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Panasonic Lumix DMC-G2 Overview

Reviewed by Dave Etchells, Shawn Barnett, Zig Weidlich, and Mike Tomkins

Review Date: 05/04/2010

Panasonic's update to the first Micro Four Thirds digital camera is the Lumix DMC-G2, a close approximation of the G1, but with a few key changes that mostly improve the function of the original while maintaining the \$799.95 price point.

Most of the Panasonic G2's basic specs remain the same, including the 12.1-megapixel sensor, the 3-inch LCD with 460,000 dots of resolution, and the electronic viewfinder's 1,440,000-pixel resolution is also maintained, as are the shape and size. Panasonic added a new processor to the G2, though, the Venus Engine HD II, which is expected to improve both videos and still images. Maximum ISO sensitivity notches up one stop, from 3,200 to 6,400.

New is the touch screen, which is integrated into a few basic functions, like focus point selection. It's a surprisingly useful feature in the Panasonic G2, which we'll explore in more detail in the User Report below.

The Panasonic G2 ships with a different lens than its predecessor, the 14-42mm f/3.5-5.6. It's a 3x zoom rather than the 14-45mm 3.2x zoom on the G1. The new lens lacks an O.I.S. switch, but it still has optical image stabilization built in; only now it's controlled from the Panasonic G2's menu.

Other changes on the Panasonic G2 include a new location for the Control dial: it goes from the front grip to the rear thumbgrip area. And a dedicated Movie button now appears on the G2's top deck, right behind the Shutter release button. Movie mode is limited to 720p, not rising to the 1080i level of the GH1, so there's still room for another model should Panasonic see fit, but the Panasonic G2 does include a new stereo Mic jack.

Test Images (click to enlarge)

Still Life



Multi Target



Basic Specifications

Resolution:	12.10 Megapixels
Kit Lens:	3.00x zoom 14-42mm (28-84mm eq.)
Viewfinder:	EVF / LCD
LCD Size:	3.0 inch
ISO:	100-6400
Shutter:	60-1/4000
Max Aperture:	3.5
Mem Type:	SD / SDHC / SDXC
Battery:	Custom LiIon
Dimensions:	4.9 x 3.3 x 2.9 in. (124 x 84 x 74 mm)
Weight:	21.8 oz (618 g) includes batteries, kit lens
MSRP:	\$800
Availability:	05/2010

Test Summary

(Mouse over items for explanations)

Power-on Time	1.0 sec
Shutter Lag, Full Autofocus	0.423 sec
Shutter Lag, Prefocused	0.120 sec
Shot to Shot time	0.70 sec
Continuous Speed	3.33 fps (9 shots)
Best Macro	3.74x2.80 in 95x71mm
Viewfinder accuracy (Optical)	100%
Viewfinder accuracy (LCD)	100%
Distortion (Wide Angle)	0.3%
Distortion (Telephoto)	-0.3%
Battery Life (CIPA standard)	360 shots

These numbers are only a summary of our full test results. For more test results, see the [Optics](#), [Exposure](#), or [Performance](#) pages of this review.

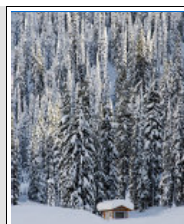
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First
Canon PIXMA Pro9000
Mark II

Second
Canon PIXMA MP990

Third
Canon PIXMA MP640

The Panasonic G2 ships from late May 2010, with a suggested retail price of US\$799.95 including the kit lens.

Panasonic G2 User Report

by Shawn Barnett, with Mike Tomkins

The original Micro Four Thirds digital camera finally has a successor in the Panasonic G2. Panasonic has seen fit to leave the basic profile alone, despite what we've perceived as a market preference for the smaller, Panasonic GF1 body style. Since the company no longer sells an SLR, maintaining the Panasonic G2 design is a logical choice to compete in the existing market for digital SLRs from Canon, Nikon, Pentax, and even its Micro Four Thirds partner Olympus, mostly because some users will expect an interchangeable-lens camera to have an optical viewfinder of some kind. Those who don't necessarily want a viewfinder already have a capable option with the Panasonic GF1.

As one who's drawn to Micro Four Thirds more for overall portability, the EVF format of the G2 and Samsung NX10 that I just reviewed is less compelling. The resulting cameras are not sufficiently smaller than the smallest digital SLRs to make a difference. Many of the lenses, however, are quite a bit smaller, so there's still plenty to like about the Panasonic G2; and as of this writing, the G2 is one of the more feature-rich of the small SLD cameras on the market with its articulating screen, high-res EVF, and touchscreen interface.

Look and feel. The Panasonic G2 looks like a very small digital SLR; indeed, were it not for the tiny lens, it would look a lot like a Canon Rebel with the bottom cut off. As a result, the Panasonic G2 feels small, but still solid, yet its smooth skin is soft and warm to the touch. I'm glad they maintained this unique rubbery finish, because it's one of the small things that sets the G-series apart from the plastic and metal competition. Note, though, that this coating is not actually tacky, enhancing the grip; in fact, it's more smooth and slippery, so be sure to keep a good hold on the G2, especially on dry days.

Heft is important in a camera, even if it's small, and the Panasonic G2 has good heft, and weight is distributed well. With battery, card, and kit lens, the Panasonic G2 weighs 21.8 ounces (1.36 pounds, 618g). Body only, the weight is 15.4 ounces (0.96 pounds, 437g). Overall, the combination has lost about 0.7 ounces (20g). The Olympus E-P2, for comparison, weighs 19 ounces (1.2 pounds, 539g) with its kit lens, battery, and card; and the Samsung NX10 weighs 21.5 ounces (1.3 pounds, 610g) also with kit lens, battery, and card.



Major differences from the front include the absence of the Front dial, which has been moved to the rear, and additions of the HD and AVCHD Lite logos. The kit lens is also new, now a 3x, 14-42mm G Vario with Mega O.I.S. (Optical Image Stabilization).



While on the subject of the new lens, Panasonic has removed the OIS On/Off switch from the side of the lens body, preferring instead to set IS status in the camera's menu. They've added a function to the left mode dial by stacking one on top of the other. The lever that peeks out from the lower left in this shot controls the autofocus mode, by moving the little white pip you see beneath the MF indicator, while the top dial sets the autofocus pattern, aligning with the smaller silver dot on the right of the dial. This was a little confusing at first, but it became clear after a few seconds. On the right the Mode dial is also integrated with the Power switch and the Drive mode switch.

The Shutter button is mounted high on the grip, while I'd have preferred a little lower position, as on the NX10 and Rebel T2i. It's not a big deal, though. Panasonic smartly moved the G2's Q. Menu and Film mode buttons to the back, where you're more likely to be looking at the screen so you can find the buttons and adjust the settings without a lot of camera tilting. In their place are the Movie Record and Intelligent Auto buttons. I would prefer the Movie Record button on the back, as it is on the GH1, but near the shutter button, as it is on the GF1, is a good compromise. Note how far the EVF's rubber eyecup protrudes from the back of the Panasonic G2, a design feature that further limits the G2's ability to fit into places as small as its competitors will fit.



