.5-4.5 Di II LD ASP IF, £365

A lot of lens for the money

The cheapest lens in the group, the Tamron is only half the price of the Pentax. Even so, it's joint top of the class for zoom range, and proudly sports Tamron's SP (Super Performance) badge – reserved for the company's up-market lenses. Luxuries include a petal-shaped lens hood and smooth action of the zoom and focus rings.

Since this lens was designed, Tamron has launched PZD (Piezo Drive ultrasonic motor) and USD (ring-type UltraSonic Drive). Sadly, neither of these systems are fitted in any of the Canon, Nikon, Pentax and Sony versions of the 10-24mm. However, many Nikon users will be thankful for its built-in electric micro-motor. This makes autofocus possible on any Nikon SLR body, unlike with the Tokina lens.

PERFORMANCE

Even with its built-in micro-motor, autofocus is sluggish, but at least it's fairly quiet and very accurate. The Tamron is also super-sharp, right where you want it most – at the 10mm end of the zoom range. This is true even at f/3.5, making the lens a great low-light performer.

Colour fringing is only noticeable at the extreme corners of the frame, and then only at the 10mm end of the zoom range. Distortions aren't too bad, considering the oversized 2.4x zoom range, and vignetting is well controlled. The Tamron offers excellent image quality for such a budget-priced lens, but the fact that it outperforms a previous review sample raises concern's about Tamron's quality control.



Tech focus...
12 elements in nine groups, seven diaphragm blades, closest focus distance of 24cm, 77mm filter thread, electric autofocus motor, physical dimensions of 83x87mm, weight 406g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

TOKINA 11-16MM F/2.8 AT-X 116 PRO DX AF £530

A weighty beast with a pro feel

One of Tokina's 'Pro' lenses, the 11-16mm has a fast, constant aperture of f/2.8, which puts all of its competitors in the shade. Build quality feels similarly professional, combining toughness with smooth precision of the zoom and focus rings. The 560g weight reinforces the pro feel and makes for well-balanced use on heavier, upmarket Canon and Nikon bodies.

An autofocus micro-motor is included in the Canon edition of the lens but lacking on the Nikon version. Autofocus is still available on cameras like the Nikon D300s and D7000, thanks to the screw drive built into these bodies. However, there's no autofocus on the Nikon D3100 or D5100, or their predecessors, so focusing is a strictly manual affair. Where available, autofocus lacks full-time manual override, but a push-pull mechanism on the focus ring enables you to switch back and forth between autofocus and manual focus instantly.

PERFORMANCE

The fast f/2.8 largest aperture makes the Tokina a tempting choice for indoor and low-light photography, but sharpness is quite poor throughout the zoom range unless you stop down to f/5.6. Even at f/8, the Tokina's sharpness isn't particularly impressive.

There's more bad news in terms of colour fringing, which can be evident across most of the frame when shooting at any focal length. Barrel distortion is also clearly noticeable throughout the zoom range.



Tech focus...
13 elements in 11 groups, nine diaphragm blades, closest focus distance of 30cm, 77mm filter thread, electric autofocus motor for Canon, no built-in motor for Nikon, physical dimensions of 84x89mm, weight 560g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

IMAGE QUALITY IN FOCUS

CANON EF-S 10-22MM
F/3.5-4.5



NIKON AF-S DX10-24MM
F/3.5-4.5G ED



OLYMPUS ZUIKO DIGITAL
9-18MM ED F/4-5.6

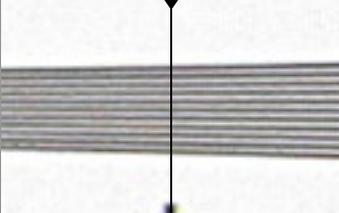


PENTAX SMC DA 12-24MM
F/4 ED AL (IF)



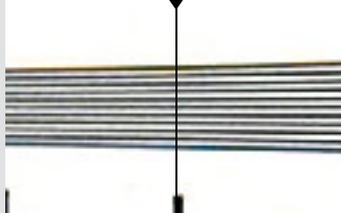
SHARPNESS TEST

ISO200



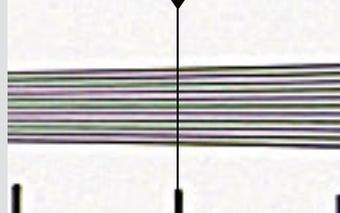
Sharpness is poor, especially at the 10mm end of the zoom range, where it has the lowest resolution scores in the whole group.

ISO200



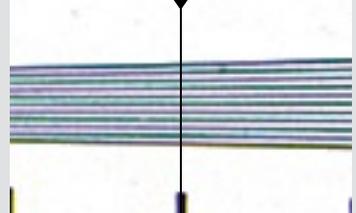
With good resolution at its largest apertures, this is great for low-light shooting, but sharpness doesn't increase much at medium apertures.

ISO200



There's not much sharpness on offer at the largest apertures throughout the zoom range, but plenty to be had if you stop down to f/8.

ISO200



Sharpness is average but consistent throughout the zoom range at all aperture settings, although it does drop off a bit at the corners at f/4.

FRINGING TEST

22mm



It's not much of an issue at the frame's centre, but colour fringing is noticeable towards the corners, especially at the 10mm focal length.

24mm



There's almost no colour fringing to be seen in the 10-15mm section of the zoom range, and only slight red fringing towards the corners at 24mm.

18mm



There's a bit of red colour fringing throughout the zoom range, most noticeably around high-contrast edges towards the edges of the frame.

24mm



Colour fringing is clearly noticeable across most of the frame and very poor in the corners, especially in the wider half of the zoom range.

DISTORTION TEST

10mm



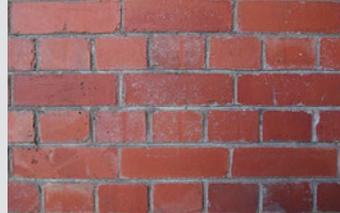
Barrel distortion is fairly low at 10mm, rising to slight and medium pincushion as you go through the 17-22mm part of the zoom range.

10mm



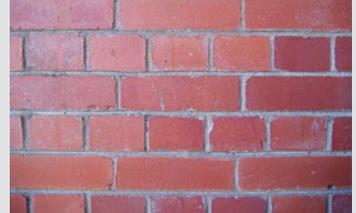
Barrel distortion at the 10mm focal length and pincushion at 24mm are pronounced but regular, making them easy to correct at the editing stage.

9mm



Barrel distortion is well controlled at 9mm, even better at mid-range zoom settings, and practically non-existent at the longest 18mm focal length.

12mm



There's some barrel distortion at every available focal length but, as expected, it's by far the worst at or near the 10mm zoom setting.

IMAGE TEST VERDICT

The Canon has very good build quality and handling, but optical performance is disappointing, especially considering you can get cheaper alternatives.



IMAGE TEST VERDICT

Lab test scores are decent, and this lens delivers excellent image quality in practically any shooting conditions, even at its largest apertures.



IMAGE TEST VERDICT

The Olympus acquits itself well, with impressive performance in all aspects of image quality, so long as you're willing to avoid large aperture settings.



IMAGE TEST VERDICT

Performance is reasonable but nothing special. Image quality is disappointing overall, considering this is the most expensive lens in the group.

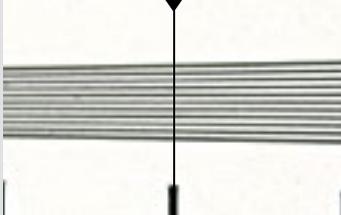


SIGMA 10-20MM
F/3.5 EX DC HSM



ISO200

24



Levels of sharpness are impressive overall, but drop off slightly when using the largest aperture in the 10-14mm section of the zoom range.

20mm



Taking the whole zoom range into account, the Sigma gives the best and most consistent performance for fringing of any lens on test.

10mm



Pincushion distortion is on a par with the Nikon at the long end of the zoom range, but barrel distortion isn't too bad at shorter focal lengths.

IMAGE TEST VERDICT

The Sigma delivers very good image quality, and it's a consistent performer throughout its whole zoom and aperture ranges.

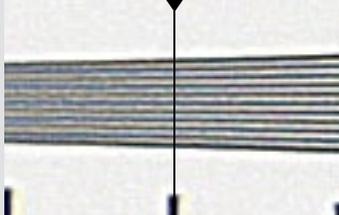


SONY ALPHA DT 11-18MM
F/4.5-5.6



ISO200

20



Centre sharpness is excellent at large apertures throughout the zoom range, and only really starts to drop off at f/16.

18mm



Outside the central region of the frame, colour fringing can be very noticeable at all focal lengths, but is poor at both ends of the zoom range.

11mm



Barrel and pincushion distortions at wide and narrow ends of the zoom range aren't impressive, given the lens's relatively short zoom range.

IMAGE TEST VERDICT

A good performer for centre sharpness, but is let down by pronounced colour fringing and distortion, considering its relatively small zoom range.

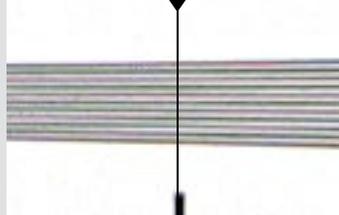


TAMRON SP AF 10-24MM
F/3.5-4.5 Di II LD ASP IF



ISO200

24



Considerably better than with previous review samples; sharpness is excellent and remains very impressive even at large apertures.

24mm



There's some red colour fringing at 10mm in the corners of the frame, but at longer focal lengths chromatic aberrations are tamed.

10mm



Considering the extra-large zoom range in common with the Nikon, this has less distortion at 10mm, but there's noticeable barrel distortion.

IMAGE TEST VERDICT

Image quality is good at all apertures and zoom settings, which is impressive given how much cheaper the Tamron is than most of its competitors.

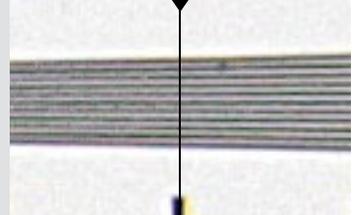


TOKINA 11-16MM F/2.8
AT-X 116 PRO DX AF



ISO200

22



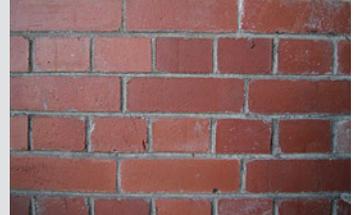
Average at f/8, the Tokina's sharpness is disappointing at larger apertures. At least it's consistent throughout the zoom range.

16mm



Cyan and magenta colour fringing are very much in evidence throughout the zoom range, and across most of the frame.

11mm



Despite having the most meagre zoom range here, barrel distortion is fairly pronounced at all focal lengths, and clearly visible at 11mm.

IMAGE TEST VERDICT

The lack of sharpness at f/2.8-4 negates the advantage of being a fast, constant-aperture lens. Fringing and distortion are also quite poor.



LENS BENCHMARKS

See how each lens performed in our lab tests

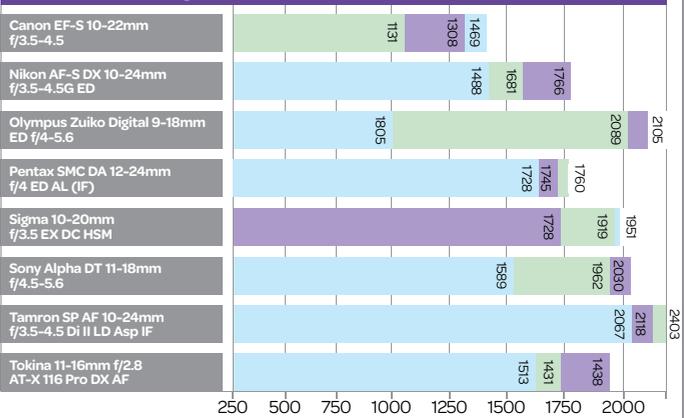
For outright sharpness at its widest zoom setting, the Tamron takes top honours, and continues to score highly throughout the rest of its zoom range. That's no mean feat considering that, along with the Nikon, it has the joint biggest zoom range in the group.

The Tamron's colour fringing is also impressively low, and is only really noticeable at or near the 10mm focal length. The downside is that barrel distortion remains quite considerable, even at the 24mm end of the zoom range. The Olympus has less barrel distortion at its widest setting, and there's almost no distortion at the 18mm end. It scores well for sharpness, but the wide-angle potential suffers when you take the format's 2x crop factor into account.

The Pentax, Sony and Tokina lenses are all let down by fringing, while the Canon is far from pin-sharp, especially towards frame edges. For consistency throughout zoom and aperture ranges, the Nikon has the edge, despite some distortion at the 10mm end.

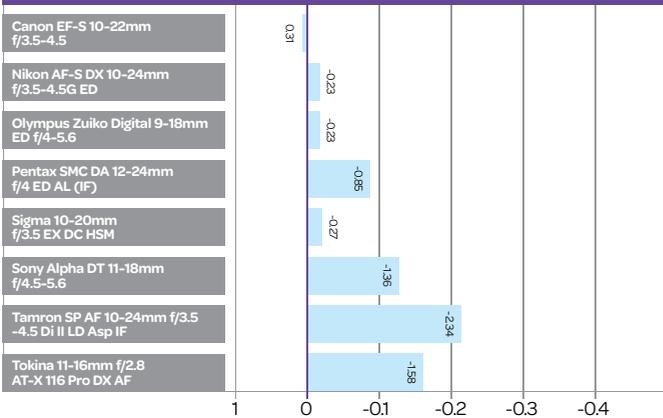
WHAT'S THIS?
Find out how we test on page 5

SHARPNESS High scores are better



These resolution figures indicate sharpness at the shortest, medium and longest focal lengths, measured at the centre of the frame at f/8

DISTORTION Closer to 0 is better



Negative/positive figures indicate barrel/pincushion distortion. The amount and type can vary across the zoom range. Results are from the mid-range

FRINGING Low scores are better

Lens	Wide	Mid	Max
Canon EF-S 10-22mm f/3.5-4.5	2.53	1.69	1.3
Nikon AF-S DX 10-24mm f/3.5-4.5G ED	0.63	0.73	1.63
Olympus Zuiko Digital 9-18mm ED f/4-5.6	1.4	1.85	1.49
Pentax SMC DA 12-24mm f/4 ED AL (IF)	4.08	3.38	2.49
Sigma 10-20mm f/3.5 EX DC HSM	0.8	0.41	0.85
Sony Alpha DT 11-18mm f/4.5-5.6	3.34	2.43	4.08
Tamron SP AF 10-24mm f/3.5-4.5 Di II LD Asp IF	1.57	0.45	0.53
Tokina 11-16mm f/2.8 AT-X 116 Pro DX AF	2.89	2.63	2.65

Higher figures indicate larger amounts of fringing, which is most noticeable towards the corners of the frame. These results are for corners shot at f/8

HOW THE LENSES COMPARE



	Canon EF-S 10-22mm f/3.5-4.5 USM	Nikon AF-S DX 10-24mm f/3.5-4.5G ED	Olympus Zuiko Digital 9-18mm ED f/4-5.6	Pentax SMC DA 12-24mm f/4 ED AL (IF)	Sigma 10-20mm f/3.5 EX DC HSM	Sony Alpha DT 11-18mm f/4.5-5.6	Tamron SP AF 10-24mm f/3.5-4.5 Di II LD Asp IF	Tokina 11-16mm f/2.8 AT-X 116 Pro DX AF
Contact	www.canon.co.uk	www.nikon.co.uk	www.olympus.co.uk	www.pentax.co.uk	www.sigma-imaging-uk.com	www.sony.co.uk	www.tamron.eu/uk	www.tokinallens.com
Street price	£499	£660	£490	£750	£490	£520	£365	£530
Mount options	C	N	3	P	C N P S Sg	S	C N P S	C N
Minimum focus	24cm	24cm	25cm	30cm	24cm	25cm	24cm	30cm
Autofocus motor	Ultrasonic (ring)	Ultrasonic (ring)	Electronic	None	Ultrasonic (ring)	None	Electronic	Electronic (C only)
Focus distance scale	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Filter size	77mm	77mm	72mm	77mm	82mm	77mm	77mm	77mm
Included accessories	None	Hood & pouch	Hood	Hood	Hood & pouch	Hood	Hood	Hood
Dimensions (DxL)	84x90mm	83x87mm	80x73mm	84x88mm	87x88mm	83x81mm	83x87mm	84x89mm
Weight	385g	460g	280g	430g	520g	360g	406g	560g
FEATURES	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
BUILD QUALITY	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
IMAGE QUALITY	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
VALUE	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
OVERALL	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆

THE DIGITAL CAMERA VERDICT

NIKON LEADS A CLOSE-RUN RACE

Despite a strong showing from the independent manufacturers in this group, Nikon provides the best all-round ultra-wide package

With its sturdy build, and refinements that include fast and practically silent ring-type ultrasonic autofocus, the Nikon 10-24mm handles well. Sharpness and contrast are excellent, giving sharp detail in landscape images, while impressive resolution at its largest apertures make it ideal for handheld shooting of interiors and low-lit scenes.

The Canon and Sigma lenses also feature ring-type ultrasonic autofocus but, while the Canon's autofocus is as quiet and fast as the Nikon's, the lens itself lacks sharpness, and

colour fringing can be noticeable towards the corners of the frame. The Sigma lens's image quality is better, but autofocus is slower and the manual focus ring is quite stiff. Even so, we prefer the Sigma on Canon bodies.

Tamron serves up the biggest surprise of the group. At just half the price of the Pentax lens and about £150 less than the Sony, it outstrips both of these lenses in terms of image quality. Sharpness is excellent, colour fringing is well controlled and distortions are manageable. It also performs better than the

Tokina 11-16mm in all these respects. That said, a previous sample failed to match this performance, suggesting that there may be some variation between individual lenses.

The Pentax's performance doesn't live up to its high price. Along with the Sony, colour fringing is very noticeable, and both lack an internal autofocus motor, relying on a screw-drive from the camera body. The Olympus fares rather better, with very good sharpness if you avoid the largest aperture settings, and distortions are minimal. **📷**



SIGMA 10-20MM £490

What's good: All the refinements of the Canon lens, but with better image quality.

