Are we too reliant on our internet connections?

For three weeks, I was without high speed fibre broadband connection from my home.
We had three visits from BT Openreach engineers and six long telephone diagnostic sessions with my ISP.
After a lot of wasted time it was concluded with the replacement of the router.
The ISP had to replace it after BT had replaced everything on my exchange line including switching me to a new fibre circuit and could only conclude that my slow connection throughput was due to a fault with the router itself!
Having painfully slow connection was terrible. Upload of any video took hours as I have now started to upload in 4K format.
Any emails that were sent to me with images and/or video had to be held over until I had the capacity to view them.
It has been over two years since I had a similar problem so I must treat this as a minor "blip" rather than a major issue, however it does bring you down to earth when this does happen.
I brought into question why the ISP diagnostics on the router failed to identify the issue

Panasonic LUMIX FZ2000/2500 tutorial series started

I had never intended to do tutorial videos on this camera as I believed that most purchasers would have the skill and knowledge to be able to set up this camera however quite a few requests started to appear in my email after releasing the FZ80/82 series.
This is a camera that I do like for video especially. It may have its critics out there for its extra 1.4 times crop when shooting 4K video (raising the 24mm to 36mm EFL) but for some users the extra reach at the telephoto end (720mm EFL) is a very useful bonus feature.
There is a simple solution that involves just adding a 67mm 0.45x wide angle lens to the main lens if you just want to shoot the 16:9 4K video or a 72mm 0.45 lens and a 67 to 72mm step up ring if you want to add a little extra wide angle of the 4:3 stills mode as well.

Here is the YouTube playlist for the new series

The series seemed to attract a fair number of initial views for the introduction part 1 (2.9K views) but the subsequent videos didn't quite make the views that I thought that they would.
Maybe I was right in my assessment of the marketplace for this type of video.
I will be completing the series with a look at video recording and then accessories for this camera.

The 24mm EFL of this camera is quickly reduced to 36mm when you shoot in any of the 4K modes because of the way in which Panasonic takes a portion of the sensor rather than the whole area. There are many technical reasons why they would do this but they are not alone. Canon also have a very aggressive 1.7X crop when shooting 4K on the EOS M50.

So, to "recover" some of the image field of view you can employ wide angle conversion lenses screwed directly to the end of the lens barrel.

Here are the two lenses that I tested. The one on the left is a combined macro (10x) and wide angle adaptor by Japan Optics and the other is a dedicated 0.43x adaptor from Zomei.

The Zomei I purchased as a 72mm lens with 67 to 72mm step up ring to avoid vignette if I wanted to use this in stills mode at 4:3.

native lens at 4:3

4:3 with Zomei WA adaptor

4:3 with Japan Optic 0.43x WA adaptor

As you can see the Japan optic lens gives a wider field of view than the Zomei lens but also has more barrel distortion. The Japan optic lens is also quite heavy.

Native lens crop from centre image   *Zomei lens crop from centre image*

The image resolution from the Zomei is very good with no visible barrel distortion, edge distortion and no colour fringing.
This fact, plus the lightweight nature of the lens, when added with a 67 to 72mm step up ring makes it a worthy recommendation if you want to get a wider 4K image to recover the loss through the crop or add a little extra field of view to the native 24mm EFL lens.

With the Zomei I have no concerns about the slight loading of the lens for zoom during power up or shut down. The Japan optics lens should be attached after power up and removed before power down to reduce zoom motor loading. I did a YouTube video to show the results on the FZ2000/2500.

Affiliate links to products (no extra charge to you but I will receive a small commission for referral).

Link to Amazon UK for lens   Link to Amazon USA for lens Link to Amazon Canada for lens

Link to Amazon UK for step up ring link to Amazon USA link to Amazon Canada

When is a JPEG image stored on your memory card/pc not a file?