Panasonic's choices of a left-mounted articulating hinge and a wide format for the LCD both conspire to leave little room on the right of the camera for establishing a good grip. There's less button-free room for the thumb than we see on competitors without the articulating screen, like the NX10. But Panasonic made the buttons more firm, less likely to be pressed by accident. The Display button is actually recessed into the camera body.

The Rear dial is firm enough that it's not likely to be activated by accident; pressing it inward activates the EV adjustment mode, highlighting the EV scale in yellow. Adjustments are then made by turning the dial. Just right of the EVF, you can see the IR sensor windows that automatically switch between the rear LCD and the EVF.

The electronic viewfinder has an extremely high resolution of 1,440,000 dots (480,000 pixels), offering a 100% field of view and 1.4x magnification. The Panasonic G2's viewfinder has a generous +/-4.0 diopter adjustment range, and a rather tight 17.5mm eye point.

Articulating LCD. The 3-inch LCD swivels, and has a 3:2 aspect ratio, and 460,000-dot resolution. It's also a touch-screen panel for some menus and AF-point selection. The LCD display provides seven-step adjustment for both brightness and color. Both display choices can offer a real-time histogram function, and three choices of onscreen guidelines.



Panasonic G2 Internals

Sensor. The Panasonic G2 has a Four Thirds sensor that measures 17.3 x 13.0mm, with a 4:3 aspect ratio. Panasonic's LiveMOS image sensor has an RGB color filter array, and yields a maximum resolution of 4,000 x 3,000 pixels. Available aspect ratios include 3:2 (4,000 x 2,672 pixels), 16:9 (4,000 x 2,248 pixels), and 1:1 (2,992 x 2,992 pixels). It's worth remembering that Micro Four Thirds is not about the sensor size, but about the lens mount and lack of a mirror box. The sensor itself is exactly the same size as the Four Thirds sensor. The crop factor for Four Thirds is 2x, so you multiply the 14-42mm of the kit lens by two to get 28-84mm equivalence to the same view on a 35mm camera.



Processor. The Panasonic G2 uses a newer generation of the company's image processor, dubbed Venus Engine HD II. This helps making burst shooting available at up to 3.2 frames per second, with a maximum burst depth of seven RAW frames, or unlimited JPEG images. (We got lower numbers in the lab, with our hard-to-compress target.) It also should improve noise suppression performance, as they've elected to allow ISO sensitivity ranges from 100 to 6,400 equivalents; and there's also an Intelligent ISO function.

The company's Supersonic Wave Filter dust reduction system is retained from the previous camera, designed to shake dust from the sensor.

Autofocus. Like all Micro Four Thirds digital cameras, the Panasonic Lumix G2 uses a contrast detection autofocus system. A choice of either 23-point or single-point focusing is available, and the Panasonic G2 includes both face detection and AF tracking functions. The Panasonic G2's touch panel display also allows it to offer touch autofocus, and even a touch shutter function. An AF assist lamp is included to help with low-light focusing on nearby subjects.

Metering. The Panasonic G2 has a 144-zone metering system, with three metering types on offer: intelligent multiple, center-weighted, or spot. Exposure mode choices include Program, Aperture, and Shutter-priority, plus a fully Manual mode. There are also a whopping 26 Scene modes that help amateurs get the results they're looking for without the need to understand shutter speeds, apertures and the like. Shutter speeds of 60 to 1/4,000 second are available, as well as a bulb mode limited to a maximum of four minutes. +/-3.0EV of exposure compensation is available in 1/3EV steps. The Panasonic G2 also includes an exposure bracketing function which can capture three, five, or seven frames with exposure varying by 1/3 or 2/3EV steps.

White balance. Nine white balance modes are available, including auto, manual and seven presets. It's also possible to fine-tune white balance, or to directly set it within a range of 2,500 to 10,000 kelvin in steps of 100 kelvin. There's also a three exposure white balance bracketing function. The Panasonic G2 includes a built-in popup flash, with a guide number of 11 meters at ISO 100. X-sync is at 1/160 second, and +/-2.0EV of exposure compensation is available in 1/3EV steps. There's also a hot shoe that is compatible with the FL220, FL360, and FL500 strobes for TTL auto shooting.

Movies. The Panasonic Lumix G2 includes a standard / high definition movie mode (or Motion Picture mode, as Panasonic calls it), able to shoot at resolutions up to 720p (1,280 x 720 pixels). Two compression types are on offer for high-def movies: either AVCHD Lite, or QuickTime Motion JPEG. For standard-definition shooting, at WVGA / VGA / QVGA resolutions, only QuickTime Motion JPEG video is possible. AVCHD video is recorded at a frame rate of 60 fields per second (30 frames per second) for NTSC, or 50 fields per second (25 frames per second) for PAL. QuickTime Motion JPEG videos are always recorded at 30fps. The Panasonic G2 provides no less than 17 Movie Scene modes. It also offers not only a built-in mono microphone, but also a stereo mic jack which doubles as a remote jack. Unfortunately, the jack is non-standard, so it won't work with most mics without a proper step-down adapter. Panasonic's DMW-MS1 stereo microphone (shown at right) of course has the correct 2.5mm plug. *For more on Movie Mode, see our [Video](#) page.*



Stills. The Panasonic G2 offers both sRGB and Adobe RGB color spaces, and can shoot still images in either compressed JPEG or Raw file formats, as well as shooting both Raw + JPEG at the same time if desired.

Storage and battery. Data is stored on Secure Digital cards, including the newer SDHC and SDXC types. The Panasonic G2 includes connectivity via USB 2.0 High Speed data, high-definition miniHDMI type C video output with



stereo audio, or standard definition NTSC / PAL video output with monaural audio (NTSC only for North America).

Power comes courtesy of a proprietary 7.2V 1,250mAh battery pack, which includes Panasonic's ID Security function to prevent use of counterfeit or third-party battery packs. With the bundled 14-42mm lens, up to 360 shots can be captured on a charge using the LCD display, or 390 shots with the electronic viewfinder.

Panasonic G2 Comparisons

Size is a big advantage to SLDs like the Samsung NX10 over most competing SLRs. As I mentioned, because of the EVF hump and the longer kit lens, the Panasonic G2 doesn't seem that much smaller, but it is, as the lenses can be made smaller overall for the given focal length equivalents (remember the 2x multiplier). So it's about the same size as the Samsung NX10, a little smaller than the Rebel T2i, a little larger than the Olympus E-PL1.

Panasonic G2 vs Samsung NX10



Compared to the Samsung NX10, the Panasonic G2 is a little shorter, a little wider, and its lens is a little longer. The lens is a little narrower, though, making it more easily pocketable when not in use.



The EVF eyecup for the Panasonic G2 is a lot larger than the NX10's as well (see how much more the G2's eyecup tilts up the camera in the shot below). The Panasonic G2 offers the advantage of a 3:2 articulating screen, but has less room for the thumb.



The Panasonic G2's grip juts forward more than the NX10's grip, which is wider and allows a narrower profile front to back.

Panasonic G2 vs Olympus E-PL1



The Panasonic G2 is a little larger than the Olympus E-PL1, both wider and taller.