What's bad: Autofocus isn't as quick as the Canon and the focus ring is a bit stiff.

Our verdict: It's much cheaper than the Canon lens, but image quality is superior.



Digital
Camera
OUR TEST
RESULTS
The best ultra-wide
lenses for your
camera revealed...



TAMRON SP AF10-24MM £365

What's good: Superior image quality to Pentax's lens, at half the price.

What's bad: Lacks the Quick-shift manual focus override of the Pentax lens.

Our verdict: A real money-saver for Pentax shooters, with a wider angle of view.



NIKON AF-S DX 10-24MM £660

What's good: Superb build, great overall image quality, excellent handling.

What's bad: It's not the outright sharpest lens in the group.

Our verdict: Ideal for everything from interiors to sweeping landscapes.



OLYMPUS ZUIKO 9-18MM £490

What's good: Optical image quality is mostly very good and it's sensibly priced.

What's bad: Poor sharpness at large aperture settings, sluggish autofocus.

Our verdict: Choice is limited for Four Thirds lenses, but this one's well worth the money.



TOKINA 11-16MM £530

What's good: Sharper than the Sony at its widest zoom setting, with less fringing.

What's bad: Distortions are more noticeable than with the Sony 11-18mm.

Our verdict: A great buy, but the Sigma 10-20mm f/3.5 is also well worth considering.





Don't dismiss 50mm lenses as a relic from the film age. As Matthew Richards discovers, they're great for digital, too...

THE CONTENDERS

- 1 Canon EF 50mm f/1.4 USM, £280
- 2 Canon EF 50mm f/1.8 II, £79
- 3 Nikon AF-S 50mm f/1.4G, £290
- 4 Nikon AF-S 50mm f/1.8G, £155
- 5 Pentax SMC DA 50mm f/1.8, £220
- 6 Sigma 50mm f/1.4 EX DG HSM, £350
- 7 Sony 50mm f/1.4 AF, £305
- 8 Sony DT 50mm f/1.8 SAM, £115

MOUNT KEY



See which lens is available for your camera with this handy key. C is a Canon mount, N is Nikon, 4/3 is Four Thirds, P is Pentax, S is Sony and Sg is Sigma

SPECIAL AWARDS



To make this test as relevant as possible, we've created a special award to tell you which lens is best for each camera system.





Those of us with sufficiently grey hair and elephantine memory might just remember a time when a standard lens for an SLR had a fixed 50mm focal length. Indeed, the early zoom lenses of the 1960s often had such dire image quality – loaded with distortions, flare and an almost complete lack of sharpness – that it took a long time for photographers to take them seriously.

Things are different now: it's almost unheard of for an SLR to be sold with anything other than an 18-55mm or similar kit lens. Sure enough, image quality is generally streets ahead of yesteryear's zooms. They typically deliver a useful range, stretching from wide-angle to short telephoto, and they're usually compact and light in weight.

FASTER IS BETTER

You can't beat the versatility of a zoom lens, but the compromise usually comes in terms of image quality. While kit zoom lenses and higher-quality standard zooms like the Canon 15-85mm and Nikon 16-85mm can offer good sharpness, distortions can still be a problem. Vignetting (darkened image corners) can also be problematic, especially when combining short focal lengths with wide apertures. But the biggest drawback, shared by all but the most expensive standard zoom lenses, is that the widest available aperture at focal lengths of around 50mm and beyond is about f/5.6.

So what's so good about having a faster standard 50mm prime lens? For one thing, it enables faster shutter speeds, which can be useful in dull shooting conditions. For example, where gloomy lighting using the

Kit anatomy More choices

Cameras like the popular Canon EOS 6D and Nikon D600 demonstrate that full-frame is trickling down from the professional sector to the consumer market. Even if you shoot with an APS-C format SLR at the moment, it's sensible to buy lenses that are full-frame compatible where possible. It doesn't really work with wide-angle optics, but it

makes sense for standard, macro and telephoto lenses. It's a bit of a moot point for Pentax: the company hasn't yet produced a full-frame digital SLR body, although the Pentax 50mm is nevertheless a full-frame-compatible lens. It's actually only the Sony DT 50mm f/1.8 SAM lens that's specifically designed for APS-C bodies. It therefore

produces a smaller image circle than the other lenses in the group, and cannot fill the whole area of a full-frame image sensor. As with other Sony DT lenses, you can still use it on a full-frame body like the SLT A-99, but only in crop mode, which utilises just the central area of the sensor, equivalent in size to an APS-C sensor.



“A faster standard prime lens enables faster shutter speeds – useful in dull shooting conditions”

widest available aperture of a kit zoom lens would only enable shooting at, say, 1/15 of a second at ISO 100, a 50mm f/1.4 lens would enable a shutter speed of 1/250 of a second. That's really very good news for handheld shooting.

Most kit zoom lenses now have image stabilisation built in, or it's

available in camera bodies from the likes of Pentax and Sony. The requirement for fast shutter speeds in handheld shooting is no longer paramount, unless you need to freeze the action of people or objects that are moving around. Even then, given that current SLRs tend to offer such good image quality at high sensitivity settings, there's always the option of bumping up the ISO when you need faster shutter speeds.

SETTING THE STANDARD

There's still one thing that a fast prime lens can do that you can't replicate with a typical zoom. The wider aperture gives you a massive reduction in depth of field. It's great when you want to blur fussy backgrounds (or foregrounds) and make the main object in a composition really stand out. It's particularly good for portraiture, opening a whole new window of opportunity for many SLR owners, which we'll come to next.

A 50mm lens is often referred to as a standard lens. This is because, historically, they give a natural perspective on 35mm film

How we test lenses Advice you can trust

Our lens tests are based on a two-stage procedure. Firstly, lab tests are carried out, shooting two test charts under controlled lighting conditions. The results are processed using Imatest Master, so that we can quantify optical performance in terms of sharpness, chromatic aberrations and distortion. Overall quality is

assessed at the centre, edge and corners of the images. For this class of prime lens, we pay particular attention to the image quality at the widest available apertures, which is a key benefit of a fast prime lens compared with standard zoom lenses.

For real-world testing, we use each of the lenses under widely varying indoor and

outdoor lighting conditions. Overall handling is checked, along with smoothness and precision of control rings and switches. We also test the speed and accuracy of autofocus systems, complete with operation of full-time manual override where available. Ratings are given for features, build quality, image quality and value for money.



cameras – and the same is therefore true on full-frame digital SLRs.

It gives a nice immediacy to your photography. You see a composition you like, lift the camera to your eye, and shoot without the complexity of adjusting zoom length. However, due to the crop factor of cameras with APS-C format image sensors, a 50mm lens has an effective focal length of 75mm (80mm if you're using a Canon SLR).

This is absolutely perfect for portraiture, as it enables you to keep an ideal distance from the person you're photographing, so that they can feel comfortable and relaxed, without the camera being too up close and personal.

Another helpful by-product of shooting with a 50mm lens on an APS-C format body is that, along with the increased, effective focal length, the depth of field is further reduced. Again, this is another plus point for portraiture, but how does it work out in practical terms?

Let's assume you're taking a portrait from a distance of two metres, using a focal length of 50mm (75mm effective). With a typical 18-55mm kit lens, the widest

“A 50mm lens is absolutely perfect for portraiture”

available aperture of f/5.6 would give you a depth of field of 36cm. Shooting with a 50mm f/1.4 lens at its widest aperture, the depth of field shrinks to a mere 9cm. Focus on the subject's eyes and you'll find that even their ears can be starting to look soft.

The widest aperture of a 50mm f/1.8 lens is two-thirds of a stop slower but, even so, it enables a tight depth of field of just 11cm at a shooting distance of two metres.

One frustration here is that you often can't utilise the widest available aperture to gain a tight depth of field when shooting under bright, direct sunlight. This is because it's likely to require a shutter speed for a correct exposure that's faster than the camera can deliver, even at its minimum ISO setting.

The situation can be easily rectified, however, simply by fitting a Neutral Density (ND) graduated filter to the lens.

EQUIPMENT KNOW-HOW

FEATURES TO LOOK FOR

Check that everything on your wish list is present

Design and build

The difference in size and weight of competing lenses can be surprising. For example, the Sigma 50mm f/1.4 is more than 1.5x longer than the Canon 50mm f/1.8 lens, and nearly four times heavier.

Auto/manual focus

Ring-type ultrasonic autofocus is quick and near-silent, complete with full-time manual override. Some lenses only have basic electric motors, or autofocus that's driven from a motor in the camera body.

Diaphragm blades

The Canon 50-mm f/1.8 lens only has five aperture blades, while others in the group have between seven and nine. Extra blades typically result in a more circular aperture, enhancing the quality of defocused areas.



Lens hood

Another benefit of a non-rotating front element is that you can use efficient petal-shaped lens hoods. However, the front element is deeply recessed in some of these lenses, so a hood isn't essential.

Front element

f/1.4 lenses often have larger front elements than f/1.8 lenses, so require larger filters. In all of the lenses here, the front element doesn't rotate during focusing, making filters easier to use.

Widest aperture

An f/1.4 lens gives a widest available aperture that's two-thirds of a stop larger than an f/1.8 lens. The trade-off is that they're typically larger, heavier and considerably more expensive than other lenses.

Diaphragms Explained

The diaphragm is the part of the lens that expands or contracts to give wider or narrower apertures, respectively. In normal shooting, the diaphragm remains fully open even when narrow apertures are set, to enable clear, bright viewing in the viewfinder. The

diaphragm only shrinks to the preset aperture after fully pressing the shutter-release button, immediately prior to the shutter opening and during the actual exposure. Most SLRs have a depth of field preview button. By pressing this, the diaphragm closes to the preset value.



CANON EF 50MM F/1.4 USM £280

A refined but sensibly priced lens

Were money no object, you could get the L-series (Luxury) Canon 50mm f/1.2 lens, but it costs a monstrous £1,170. At a quarter of the price, the f/1.4 is much more affordable and a mere one-third of a stop slower. It offers some of the same attractions as the dearer lens, including an eight-blade diaphragm to give a rounded aperture, a focus distance scale positioned beneath a viewing window, and Super Spectra coatings to reduce ghosting and flare.

One bit of downgrading is that the autofocus system is based on an ultrasonic motor, rather than being ring-type ultrasonic. It's a bit slower and more audible, but quiet nonetheless. Unusually for an ultrasonic motor system, or Micro USM as Canon calls it, full-time manual override is available in One Shot autofocus mode. This is a feature usually reserved for Canon's ring-type USM and more recent STM (Stepping Motor) autofocus systems.

Build quality and specs are superior to the cheaper Canon 50mm f/1.8, also on test. The mounting plate is made from metal rather than plastic, and the f/1.8 lens lacks a focus distance scale. Typical of non-L-series Canon lenses, however, there's no lens hood supplied; the optional ES-71 II hood costs an additional £25.

PERFORMANCE

Relatively fast 50mm f/1.4 lenses often fail to give great sharpness at their widest available aperture, and this is no exception. It's pretty good by the time you hit f/2.8 and has a sweet spot at f/8. But even here, sharpness is slightly outclassed by most competing f/1.4 lenses.



Tech focus...
7 elements in 6 groups, 8 diaphragm blades, closest focus distance 45cm, 58mm filter thread, ring-type ultrasonic autofocus, physical dimensions 74 x 51mm, weight 290g

Digital Camera

FEATURES
★★★★★
BUILD QUALITY
★★★★★
IMAGE QUALITY
★★★★★
VALUE
★★★★★

OVERALL

★★★★★



CANON EF 50MM F/1.8 II £79

As cheap as it gets for a 50mm lens

You can't help but feel that Canon had to cut a few corners to build a lens that sells for just £79. Sure enough, it only has a plastic mounting plate, a basic electric micro-motor for autofocus and no distance scale. It's feather-light at 130g and feels a little flimsy in the hand. There's one less element in the optical design, compared with the Canon 50mm f/1.4 lens, and the diaphragm only has five blades, as opposed to eight.

The focus ring rotates during autofocus, but this doesn't cause any real handling problems. That's because the focus ring itself is positioned right at the front end of the lens, and it's tiny. The downside is that manual focusing is quite tricky, not only because of the smallness of the ring, but also because its action lacks any real precision.

At 52mm, the filter attachment ring is also small. This can be annoying for Canon shooters who already have kit zoom lenses like the 18-55mm and 55-250mm. These both have a 58mm attachment thread (as does the Canon 50mm f/1.4), so a step-up ring will be needed to use existing filters.

PERFORMANCE

Canon claims that the lens's 'virtually circular aperture diaphragm' gives a soft effect to defocused areas in images. However, defocused lights and bright spots take on a pronounced pentagonal appearance in anything other than wide-open shooting.

Looking on the positive side, sharpness and contrast are pretty reasonable for such an inexpensive lens.



Tech focus...
6 elements in 5 groups, 5 diaphragm blades, closest focus distance 45cm, 52mm filter thread, electric motor autofocus, physical dimensions 68 x 41mm, weight 130g

Digital Camera

FEATURES
★★★★★
BUILD QUALITY
★★★★★
IMAGE QUALITY
★★★★★
VALUE
★★★★★

OVERALL

★★★★★



NIKON AF-S 50MM F/1.4G £290

Great features and upmarket build

This Nikon is pretty much the same size, weight and price as the Canon 50mm f/1.4. The Nikon features ring-type ultrasonic autofocus instead of an ultrasonic motor, and has a nine-blade rather than eight-blade diaphragm. Build quality feels a bit stronger, and the Nikon adds a weather-seal ring on its metal mounting plate, which is absent in the Canon design.

Other little luxuries include a lens hood and carrying pouch, which you'd have to pay extra for with the Canon. The hood is a useful addition: while the front element is deeply recessed when shooting at its infinity focus setting, it moves forward toward the front of the lens barrel as you go through the focus range towards the minimum focus distance of 45cm. The focus distance itself is clearly visible in a scale that's positioned beneath a viewing window on the top of the barrel.

Typical of Nikon's ring-type ultrasonic autofocus lenses, there are M/A (manual-priority autofocus) and M focusing modes. M/A gives regular autofocus with full-time manual override, while M is for purely manual focusing. In practice, the focus ring enables smooth and precise adjustments in both focusing modes.

PERFORMANCE

Sharpness is particularly impressive at the widest available aperture of f/1.4 and improves steadily with diminishing apertures to around f/8 to f/11. The bokeh, or quality of defocused areas in images, is particularly smooth, helped by the nine-blade rounded diaphragm.



Tech focus...
8 elements in 7 groups, 9 diaphragm blades, closest focus distance 45cm, 58mm filter thread, ring-type ultrasonic autofocus, physical dimensions 74 x 54mm, weight 280g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

NIKON AF-S 50MM F/1.8G £155

Punches above its weight for the price

This lens doesn't feel like a poor relation to its f/1.4 counterpart. Design values include ring-type ultrasonic autofocus, a weather-seal on its metal mounting plate and a focus distance scale positioned beneath a viewing window. In all these respects, it's like a similarly sized but lighter version of the Nikon f/1.4 lens. Autofocus is quick and near-silent, and the fact that the focus ring is equally large, smooth and precise is good news. It also offers full-time manual override in single autofocus mode.

Dig a little deeper and there are some notable differences between the two Nikon lenses. The f/1.8 optic has one fewer element in its construction, and only has seven diaphragm blades compared with the nine blades of the Nikon f/1.4. Even so, that's two more blades than the Canon 50mm f/1.8 lens, producing a more rounded aperture. Then again, the Nikon f/1.8 is nearly twice the price of the Canon f/1.8 lens.

Included accessories consist of a lens hood and carrying pouch. As with the Nikon f/1.4 lens, the front element stretches closer towards the front of the lens barrel at short focus distances but, this time, it's still quite deeply recessed even at the minimum focus distance. The lens hood is therefore often unnecessary.

PERFORMANCE

The Nikon gives very good performance at the price, with impressive handling and all-round image quality. It's a much more refined option than the competing Canon lens, and excellent value for money if you don't need the extra two-thirds of a stop delivered by an f/1.4 lens.



Tech focus...
7 elements in 6 groups, 7 diaphragm blades, closest focus distance 45cm, 58mm filter thread, ring-type ultrasonic autofocus, physical dimensions 72 x 53mm, weight 185g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★



5 PENTAX SMC DA 50MM F/1.8 £220

A little bit pricey for an f/1.8 lens

Considerably more expensive than the other f/1.8 lenses in the group, the Pentax isn't especially strong on features. There's no internal autofocus motor, the lens instead relying on a screw-drive from a motor in the camera body to actuate autofocus. There's also no focus distance scale, and a lens hood isn't supplied. On the plus side, it's the most compact and lightest lens here and, despite weighing just 122g, build quality feels mostly very good. That said, the mounting plate is plastic, rather than metal, but the lens feels robust overall.

As well as featuring multi-coated elements, the front element has a protection coating to repel dust and water. It's a shame that the mounting plate doesn't also have a rubber weather seal, as with both of the Nikon lenses in the group.

Handling is a bit of a mixed bag. The camera-driven autofocus is fast, but noisy compared with most other lenses on test. The focus ring also rotates during autofocus and it's quite large, so you have to be careful not to foul its action with your fingers during handheld shooting. A bonus is that the lens features Pentax's Quick-Shift focus system, which enables full-time manual override.

PERFORMANCE

The Pentax has fairly minimal barrel distortion and does quite well at controlling colour fringing. Sharpness is good at f/1.8, impressive at medium apertures, and doesn't drop much at f/16. Overall image quality is pleasing, but the lens still seems overpriced.