When we see an image on a memory card like P100369.jpg we automatically assume that this is in fact a file format. To be absolutely correct a JPEG image stored on any form of media is not a file type but is an instruction or blueprint of how the computer display or editing program should display the file.
JPEG was an instruction set devised by the Joint Photographic Experts Group to take the original image file and compress that data into a smaller physical file size and then can instruct the display processor or editor how to reconstruct it with as little loss as possible,
JPEG is not a "lossless" process, some of the image information is lost/discarded during the compression, Unlike BMP or PNG which are not lossless formats.
The actual image file is a JFIF's and uses discreet cosine transformation to compress the image data from both the luminance (black and white image data) and chrominance (colour data).
Our eyes are very much able to distinguish changes is brightness levels but very poor at changes in colour so it is the function of this compression program to ensure that as much black and white image information is stored in the file.
To do this the processor must take the RGB (or sRGB) and convert this into a Y' cB cR (Luminance and Blue/Red data). The cB & CR colour information can be sampled as 4:4:4 where every pixel in a 4 x 4 pixel matrix is used to define the single pixel point colour to a 4:2:0 sub sample which only uses 1 pixel in the 4 x 4 matrix to define the

colour of that pixel. So, in general it is usual to down sample the colour by a factor of 2 in both horizontal and vertical directions in the 4 x 4 pixel matrix being encoded.

A typical Bayer filter matrix used in most digital cameras (except Fuji)

In any 4 block of pixels there are always 2 x the number of green pixels. This is used to simulate our eyes spectral response especially in darkness.

Thus, the green channel is used to provide the illuminance of the scene and this is Y' in the Y' cB cR colour system.

You might see that because every camera pixel has a primary colour filter a 12M pixel sensor would in fact have only 4M of actual colour data.

To get the actual colour in RGB of the pixel the camera employs a de-mosaicking algorithm. The actual process varies from camera to camera and hence the reason a RAW file from Panasonic is different to a RAW file from Sony etc.

This is one of the reasons why newer cameras aren't always supported by Adobe Lightroom/Photoshop until a suitable de-mosaicking engine has been built to recreate the image.

The actual maths used to determine the individual colour of a camera pixel is very interesting (if not mind blowing!)

So, even though a pixel may have a red filter over it by using a suitable algorithm it is possible to "interpolate" what the colour might have been by looking at the values in the neighbouring pixels i.e. the green value might be the average of the two nearest pixels and similarly the blue will be the average of the two closest pixels.

Our eyes are poor at determining colour so this approximation method does achieve remarkable results.

The final image file is a sequence of numbers representing 0 – 255 monochrome (illuminance) (or the darkest area to the brightest white) and a sequence of R G B values for each pixel in the matrix.

This is very simplistic – it has the values modified by the discrete cosine transformation and the parameters used to determine the compression of both the luminance and colour information must be stored in the EXIF header file so that the image processing software (like Photoshop or Affinity photo etc) can rebuild the JPEG file correctly.

Thus, the EXIF header is a very important piece of the JPEG image as it tells the processing software how many horizontal and vertical pixels it has and the compression methods used. Also, the camera manufacturer may add other data like the ISO, aperture, shutter speed white balance, shooting mode etc.

The file also contains the thumbnail of the image (which is created by the camera during the processing of the JPEG image (even if you shoot RAW only).

So, in summary the image isn't an image at all it is a sequence of numbers and a plan of how to build an image from it. Any processing done is done using mathematical formulas on these numbers. For example, adding saturation would be achieved by multiplying all the colour values by a value representing the increase in saturation.

Contrast might be achieved by multiplying the values of the luminance values.

Sharpening by multiplying/dividing adjacent pairs of luminance numbers to increase the apparent contrast between them.

With cameras with over 40M pixels you can see why it takes a lot of computer power to perform some processing operations within your image editor program!