Two advantages the G2 has over the E-PL1 is the included electronic viewfinder and the articulating LCD. The touchscreen is also an advantage. The E-PL1's advantage is its smaller size, lower price, and slightly higher quality as the ISO rises.



Here you can see the extent to which the E-PL1's EVF sticks out from the back of the camera, while the E-PL1 lays flat on the light table. The E-PL1's 14-42mm lens also retracts into itself when not in use, making a smaller package overall.



With the 17mm pancake lens attached, you can see that the only aspect truly making the E-PL1 fit into smaller spaces than the G2 is the EVF eyecup; the grip has very little to do with it.

Panasonic G2 vs. Canon Rebel T2i



While the Panasonic Lumix G2 is smaller than the Canon Rebel T2i, at some point you have to decide whether it's sufficiently smaller to make a difference in whether you'd bring it along. It still has a grip and viewfinder hump.



For the record, I do think there's a difference, but it's not huge. It's just another factor to consider. The swiveling LCD is still an advantage to the G2.



When you look at the third dimension of the lens, you get an idea of why I say it's not that much smaller. The lens sticks out almost as far as the Rebel's lens (the Rebel lens is extended somewhat in this shot).

Shooting with the Panasonic G2

by Shawn Barnett

So much about the Panasonic G2 is similar to the G1, it's tempting to just cut and paste that review into this one so I don't miss any of the pertinent observations, but I can recommend you read the [G1 review](#) if you're very serious about choosing the Panasonic G2, because its newness was better covered there when the device was the only mirrorless interchangeable lens camera on the market. Now the G2 is one of a growing number of mirrorless camera models, with four companies currently in, or about to enter the market (Sony is the company about to enter, as they announced their coming cameras in February 2010 at PMA).

Taking the Panasonic G2 for a stroll is a pleasure, not unlike taking the Samsung NX10 or Olympus Pen series out for a shoot. I was quickly reminded, though, of the luxuries available with the G2 that are not found on the others. First, there's the buttery-smooth swivel LCD that made shooting down low or high and vertical quite a bit easier. I'm a fan of left-hinged displays, because they offer more angles overall than tilting designs, and those that swivel from the top or bottom.

You can choose to leave the Panasonic G2's LCD off, and the EVF will only come on when you bring the LCD to your eye, or you can use the LCD panel as a status display. Just cycle through the modes with the Display button. A very smart, energy-saving design.

EVF. It bears repeating that the EVF is smooth and clear thanks to the LCOS (Liquid Crystal On Silicon) display. It as a 60 frame-per-second refresh rate, so it's a lot closer to reality than most displays. The peculiar thing about LCOS is that unlike every other color liquid crystal display you've seen, there's no grid between pixels with LCOS, and you can't see individual red, green, or blue pixels. It's just smooth image. Well, there are jaggies, but the pattern is a very clean one.

I still notice distortion in the viewfinder, and with my glasses on there's some chromatic aberration and it's hard to get the whole picture in without smashing my glasses between my eye and the eyecup, so I don't use it as much as I'd like. I still prefer a true optical view for some things. If I were doing some tripod work, I'd consider taking off my glasses to better see this view, as the diopter corrects from -4 to +4, the most impressive range we've seen since the G1.

Touch Panel. Getting back to the LCD, its new feature is the touchscreen. So far I haven't really fallen for any touchscreen digicams. A longtime PDA user, you'd think touchscreens would be a natural for me, but not so far.

But I was surprised when I brought the Panasonic G2 up to compose

a shot and found that its AF point was high and to the right of the frame, not where I remembered it last. I furrowed my brow and brought the Panasonic G2 up to where I could figure out how to re-adjust the AF-point position. I tried a few combinations common to other cameras, to no avail. Then I remembered: Touchscreen. I tapped in the center of the LCD, and the AF point jumped to the center. That's better. I started to compose the image again, and decided I wanted the autofocus high and to the left, rather than the right, and tapped again. The focus point moved instantly and I was able to get my shot. Easier than ever. Wow.

Of course, the problem was that sometimes an accidental touch on the screen as I walked around would put the AF point yet somewhere else I didn't intend. Thankfully, you can either turn off this feature, or just tap again to select your AF point.

The other thing I like about Panasonic's implementation of their Touch Panel is that it's not for everything. Many companies have tried to eliminate all buttons so they can make their cameras small, yet with a big LCD. On the Panasonic G2, touch is used for the AF point, for moving the histogram around, for flicking through pictures in Playback mode, for zooming in on pictures (just tap), and for making selections from the Quick Menu. You can also use it as a shutter release.

Though I say it's not for everything, the Touch Panel is still used to enhance quite a few functions, autofocus in particular. In AF Tracking focus mode, you can tap on your subject to have the Panasonic G2 track it. It's pretty impressive to watch the yellow target icon follow your subject around. When Face Recognition is active, you can touch to override this mode's AF component; the camera will still recognize and set exposure based on faces, but focus will be confined to the area you select. Note also that you can enlarge or constrict the focus size with the Rear dial while the AF point is yellow.

Not cool enough for you? Put the Panasonic G2 into 23-Area-Focusing mode and with a touch you can confine the camera to just a few available AF points. Nine "plus" symbols appear on the screen, and each marks a cluster of four, five, or six AF points. The real power here is in the touch screen, because it allows changes so quickly, it truly makes multi-AF capability useful. I'm usually more likely to shoot with the center point, but I might grow to love the Panasonic G2's touchscreen AF-point selection. The G2's AF system covers the bases so thoroughly, it's safe to say that Panasonic has the most comprehensive and accessible contrast-detect autofocus system on the market.

Touch also works in Playback mode: A swipe slides from one image to the next, and a tap zooms in on an image. If you want to zoom back out, tap on the zoom out button. Simple.

Focus speed. The Panasonic G2's autofocus remains quite snappy, and in video mode it's more like a camcorder than we've seen on other small digital cameras; it also performs better than any SLR we've seen to date. And that's not with the special HD lens that shipped with the GH1, that's with the new kit lens.

Shutter lag numbers are quite good for the category, with the Panasonic G2 focusing and capturing a shot in 0.42 second with the kit lens. Continuous AF performance is a bit faster, at 0.40 second. Prefocus lag times hover around a very snappy 0.12 second. That's not as fast as some digicams, nor as fast as some SLRs, but it's plenty fast for the category. The reason it's a little slower is its open-shutter design. SLR shutters, when used traditionally, are always closed, with the first curtain poised and ready to



Optical quality is good, and image stabilization is rock solid with the new 14-42mm kit lens.

Unique shutter: Panasonic had to create a new type of

snap open as soon as you trip the shutter. SLRs and SLRs in Live View mode have the shutter open to draw the live image and display it on the LCD, so they have to close the first curtain before making the exposure. That takes time, which is reflected in that longer prefocus exposure time. The Nikon D5000, for comparison, has a prefocus shutter lag of 0.085 second in standard mode, but gets even slower in Live View mode, increasing to 0.54 second. So by comparison, the Panasonic G2 is doing pretty well. Note that modern SLRs are still faster at full autofocus shutter lag, with the Canon T2i testing at 0.25 second to acquire focus and capture an image.