Tech focus...
6 elements in 5 groups, 7 diaphragm blades, closest focus distance 45cm, 52mm filter thread, camera-driven autofocus, physical dimensions 63 x 39mm, weight 122g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★☆☆

OVERALL
★★★★★

6 SIGMA 50MM F/1.4 EX DG HSM £350

The Sigma's a full-fat 50mm lens

You can expect f/1.4 lenses to be bigger and heavier than their f/1.8 counterparts, but the Sigma really does go large in its design. At 505g, it's about twice the weight of some f/1.4 lenses on test, and up to four times the weight of the f/1.8 lenses. Meanwhile, its extra girth is reflected in its oversized 77mm filter thread, where most other 50mm f/1.4 lenses have a 58mm thread (55mm for the Sony). Extra weight isn't necessarily bad news, however: the Sigma feels well balanced when shooting on big, full-frame cameras.

As with the Nikon lenses here, autofocus is courtesy of a fast and whisper-quiet ultrasonic ring-type system. It's accurate, and full-time manual override is silky smooth, with a well-positioned and high-precision focus ring.

Build quality feels tough and dependable, although there are no weather seals fitted to the lens. In common with only the Nikon 50mm f/1.4 lens group, the Sigma features nine diaphragm blades, where most others have only seven. This helps to maintain a well-rounded aperture, from wide to medium settings. A petal-shaped lens hood and carrying pouch are supplied with the lens, both of which are of good quality.

PERFORMANCE

A bonus of the Sigma's large front element is that vignetting is fairly minimal, even when shooting at f/1.4 on a full-frame body. Bokeh is smooth and pleasant, but the lens is a bit of an under-achiever when it comes to image sharpness at wide apertures.



Tech focus...
8 elements in 6 groups, 9 diaphragm blades, closest focus distance 45cm, 77mm filter thread, ring-type ultrasonic autofocus, physical dimensions 85 x 68mm, weight 505g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★





SONY 50MM F/1.4 A £305

Remarkably compact for an f/1.4 lens

The Sony 50mm f/1.4's design follows the opposite path to the competing Sigma lens. Downsizing seems to be key, with a size and weight that's much more in keeping with f/1.8 lenses. It also has a relatively small filter thread of 55mm. Surprisingly, the lens itself is even smaller than Sony's 50mm f/1.8 lens, despite the fact that the f/1.4 is compatible with full-frame bodies, whereas the f/1.8 is designed exclusively for cameras with APS-C format sensors.

Sony has managed to squeeze in a focus distance scale, but the focus ring seems almost like an afterthought. It's small and placed at the forward end of the lens barrel, and has no knurling to assist a secure hold. That's not an altogether bad thing, however, as the focus ring rotates during autofocus.

Contributing to the fairly lightweight build of 220g is the absence of a built-in autofocus motor. Instead, autofocus needs to be driven from an in-camera motor via a screw-drive. As with the similar arrangement in the Pentax 50mm lens, autofocus is fairly fast, but the Sony is a little quieter. The minimum focus distance of 45cm, maximum magnification factor of 1.5x, and the provision of a seven-blade diaphragm are all par for the course.

PERFORMANCE

There's a noticeable darkening of image corners when using the lens at wide apertures on a full-frame body like the A99, but it's not too bad on APS-C format cameras. Sharpness and distortion levels are average for this class of lens, but colour fringing is relatively poor.



Tech focus...
7 elements in 6 groups, 7 diaphragm blades, closest focus distance 45cm, 55mm filter thread, camera-driven autofocus, physical dimensions 66 x 43mm, weight 220g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

SONY DT 50MM F/1.8 SAM £115

Cheap at a third of the price?

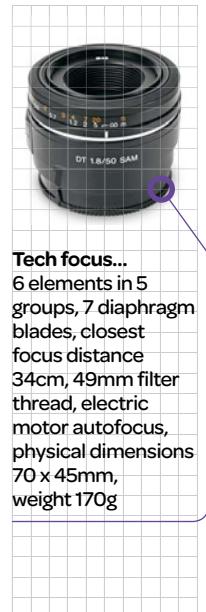
Compared with the Sony 50mm f/1.4, which is the second most expensive in the group, this f/1.8 lens costs little more than a third of the price. It's designed exclusively for cameras that feature APS-C format image sensors, so can only be used in crop mode on full-frame bodies like the Sony A99. It's quite small and lightweight, but feels a bit plasticky and, like the Canon and Pentax f/1.8 lenses, has a plastic rather than metal mounting plate. Unlike the Sony f/1.4 lens, the focus distance scale is printed on the focus ring (which rotates during autofocus), instead of being positioned beneath a viewing window. But at least it does have a focus distance scale, which is absent on the Canon and Pentax f/1.8 lenses.

Another difference between the Sony lenses is that this one's an SAM lens, with a built-in Smooth Autofocus Motor. It's a fairly basic electric motor and, on our A77 body, offered neither an increase in autofocus speed nor reduction in noise, compared with the f/1.4.

Whereas all other lenses in the group have a minimum focus distance of 45cm, this one focuses down to 34cm. As a result, the maximum magnification factor is slightly larger, at 0.2x rather than the more typical 0.15x.

PERFORMANCE

Sharpness is marginally higher than in Sony's more expensive f/1.4 lens, and colour fringing is better controlled. Vignetting on APS-C bodies is worse than with other lenses on test, which is no real surprise when all the others are full-frame compatible.



Tech focus...
6 elements in 5 groups, 7 diaphragm blades, closest focus distance 34cm, 49mm filter thread, electric motor autofocus, physical dimensions 70 x 45mm, weight 170g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

IMAGE QUALITY IN FOCUS

SLRs

Compact System Cameras

Lenses and Accessories

CANON EF 50MM
F/1.4 USM



CANON EF 50MM
F/1.8 II



NIKON AF-S 50MM
F/1.4G



NIKON AF-S 50MM
F/1.8G



SHARPNESS TEST

ISO 200

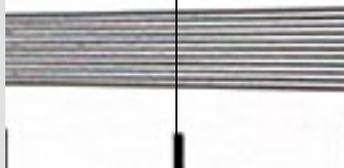
24



Good rather than exceptional, this is outclassed for sharpness by most other most other lenses in the group, at any given aperture.

ISO 200

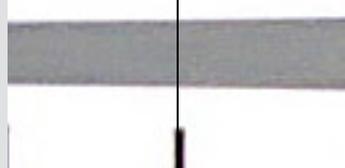
24



It's a close match for the Canon f/1.4 lens at most apertures, doing well in terms of sharpness for a relatively inexpensive lens.

ISO 200

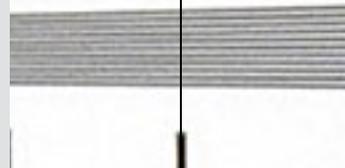
28



A strong performer. Even at its widest f/1.4 aperture, the Nikon f/1.4G maintains sharpness particularly well across the entire image frame.

ISO 200

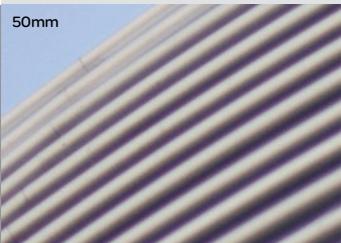
24



Sharpness at most apertures comes pretty close to the more expensive lenses in the group, although it drops off a bit at f/16.

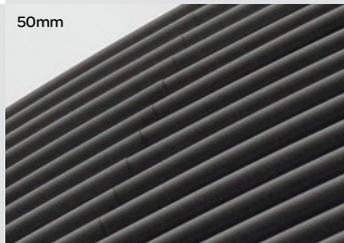
FRINGING TEST

50mm



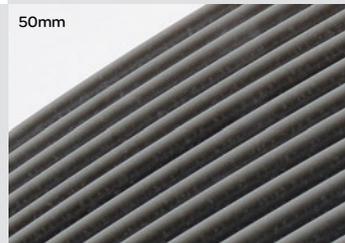
It's a little worse than from both Nikons. Fringing is more noticeable than from the Canon f/1.8 lens at medium to narrow apertures.

50mm



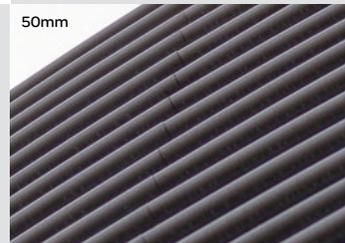
There's a little bit of colour fringing with this Canon at f/1.8, but it's well controlled throughout the rest of the aperture range.

50mm



Extremely low colour fringing is practically impossible to see in the vast majority of images, even in extreme corners of the frame.

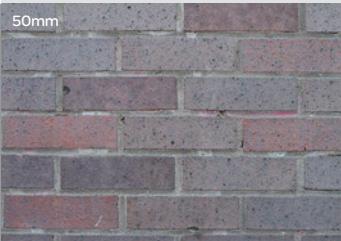
50mm



As with Nikon's more pricey 50mm f/1.4 lens, colour fringing is almost completely absent throughout the entire aperture range.

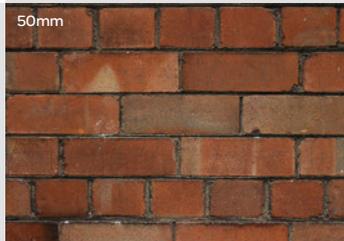
DISTORTION TEST

50mm



There's a little barrel distortion present; the Canon is a fairly average performer in this respect for a 50mm prime lens.

50mm



Barrel distortion is well restrained and is marginally less noticeable than in the Canon f/1.4 lens, but the difference is mostly negligible.

50mm



There's a little more distortion than with some lenses in the group but, in practice, it usually goes unnoticed in images.

50mm



There's minimal barrel distortion, which is difficult to spot in images. It outperforms the Nikon f/1.4 lens in this respect.

IMAGE TEST VERDICT

It's not a super-sharp lens, but image quality is good on the whole – and portrait-friendly, with a slightly dreamy look to f/1.4 images.



IMAGE TEST VERDICT

Bokeh isn't helped by the five-blade diaphragm, but image quality is pretty decent on the whole, considering the budget asking price.



IMAGE TEST VERDICT

Superb all-round performance in image quality is the main attraction of this lens, backed up by excellent handling and value for money.



IMAGE TEST VERDICT

We don't have any complaints about the Nikon's image quality, which is all the more remarkable considering the lens's affordable price.



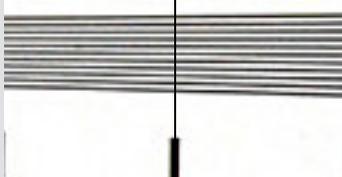


PENTAX SMC DA 50MM
F/1.8



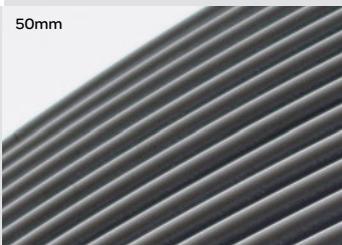
ISO 200

24



It pretty much equals the best lenses here at f/8, and the Pentax does well to retain good sharpness throughout its aperture range.

50mm



Only a little worse than the top-performing Nikon lenses on test; colour fringing is also fairly constant at all apertures.

50mm



There's only a little barrel distortion, the Pentax again offering good performance that beats some of the competition.

IMAGE TEST VERDICT

Image quality is impressive, but a lack of refined features and poor handling lets it down, considering it's so expensive for an f/1.8 50mm lens.

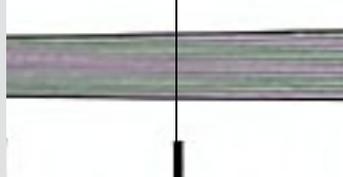


SIGMA 50MM
F/1.4 EX DG HSM



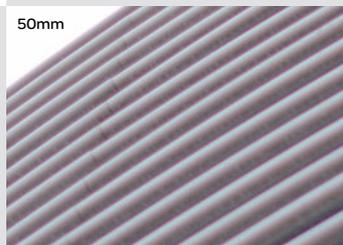
ISO 200

28



Outstanding at medium apertures, the Sigma is top of the group. However, it's relatively uninspiring at wide apertures.

50mm



Colour fringing can be noticeable at f/1.4, especially towards image corners, but it's well controlled at medium to narrow apertures.

50mm



Unlike every other lens on test, the Sigma produces pincushion rather than barrel distortion, but it's nevertheless not too noticeable.

IMAGE TEST VERDICT

Image quality is mostly excellent with particularly good peripheral illumination, but the relative lack of sharpness at f/1.4 is disappointing.

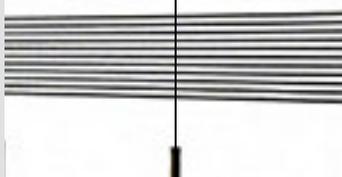


SONY 50MM
F/1.4 AF



ISO 200

22



Sharpness levels are average at f/1.4, but don't rise quite as high as with some of the best lenses here through the rest of the aperture range.

50mm



For colour fringing, the Sony f/1.4 is the worst lens on test. It can be quite noticeable towards edges and corners of images.

50mm



Slightly better than from the Sony f/1.8 lens; the small amount of barrel distortion is usually a non-issue in images.

IMAGE TEST VERDICT

With average sharpness and distortion, image quality is let down by noticeable colour fringing and vignetting on a full-frame body.

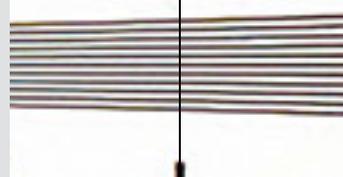


SONY DT 50MM
F/1.8 SAM



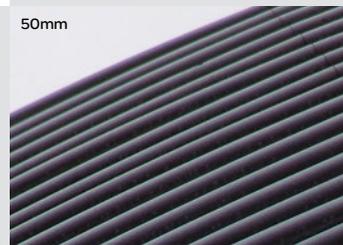
ISO 200

22



At any given aperture, sharpness is slightly better than with Sony's more expensive f/1.4 lens, and it's impressively sharp at f/8.

50mm



There's less colour fringing than in the Sony f/1.4 lens, but it's still the second-worst lens in the group at most apertures.

50mm



Distortion is only slightly worse than with most others (measured on APS-C format bodies), which is good for an APS-C specific lens.

IMAGE TEST VERDICT

Image quality is pretty good overall but vignetting is much more noticeable than when using full-frame optics on APS-C cameras.



LENS BENCHMARKS

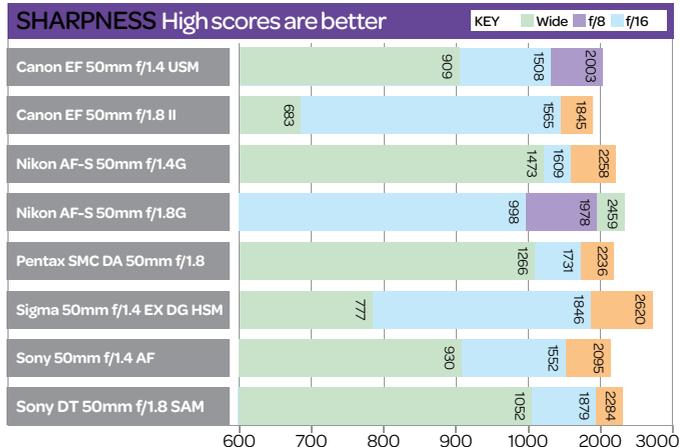
See how each lens performed in our lab tests

While it's all very well having an extra two-thirds of an f/stop available in an f/1.4 lens compared with an f/1.8 lens, if sharpness plummets dramatically at very wide apertures, the benefit comes at too high a cost, in terms of both overall image quality and financial outlay.

The Nikon 50mm f/1.4 lens does the best to retain sharpness while also keeping costs down to a very reasonable level. Both Nikon lenses in this group also earn top marks for control of chromatic aberrations or colour fringing. On the other hand, Sony languishes at the bottom of the group in this respect.

Distortions are well controlled in all the lenses on test. All but the independent Sigma 50mm f/1.4 exhibit slight barrel distortion, whereas the Sigma displays a little pincushioning. Unfortunately, both of the Sony lenses are rather disappointing in their tendency to produce vignetting or darkened image corners.

SHARPNESS High scores are better



The Nikon 50mm f/1.4 produces pin-sharp images, and maintains sharpness better than most throughout the entire aperture range.

DISTORTION Closer to 0 is better



The amount of barrel distortion is fairly similar for nearly all the lenses on test, while the Sigma bucks the trend with a little pincushion.

FRINGING Low scores are better

	Wide	f/8	f/16
Canon EF 50mm f/1.4 USM	0.51	0.7	0.81
Canon EF 50mm f/1.8 II	0.58	0.22	0.23
Nikon AF-S 50mm f/1.4G	0.22	0.14	0.11
Nikon AF-S 50mm f/1.8G	0.06	0.08	0.27
Pentax SMC DA 50mm f/1.8	0.51	0.34	0.63
Sigma 50mm f/1.4 EX DG HSM	1.41	0.18	0.17
Sony 50mm f/1.4 AF	2.73	3.53	3.12
Sony DT 50mm f/1.8 SAM	1.81	0.99	0.66

Both of the Sony 50mm lenses are relatively poor in terms of chromatic aberrations, with the Sony f/1.4 lens being the worst in the group.