Panasonic arguably have market dominance when it comes to recording video, especially 4k UHD video, with their range of travel zoom, bridge and compact systems cameras.
Soon they will add a full frame camera to their line-up.
When you consider the process of capturing the image at the sensor level, processing and storing the resulting video file on some form of storage medium it is quite a fantastic technological achievement.
All of this has been made possible by faster processors and graphics chips capable of crunching the huge amounts of data that is generated by a 4K video camera.

If you consider the pixel count is 3840x2160 pixels that equates to a frame of 8,294,400 pixels.
To give you an idea of the raw data rates, a typical digital camera has either a 12 or 14 bit sensor, so at 14 bits, a 24 megapixel camera is going to produce 42 megabytes of data per frame, that means that for 24fps video, the image processing circuitry has to be able to keep up with processing over a gigabyte per second.
That's over 60 gigabytes per minute or 3.6 terabytes per hour.
Comparatively, for 1080p video, it only must deal with 1/12 that information.
75MB a second is far easier to manage and with compression, that size can get down to something manageable (and keep in mind, the bigger the raw data gets, the harder it becomes to do compression in real time too).

I'm sure that not a lot of people understand the terms used in video recording so I'm going to attempt to describe them exactly as I understand them as relating specifically to camera recording!

Number of frames per second
Frame rate, is the number of still pictures per unit of time of video.
PAL standards (Europe, Asia, Australia, etc.) and SECAM (France, Russia, parts of Africa etc.) specify 25 frame/s, while NTSC standards (USA, Canada, Japan, etc.) specify 29.97 frame/s

Interlaced vs progressive
Video can either be interlaced or progressive. In progressive scan systems, each refresh period updates all scan lines in each frame in sequence.
When displaying a progressive recorded signal, the result is optimum resolution of both the statistic and moving parts of the image.
Interlacing was invented to reduce flicker in early CRT video displays without increasing the number of complete frames per second. Interlacing retains detail while requiring lower bandwidth compared to progressive scanning.

NTSC, PAL and SECAM are interlaced formats. Abbreviated video resolution specifications often include an i to indicate interlacing. For example, PAL video format is often described as 576i50, where 576 indicates the total number of horizontal scan lines, i indicates interlacing, and 50 indicates 50 fields (half-frames) per second.

When displaying an interlaced signal on a progressive scan device, overall resolution is degraded by simple line doubling—artefacts such as flickering or "comb" effects in moving parts of the image which appear unless special signal processing eliminates them.
A procedure known as de-interlacing can optimize the display of an interlaced video signal.

Video compression method
Uncompressed video delivers maximum quality, but with at the expense of a very high data rate.
There are a variety of methods used to compress video streams, with the most effective ones using what is called a group of pictures (GOP). This compression method just registers the differences between parts of a single frame; this task is known as intraframe compression and is closely related to image compression.
Likewise, another compression method registers the differences between frames; this task is known as interframe compression, including motion compensation and other techniques. The most common modern compression standards are MPEG-2, used for DVD, Blu-ray and satellite television, and MPEG-4, used for AVCHD, Mobile phones (3GP) and Internet.

Aspect ratio

Aspect ratio describes the proportional relationship between the width and height of video screens and video picture elements. All popular video formats are rectangular, and so can be described by a ratio between width and height. The ratio width to height for a traditional television screen is 4:3.
High definition televisions use an aspect ratio of 16:9.

The popularity of viewing video on mobile phones has led to the growth of vertical video 😄
The growth of vertical video viewing growing from 5% of video viewing in 2010 to 29% in 2015. Vertical video ads like Snapchat's are watched in their entirety nine times more frequently than landscape video ads!

Video Codec

A video codec is an electronic circuit or software that compresses or decompresses digital video.
It converts uncompressed video to a compressed format or vice versa. In the context of video compression, "codec" is a concatenation of "encoder" and "decoder".

The compressed data format usually conforms to a standard video compression specification. The compression is typically lossy, meaning that the compressed video lacks some information present in the original video. A consequence of this is that decompressed video has lower quality than the original, uncompressed video because there is insufficient information to accurately reconstruct the original video.