Stabilization. Panasonic's Mega O.I.S. just continues to impress. I find fewer smudged shots than usual with the company's lenses, and the new 14-42mm lens is no exception. Heartbeats do not affect the image as I hold the camera, which can be somewhat surreal: watching your hand and camera move while the onscreen image stays steady.

Shutter speed preview: To see how motion captured at a given shutter speed will appear in your photo, try Shutter Speed Preview mode.

"HD" optic, did surprisingly well. AF Tracking was better than competing models with live AF, and obviously way ahead of those camera that simply lack AF tracking during video recording. It hunts only a little as it seeks focus.

Despite what it seems to say in the manual, the Panasonic G2 is Program only, no aperture or shutter priority exposure control is available. Still, Peripheral Defocus mode is available, giving some depth-of-field control, and Flicker Reduction offers four shutter speed choices, from 1/50 to 1/120 second.

Having the ability to set the AF point with a touch on the LCD while recording video is nothing short of amazing. Shifting focus from one subject to another--a great storytelling feature--is as easy as touching the screen.

We like that AVCHD Lite and Motion JPEG are supported with the Panasonic G2, something rare on other cameras. Sound quality from the built-in microphone is good, and also sensitive. We do notice a slight bit of background hiss, however; as it's not something we've really looked at before, it's hard to say how important that might be.

Though the Panasonic G2 has a microphone jack, it's a non-standard 2.5mm size, so you'll need an adapter for most microphones. As with most digital cameras, there's no manual level control for audio.

We found very few compression artifacts in video in either AVCHD or Motion JPEG, but a big nuisance was how long it takes to activate recording: The Panasonic G2 doesn't start recording until about a second *after* you've pressed the Record button. Worse is that it cuts off recording about 0.5 to 0.7 second *before* you press the Record button to stop recording.

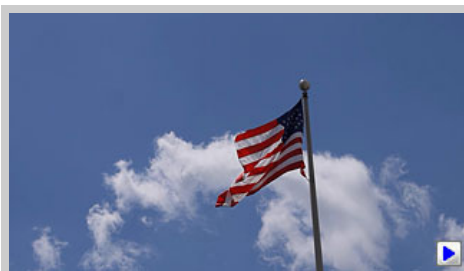
Dave's done a very thorough writeup of on the Panasonic G2's video capability, so check it out on the [Video tab](#).

Lenses and adapters. The list of available Micro Four Thirds lenses continues to grow, and the available adapters make the possibilities too vast to list here. But among actual Micro Four Thirds lenses available from Panasonic and Olympus, there are some real gems. We haven't seen them all, but two of my favorites are the Olympus 17mm f/2.8, the Panasonic 20mm f/1.7, both pancake designs that turn out great images in all kinds of light with good focus across most of the frame. The 20mm has the edge in both sharpness and light sensitivity, but the 17 does quite well. Among

shutter for the Lumix G1, one that is open at rest, rather than closed. (This is copied from the G1 review, since the shutter is the same.) The mechanism uses at least two shutters: One closes from the bottom first, to prepare the sensor for image capture. Then that shutter falls first, and the second curtain follows after. Then the second curtain opens for the next exposure. This video shows two sequences, both with the shutter in High Speed Continuous mode. The first has the shutter speed set to 1/60 second, the second to 1/1,000 second. (Video was captured with the Casio FH20 at 420fps.) Because YouTube seems to remove a few frames, please feel free to download this video instead:
[PanG1_shutter.mp4](#)

Depth-of-time preview. The Panasonic G2 has a depth-of-field preview button, right below the five-button navigator on the back, which stops down the lens aperture to your current setting. But the G2 also has a unique mode called Shutter Speed Preview. First press the Preview button to activate the depth-of-field preview, then press the Display button. The camera will then leave the aperture stopped down and essentially expose the sensor at the selected shutter speed, refreshing the display at the intervals set. For example, if you want to capture a waterfall at f/8 to get most of the picture in focus, and you want the water to appear as a soft cascade, you can set the camera to the aperture you want and see the live effect onscreen. If it's too bright or dark, you can make the necessary adjustments to ISO, aperture, and shutter speed and work out just how you want the photo to look without taking a bunch of test shots.

Movie mode. Unlike its predecessor, the Panasonic G2 has a Movie mode and its revised lens, though not an



Motion JPEG HD movie. 1280x720 at 30 fps. (Click to download 18MB MOV file.)

the mid-range zooms, the Panasonic 14-45 stands out as the most capable in terms of optical performance and image stabilization. According to our tests, it seems sharper than the 14-42mm that ships with the G2.

Wide-angle superstars are the Panasonic 7-14mm and the Olympus 9-18mm, each delivering impressive images for landscape photographers. The 7-14mm is particularly stunning, but quite a bit more daunting to bring along than the diminutive 9-18mm. We have not yet seen the Olympus 14-150mm, but the Panasonic 14-140mm, while large, really turns out impressive images regardless of focal length, and it's preferred for movies thanks to its faster AF and silent, stepless aperture.



	
Panasonic G HD 14-140mm f/4.0-5.8 OIS	Olympus M.Zuiko 14-150mm f/4-5.6
	
Panasonic G 14-45mm f/3.5-5.6 OIS	Panasonic G 45-200mm f/4.0-5.6 OIS
	
Panasonic DG 45mm f/2.8 Macro	Noktor 50mm f/0.95
Micro Four Thirds Adapters	
Panasonic Four Thirds DMW-MA1	Olympus Four Thirds MMF-1
Panasonic M-Mount DMW-MA2M	Olympus Four Thirds MMF-2
Panasonic R-Mount DMW-MA3R	Olympus OM Adapter MF-2
Cosina Voigtlander F mount	Cosina Voigtlander VM mount
Cosina Voigtlander K mount	

The Lumix G2 also supports Panasonic's new 12.5mm 3D lens, so we've included our impression of it on the GF2 here:

Panasonic 12.5mm 3D lens on the GF2

by Shawn Barnett

Reviewing a 3D lens naturally requires the hardware--TV and glasses--to view the effect, as the back of the current Panasonic cameras do not serve to show you 3D. So along with the new 12.5mm lens, Panasonic sent us a rather large plasma display, the TC-P50GT25 50-inch TV. They also sent a couple pair of TY-EW3D10U battery-operated 3D glasses. Working together, the TV and glasses deliver an alternating 60 frames per second to each eye, which means that the TV puts out 120 frames per second total. Called Active Shutter, the technology is universal to current 3D televisions, but it seems the brand of glasses needs to be matched to the television.



We shot a number of images of different subjects, including trees, dogs, kids, buildings, and cars. That gave us a pretty good feel for what the Lumix 12.5mm 3D lens could do. Though the active shutter technology built into the TV is optimized to deliver smooth video, according to marketing materials, the Panasonic GF2 does not produce videos with the 12.5mm 3D lens, only stills. The lens is also only compatible with the G2, GH2, and GF2 Micro Four Thirds cameras; currently no Olympus Pen Micro Four Thirds models support the lens. The camera can be set to record just the 3D image in MPO (Multi-Picture Object) format, or else the MPO plus JPEG in fine or compressed formats. Note that the resolution of the JPEG captured is 1.4 megapixels (1,600 x 904), because the lens is just laying down two images side by side on the camera's sensor. The MPO is essentially the same times two, so don't be expecting lush 12 or 16-megapixel images; the 3D images from this lens are intended primarily for electronic viewing.