HOW THE LENSES COMPARE

	Canon EF 50mm f/1.4 USM	Canon EF 50mm f/1.8 II	Nikon AF-S 50mm f/1.4G	Nikon AF-S 50mm f/1.8G	Pentax SMC DA 50mm f/1.8	Sigma 50mm f/1.4 EX DG HSM	Sony 50mm f/1.4 AF	Sony DT 50mm f/1.8 SAM
Contact	www.canon.co.uk	www.canon.co.uk	www.nikon.co.uk	www.nikon.co.uk	www.pentax.co.uk	sigma-imaging-uk.com	www.sony.co.uk	www.sony.co.uk
Street price	£280	£79	£290	£155	£220	£350	£305	£115
Mount options	C	C	N	N	P	C N % P S Sg	S	S
Aperture range	f/1.4 to f/22	f/1.8 to f/22	f/1.4 to f/16	f/1.8 to f/16	f/1.8 to f/22	f/1.4 to f/16	f/1.4 to f/22	f/1.8 to f/22
Autofocus type	Ultrasonic motor	Electric motor	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Camera driven	Ultrasonic (ring-type)	Camera driven	Electric motor
Minimum focus distance	45cm	45cm	45cm	45cm	45cm	45cm	45cm	34cm
Diaphragm blades	8 blades	5 blades	9 blades	7 blades	7 blades	9 blades	7 blades	7 blades
Filter size	58mm	52mm	58mm	58mm	52mm	77mm	55mm	49mm
Dimensions (DxL)	74 x 51mm	68 x 41mm	74 x 54mm	72 x 53mm	63 x 39mm	85 x 68mm	66 x 43mm	70 x 45mm
Weight	290g	130g	280g	185g	122g	505g	220g	170g
FEATURES	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
BUILD QUALITY	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
IMAGE QUALITY	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
VALUE	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
OVERALL	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆



THE DIGITAL CAMERA VERDICT

NIKON IS BEST FOR PERFORMANCE

The Nikon AF-S 50mm f/1.4G delivers premium performance at a competitive price, and the budget Nikon AF-S 50mm f/1.8G isn't far behind

Comparing all the lenses in the group, the Nikon 50mm f/1.4 stands out by maintaining excellent sharpness and contrast throughout its entire aperture range. Colour fringing is extremely well controlled and there's little distortion. Handling and build quality are very good and it's sensibly priced at £290, making it an outright winner. Nikon's f/1.8 lens is only about half the price,

yet has most of the same advanced features and refined handling, and still manages to give superb image quality. It's unbeatable value.

The Canon lenses lag a little behind Nikon's offerings. The f/1.4 is lacking in sharpness, especially at its widest aperture, although barrel distortion is marginally better controlled. The Canon f/1.8 is quite basic in terms of features and build quality, although it's inexpensive at just £79. The

Pentax 50mm f/1.8 delivers superior image quality and is well engineered, but its feature set is basic, especially as it costs £220.

The Sigma is the only independent lens here. It's larger and heavier than competing f/1.4 lenses, but gives very little darkening of image corners, even at its widest aperture. Unfortunately, sharpness is underwhelming at f/1.4. The Sony lenses are comparatively tiny but peripheral illumination is quite poor.



NIKON AF-S 50MM F/1.4G £580

What's good: Superb image quality, build and handling at a sensible price.

What's bad: Not the greatest when it comes to controlling barrel distortion.

Our verdict: It's the best all-round lens in the group and very good value.



Digital
Camera
OUR TEST RESULTS
The best 50mm lenses for your camera reveals



NIKON AF-S 50MM F/1.8G £400

What's good: Almost as good as the leading Nikon f/1.4 lens in all respects.

What's bad: Not quite as razor-sharp as the Nikon f/1.4, but not far behind.

Our verdict: An outstanding lens at an affordable price. Unbeatable value.



CANON EF 50MM F/1.4 USM £280

What's good: Upmarket build quality with nice handling and good image quality.

What's bad: A little lacking in sharpness and contrast at its widest aperture.

Our verdict: Not the sharpest tool in the box, but it's a good buy overall.



SIGMA 50MM F/1.4 EX DG HSM £350

What's good: Amazing sharpness at medium aperture settings; good peripheral illumination.

What's bad: Lacks sharpness at f/1.4, and is quite big and heavy for a 50mm lens.

Our verdict: It's the most expensive lens in the group but worth the money.



PENTAX SMC DA 50MM F/1.8 £220

What's good: Very compact and lightweight, impressive image quality.

What's bad: Relatively lacking in features, and the handling could be better.

Our verdict: Expensive for a fairly basic f/1.8 lens, but it performs well.



Macro marvels

Looking for a keenly-priced macro for autumn and winter? Matthew Richards finds eight of the best buys, starting from under £200



THE CONTENDERS

- 1 Canon EF 50mm f/2.5 Macro, £230
- 2 Canon EF-S 60mm f/2.8 Macro USM, £350
- 3 Nikon AF-S 40mm f/2.8G DX Micro, £195
- 4 Nikon 60mm f/2.8D AF Micro, £365
- 5 Olympus M.ZUIKO ED 60mm f/2.8 Macro, £450
- 6 Sigma 50mm f/2.8 EX DG Macro, £270
- 7 Sony 50mm f/2.8 Macro, £460
- 8 Tamron SP AF 60mm f/2 Di II Macro, £350

MOUNT KEY



See which lens is available for your camera with this handy key. C is a Canon mount, N is Nikon, 4/3 is Four Thirds, P is Pentax, S is Sony and Sg is Sigma

SPECIAL AWARDS



To make this test as relevant as possible, we've created a special award to tell you which lens is best for each camera system



6

2

1

3

Macro lenses are close-up specialists, usually offering a full 1x magnification factor at their closest focus setting. It's not always the case, though, as demonstrated by the Canon 50mm macro in this group, which only offers 0.5x magnification. The most popular focal length for macro lenses is around 100mm, especially on full-frame cameras. This enables you to keep a not overly threatening distance from bugs and other timid little creatures when you're shooting them. So why go shorter?

On cameras with APS-C sensors, a 50mm macro lens has an effective focal length of around 75-80mm. That's not only edging towards the

Kit anatomy Close-up options

Buying a macro lens isn't the only in-road to close-up photography. The cheapest alternative is to buy close-up filters, made by the likes of Hoya and Kood. These screw into the filter thread of a lens, their dioptre enabling closer focusing and greater magnification. They're available in different strengths and can be stacked for greater effect, although you can expect a progressive loss in image quality.

Another option is to fit extension tubes, which mount between the camera body and the attached lens. These don't contain any

glass elements, but simply move the lens further away from the camera. Again, they're available in different strengths, but cheaper versions don't feature any electronic connections between the attached lens and camera body, so autofocus and exposure metering are impossible.

Yet another alternative is a reversing ring. In this case, one lens is mounted to the camera, but a second lens is reversed and attached to the primary lens via the reversing ring. It's an unwieldy set-up, but can yield good results.

"These lenses should be super-sharp with negligible distortion and a fast max aperture of f/2.8"



This is about as close as you can get with most non-macro optics

100mm focal length favoured by full-frame photographers, but is also ideal for portraiture. Indeed, these lenses are often referred to as 'portrait macro' lenses for APS-C bodies. As macro prime lenses, they should not only be super-sharp with negligible distortion, but offer a reasonably fast maximum aperture of around f/2.8. This is effective for blurring messy backgrounds in portrait shots.

PRIME TIME

The Canon 50mm, Nikon 60mm, Sigma 50mm and Sony 50mm lenses in this test group not only work on APS-C bodies but are also fully compatible with full-frame cameras. In this case, they double up as useful 'standard' prime lenses, closely matching the perspective of the human eye for general shooting.

One thing common to all macro lenses is that they're designed to be 'flat field' lenses. At short focus distances, they aim to have little or no field curvature, so the centre, edges and corners of the frame are equally

focused at the same object distance. For example, consider you're photographing something flat like a postage stamp from head on (a stamp will practically fill the whole frame with a 1x magnification macro lens on a body with an APS-C sensor). A flat field design will ensure that the whole of the stamp is sharp in the image when the lens is focused correctly. It's an important consideration because, even at small aperture settings, depth of field is tiny at 1x magnification.

We're often concerned with a lens's performance at its largest available aperture, where sharpness often drops off. But for macro lenses, where you often need to use a small aperture to eke out a little extra depth of field, good sharpness and contrast is also very desirable at around f/16. This is difficult to achieve due to the effects of diffraction (bending of light rays), which become more problematic at small apertures.

How much difference does aperture really make to depth of field in macro shooting? Let's take the Canon 60mm lens on an APS-C body as an example. At its closest focus setting of 20cm, an aperture of f/16 will give you a depth of field of about 4mm in total. Shrink the aperture to f/5.6 and the entire depth of field is reduced to just 1.7mm.

MIND THE GAP

Whereas a 100mm macro lens will have a closest focus distance of about 30cm, it's only about 20cm for a 50mm macro lens. However, this isn't the gap between the front of the lens and the subject you're shooting. Instead the focus distance, as always, is measured from the 'focal plane' (the position of the image sensor in a digital camera) and the subject. Since the image sensor is towards the rear

How we test lenses Advice you can trust

Our testing procedure includes lab tests under controlled conditions, as well as 'real-world' shooting. Firstly, all lenses are fitted to mid-range cameras and used to take images of two test charts under studio lights. The results are processed using Imatest Master, so that we can quantify optical performance in terms of sharpness, chromatic aberrations and distortion. Overall quality is assessed at the centre, edge and corners of the images.

For real-world conditions, we use each of the lenses under widely varying indoor and outdoor lighting conditions. Overall handling is checked, as well as the smoothness and precision of zoom and focus rings, and the operation of all switches. We also test the speed and accuracy of autofocus systems, complete with operation of full-time manual override where available. Ratings are finally given for features, build quality, image quality and value for money.



Richard H. Johnston

Above A true macro lens enables you to fill the frame with small details

of the camera and the lens itself cuts into the distance, the gap between the front of the lens and what you're shooting can end up being very small.

To make matters worse, while some macro lenses in this group have internal focus mechanisms, others don't. The front elements of the Canon 50mm, both Nikon lenses, and the Sigma and Sony lenses all extend forwards as you focus down towards the closest focus distance. For example, the Sony 50mm has a stated length of 67mm. However, it extends to 114mm at its closest focus setting.

Add on the depth of the image sensor within the attached camera body and its front element comes to just 5cm from the object you're photographing when using the closest focus distance. You can often find that the lens casts a shadow over what you're shooting, or at least cuts out some of the light on the subject. Illumination from a camera's pop-up flash can also be obscured and, if you need to light the subject from an oblique angle, it's easy to end up with deep but unwanted shadows (see Ringflash Explained, right).

Getting back to the use of these lenses in general photography, bear in mind that macro lenses often have a very long focus travel. This helps to enable precise focusing in critical macro work. However, it can make autofocus very slow, so a focus limiter switch can be useful, as described in Features to Look For, above right.

EQUIPMENT KNOW-HOW

FEATURES TO LOOK FOR

Make sure your macro lens suits the way you shoot

Aperture range

Larger maximum apertures enable faster shutter speeds at any given ISO. Most lenses in this class are f/2.8, but the Canon 50mm is one-third of a stop larger and the Tamron 60mm is a full stop faster.

Autofocus

Ring-type ultrasonic autofocus systems tend to be fast, quiet and offer a full-time manual focus override. Some lenses have no internal focus actuator and rely on a screw-drive from the camera body.

Focal length

The effective focal length is magnified by 1.5x for Nikon, Pentax and Sony bodies with APS-C sensors, and 1.6x for Canon. Four Thirds and Micro Four Thirds cameras have a 2x multiplier.



Internal focusing

This is preferable, especially for lenses with a short focal length, as the lens doesn't extend at shorter focus distances. So you can maintain more distance between the front of the lens and what you're shooting.

Image circle

Some lenses can be used with full-frame and APS-C cameras, but the Canon EF-S, Nikon DX and Tamron Di II lenses are designed for APS-C bodies. The Olympus lens is built for a Micro Four Thirds fitment.

Focus limiter switch

This limits the focus travel to only medium-infinity focus distances or, in some cases, either side of a medium focus point. It speeds up autofocus, as the lens doesn't have to hunt through its entire travel range.

Ringflash Explained

For even lighting without shadows, which is often important in macro photography, the best solution is to use ringflash. Unlike a regular flashgun or studio flash, the main flash tube forms a ring that mounts to the front of the lens. Because the flash is effectively fired from all

around the circumference of the lens, any resulting shadows are minimal.

Most camera manufacturers make ringflash systems to fit their macro lenses, and independent models are available from companies such as Metz and Sigma.



CANON EF 50MM F/2.5 MACRO

£230

An oldie that gets halfway there

First launched all the way back in 1987, this veteran lens is still in production 25 years later, so it's certainly stood the test of time. Frills are few, with the fitment of only a standard micro motor for autofocus. The manual focus ring is disappointingly thin, there's no focus limiter switch and overall construction quality is mediocre. At least the front of the lens is designed to accept fitment of Canon's ringflash.

Like most Canon lenses, this one comes without a lens hood, but you really don't need one, as the front element is recessed very deeply within the barrel. The inner barrel extends at closer focusing distances and is marked with magnification ratios. However, these are only correct when you're using the optional Life-Size Converter, which costs an additional £220. In standard trim, the lens only achieves a maximum magnification of 0.5x, but the converter takes it up to a full 1x, while also reducing the largest available aperture to f/3.5.

PERFORMANCE

Autofocus is fairly slow and noisy. The lack of a limiter switch further hampers focusing speed, because the focus travel is very long. On the plus side, the extended travel makes for precise manual focus adjustments, which is especially important for macro shooting. Even so, a bigger focus ring would greatly improve handling. Image quality is disappointing too, with a real lack of sharpness at large apertures, as you'll see from our lab test results on page 130.



Tech focus...
 Nine elements in eight groups, six diaphragm blades, closest focus distance 23cm, 52mm filter thread, electric motor autofocus, physical dimensions 68x63mm, weight 280g

Digital Camera

FEATURES

★★★★★

BUILD QUALITY

★★★★★

IMAGE QUALITY

★★★★★

VALUE

★★★★★

OVERALL

★★★★★

Canon's newer 60mm lens is more refined than its 50mm offering. A ring-type ultrasonic actuator aims to deliver fast, near-silent autofocus, complete with full-time manual override. Fully internal focusing means that the front element neither rotates nor extends as you go from infinity to the shortest focus setting of 20cm, where the lens delivers full 1x magnification instead of the other Canon's under-achieving 0.5x. 60mm is a good choice of focal length on Canon cameras like the 650D, 60D and 7D, as the crop factor gives a very macro-friendly effective focal length of 96mm.

The lack of a supplied lens hood is more of an issue than with the Canon 50mm lens, as the larger front element is positioned right at the front of the barrel. The official, optional ET-67B lens hood costs £30. One similarity between the two Canon lenses is that they both feature a mounting ring for fitting the Canon MR-14EX ringflash. It's pricey, however, at £460.

PERFORMANCE

For general shooting, autofocus is quick and quiet, despite the lack of a focus limit switch. The missing switch isn't too much of a pain because the overall focus travel is very small for a macro lens. The downside is that the very small, precise manual focus adjustments that you often need for macro shooting are difficult to achieve. This is despite a physically larger focus ring, which is about twice the width of the one fitted to the Canon 50mm lens.



Tech focus...
 12 elements in eight groups, seven diaphragm blades, closest focus distance 20cm, 52mm filter thread, ultrasonic (ring-type) autofocus, physical dimensions 73x70mm, weight 335g

Digital Camera

FEATURES

★★★★★

BUILD QUALITY

★★★★★

IMAGE QUALITY

★★★★★

VALUE

★★★★★

OVERALL

★★★★★



NIKON AF-S 40MM F/2.8G DX MICRO

£195

Nikon's bargain macro lens

With a different design philosophy to Canon's 60mm macro lens for APS-C cameras, Nikon serves up a shorter focal length of 40mm. The 'effective' focal length is 60mm instead of the Canon's 96mm, so it's closer to a 50mm than a short telephoto – good for general shooting, but a compromise for macro photography.

Like the Canon 60mm, this lens is fitted with ring-type ultrasonic autofocus, but the Nikon comes complete with a focus limit switch. You can't lock it to a short-to-medium range, but you can lock out the close-up range for general shooting. Focusing then only operates in the 2cm-infinity range.

The front element doesn't rotate during focusing, but the barrel does extend towards close focus settings. At its minimum focus distance of 16.3cm, the front of the lens is only about 3.5cm from the object you're shooting, so lighting can be problematic. Nikon's cheapest R1 macro flash kit weighs in at about £415.

PERFORMANCE

For a ring-type ultrasonic system, autofocus speed is slow, so the focus limit switch is a worthwhile inclusion. This locks out more than half the travel at the close-up end. The amount of overall travel is quite small for a macro lens, making precision manual adjustments fiddly for close-up shooting. The problem is compounded by the focus ring lacking smoothness, but the lens redeems itself with its image quality, which is superb throughout the entire aperture range.



Tech focus...
 Nine elements in seven groups, seven diaphragm blades, closest focus distance 16.3cm, 52mm filter thread, ultrasonic (ring-type) autofocus, physical dimensions 69x65mm, weight 235g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

NIKON 60MM F/2.8D AF MICRO

£365

It's old-school, but it's still got it

Looking every inch a throwback to the last century, the venerable Nikon 60mm macro is a D-mount lens, complete with aperture ring at the rear of the barrel and another ring further forward for switching between autofocus and manual focus modes. The arrangement doesn't find favour in Nikon's more recent designs.

Nikon does make a newer 60mm G-mount macro lens, which is like a scaled-up version of the 40mm for full-frame cameras. Unlike the 40mm lens and the D-mount 60mm, it features internal focusing, but it's more expensive to buy. In previous tests, we weren't too impressed with the 60mm f/2.8G's sharpness either.

The 60mm f/2.8D lacks an internal focus motor so it can't autofocus on bodies like the D3200 and D5100, which lack an autofocus motor built into the camera body. This is a pain for general shooting, but fine for manual focusing in macro photography.



Tech focus...
 Eight elements in seven groups, seven diaphragm blades, closest focus distance 22cm, 62mm filter thread, no autofocus motor, physical dimensions 70x75mm, weight 440g

PERFORMANCE

On bodies with an internal autofocus motor, focusing speed is a bit sluggish but not much slower than in the Nikon 40mm that features a ring-type ultrasonic system. The focus limit switch works rather better, as it can lock the range to both the close-up or longer-distance sections of the travel. Focus travel itself is rather longer than with the 40mm lens, smoother in operation, and comes with the benefit of a bigger and more knobby focus ring. Precision manual focusing for critical macro shots is a joy.