AVCHD, MOV and MPEG4 are types of video containers (files) that you may see in Panasonic cameras and they all use the H.264 video codec. The later Apple iPhones use a HEVC codec which is based on the H.265 codec.

Recording video

To record video with our bridge, travel zoom or CSC we need to select a video Size like 4K or Full HD and then we need to select the recording format MP4, MOV or AVCHD. From the recording quality now select the frame size and bandwidth such as MOV [4K] 3840x2160 25p, 100Mbps (IPB) or MOV 1920x1080 25.00p, 200Mbps (ALL-Intra).

In general, you ought to select the size and quality that will be your target delivery. I've found that recording everything in 4K now gives excellent quality for either YouTube at 4K or 1080p uploads.
If you are recording in 1080p Full HD, then you should select the highest bit rate (200Mbps) if your pc will edit the files without too much effort (or use proxy editing program techniques).

Setting the *recording mode* will allow you set these options however the creative video mode giving access to all the recording functions is accessed through the dedicated recording position on the Mode Dial.
Here you will select the P, A, S or Mode for the video recording process.

As with stills photography the choice will be driven by scene content. Manual mode allows the video to be recorded with no variation in scene brightness as the camera moves from one position to another.
The P mode will be generally good enough for most users as it has a good compromise in the way it operates.
Some prefer to keep the shutter speed at a setting which is twice the camera frame rate which recreates the look like analogue film as this replicates the 180-degree shutter rule that is found in film based cameras.

So, for example if you are shooting at full HD and 25 fps the suggested shutter speed is 1/50 sec to obtain this look.
In the A and P modes the camera may choose shutter speeds from 1/25 (1/30) to 1/2000 sec depending upon the ambient light and the aperture selected. With the FZ2000/2500 you have the built-in ND filters if you want to limit the shutter speed to lower values to prevent the staccato look that usually accompanies these high shutter speeds. With cameras without this facility you can of course attach your own ND filters to the lens.
So if you have say an exposure of 1/100 sec @ f5.6 and ISO 125 with a 50 fps recording setting if you were to drop the exposure to 1/50 sec you can increase the aperture to F8 with the same ISO setting.

If you switch the camera into manual focus you can also reduce the shutter below the 1/25(1/30) minimum imposed in the AF modes. Providing there is no subject motion in your shots you can use shutter speeds all the way down to ½ second with most cameras. This enables you to shoot video in very low light scenes.