ISO-Standard Dog. Charlotte the dog sat for the rare static photo, but only when she heard it was 3D. She fairly leaps from the screen in this sharp shot. [Download MPO file](#) to play on a 3D television.

While using the lens was fun, we were quickly disappointed with a few aspects. One is that the very small, and fixed aperture of f/12 limits your shooting to bright daylight. The lens is hyperfocal, meaning that you don't need to focus. Objects from 1.97 feet (60 cm) to infinity should be in focus in all shots; that's really what you want for 3D, so no foul there. And though it's a 12.5mm focal length, the angle of view is actually quite a bit narrower than a 12.5mm lens would be with any other MFT lens, again because it's projecting *two* images side by side on the sensor (it should be a 25mm equivalent). Panasonic calls it 65mm equivalent at 16:9, and we'd have to agree. That kept us backing up quite a bit to frame images, sometimes quite a distance. So not just bright daylight, but preferably flat, open spaces are necessary to take advantage of this 3D lens.

What's noteworthy is that Panasonic was able to deliver 3D imaging in such a small lens. 3D as we're used to seeing it, however, is made with eyes that are separated by about 60-70mm (depending on the person), compared to this lens's 10mm separation. This almost probably explains lack of depth that we often perceived on the television.

I happened upon a nice day in mid-Winter, and took a few shots of the kids outside, then piled them in the van for a trip to the office where we could see the pictures in 3D. I'm blessed with a yard that is big enough to zoom with my feet, and I found myself having to back off as much as 20 or 30 feet to frame images the way I'd normally do with a zoom, just to get two small kids in the frame. I also crouched down much of the time to allow for plenty of background in the pictures. I had the sense that I could see some of the 3D effect on the Panasonic GF2's screen after capture, almost certainly an illusion, but it wasn't until we got to the big 50-inch television that the images really popped.



Children. Most shots of the kids were well-defined from the background, but that background tended to curve up rapidly behind them to my perception. [Download MPO file](#) to play on a 3D television.

Some of them, anyway. Whether an image popped really depended on the

lighting and the distance between me, the subject, and the background. In fact, it seems that objects about halfway between the camera and the background stood out the most, an observation made by my oldest daughter. All three kids seemed to enjoy seeing themselves at first, and they fought for the two sets of glasses, with me fighting right along with them so I could have a glimpse too. After about 10 minutes, though, the interest faded, and the younger boys wandered off to explore the office, while my daughter took the glasses off altogether, only putting them back on to see what I was talking about as I continued to rifle through the images. She was getting nauseated, and the glasses hurt her eyes. To be fair, she said she was nauseated before we got there, and it turned out she had a stomach flu after all. But the boys also said the glasses bothered their eyes after a few minutes of viewing, and when their sister freed up her glasses, they were not interested



Vehicles. To my eye, the vehicles are mostly 3D, but without the proper depth. The trees in the background are mostly flat. [Download MPO file](#) to play on a 3D television.

in coming back to see more (my youngest son refuses to watch 3D movies at the theater, so it's impressive that this Panasonic TV held him as long as it did).

Publisher Dave (who's notoriously sensitive to motion sickness) also reported some queasiness when viewing 3-D images. He thinks it's caused by the way the scene position appears to shift when you move your head. If you don't easily become seasick or just don't move your head much while viewing, this may not be a problem for you.

My eyes were slightly bothered by viewing the images at first, but I think I could get used to the glasses and TV. I was surprised that you could still see 3D fairly well as much as 45 degrees off-axis, unlike the passive 3D glasses I've used in the past. Each of the lab viewers experienced more or less 3D effect depending on the person. People with a very dominant eye might see no effect at all. I tended to see more than most, but I noticed a limitation: backgrounds often seemed to wrap back up toward the camera, rather than continuing cleanly back as I knew they should. As a result, you get the effect of paper cutouts against a steeply sloping background, rather than full depth. The 3D experts around me say it's likely the small 10-millimeter separation between the lenses that causes the perceived compression, not so much the 65mm-equivalent lens. Another flaw in the viewing experience was that dark objects against a light background tended to show ghost images overlaying the dark portions, especially noticeable in people and tree trunks. This is likely the result of the glasses not completely blocking light when in the "off" state: Some of the other eye's image leaks through, making the ghost images appear where a dark foreground object is next to a light one or vice versa.



Depth. This shot of the small truck should show what I mean with the lack of depth going back when viewed in 3D. [Download MPO file](#) to play on a 3D television.

The images were realistic enough that I found myself shifting my head to see if I could see more of a scene by moving to peek around a real opening into 3D space. When you do that, though, the 3D background just appears to float, unmoving, behind the foreground objects, an odd, somewhat unsettling phenomenon that caused a couple of viewer's queasiness.



Lab shot. Here's a tighter-than-usual shot of the INB indoor test target that should also show some depth. [Download MPO file](#) to play on a 3D television.

Since we had the big, beautiful Panasonic 3D TV in-house, we also viewed a few images from the Sony NEX-3 made with the 3D Sweep Panorama function, as these are also MPO files. Results were good, with perhaps a bit more depth. But because the images are stitched from multiple images, it was really obvious where the stitching errors were made, because things like bunches of trees, which are considerably more difficult to stitch, would stand out as not conforming to the 3D world; one tree even popped out from the background to appear to be in front of the trees it was most certainly behind.

While I enjoyed looking at the 3D images for the novelty, I don't think it's something I'd do very often. Given how little time the kids looked at it, I'm sure I won't be an early adopter of the technology, even though the television Panasonic sent us currently sells for about as much as a