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★



OLYMPUS M.ZUIKO ED 60MM F/2.8 MACRO

£450

Small but perfectly formed

Thanks to the 2x crop factor of the Micro Four Thirds system, this lens has an effective focal length of 120mm. It loses any pretence of doubling up as a 'standard' prime and is best regarded as a specialist macro lens that's also useful as a short telephoto. So it's in direct competition with the big boys for full-frame cameras, but is more slimline and lightweight.

Clever features include the focus limit switch – as well as three positions for short, long and full-range focusing, there's a handy fourth, non-locking setting that pushes the focus to its closest setting. It's useful when you want maximum magnification, because you can hold the switch in place and move the camera back and forth until focus is achieved. The distance scale features a red bar that moves back and forth under a viewing window to indicate the focus distance. Autofocus is based on Olympus's whisper-quiet MSC (Movie & Still Compatible) system. It's quick for stills and smooth for video capture. Focusing is fully internal, so the lens barrel doesn't extend.

PERFORMANCE

With its lightweight yet robust, beautifully finished and weather-sealed build, the Olympus has impeccable handling. The large manual focus ring is very smooth and offers immense precision, while autofocus performance is excellent. As well as being great for macro shots, it delivers superb telephoto images with a tight depth of field, as sharpness at f/2.8 is incredible.



Tech focus...
13 elements in ten groups, seven diaphragm blades, closest focus distance 19cm, 46mm filter thread, MSC autofocus, physical dimensions 56x82mm, weight 185g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★

SIGMA 50MM F/2.8 EX DG MACRO

£270

A good all-rounder at a nice price

The Sigma 50mm comes in many mount options, including Canon, Nikon, Pentax, Sigma and Sony. Only the Canon and Sigma editions however have a built-in autofocus motor. The others rely on being driven from an in-camera motor, so users of Nikon D3200, D5100 and similar cameras can only focus manually.

The size of the lens is typical of a 50mm f/2.8 full-frame optic, at least at longer focus settings. However, the length extends from 67mm to 105mm at its shortest focus setting, and that's without the supplied lens hood fitted. The front of the lens stretches to about 4cm from the object you're photographing in full 1x magnification mode, which is a bit on the close side. At least Sigma takes advantage of the extending barrel to give a calibrated display of magnification factor through the focus range. Focus distance itself is printed on the focus ring but isn't neatly beneath a viewing window, as with all the other lenses in the group.

PERFORMANCE

We tested the Sigma on a Nikon D7000 body. In this configuration, autofocus is a little slow and loud, but not alarmingly so. A focus limiter switch helps performance in practical terms, as you can select only short-range or long-range focusing. The focus travel is very long and, with its smoothly operating focus ring, the Sigma enables precise manual focusing for close-ups. Sharpness is good and consistent throughout most of the aperture range, down to about f/16.



Tech focus...
Ten elements in nine groups, seven diaphragm blades, closest focus distance 19cm, 55mm filter thread, electric motor autofocus (Canon, Sigma), physical dimensions 72x67mm, weight 320g

Digital Camera

FEATURES
★★★★★

BUILD QUALITY
★★★★★

IMAGE QUALITY
★★★★★

VALUE
★★★★★

OVERALL
★★★★★



SONY 50MM F/2.8 MACRO

£460

What price full-frame quality?

Costing considerably more than many competing lenses, the Sony is the most expensive optic on test here. Despite this, it lacks an internal autofocus motor and doesn't have an internal focus system. It's a little shorter than the competing Sigma lens at the infinity focus setting, but extends to a slightly longer 109mm at its closest focus distance. Even so, the distance from the front of the lens to the object being photographed is 1cm longer at 5cm.

Unlike the Sigma, the Sony's focus ring doesn't rotate in autofocus mode, which improves handling. Better still, the Sony not only features a similar focus limit switch to the Sigma, which locks the available range either side of a medium focus distance, but it also has a focus lock button on the side of the lens. It's a useful addition and goes some way to making up for the deficit of features in other areas, especially considering the lens's premium price.

PERFORMANCE

Autofocus is reasonably rapid, but quite noisy in operation. Manual focusing is fairly easy with the lens's long focus travel and generously proportioned manual focus ring. However, the ring's operation is a bit stiff and jerky, which can make things a little tricky at very close focus distances. Sharpness is particularly impressive at apertures between f/1.8 and f/16, although colour fringing can be noticeable at large apertures. Overall, the Sony is a solid performer but feels pricey for just under £500.



Tech focus...
Seven elements in six groups, seven diaphragm blades, closest focus distance 20cm, 55mm filter thread, no autofocus motor, physical dimensions 72x60mm, weight 295g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

TAMRON SP AF 60MM F/2 DI II MACRO

£350

Not the sharpest tool in the box

On Nikon or Sony bodies, the Tamron has a fairly conventional effective focal length of 90mm, and it works out to 96mm on a Canon camera. It's only natural to think that the lens is an APS-C version of Tamron's popular 90mm macro lens for full-frame cameras but it's actually very different. Unlike the 90mm lens, this one has fully internal focusing and, instead of the front element being deeply recessed in the lens barrel, it's positioned right at the front.

Aperture-wise, this is the fastest lens in the group, offering greater possibilities for blurring the background in general shots, and for keeping shutter speeds up in gloomy light. Ultimately, however, its suitability for this depends on the image quality that the lens is able to deliver at apertures between f/2 and f/2.8.

PERFORMANCE

The Tamron is quite sluggish and noisy during autofocus and lacks a focus limiter switch, so it's prone to hunting through its entire range if it fails to lock onto a target immediately. There's no full-time focus override and manual focus suffers from a stiff and jerky focus ring. It's a shame because the oversized focus ring would otherwise be a bonus for handling.

Sharpness is extremely lacking at f/2 and still very poor at f/2.8. The Tamron doesn't really get into its stride until you hit f/5.6 and, even then, it lags behind other lenses in the group. For overall image quality, it's nowhere near a match for the older Tamron 90mm lens.



Tech focus...
14 elements in ten groups, seven diaphragm blades, closest focus distance 23cm, 55mm filter thread, electric motor autofocus, physical dimensions 73x80mm, weight 400g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

IMAGE QUALITY IN FOCUS

SLRs

Compact System Cameras

Lenses and Accessories

CANON EF 50MM F/2.5 MACRO



CANON EF-S 60MM F/2.8 MACRO USM



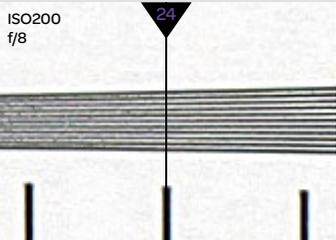
NIKON AF-S 40MM F/2.8G DX MICRO



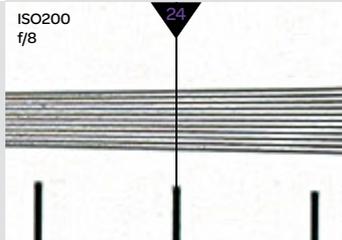
NIKON 60MM F/2.8D AF MICRO



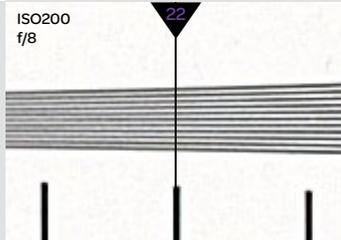
SHARPNESS TEST



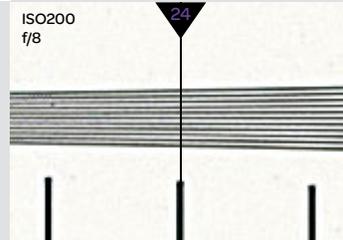
Dire at the maximum aperture of f/2.5, it's better at smaller settings. Sharpness is consistent between the centre and corners of the frame.



Much better than the Canon 50mm at large apertures, and the 60mm has slightly superior performance at medium and small apertures.



Centre sharpness is consistent and good through the aperture range, at least down to f/16. Corner sharpness is less impressive at large apertures.

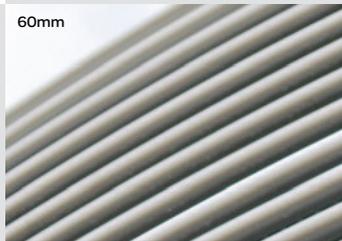


Slightly less impressive for sharpness than Nikon's 40mm lens at f/2.8, but the 60mm is better at f/16 – an ideal aperture for macro shots.

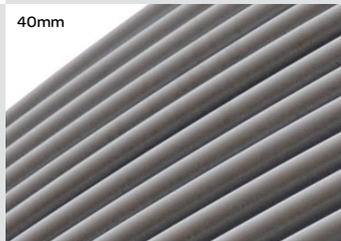
FRINGING TEST



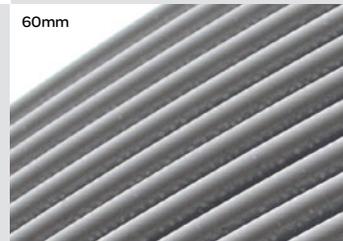
Taking an average of the data through the aperture range, colour fringing is the worst of any lens in the group. It's most noticeable at f/2.8.



Chromatic aberrations are quite well controlled at f/2.8 but rise steadily through the aperture range. They're on a par with the Canon 50mm at f/16.



Well contained, there's very little colour fringing to be seen even in the extreme corners of images. What little there is peaks at around f/5.6 to f/8.



The best on test for colour fringing by quite a margin, there are practically no chromatic aberrations, even towards the corners of the frame.

DISTORTION TEST



There's fairly little distortion, but it's more noticeable than with most competing optics, the Canon having slight pincushion.



There's very slight pincushion distortion, but it's far less noticeable than with the Canon 50mm. In most shots it's a non-issue.



There's some pincushion distortion but it's not as noticeable as with the Canon 50mm. The bigger Nikon 50mm is much better in this respect.



The Nikon 60mm beats all other lenses in the group with the best for a lack of distortion, serving up the best lab score. This is as good as it gets.

IMAGE TEST VERDICT

Disappointing overall, the Canon 50mm can't compete with most other lenses in terms of sharpness, colour fringing or distortion.



IMAGE TEST VERDICT

A sizeable step in the right direction, compared with Canon's 50mm lens, the 60mm just about earns four stars for image quality.



IMAGE TEST VERDICT

Image quality is very acceptable overall, and particularly impressive at large apertures considering the relatively low price of the lens.



IMAGE TEST VERDICT

Superb all-round image quality is the main attraction of this lens. Sharpness could be slightly better at f/2.8, but in all other respects it's excellent.

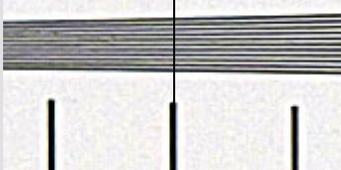


OLYMPUS M.ZUIKO ED
60MM F/2.8 MACRO



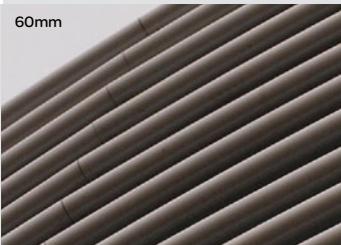
ISO200
f/8

24



Stunningly sharp at f/2.8-5.6, the Olympus has amazing resolving power, revealing even the finest levels of detail. The only slight dip is at f/8.

60mm



Colour fringing is minimal to low at most apertures, peaking at f/16 towards the corners of the frame. It's not a problem in the majority of shots.

60mm



There's very marginal barrel distortion but, as with colour fringing, it's almost impossible to spot in most images, so not worth worrying about.

IMAGE TEST VERDICT

Image quality is beautiful throughout the aperture range and very impressive at large apertures. An excellent lens for telephoto and macro shooting.

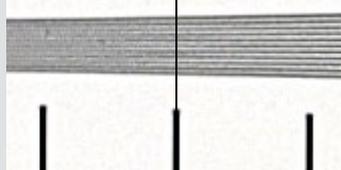


SIGMA 50MM F/2.8 EX
DG MACRO



ISO200
f/8

22



It can't match the best lenses in the group, but sharpness is respectable and quite consistent through the aperture range between f/2.8 and f/16.

50mm



Performance is excellent in terms of colour fringing, the Sigma only being narrowly beaten into second place in the group by the Nikon 60mm.

50mm



There's a little barrel distortion to be seen in images from the Sigma, and it's slightly more pronounced than with the Olympus and Sony lenses.

IMAGE TEST VERDICT

With strong all-round performance, the Sigma's image quality is impressive considering the fairly low-budget price of the lens.

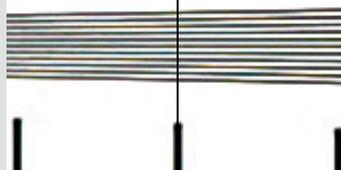


SONY 50MM F/2.8
MACRO



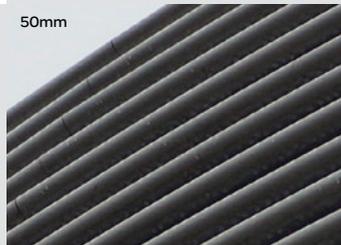
ISO200
f/8

24



Sharpness is good and consistent, both throughout the aperture range and across the whole frame. It's the lens's strongest attribute.

50mm



Not too bad, but the Sony earns the worst score for colour fringing at its largest aperture of f/2.8, which occurs across most of the frame.

50mm



Barrel distortion is a little noticeable. To compare, it's about midway between that of the Olympus and Sigma lenses in the group.

IMAGE TEST VERDICT

Image quality is very good, as you'd expect from a lens at this price. The only flaw is that colour fringing is quite pronounced, especially at f/2.8.

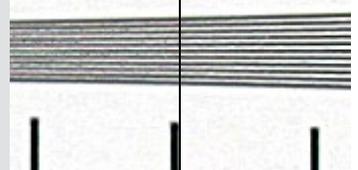


TAMRON SP AF 60MM
F/2.8 DI II MACRO



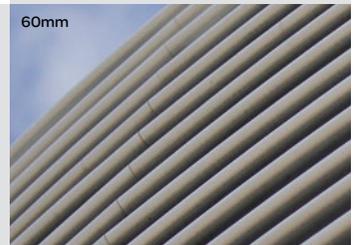
ISO200
f/8

22



Sharpness is very poor at f/2 and still disappointing at f/2.8. Between f/5.6 and f/16 it's not too bad, but still worse than other lenses in the group.

60mm



Colour fringing isn't a problem and is consistent throughout the aperture range. It's most noticeable towards the extreme corners of the frame.

60mm



By far the worst in the group here, the Tamron has clearly noticeable barrel distortion – disappointing for a macro prime lens.

IMAGE TEST VERDICT

With its lack of sharpness at large aperture settings and noticeable distortion, the Tamron just manages a three-star rating for image quality.



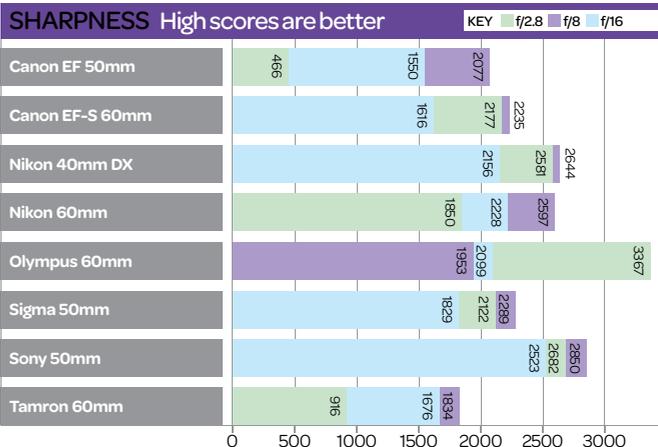
LENS BENCHMARKS

See how each lens performed in our lab tests

Given the dual role of these lenses for close-ups as well as for fast standard or telephoto use, sharpness is important at both ends of the aperture range. The Olympus 60mm is a clear winner for outstanding sharpness at its largest available aperture of f/2.8, and it still has plenty of resolving power at f/16, ideal for macro shooting. At the other end of the scale, the Canon 50mm and Tamron 60mm have a disappointing lack of sharpness at f/2.8 and they're even worse at their maximum available apertures of f/2.5 and f/2 respectively.

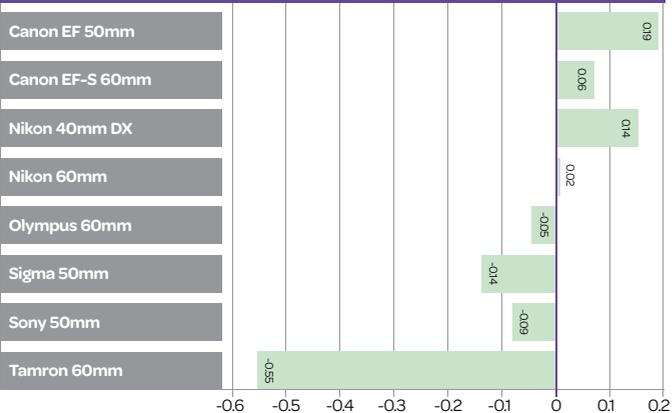
Most lenses give very little distortion, either barrel or pincushion, and it's only the Tamron 60mm's barrel distortion that is sometimes noticeable in shots. The next worst offenders are the Canon 50mm and Nikon 40mm, which demonstrate slight pincushion, whereas the Nikon 60mm lens has practically no distortion at all. For colour fringing, the Sony 50mm has the worst score of all when used at its f/2.8 aperture.

WHAT'S THIS?
Find out how we test on page 5



The Olympus lens shows its class here, with sharpness values that far outshine the results from the other lenses

DISTORTION Closer to 0 is better



This demonstrates how badly the Tamron's lens distortion is compared with the results from the other lenses

FRINGING Low scores are better

Lens	f/2.8	f/8	f/16
Canon EF 50mm	1.43	1.15	1.17
Canon EF-S 60mm	0.48	0.81	1.18
Nikon 40mm DX	0.21	0.5	0.4
Nikon 60mm	0.09	0.08	0.07
Olympus 60mm	0.63	0.2	1.45
Sigma 50mm	0.15	0.26	0.25
Sony 50mm	1.78	0.62	0.48
Tamron 60mm	0.97	0.62	0.68

Canon's 50mm lens is particularly disappointing here, but the Olympus 60mm is also poor at f/16

HOW THE LENSES COMPARE

	Canon EF 50mm f/2.5 Macro	Canon EF-S 60mm f/2.8 Macro USM	Nikon AF-S 40mm f/2.8G DX Micro	Nikon 60mm f/2.8D AF Micro	Olympus M.ZUIKO ED 60mm f/2.8 Macro	Sigma 50mm f/2.8 EX DG Macro	Sony 50mm f/2.8 Macro	Tamron SP AF 60mm f/2 Di II Macro
Contact	www.canon.co.uk	www.canon.co.uk	www.nikon.co.uk	www.nikon.co.uk	www.olympus.co.uk	www.sigma-imaging-uk.com	www.sony.co.uk	www.tamron.eu/uk
Street price	£230	£350	£195	£365	£450	£270	£460	£350
Mount options	C	C	N	N	%	C N P S Sg	S	C N S
Minimum focus	23cm	20cm	16.3cm	22cm	19cm	19cm	20cm	23cm
Max magnification	0.5x	1x	1x	1x	1x	1x	1x	1x
Autofocus motor	Micro motor	Ultrasonic (ring)	Ultrasonic (ring)	None	MSC	Micro motor (C Sg)	None	Micro motor
Filter size	52mm	52mm	52mm	62mm	46mm	55mm	55mm	55mm
Included accessories	None	None	Hood and pouch	None	None	Hood	None	Hood
Dimensions (DxL)	68x63mm	73x70mm	69x65mm	70x75mm	56x82mm	72x67mm	72x60mm	73x80mm
Weight	280g	335g	235g	440g	185g	320g	295g	400g
FEATURES	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
BUILD QUALITY	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
IMAGE QUALITY	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
VALUE	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
OVERALL	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆

THE DIGITAL CAMERA VERDICT

THE OLYMPUS IS THE CLOSE-UP CHOICE

The diminutive Olympus 60mm lens takes on the big guns and shows that Micro Four Thirds really is a force to be reckoned with

The Olympus 60mm is a beautifully crafted high-precision optic. The MSC (Movie & Still Compatible) autofocus system works brilliantly, the focus limiter system is extremely well implemented, manual focusing is super-smooth and there's the reassurance of dust and splash-proofing. Best of all though, image quality is absolutely excellent with stunning sharpness at f/2.8. Given the effective 120mm focal length, this makes the lens every bit as desirable as a fast

telephoto lens as it is for macro shooting. There's a neat sliding lens hood specially made for it as well, although sadly you will need to purchase this as an optional extra. If you really want to push the boat out, Olympus also offers an FS-SRF11 ringflash set at around £650.

Compared with the Olympus, Canon's 50mm lens is lacklustre when it comes to features and image quality, although the Canon 60mm fares a little better. The Nikon 40mm lens has impressive sharpness, but

stretches a little too close for comfort towards whatever you're photographing for serious macro work. Even so, it's remarkably good value at the knockdown price. The comparatively antique Nikon 60mm lacks an internal autofocus motor, but overall build and image quality are rather better.

There are a few similarities between the Sigma and Sony 50mm lenses, despite the Sony costing nearly £200 more. The Sony is the sharper of the two, but colour fringing is disappointing at large apertures. **►**



CANON EF-S 60MM F/2.8 MACRO USM **£350**

What's good: Internal focusing, fast and near-silent ring-type ultrasonic autofocus.

What's bad: No focus limiter switch.

Our verdict: Good image quality and some high-end features at a reasonable price.



Digital Camera OUR TEST RESULTS

The best macro lenses for your camera revealed...

With thanks To Westonbirt Arboretum for permission to shoot. It's a wonderful venue for nature photography - see www.forestry.gov.uk/westonbirt



NIKON 60MM F/2.8D AF MICRO **£365**

What's good: Build and good image quality.

What's bad: Will only focus manually on bodies like the D3200 and D5100.

Our verdict: Better image quality than the newer G-mount Nikon 60mm, and cheaper.



OLYMPUS M.ZUIKO ED 60MM F/2.8 MACRO **£450**

What's good: Excellent autofocus system, extraordinarily sharp at large apertures.

What's bad: Expensive and lens hood is extra.

Our verdict: An outstanding lens that's very compact yet offers superb quality.



SIGMA 50MM F/2.8 EX DG MACRO **£270**

What's good: Image quality and a solid build.

What's bad: Lacks a built-in autofocus motor, apart from Canon and Sigma-fit editions.

Our verdict: A good value buy, and it's available in several different mount options.



SONY 50MM F/2.8 MACRO **£460**

What's good: Very good levels of sharpness throughout the aperture range.

What's bad: The feature-set is a bit lacking, especially considering the high selling price.

Our verdict: A good buy for Sony SLR and SLT cameras if you don't mind the price.



Far-reaching superzooms

Superzoom lenses with wide-angle *and* zoom power are ideal for travel. Matthew Richards is your guide

SLRs

Compact System Cameras

Lenses and Accessories



THE CONTENDERS

- 1 Canon EF-S 18-135mm f/3.5-5.6 IS STM, £345
- 2 Canon EF-S 18-200mm f/3.5-5.6 IS, £390
- 3 Nikon AF-S DX 18-200mm f/3.5-5.6G ED VR II, £580
- 4 Nikon AF-S DX 18-300mm f/3.5-5.6G ED VR, £680
- 5 Pentax smc DA 18-135mm f/3.5-5.6 ED AL IF DC WR, £550
- 6 Sigma 18-200mm f/3.5-6.3 II DC OS HSM, £260
- 7 Sigma 18-250mm f/3.5-6.3 DC Macro OS HSM, £400
- 8 Sony DT 18-250mm f/3.5-6.3, £470

MOUNT KEY



See which lens is available for your camera with this handy key. C is a Canon mount, N is Nikon, 4/3 is Four Thirds, P is Pentax, S is Sony and Sg is Sigma

SPECIAL AWARDS



To make this test as relevant as possible, we've created a special award to tell you which lens is best for each camera system.



Full-frame SLRs for the masses may be the new big thing, but APS-C format cameras still have a lot going for them, especially at this time of year. The season of summer holidays is upon us and relatively compact, lightweight cameras make ideal travelling companions. There's still the issue of being bogged down with a load of lenses, but that's where superzooms come to the fore.

Typically, you can expect an oversized zoom range of 18-200mm or more. Boosted by the crop factor of APS-C cameras, this equates to an effective 28-300mm or thereabouts, giving you a fairly generous wide-angle facility at one end, powerful telephoto reach at the other, and everything in between.

Some go further still, and the Nikon 18-300mm delivers the equivalent of a whopping 450mm of telephoto power at the long end. At the other end of the scale, the Canon and Pentax 18-135mm lenses have less telephoto potential and rely more heavily on the crop factor to boost their effective reach. This works out to just over 200mm in both cases.

Better still, because the image circle produced by APS-C format lenses doesn't need to be nearly as

Kit anatomy More choices

Tamron currently offers two superzoom lenses for the APS-C format, and both were reviewed in our last superzoom group test (issue 129).

The Tamron 18-200mm f/3.5-6.3 XR Di II is one of the oldest superzoom lenses still on the market, but image quality is pretty reasonable. It's also refreshingly inexpensive, at around £160, and is available for Canon, Nikon, Pentax and Sony cameras. The only real drawback, at least for Canon

and Nikon users, is the lack of image stabilisation.

Tamron's much newer AF 18-270mm f/3.5-6.3 Di II VC PZD has a bigger zoom range and features a quieter autofocus system, based on an ultrasonic piezoelectric motor. An optical stabiliser is fitted to the Canon and Nikon versions, but not the Sony edition of the lens. It's only marginally bigger than the older Tamron 18-200mm lens and costs about £350.



“React to a huge range of shooting opportunities in super-quick time with just a flick of the wrist”

Below and bottom
Taken at either end of the zoom range, using an 18-200mm lens on an APS-C format SLR, these two shots show the telephoto and wide-angle potential

large as from a full-frame compatible lens, the physical size of these superzooms also tends to be quite modest. Indeed, this is an area where some manufacturers have made significant strides. The latest editions of the Sigma 18-200mm and 18-250mm superzooms on test are much smaller and lighter than the previous versions of these lenses.

AND THERE'S MORE...

It's no surprise that superzooms are often referred to as travel lenses, but that's certainly not all they're good for. When you're shooting in a dusty environment, the last thing you want to do is to swap lenses. Despite the automatic cleaning mechanisms fitted to the image sensors of most

current SLRs, it's still best to avoid the camera ingesting big gulps of dust. A superzoom can therefore help your camera to enjoy a clean and healthy lifestyle.

Another bonus is that you can react to a huge range of shooting opportunities in super-quick time, with just a flick of the wrist. For example, imagine you're taking a wide-angle shot of a rolling landscape when some interesting wildlife presents itself. All you need to do is zoom in and shoot, instead of rummaging in your camera bag for a telephoto lens, then swapping lenses on the camera, only to find that the creature has made a run for it. Superzooms give you the same instant-response benefit in countless travel and holiday shooting scenarios. Frustration avoided.

NOT SO FAST

While there's no beating a superzoom for allowing speedy reaction times,



How we test lenses Advice you can trust

Our lens tests are based on a two-stage procedure. Firstly, lab tests are carried out, shooting two test charts under controlled lighting conditions. The results are processed using Imatest Master so that we can quantify optical performance in terms of sharpness, chromatic aberrations and distortion. Overall quality is assessed at the centre, edge and corners of the images.

For real-world testing, we use each of the lenses under widely varying indoor and outdoor lighting

conditions. Overall handling is checked, along with smoothness and precision of zoom and focus rings, and the operation of all switches. We also test the speed and accuracy of autofocus systems, complete with operation of full-time manual override where available.

The effectiveness of optical stabilisation systems, where fitted, is checked by gradually reducing shutter speeds during handheld shooting. Ratings are finally given for features, build quality, image quality and value for money.

they're fairly slow when it comes to their widest available apertures. Some lenses in this class only offer f/6.3 at the telephoto end of the zoom range. Even so, that's only a third of a stop slower than the typical f/5.6 aperture of most budget telephoto zoom lenses. On the plus side, current SLRs tend to give very good image quality at medium and even high sensitivity settings, so you can bump up the camera's ISO setting to enable faster shutter speeds in dull lighting conditions. More good news is that, at the long end of a superzoom's focal length range, even f/6.3 can give you a reasonably tight depth of field when you need it.

For those that don't like to push sensitivity settings further than they really need to, most current superzoom lenses have the added attraction of optical image stabilisation. This is generally good for a four-stop advantage, enabling consistently sharp handheld shots without the need for very fast shutter speeds. Pentax and Sony bodies have sensor-shift image stabilisation built into the camera, so optical stabilisers aren't featured in these companies' superzoom lenses. They're also omitted in the Pentax-fit and Sony-fit versions of both of Sigma's current superzooms. The same goes for the Sony-fit edition of the Tamron 18-270mm VC lens (see More Choices).

WHERE'S THE CATCH?

Build a mighty zoom range into a small, lightweight package and something inevitably has to give. That something is image quality. Compared to prime lenses and top quality zooms that have a more modest range, superzoom lenses generally aren't quite as sharp. This can be especially true at the long end of the zoom range. Another unwanted attribute can be an increase in chromatic aberrations (colour fringing), particularly towards the corners of the image frame.

Distortions are also likely to be more noticeable. These usually range from pronounced barrel distortion at the wide-angle end of the zoom range, to pincushion at mid to long zoom settings. It's the price you pay for the outstanding versatility of a superzoom. However, as we'll see, some superzooms compromise image quality a lot more than others.

EQUIPMENT KNOW-HOW

FEATURES TO LOOK FOR

Get what you want out of a new superzoom lens

Size and weight

A reasonably compact and lightweight build is a great advantage, especially given a superzoom's suitability as a travel or walkabout lens. Those on test range from 405g to 830g in weight.

Zoom range

With these superzooms, this can be as little as 18-135mm or as much as 18-300mm. A bigger zoom range adds more versatility to your lens use, but with a greater risk of compromising image quality.

Widest aperture

There aren't any fast superzooms on the market with particularly wide apertures, at the moment. Expect the widest available aperture to shrink to around f/5.6 or f/6.3 at the telephoto end.



Autofocus actuator

For fast and practically silent autofocus, a ring-type ultrasonic system is best. However, at present only the Nikon lenses in this group feature this type of autofocus, but we expect more to come.

Zoom lock

The physical length of superzoom lenses extends greatly at telephoto zoom settings. A zoom lock switch ensures against the lens stretching out accidentally when you're walking about.

Optical stabiliser

Given the combination of long telephoto reach and the lack of wide apertures, an optical stabiliser is great to have – unless your camera body has built-in, sensor-shift stabilisation, as a few models do.

Autofocus systems Explained

The autofocus system in both Nikon lenses is based on two large rings, driven at an ultrasonic frequency. Autofocus is fast, near silent and features full-time manual override. Both Sigma lenses use a slightly noisier ultrasonic motor. This system also tends to be slower than

ultrasonic, and lacks full-time manual override. The Canon 18-200mm and Pentax 18-135mm use a basic electric motor, where the Sony 18-250mm has no built-in autofocus motor. Instead, its autofocus is driven by a motor in the camera. The Canon 18-135mm uses a stepping motor.



CANON EF-S 18-135MM F/3.5-5.6 IS STM £345

A new and improved superzoom

The original EF-S 18-135mm, offered as a kit lens option with bodies like the Canon 60D and 7D, was a bit of a lacklustre affair. Autofocus was pretty noisy and lacked full-time manual override, with the system relying on a basic electric micro motor. That's been put right in the new version, which features a stepping motor instead. The aim is to deliver practically silent autofocus complete with smooth focusing transitions when shooting movies. It also enables full-time manual override.

Another new trick is a revised four-stop image stabiliser, which now includes dynamic stabilisation for shooting movies. The number of diaphragm blades is also increased from six to seven, enabling a more rounded aperture. On paper it looks a significant upgrade to the previous lens, and it only costs about £25 more. Annoyingly, you still need to pay an extra £20 for the petal-shaped lens hood.

PERFORMANCE

The STM autofocus really lives up to its claims and is a delight to use. It's fast for stills, while giving smooth transitions for video, and it's amazingly quiet in operation. Unlike the older Canon 18-200mm lens, the focus ring doesn't rotate during autofocus, improving handling. Sharpness isn't quite as good as with the Canon 18-200mm at wide-angle settings, although barrel distortion is less pronounced. It's sharper than the other Canon at its maximum telephoto reach, albeit a fairly lowly 135mm.



Tech focus...
16 elements in 12 groups, seven diaphragm blades, closest focus distance 39cm, 67mm filter thread, stepping motor autofocus, physical dimensions 77x96mm, weight 480g



CANON EF-S 18-200MM F/3.5-5.6 IS £390

A bit on the big side

Considering the recent downsizing of superzooms with a range of 18-250mm or more, the Canon 18-200mm is quite big and heavy. For example, the Sigma and Sony 18-250mm lenses both have 62mm filter threads, are less than 90mm in length and weigh 470g and 440g respectively. Despite its lesser zoom range, the Canon is over 10mm longer, has a 72mm filter thread and tips the scales at almost 600g.

One thing in the Canon's favour is that it's reasonably inexpensive, especially for a camera manufacturer's own-brand lens. Indeed, it's nearly £200 cheaper than the competing Nikon 18-200mm. Build quality feels pretty solid and highlights include a four-stop image stabiliser with automatic tripod and panning detection. In other respects, however, the lens feels quite basic. Autofocus relies on a humble electric motor which is quite noisy and lacks full-time manual override. There's no focus distance scale, and it features just six aperture blades.



Tech focus...
16 elements in 12 groups, six diaphragm blades, closest focus distance 45cm, 72mm filter thread, electric motor autofocus, physical dimensions 79x102mm, weight 595g





NIKON AF-S DX 18-200MM F/3.5-5.6G ED VR II £580

Does the quality match the price tag?

The 18-200mm zoom range here is modest for a superzoom, but there's nothing average about the selling price. At £580, it's not only one of the most expensive lenses in the test, but also more than twice the price of the competing Sigma 18-200mm. So what are you paying for? For starters, the ultrasonic autofocus system is ring-type rather than motor-based, giving the potential of very fast and near silent operation. The four-stop VR (Vibration Reduction) system on a par with the Canon and Sigma stabilisers in general shooting, but the Nikon has an additional Active mode. This works better when shooting from an unsteady platform.

Luxuries include a focus distance scale, mounted beneath a viewing window. This is completely absent on some lenses, or simply printed on the outside of the focus ring. The Nikon also includes a weather seal ring on its mounting plate to help keep dust and moisture out of the camera. Overall, it feels a lot more up-market than most superzooms.

PERFORMANCE

Its lab results for outright sharpness aren't the best but, in real-world shooting, it delivers fabulous contrast and captures plenty of fine detail. Chromatic aberrations are lower than with any other lens on test. Autofocus is fast and extremely quiet, and the full-time manual override works really smoothly. Zoom creep can be a bit of an issue, but unlike in the previous version of this lens, there's a zoom lock switch.



Tech focus...
16 elements in 12 groups, seven diaphragm blades, closest focus distance 50cm, 72mm filter thread, ring-type ultrasonic autofocus, physical dimensions 77x97mm, weight 565g

Digital Camera

FEATURES ★★★★★
 BUILD QUALITY ★★★★★
 IMAGE QUALITY ★★★★★
 VALUE ★★★★★

OVERALL ★★★★★

NIKON AF-S DX 18-300MM F/3.5-5.6G ED VR £680

Leads the field for zoom range

When Tamron launched its 18-270mm superzoom, it boasted the biggest zoom range for any SLR lens. That's now been eclipsed by Nikon's relatively recent 18-300mm, which has a monster 16.7x zoom range. The overall build quality and features are essentially the same as in the Nikon 18-200mm. The VR II system gives four-stop stabilisation and you get ring-type ultrasonic autofocus, a weather seal on the mounting plate and a decent f/5.6 widest aperture at the telephoto end of the range.