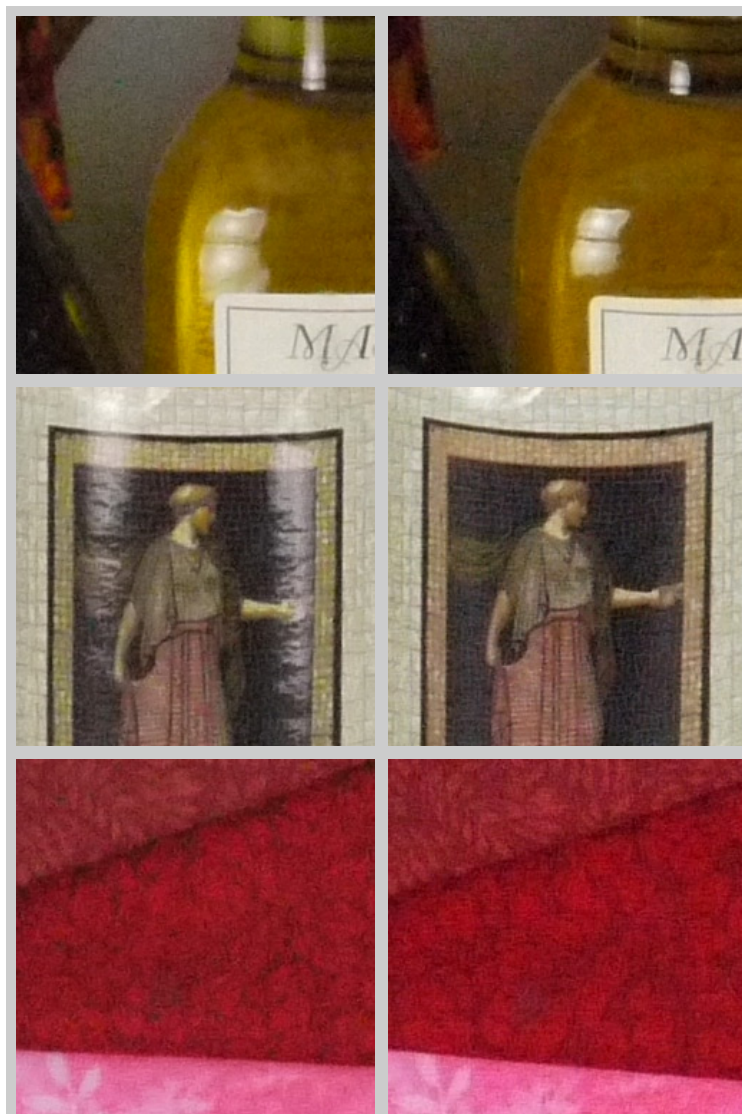
2D 50-inch TV cost last year: around US\$1,050 at current street prices. (And the TC-P50GT25 is a very, very good 2D TV as well, with great color, excellent dynamic range, and very fast refresh.) The glasses are about US\$100 per pair. Those already invested in 3D, be it for gaming or movie viewing, will likely find the US\$250 lens an inexpensive way to enjoy the hardware they already have, provided they also already have a Panasonic G2, GF2, or GH2. (Those same users might also see it as additional reason to buy into the whole Panasonic Micro Four Thirds camera lineup as a whole.)

Still, I'm glad I have some photos of the kids playing in 3D, because someday the technology may be as ubiquitous as the once-futuristic flat panels are today. Indeed, some of what we saw at CES 2011, especially glasses-free 3D, made even the most skeptical 3D doubters among us start to wonder. Perhaps instead of continued confinement to the iconic reels of the 72-year-old Viewmaster stereoscopic viewer, 3D might finally stick around, what with electronic capture and electronic display technology finally becoming the mainstream method of image creation and consumption. Meanwhile, if you want to start capturing 3D now, the Panasonic 3D lens is available for current or future G2, GF2, or GH2 shooters at a reasonable price.

Panasonic G2 Image Quality

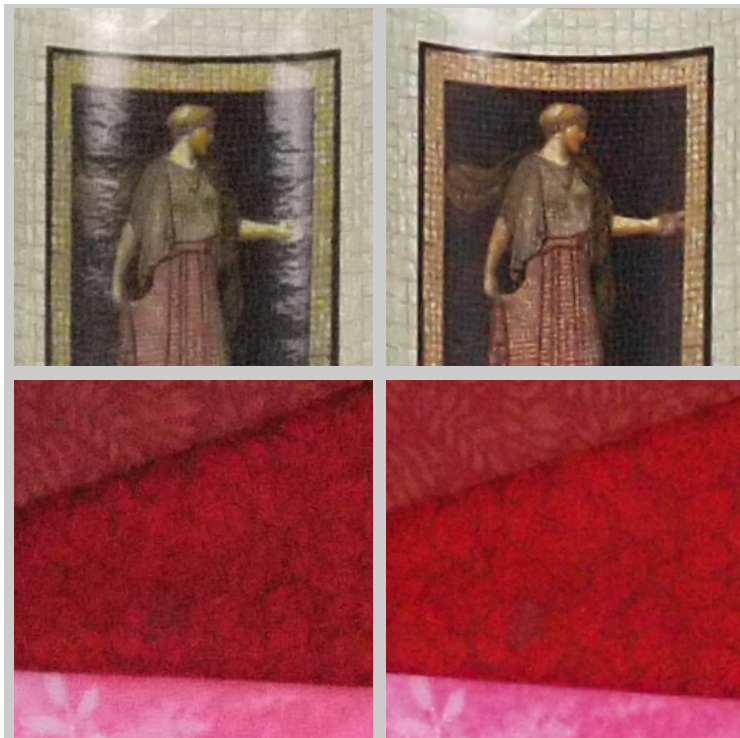
No camera is without its issues, and the Panasonic G2 has a few, brought out by some of our laboratory shots. Mainly the way the G2 handles yellows raises some questions, but all of the high-end Panasonic cameras have exhibited this tendency, so it's something to do with how they handle color in general. Noise is also an issue, and noise suppression. See the crops and commentary below for more, and be sure to see our [Optics](#) and [Image Quality](#) pages for a more thorough analysis of image quality.

Panasonic G2 versus Panasonic G1 at ISO 1,600

**Panasonic G2 at ISO 1,600****Panasonic G1 at ISO 1,600**

Comparing the Panasonic G2 to the G1 shows a few minor differences, but not differences we normally comment on in this section. Noise suppression seems to have improved just a bit in the shadow shot above, but the exposure is also just a little darker, which makes it harder to be sure. The G1 rendered the mosaic pattern's color a little more truly, with the G2 having too much of a green cast. And the red swatch is a messy draw, with the G2 showing more contrast, but revealing perhaps less detail. Remember that this is ISO 1,600, though, and both seem to do a decent job.

Panasonic G2 versus E-P1 at ISO 1,600



Panasonic G2 at ISO 1,600

Olympus E-P1 at ISO 1,600

Using the same sensor should make the Panasonic G2 and Olympus E-P1 produce identical images, or so you'd think. But there's always the processor to consider, and the two processors do render the image quite differently. Olympus has a slight edge at 1,600, mostly in the area of color rendition and detail. Yellows are the main problem, which all Panasonic MFT and some of their other cameras tend to render rather green. Look at the yellow bottle and the mosaic pattern in particular. They should not appear at all green, but more of a brownish yellow. Even the G1 agrees. Olympus also does better with the red leaf swatch, while the only area the G2 does better is in the shadow image at top, with less chroma noise than the Olympus image. Panasonic is working pretty heavily to eliminate color error. Might that be causing the yellow error?