The extra zoom range does come at a price (and we're not just talking about the cash) compared with the Nikon 18-200mm. The 18-300mm is bigger, has a larger 77mm filter thread, and is much heavier at 830g compared with the smaller Nikon's 565g. Indeed, when mounted on a camera, the combined weight can soon feel uncomfortable when it's dangling from a neck strap. Nikon's claims of it being a 'compact and lightweight design' seems a little optimistic when you consider that the Sigma 18-250mm is little more than half the weight.

PERFORMANCE

For such a big lens, the absence of zoom creep is impressive. The downside is that the zoom ring feels stiff. Sharpness isn't quite as good as the Nikon 18-200mm, but chromatic aberrations are similarly low. Distortions are more pronounced, with some extreme barrel distortion at wide-angle zoom settings and noticeable pincushion at mid to long focal lengths.



Tech focus...
19 elements in 14 groups, nine diaphragm blades, closest focus distance 45cm, 77mm filter thread, ring-type ultrasonic autofocus, physical dimensions 83x120mm, weight 830g

Digital Camera

FEATURES ★★★★★
 BUILD QUALITY ★★★★★
 IMAGE QUALITY ★★★★★
 VALUE ★★★★★

OVERALL ★★★★★



PENTAX SMC DA 18-135MM F/3.5-5.6 ED AL IF DC WR £550

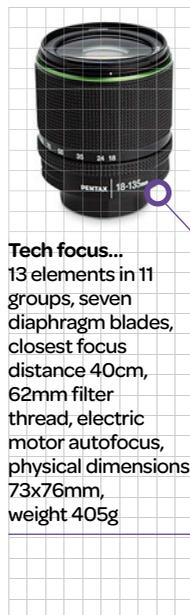
Robust, but what about image quality?

The Pentax lens is the smallest and most lightweight optic in the group, although the zoom range is rather less 'super' than most. However, its good build quality incorporates weather seals, including a rubber ring on the mounting plate. There's also an SP (Super Protect) coating on the front element, designed to repel water, dust and grease. Overall, the Pentax lens seems ideally suited to the great outdoors.

Another bonus is the Quick-Shift autofocus system. This is based on a DC (Direct Current) electric motor. It's not quite as refined as ring-type ultrasonic autofocus, but is nevertheless fast, quiet and comes complete with full-time manual focus override. Even so, the latter would benefit from a slightly larger focus ring, and it's a shame that the lens lacks a focus distance scale. At least the oversized zoom ring is very comfortable to use.

PERFORMANCE

Despite the quality feel and good handling, image quality is more of a mixed bag. Sharpness is respectable at wide to mid zoom settings, but falls off horribly at the long end. When using the widest apertures, it also lacks sharpness towards the corners of the frame throughout the entire zoom range. Colour fringing is more noticeable than with most competing lenses. Distortions aren't too bad, but that's to be expected considering the relatively limited zoom range. Overall, the Pentax doesn't really do enough to justify its high asking price.



Tech focus...

13 elements in 11 groups, seven diaphragm blades, closest focus distance 40cm, 62mm filter thread, electric motor autofocus, physical dimensions 73x76mm, weight 405g

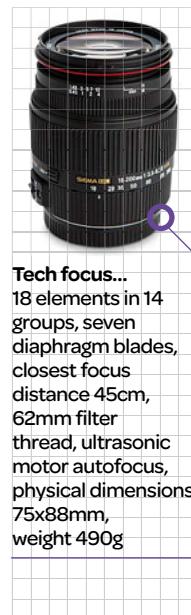


SIGMA 18-200MM F/3.5-6.3 II DC OS HSM £260

Not just a small step

This Mark II edition isn't just a minor revision, it's a whole new lens. It's significantly smaller and lighter than the original 18-200mm OS, adds a top quality FLD (Fluorite-equivalent Low Dispersion) element, has an updated optical stabiliser, and features an HSM (Hypersonic Motor) autofocus system. These are all welcome additions, the more recent OS system giving a four-stop benefit instead of just 2.5-stops. The ultrasonic motor-based autofocus isn't as quiet as ring-type systems, but it's much quieter than the electric motor used in the original.

One thing to bear in mind is that optical stabilisation isn't included in the Pentax and Sony versions of the lens. Instead they rely on anti-shake systems in the camera bodies themselves. Autofocus is also unavailable when using pre-2008 Pentax bodies like the K100D and K110D, as with the Sigma 18-250mm lens. Build quality feels solid and substantial, despite the lens being compact and lightweight.



Tech focus...

18 elements in 14 groups, seven diaphragm blades, closest focus distance 45cm, 62mm filter thread, ultrasonic motor autofocus, physical dimensions 75x88mm, weight 490g

PERFORMANCE

Autofocus is pretty fast, although handling is slightly impaired by the focus ring rotating while AF is going about its business. There's also no full-time manual override. Sharpness is very good at the wide-angle end of the range. Compared with previous samples, sharpness proved less impressive at mid to long zoom settings. Even so, sharpness is maintained quite well into the corners of the frame, and contrast is very good. The Sigma is definitely great value.





SIGMA 18-250MM F/3.5-6.3 DC MACRO OS HSM £400

Sigma's latest is small yet mighty

A triumph of downsizing, this new Macro edition of the Sigma 18-250mm is 12mm shorter than its predecessor, 160g lighter and has a smaller filter thread of 62mm rather than 72mm. Even more remarkably, it's lighter in weight than Sigma's own current 18-200mm, despite delivering extra zoom range. This is thanks in part to the TSC (Thermally Stable Composite) material used in its construction. Sigma claims it's not only lighter, but copes better with extreme temperature changes compared with the more usual polycarbonate.

The four-stop image stabiliser (Canon and Nikon versions only) and HSM autofocus are identical to those of the Sigma 18-200mm lens. However, the 18-250mm has a shorter closest focus distance of 35cm, compared with the 45cm of the 18-200mm and the older 18-250mm lenses. That's just about enough for the lens to earn its Macro badge, giving a maximum magnification factor of 0.34x.

PERFORMANCE

Autofocus is fast and very quiet, and image stabilisation lives up to its four-stop claims. Handling is close to the Sigma 18-200mm, except that the focus ring isn't recessed on this lens, so you have to be a bit more careful about finger fouling during autofocus. Sharpness is very good and distortions are low, especially when you consider the generous zoom range. On balance, this lens is worth the extra outlay, compared with the Sigma 18-200mm.



Tech focus...
16 elements in 13 groups, seven diaphragm blades, closest focus distance 35cm, 62mm filter thread, ultrasonic motor autofocus, physical dimensions 74x89mm, weight 470g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

SONY DT 18-250MM F/3.5-6.3 £470

Compact for an old-school lens

The Sony 18-250mm was launched six years ago, and was ahead of its time for squeezing such a big zoom range into a compact and lightweight package. Indeed, it's still marginally shorter and slightly lighter than the new Sigma 18-250mm. In some respects, the feature list is also pretty lightweight. It's the only lens in the group that lacks an internal autofocus motor. Instead, autofocus is driven from a motor in the camera body. The same goes for image stabilisation, which comes courtesy of sensor-shift mechanisms in Sony SLR and SLT bodies.

The lens does at least feature a focus distance scale, but it's only printed on the outside of the focus ring. There's also a zoom lock switch for restraining the lens at the short end of its zoom range. Ultimately, the Sony looks quite pricey given its relative lack of advanced features, so it all comes down to just how good the performance is.



Tech focus...
16 elements in 13 groups, seven diaphragm blades, closest focus distance 45cm, 62mm filter thread, camera-driven autofocus, physical dimensions 75x86mm, weight 440g

Digital Camera

FEATURES ★★★★★

BUILD QUALITY ★★★★★

IMAGE QUALITY ★★★★★

VALUE ★★★★★

OVERALL ★★★★★

PERFORMANCE

We've seen great performance from some Sony lenses in the past, but this isn't one of them. Autofocus is painfully slow and very noisy. Sharpness is poor at the wide-angle end of the zoom range and gets progressively worse towards the telephoto end. Barrel distortion is very pronounced at wide-angle settings and colour fringing is the worst of any lens in the group. Overall, this Sony optic doesn't have much going for it, and you're much better off opting for the equivalent Sigma lens.

IMAGE QUALITY IN FOCUS

CANON EF-S 18-135MM
F/3.5-5.6 IS STM



CANON EF-S 18-200MM
F/3.5-5.6 IS



NIKON AF-S DX 18-200MM
F/3.5-5.6G ED VR II



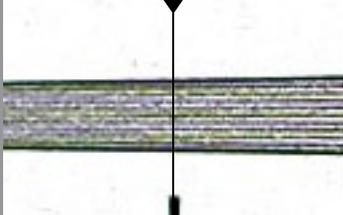
NIKON AF-S DX 18-300MM
F/3.5-5.6G ED VR



SHARPNESS TEST

ISO200

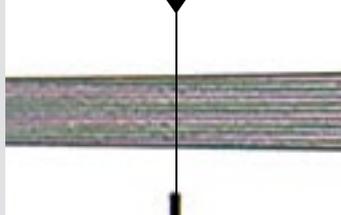
26



Sharpness peaks at mid-zoom settings but remains consistent throughout the zoom range, and is good into the corners of the frame.

ISO200

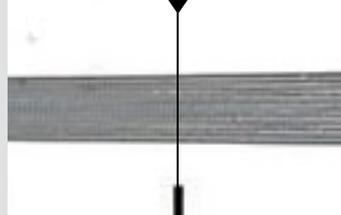
26



This lens beats all other competitors for wide-angle sharpness, although sharpness drops off steadily as you extend towards the telephoto end.

ISO200

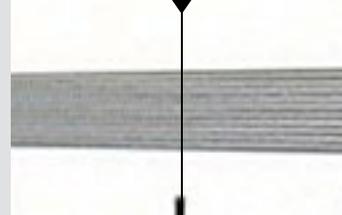
28



The Nikon 18-200mm retains plenty of fine detail while delivering exceptional contrast. Sharpness is maintained at the widest apertures.

ISO200

24



Less impressive than the Nikon 18-200mm for sharpness, the 18-300mm also drops off more at the long end of its zoom range.

FRINGING TEST

40mm



Most noticeable towards corners at the wide-angle end of the range. At longer zoom settings it's slightly better than the Canon 18-200mm.

105mm



There's marginally less colour fringing than with the Canon 18-125mm at the widest-angle zoom setting, but it's worse at mid to long settings.

35mm



For a superzoom lens, colour fringing is amazingly well restrained, even in extreme corners. In this respect, it's the best in the group.

85mm



It's a close match for the Nikon 18-200mm at most focal lengths, which is impressive, but there's more fringing at mid zoom settings.

DISTORTION TEST

18mm



Barrel and pincushion distortions are pretty average. We hoped for slightly better performance given the modest zoom range.

18mm



Wide-angle barrel distortion is among the worst in the group, and much more noticeable than with the Canon 18-135mm or Sigma lenses.

18mm



There's less wide-angle barrel distortion than with the Canon 18-200mm, and pincushion is modest at mid to long settings.

18mm



The mighty zoom range comes with heavy barrel distortion at the wide-angle end, and the worst mid-range pincushion of any lens on test.

IMAGE TEST VERDICT

The new STM version of the Canon 18-135mm delivers very good image quality that stays impressively consistent throughout the zoom range.



IMAGE TEST VERDICT

Sharpness is best at the wide-angle end but this comes with heavy barrel distortion. Overall, the Canon 18-135mm beats this lens for image quality.



IMAGE TEST VERDICT

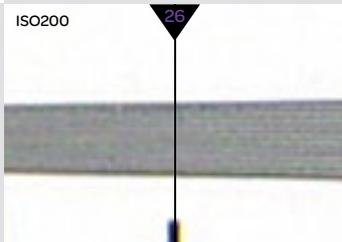
Image quality is very impressive and a good match for the Nikon's superior features and build. It's an excellent all-rounder.



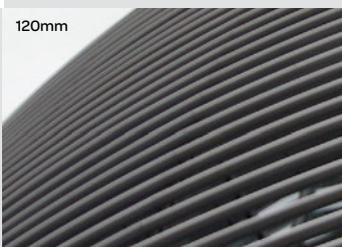
IMAGE TEST VERDICT

Overall image quality isn't as good as from the Nikon 18-200mm, so you have to consider if the extra zoom range is really worth it.





Wide-angle sharpness is only moderate, and at the telephoto end of the zoom range the Pentax is the softest lens in the group.



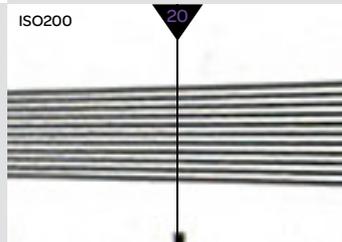
Colour fringing is quite poor, especially at either end of the zoom range. Of all the lenses on test, only the Sony is worse.



Barrel and pincushion distortions are fairly well controlled at all focal lengths, helped by the relatively modest zoom range.

IMAGE TEST VERDICT
Restrained distortions are the main plus point, but performance in terms of sharpness and colour fringing are disappointing.

★ ★ ★ ☆ ☆



Sharpness at medium to long zoom settings isn't as impressive as we've come to expect based on our previous tests on this lens.



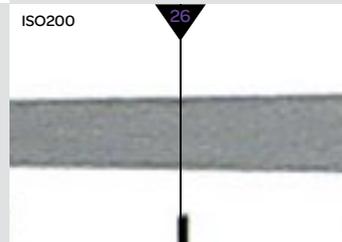
Colour fringing results are fairly typical for this class of lens, being most noticeable at either end of the zoom range.



Distortions are pretty well controlled overall with this lens, but pincushion is a bit on the high side at mid zoom settings.

IMAGE TEST VERDICT
We've always been impressed by the Mark II's image quality, although this review sample lacked sharpness at mid to long zoom settings.

★ ★ ★ ★ ☆



The Sigma 18-250mm delivers its best sharpness at the wide-angle end, but it's still impressive at mid to long zoom settings.



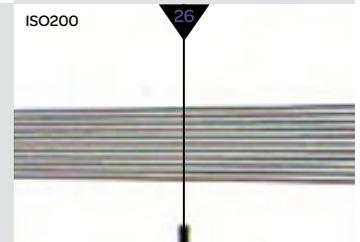
It's a bit on the high side at the telephoto end, but overall, colour fringing is pretty average throughout the zoom range.



Apart from fairly high pincushion distortion at mid-zoom settings, the Sigma does well to keep distortions fairly low.

IMAGE TEST VERDICT
The overall image quality of this lens is very good indeed, especially considering its pretty generous 18-250mm zoom range.

★ ★ ★ ★ ☆



Telephoto sharpness is practically as disappointing as from the Pentax lens, and it's the softest lens in the group at the wide-angle end.



Colour fringing is very noticeable towards the edges and corners of the frame. The Sony is the worst lens on test in this respect.



Pincushion distortion isn't too bad at mid to long zoom settings but barrel distortion is pronounced at the wide-angle end.

IMAGE TEST VERDICT
Taking all factors of image quality into account, the Sony delivers the least inspiring results of any superzoom lens in this test group.

★ ★ ☆ ☆ ☆

LENS BENCHMARKS

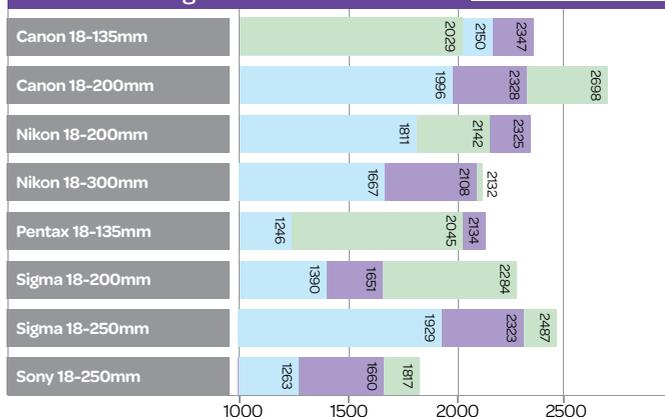
See how each lens performed in our lab tests

Now you'd think that a greater zoom range would impact more heavily on image quality. However, the Pentax has the joint smallest zoom range in the group (along with the Canon 18-135mm), yet fails to deliver when it comes to telephoto sharpness. By contrast, the Sigma 18-250mm does particularly well in our image quality tests, despite its extra-large zoom range. Unfortunately that's something that can't be said for the Sony 18-250mm lens.

Most superzooms tend to give greatest sharpness at wide-angle or mid zoom settings, with telephoto sharpness being more of a challenge. Colour fringing is most noticeable towards the corners of images, and in this respect there's a marked difference in the performance of competing lenses. For distortions, there's always pronounced barrel distortion at wide-angle settings, switching to pincushion at mid to long zoom settings. Again, the actual amounts vary somewhat between the different lenses on test.

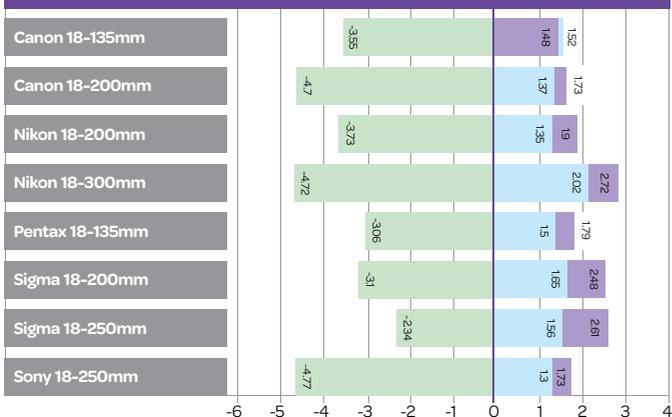
WHAT'S THIS?
Find out how we test on page 5

SHARPNESS High scores are better



Most lenses give good levels of sharpness throughout their zoom ranges. The Pentax and Sony are least impressive, especially at the telephoto end.

DISTORTION Closer to 0 is better



The Canon 18-200mm, Nikon 18-300mm and Sony give the most barrel distortion, and the Nikon 18-300mm has the worst mid-zoom pincushion.

FRINGING Low scores are better

Lens	Wide	Mid	Tele
Canon 18-135mm	2.11	0.51	1.84
Canon 18-200mm	1.9	1.18	2.28
Nikon 18-200mm	0.43	0.21	0.53
Nikon 18-300mm	0.46	0.69	0.38
Pentax 18-135mm	2.61	1	3.27
Sigma 18-200mm	2.19	0.76	2.01
Sigma 18-250mm	1.92	0.68	2.67
Sony 18-250mm	3.52	3.12	6.02

Both Nikon lenses perform extremely well, the Canon and Sigma lenses are good, but the Pentax and Sony have the worst scores for colour fringing.

HOW THE LENSES COMPARE



	Canon EF-S 18-135mm f/3.5-5.6 IS STM	Canon EF-S 18-200mm f/3.5-5.6 IS	Nikon AF-S DX 18-200mm f/3.5-5.6G ED VR II	Nikon AF-S DX 18-300mm f/3.5-5.6G ED VR	Pentax smc DA 18-135mm f/3.5-5.6 ED AL IF DC WR	Sigma 18-200mm f/3.5-6.3 II DC OS HSM	Sigma 18-250mm f/3.5-6.3 DC Macro OS HSM	Sony DT 18-250mm f/3.5-6.3
Contact	www.canon.co.uk	www.canon.co.uk	www.nikon.co.uk	www.nikon.co.uk	www.pentax.co.uk	sigma-imaging-uk.com	sigma-imaging-uk.com	www.sony.co.uk
Street price	£345	£390	£580	£680	£550	£260	£400	£470
Mount options	C	C	N	N	P	C N P S Sg	C N P S Sg	S
Image Stabiliser	4-stop	4-stop	4-stop	4-stop	None	4-stop (none for P, S)	4-stop (none for P, S)	No
Autofocus motor	Stepping motor	Electric motor	Ultrasonic (ring type)	Ultrasonic (ring type)	Electric motor	Ultrasonic motor	Ultrasonic motor	None
Minimum focus distance	39cm	45cm	50cm	45cm	40cm	45cm	35cm	45cm
Filter size	67mm	72mm	72mm	77mm	62mm	62mm	62mm	62mm
Included accessories	None	None	Hood, pouch	Hood, pouch	Hood	Hood	Hood	Hood
Dimensions (DxL)	77x96mm	79x102mm	77x97mm	83x120mm	73x76mm	75x88mm	74x89mm	75x86mm
Weight	480g	595g	565g	830g	405g	490g	470g	440g
FEATURES	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆
BUILD QUALITY	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆
IMAGE QUALITY	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆
VALUE	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆
OVERALL	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆

THE DIGITAL CAMERA VERDICT

THE NIKON 18-200MM LEADS THE FIELD

This has long been our favourite superzoom lens, but some of the newer competing lenses are narrowing the gap and have a lot to offer

Nikon goes the extra mile, building advanced features from its high-end standard and telephoto zoom lenses into its superzooms. Build quality is impeccable and, in the case of the Nikon 18-200mm, is backed up by excellent image quality. For us it's the best superzoom on the market. The Nikon 18-300mm boasts the biggest zoom range on test but with weaker image quality. It's also big and heavy.

The Sigma lenses are lightweight and compact. Sharpness of the 18-200mm didn't match up to previous samples of this lens that we've tested, but it's very good nonetheless. Even so, the 18-250mm is no larger and even lighter in weight, while also giving extra zoom range without sacrificing image quality.

Canon's new 18-135mm is a marked improvement over the previous version, with better image quality and a much more refined

STM (Stepping Motor) autofocus system. Overall, we prefer it to the Canon 18-200mm, despite its relative lack of telephoto reach.

The tail-enders of the group are the Pentax 18-135mm and Sony 18-250mm lenses. The Pentax's build quality is very good but it fails to back this up with strong all-round image quality. The Sony certainly packs a punch in terms of zoom range but autofocus is noisy and sluggish, and image quality disappoints.



NIKON AF-S DX 18-200MM F/3.5-5.6G ED VR II, £580

What's good: Ring-type ultrasonic autofocus, dual-mode image stabiliser, impressive build.

What's bad: A bit on the chunky side compared with Sigma's latest lenses.

Our verdict: Excellent performance and features make it the top choice for Nikon fans.



Digital
Camera
OUR TEST
RESULTS
The best superzoom
lenses for your
camera revealed



SIGMA 18-250MM F/3.5-6.3 DC MACRO OS HSM, £400

What's good: Powerful zoom range, effective stabiliser, compact size, lightweight build.

What's bad: Focus ring rotates during autofocus, some colour fringing at extremes.

Our verdict: Impressive performance in a really travel-friendly package.



SIGMA 18-200MM F/3.5-6.3 II DC OS HSM, £260

What's good: All the features of the Sigma 18-250mm lens, at a bargain price.

What's bad: Sharpness didn't match up to previous examples we've tested.

Our verdict: A steal at the price, especially if you don't need maximum telephoto reach.



CANON EF-S 18-135MM F/3.5-5.6 IS STM, £345

What's good: Practically silent yet fast autofocus, very good image quality.

What's bad: Lacks the telephoto reach of most competing superzooms.

Our verdict: For features and quality, it's the pick of Canon's current superzooms.



NIKON AF-S DX 18-300MM F/3.5-5.6G ED VR, £680

What's good: Very good build quality with plenty of high-end features.

What's bad: Big and heavy, image quality is a step down from the Nikon 18-200mm.

Our verdict: Worth buying if you're dead set on its class-leading zoom range.



Memory cards

Matthew Richards compares six Compact Flash and SDHC cards to find the best combination of storage, speed and value

1 SanDisk Ultra 30Mb/s CF

Price: £29

Web: www.sandisk.co.uk

The SanDisk Ultra offers reasonable performance and is cheaper than some cards that are only slightly faster. The highest capacity is only 16Gb, but this is plenty for lower-resolution cameras like the D300s, where it's a great value choice.

★★★★★

4 Integral Ultima Pro UHS-1 95Mb/s SDHC

Price: £29

Web: www.integralmemory.com

The 32Gb Integral card offers great performance. Bear in mind that the 95Mb/s rating is only for read speeds. The claimed maximum write speed is 45Mb/s, but overall, it's excellent value.

★★★★★

2 Kingston Ultimate 600x CF

Price: £28

Web: www.kingston.com

The fastest card on test for write speed in a D800, the Kingston Ultimate 600x beats even the Lexar 1000x, although it's a bit slower than the Lexar for downloading files to a computer via a USB 3.0 reader. It's also outstanding value.

★★★★★

5 SanDisk Extreme Pro UHS-1 45Mb/s SDHC

Price: £15

Web: www.sandisk.co.uk

This SanDisk has excellent write speeds both in-camera and when using a USB 3.0 card reader. However, read speed is less impressive, so it takes longer to download your photos to a computer.

★★★★★

3 Lexar Professional 1000x CF

Price: £71

Web: www.lexar.com

The 1000x has good write speed, both in-camera and via a card reader. For USB 3.0 read speed, it's the fastest card here. It's also the most expensive per Gb and, considering that many other cards write data faster, it's not the best value.

★★★★★

6 Lexar Professional 600x UHS-1 SDHC

Price: £24

Web: www.lexar.com

If you want the ultimate in speed from an SDHC card, look no further. It delivers the fastest in-camera and USB 3.0 write speeds in the group, and just beats the Integral Ultima Pro.

★★★★★

MEMORY CARDS	SanDisk Ultra 30Mb/s	Kingston Ultimate 600x	Lexar Professional 1000x	Integral Ultima Pro UHS-195Mb/s	SanDisk Extreme Pro	Lexar Professional 600x UHS-1
Card type	CF-UDMA 5	CF-UDMA 6	CF-UDMA 7	SDHC UHS-1	SDHC UHS-1	SDHC UHS-1
Capacity range	2-16Gb	16-32Gb	16-128Gb	32Gb	8-32Gb	16-32Gb
Camera write speed	19.1Mb/s	26.4Mb/s	24.8Mb/s	21.6Mb/s	21.6Mb/s	25Mb/s
Camera buffer cleared	22.9 secs	16 secs	18 secs	19.5 secs	21.2 secs	17.2 secs
USB 3.0 write speed	28.7Mb/s	55.6Mb/s	52.6Mb/s	39.1Mb/s	35.2Mb/s	55.9Mb/s
USB 3.0 read speed	27.6Mb/s	27.6Mb/s	27.6Mb/s	41.8Mb/s	30Mb/s	30Mb/s

From the makers of Digital Camera magazine

Macro flash kits

Get great seasonal close-ups! Matthew Richards reviews six macro flash kits, designed for close-up power and versatility

1 Viltrox JY-670 Macro Light Professional Kit

Price: £85 **Web:** www.ukphotodistro.co.uk

This foregoes an auto exposure facility to keep costs down. The flash ring has dual tubes that cover most of its circumference, and two mini lights. The hotshoe-mounting has controls for using either or both of the flash tubes, and for setting power between full and 1/128th output.



4 Sunpak Auto 16R Pro Ringflash

Price: £335 **Web:** www.intro2020.co.uk

It's not a dedicated flashgun, but still boasts an auto flash mode – albeit without through-the-lens metering. Adjustments are available between full power and 1/256th power, and the flash tube forms a perfect circle. The hotshoe-mounting is easy to use and the flash module connects to various lenses using adaptor rings.



2 Nikon Close-up Speedlight Remote Kit R1

Price: £415 **Web:** www.europe-nikon.com

Two programmable, wireless SB-R200 flashguns mount onto a ring that comes with five screw-in adaptors. You also get diffusers, coloured filters, stands and clamps for both flashguns, which are triggered in wireless mode using the pop-up flash in commander mode.



5 Aputure Amaran Halo LED

Price: £50 **Web:** www.ukphotodistro.co.uk

This kit uses a circular array of high-power LEDs, which enables a powerful output in flash mode with the bonus of continuous lighting at reduced power. Dedication includes AF assist lighting in flash mode, but there's no TTL flash metering. Eight mounting rings enable fitment to filter thread sizes between 49mm and 77mm.



3 Sigma EM-140 DG

Price: £315 **Web:** www.sigma-imaging-uk.com

The lighting ring fits around the lens and has two small independent flash tubes on opposite sides. Both 55mm and 62mm adaptors are supplied. There are lots of onboard controls for adjusting auto TTL and manual flash output, but the interface isn't as intuitive as some others.



6 Nissin MF18 Macro Flash

Price: £250 **Web:** www.nissindigital.com

A fully-featured macro flash, this has a smart hotshoe-mounting controller and circular flash tube that attaches to lenses via adaptor rings. Six adaptor rings are supplied. The onboard control system is intuitive, based on a colour LCD screen, and enables high-precision adjustments in TTL and manual flash modes.



From the makers of Digital Camera magazine



Light travel tripods

Want extra support without being weighed down? Here are six lightweight travel tripods that help you ensure sharp shots

1 Benro Flat Traveler 2 (A1192TBO)

Price: £205 **Web:** www.benro.com

A modular system that includes separate legs, centre column and ball head, the 1.72kg Benro comes in a sturdy carry case. The legs fold flat for stowage but offer multi-angle options in use. It comes up trumps for maximum load (8kg) and operating height (175cm).

★★★★★

2 Hama Traveller Compact Pro (004214)

Price: £35 **Web:** www.hama.co.uk

With a design based on four leg sections, this doesn't fold down as small as other tripods here, but extends to a maximum operating height of 163cm. Features include multi-angle legs with retractable foot spikes and a good ball head. The maximum load rating is a hefty 4kg.

★★★★★

4 Slik Sprint Pro II GM

Price: £65 **Web:** www.sliktripod.co.uk

The Slik has four-section legs fitted with clip locks, and a sturdy ball head. Trickery includes multi-angle legs and adjustable friction damping for the centre column, which you can split or invert. It has a maximum load rating of 2kg, and at 0.94kg is the lightest tripod here.

★★★★★

5 Vanguard Nivelu 245BK

Price: £120 **Web:** vanguardworld.co.uk

This features multi-angle legs plus a pivoting centre column. This enables the head to be stowed between the feet, giving the smallest carrying size here, at just 37cm. The tripod still extends to 161cm. Progressive twisting of each foot locks and unlocks each of five leg sections.

★★★★★

3 Manfrotto Compact Photo-Video Kit (MKC3-H01)

Price: £45 **Web:** www.manfrotto.co.uk

This kit's pistol-grip head has a switch for locking out the swivel facility. Despite five-section legs, folded height is 46cm and the maximum operating height is only 154cm. With a meagre maximum load of 1.5kg, it's the only tripod here that lacks multi-angle legs.

★★★★★

6 Velbon Ultra LUXi L

Price: £85 **Web:** www.velbon.co.uk

The robust Velbon extends from its 39cm carrying height to full extension of 161cm, with the twisting of each foot for unlocking and locking. The multi-angle leg mechanisms work well, and there's a split/invert centre column. It's the only tripod to feature a three-way head.

★★★★★

Flashgun showcase

Six advanced yet sensibly priced bounce and swivel flashguns shine a light for Matthew Richards

1 Canon Speedlite 430EX II

Price: £205 Web: www.canon.co.uk

With a GN 43 rating, this boasts a recycling time of 3.0 seconds from a full-power flash. It works well in wireless slave mode, but there's no wireless master facility. There's automatic sensing for full-frame and APS-C sensor camera bodies, and a high-speed sync mode.



4 Nissin Di866 Mk II Speedlite

Price: £200 Web: www.kenro.co.uk

Available in Canon, Nikon and Sony options, features include wireless master/slave functions, a secondary fill-flash tube, high-speed sync and strobe output. Recycling takes 4.9 seconds from a full-power flash, rated at GN 60. It also has an intuitive colour LCD.



GN = Guide Number @ ISO 100

2 Metz 58 AF-2 Digital

Price: £250 Web: www.metzflash.co.uk

This has a GN 50 maximum power rating, after which recycling takes 5.6 seconds. Features include wireless master/slave functions, a secondary fill-flash tube and high-speed sync and strobe modes. Fit options include Canon, Nikon, Pentax, Sony and Four Thirds.



5 Sigma EF-610 DG Super

Price: £160 Web: sigma-imaging-uk.com

This is rated at GN 61, and recycling takes 6.3 seconds. Flash modes include high-speed sync and strobe, and wireless master/slave. However, wireless modes are difficult to use, and the menus are fiddly. Fit options include Canon, Nikon, Pentax, Sigma and Sony.



3 Nikon SB-700 Speedlight

Price: £230 Web: www.nikon.co.uk

The versatile SB-700 has a GN 37 rating with fast recycling of 2.9 seconds from a full-power flash. Wireless master and slave modes work well and high-speed sync is available. A high-quality diffusion dome and coloured filters are included.



6 Sunpak PZ42X

Price: £110 Web: www.intro2020.co.uk

This lacks any advanced flash modes and can't be used as a wireless master or slave. It's compact and robust, although the mounting plate is plastic. The GN 42 rating is pretty good, with a full-power recycling time of 5.8 seconds. It's available in Canon, Nikon and Sony options.



Photo backpacks

Carry your kit in secure comfort with a purpose-made backpack.

Matthew Richards tests out six of the best

1 Hama Daytour 230

Price: £100 **Web:** www.hama.com

Can't decide between a full photo and split daypack? The innovative Hama Daytour can be both. It's split into two sections, both of which are decked out with adjustable dividers. Organiser sections are on hand for memory cards, batteries and filters. Extra pockets are plentiful, but there's no laptop compartment.

★★★★★

4 Tamrac Expedition 6x

Price: £110 **Web:** www.tamrac.co.uk

Tough enough to take the knocks on the wildest expedition, a huge main compartment is given over solely to photo gear. There's room for a camera with fitted lens, plus up to ten other lenses. The centre section is long enough for a camera with a long lens attached, or for two cameras with smaller lenses.

★★★★★

2 Manfrotto Veloce VII

Price: £70 **Web:** www.manfrotto.co.uk

A full photo backpack with space for seven items plus an external attachment fastener and a full-length internal section for tripods. The main opening is at the rear, so you lay the bag down on its front for access. There's also a top opening so you can grab your camera and lens without opening the whole bag.

★★★★★

5 Think Tank Photo Glass Limo

Price: £150 **Web:** thinktankphoto.com

Remove the dividers and use the supplied collar for the rear of a lens, and this is perfect for a lens like the Nikon 600mm f/4 AF-S VR. Replace the dividers and it can hold a camera with attached lens, plus up to seven lenses and accessories. Equally adept at holding a camera with a telephoto lens, plus four other lenses.

★★★★★

3 Lowepro Flipside 400 AW

Price: £85 **Web:** www.lowepro.com

Despite weighing just 1.6kg, the main compartment is huge, able to take up to 12 photo gadgets. It can hold one or two cameras plus lenses, or one camera with a long lens attached, plus other kit. Build quality is strong. There's also a memory card organiser, tripod attachment system and slip-on rain cover.

★★★★★

6 Vanguard Quovio 44

Price: £150 **Web:** www.velbon.co.uk

This split photo/daypack is very versatile. The shoulder straps can be swapped around so you can wear the bag as a messenger-style slingback, or as a regular backpack. In slingback mode, the quick-access side opening is particularly useful. On the other side, there's a pull-out tripod attachment system.

★★★★★



★★★★★
Digital
Camera
BEST ON
TEST

★★★★★
Digital
Camera
GOLD
AWARD

★★★★★
Digital
Camera
GREAT
VALUE