Panasonic G2 versus Samsung NX10 at ISO 1,600



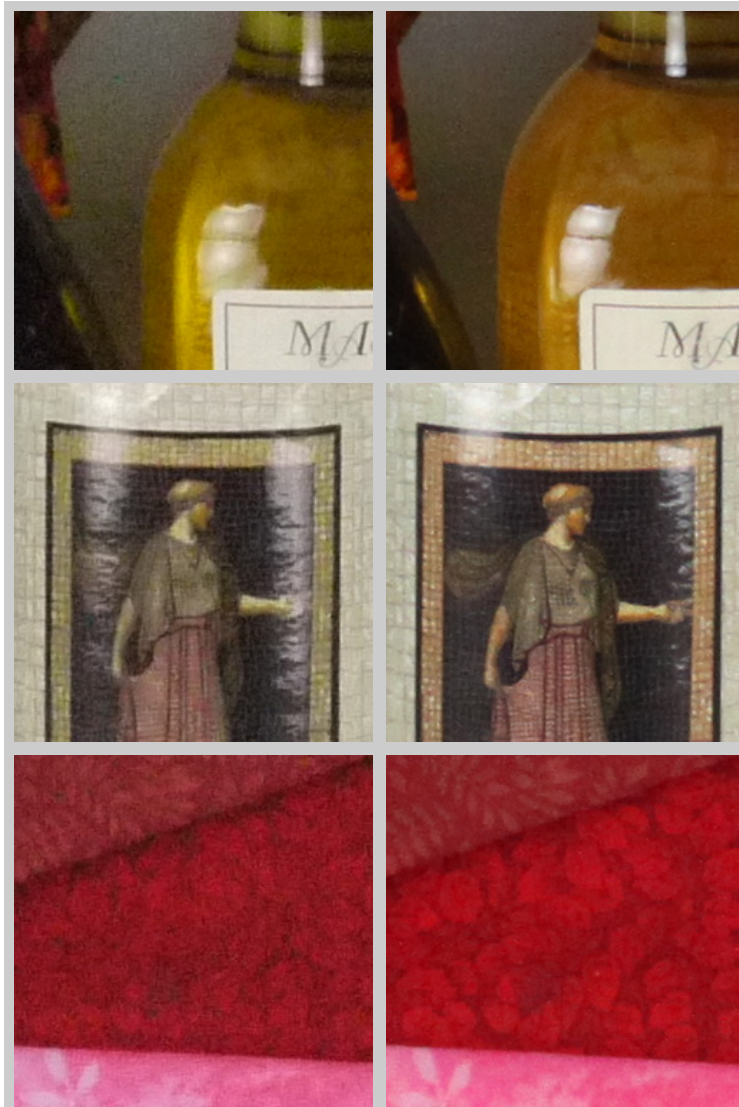


Panasonic G2 at ISO 1,600

Samsung NX10 at ISO 1,600

There's a pretty dramatic difference between the color rendering and exposure in the Panasonic G2 and NX10 images, but it's still clear that the Samsung NX10 retains more noise at ISO 1,600 than does the Panasonic G2. Detail is a little softer in the G2's image of the mosaic bottle, but the NX10 shot has a more artificial look, one that nonetheless would print better. I'll also mention the green cast in the G2's mosaic image. The G2 also really stomps on color saturation to fight chroma noise, while the NX10 does less to kill chroma noise and ends up with brighter color. The red swatch is almost a wash here, again hard to judge thanks to the possible difference in exposure.

Panasonic G2 versus Canon T1i at ISO 1,600

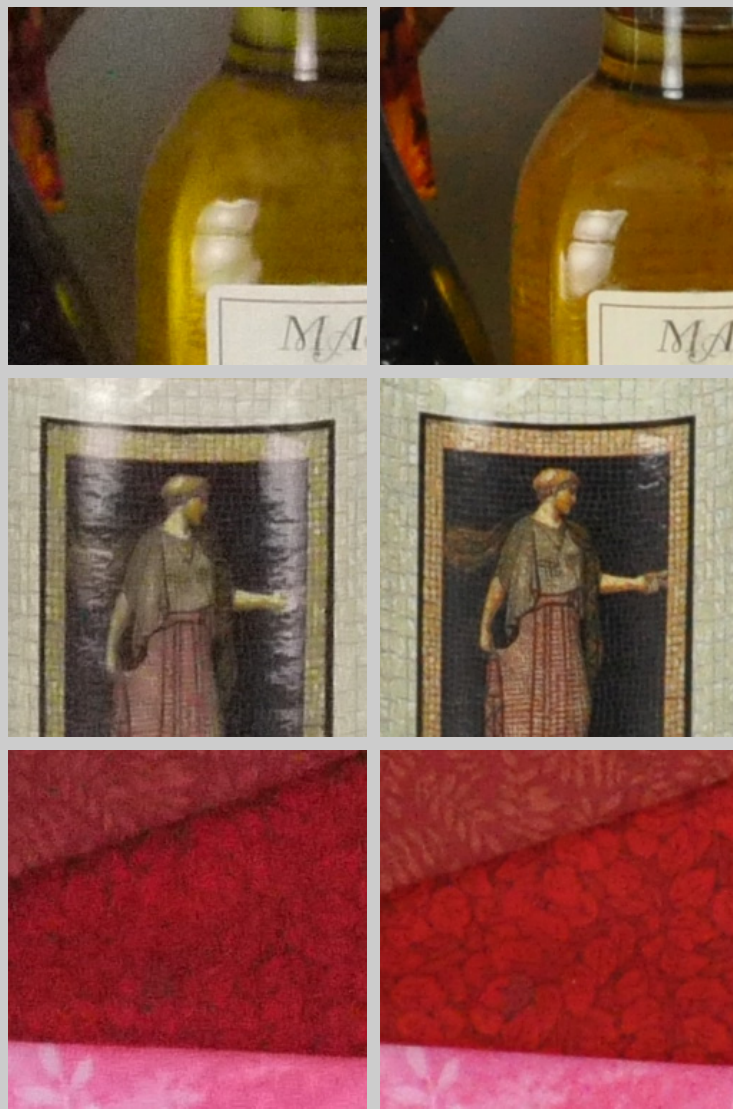


Panasonic G2 at ISO 1,600

Canon T1i at ISO 1,600

Here we have a 12.1-megapixel Micro Four Thirds sensor going up against a 15.1-megapixel APS-C sensor, so not only do we expect to see larger image elements from the Canon, but there should be less noise as well. The T1i produces smoother shadows, displays more even detail and proper color, and does a better job with the red swatch than the G2. So that larger camera and sensor do provide a little more after all, for about the same price.

Panasonic G2 versus Nikon D5000 at ISO 1,600



Panasonic G2 at ISO 1,600

Nikon D5000 at ISO 1,600

Megapixel for megapixel, the Nikon D5000 also delivers a little more, thanks to about 64 percent greater image area available on the APS-C sensor vs the Micro Four Thirds sensor. Still, though the D5000's shadow area is smoother, with less luminance noise, I detect large blobs of chroma noise in the transition from light to dark, while the G2's image has more luminance noise, which looks more natural in prints. The Nikon gets the colors in the Mosaic image better than any in this group, and it also excels at the red leaf swatch above all others.

Detail: Panasonic G2 vs Panasonic G1, Olympus E-P1, Samsung NX10, Canon T1i, and Nikon D5000



MALL, INDEPENDENT B					
Pu Bre LAGE / FLAVOUR					
Panasonic G2 ISO 100 ISO 3,200	Panasonic G1 ISO 100 ISO 3,200	Olympus E-P1 ISO 100 ISO 3,200	Samsung NX10 ISO 100 ISO 3,200	Canon T1i ISO 100 ISO 3,200	Nikon D5000 ISO 100 ISO 3,200

Detail comparison. An ISO 1,600 comparison is only so helpful. A camera's ISO 100 and 3,200 performances are also of value, especially when it comes to fine detail, so I've pitted the same set of cameras against each other in the high-contrast detail department.

Overall, the Panasonic G2 does well, but comes in third behind the E-P1 and T1i. It's surprising how much more confident the E-P1 is rendering the black letters at both ISO settings than is the G2, especially when you consider that they're both using the same excellent Olympus Digital Zuiko 50mm f/2 Macro lens. The red letters are also more faded, especially at ISO 3,200, than any but the Samsung NX10. Note that the E-P1 and T1i both show strong image sharpening halos around the letters, which certainly improves their performance.

Also consider that this test is not independent of lens quality, focus errors, and other variables, so again take this mostly as a comparison of what each camera was able to do with the best standardized optics we can muster. The Samsung NX10 used its very sharp 30mm f/2 lens. The Olympus E-P1 and Panasonic G2 used the rather excellent Olympus Digital Zuiko 50mm f/2 Macro lens. The Nikon and Canon used our laboratory-standard Sigma 70mm f/2.8 EX DG Macro lenses, which are very sharp.

Panasonic G2 Print Quality

Printing JPEG images from the Panasonic G2 gives a different perspective from just looking at the images onscreen. Enlargement to 20x30 was a little much even for the ISO 100 shots, but that's about the limit for a 12-megapixel image. Shots at this size would be fine for wall display, and would sharpen up nicely in a photo editing program.



ISO 100 images look very sharp at 16x20 inches, though the problem with the greenish yellows continues. Detail is very good, though.

ISO 200 shots also look good at 16x20, very little difference is detectable.

ISO 400 shots also look great at 16x20, very good noise suppression up to this point, with only the slightest luminance noise appearing in the shadows for those who really want to get in and pick nits. They'll also detect the slightest softening of detail, but this sharpens right up with a switch to 13x19 inches.

ISO 800 images look about the same at 13x19, with a little more luminance noise in the shadows, but still strong detail.

ISO 1,600 is where quality and contrast starts to degrade, and noise starts to bug. Still, you'd get a decent 11x14 out of ISO 1,600, and an excellent letter size print (8.5x11 inches).

ISO 3,200 gets a little worse. You can get an okay 8x10 out of it, but dark areas start to get pock-marked by large blobs of luminance noise, and color starts to fade pretty noticeably. Everything but the color comes back when printed at 5x7, though.

ISO 6,400 looks more like a bad painting at 5x7, but enters the realm of the "usable" at 4x6, though color is faded and noise muddies some colors.

Overall, the Panasonic G2's images print well up to ISO 800, but start to fall apart at ISO 1,600. This is a good performance, but doesn't rise to excellent when compared to some of the competition. It seems like a two-year-old sensor in this new camera when you see the recent leaps other companies have made.

In the Box

The Panasonic G2 ships with the following items in the box:

- Panasonic G2 body
- 14-42mm lens (if purchased as a kit)
- Body cap
- Lens caps
- Stylus
- Lithium-ion battery
- Battery charger
- USB cable
- Shoulder strap
- CD-ROM
- Quick Start manual

- Warranty card



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Panasonic G2 Conclusion

Pro:	Con:
• Rear control dial is in better position • Articulating, high-resolution 3:2 LCD • High-resolution EVF • IR sensor switches between EVF and LCD • Good shape to grip • Soft, warm rubber finish • 20g lighter than its predecessor, but camera still has good heft • Good use of switches on the camera body • Excellent +/-4 diopter range for EVF • Good kit lens • Excellent optical image stabilization • AF tracking while shooting stills or video • External microphone jack • Touch controls for autofocus • Touch controls also work when shooting video • Fast AF for contrast detect • Very good low-light focusing • AF assist lamp • Very good Auto WB in tungsten lighting • Correction of lens CA and distortion for in-camera JPEGs and some RAW converters • Adjustable noise reduction • iAuto • iExposure • iResolution • Face recognition • Supports both AVCHD Lite and Motion JPEG for video • Dedicated movie button • Shutter speed preview • Decent built-in flash, but no wireless support • Supports SDXC cards • Growing range of available lenses	• Grip area is somewhat slick • Rear EVF protrudes far behind the camera, making it harder to fit into small spaces • Kit lens has no IS switch (camera menu only); plastic mount • Lots of geometric distortion in uncorrected RAW at wide-angle, which contributes to soft corners in JPEGs • Large minimum macro area • Same yellow-orange tint issue as previous G series • No manual modes while recording video • Non-standard audio jack • Noticeable background hiss on video recordings • Video starts a second late, ends early • Contrast and especially Saturation adjustments don't offer much latitude • Contrast works mostly on shadows and midtones • High ISO performance not as good as some recent Micro Four Thirds models • Good dynamic range scores for MFT, but not as good as APS-C cameras • Smallish buffer sizes in burst mode • Burst mode rate with Live View is slower than average

Its predecessor set new benchmarks for EVF quality, and also established a whole new category of mirrorless, interchangeable-lens digital cameras, so its natural that we'd expect a lot from the Panasonic G2. In many ways, the Panasonic G2 delivers, with the same high-resolution electronic viewfinder and the wide, articulating LCD, now enhanced with the magic of touch to set things like focus and simple Quick Menu selections.

Minor interface tweaks also make the Panasonic G2's operation a little more obvious, like making the Front dial into a Rear dial. Controls that are seen are more likely to be used, and this one was lost out on the front of the grip. We also like how they placed the Record button on the top deck, matching the GF1; what we don't like is how they slowed down video activation time, taking a second to start up and chopping more than a half second off the end of videos. Overall, though, the video performance of the Panasonic G2 has indeed improved, with good image quality, better subject tracking, and quite competent focus performance.

Autofocus is fast, still faster than most of the SLD competition, with much less wobbling as it seeks for focus than we

see in the Olympus Pen cameras (though their performance has recently been improved with a firmware upgrade).

Where we have a little trouble is one of the areas they didn't perform a significant upgrade: The sensor. From what we can tell, this is the same sensor as is used in the Olympus and Panasonic cameras, save for the GH1, and it's starting to show its age, especially at higher ISOs. When we first looked at the G1, it was the first and only example of high ISO quality in a Micro Four Thirds sensor. Then came the Olympus E-P1, which did noticeably better at high ISO and at color rendition. The G2 still has the same high ISO problem that plagues its brethren starting at ISO 1,600, and it also inherits something from the Panasonic line in general: trouble with yellows. Indeed, yellows look green, and oranges look brown; very unflattering.

Still, printed performance is great, and if you shoot in RAW and develop in a program like Adobe Lightroom, you won't need to worry as much about the colors.

Optical quality went down just a bit from the original 14-45mm kit lens that shipped with the Original G1 and the GF1. It's still pretty good, though, especially after its tweaked a bit by software post-capture. The lens is light and simple and small, hiding in almost any pocket, which is the beauty of the system over an SLR.

Aspiring videographers should probably look into a GH1 while they're still around. They cost a pretty penny, but perform pretty well for video. Overall, the Panasonic G2 is a big improvement on the G1, offering a refreshing new way to interact with the camera. It will serve the needs of the enthusiast photographer and the consumer shooter looking for a high quality, yet light weight digital photography solution, whose accessories and lenses will fit in the smallest of camera bags. It's a [Dave's Pick](#).



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Does each block left and right stand out against the white or black strip?
Below, you should be able to blur your eyes and see a solid grey.
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Gamma 2.2

254	250	30	11
253	248	25	9
252	245	20	7
251	240	15	5

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