25fps 1/50 sec shutter speed
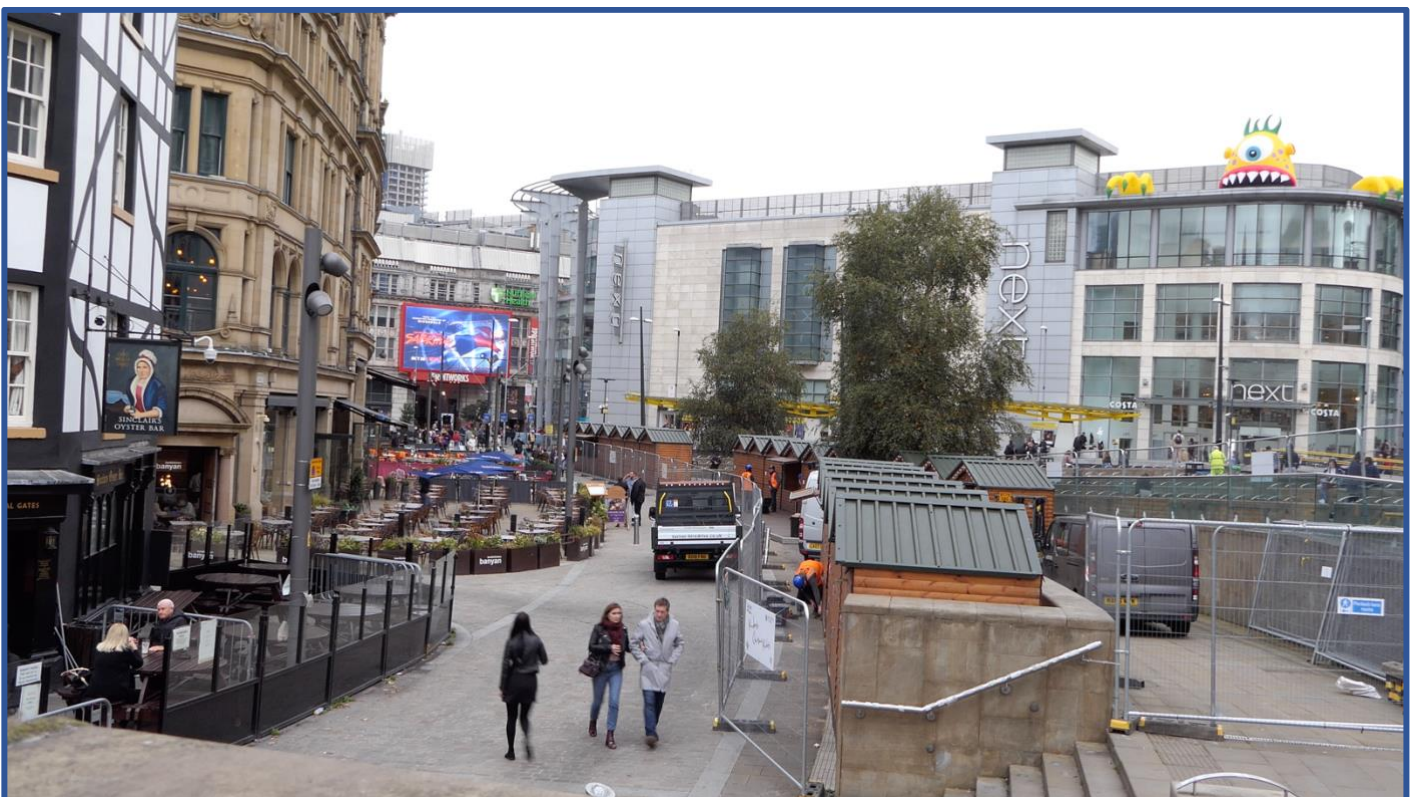
25 fps 1/15sec shutter speed

Note the amount of subject motion blur (girls right leg) in the 1/15 sec exposure.

A couple of newsletters ago I was enquiring how you found camera clubs were receptive to you turning up with a bridge camera rather than a DSLR or CSC.

I only had a couple of responses to this, but from those responses, the clubs were still very much focussed on advanced amateur gear and didn't cater for bridge camera users.
This is a shame as we should be sharing knowledge and techniques rather than being centred on equipment.

I would love to see a camera club where the competition winner was using a smartphone image.
I viewed a local camera club public exhibition recently and whilst there were some great images (largely from just a couple of members) there were a lot of images displayed that were both technically poor (incorrect exposure, processing (black and white) and composition). It would appear that this particular club really didn't have an ethos which encourages the smarter members to help the ones who were struggling with their image creation.

Simple table top photography

You don't need an elaborate set up shot some great images – especially if you are shooting smaller objects.

A simple two £5 table lamps (Ikea) fitted with 3w globe LED lamps (2700k) set up

Using a roll of inexpensive paper roll you can create the "infinity" background. Mine is just held on the adjacent windowsill by the flower vases and just hangs over my table. I placed the two Ikea table light, which are fitted with 3W globe diffused 2700K LED lamps. The goosenecks can be bent to set the angles required for your shoot.

In the following images, I used the FZ2000/2500 in the manual WB mode after setting the WB on a sheet of white card.

As the days get shorter and colder (here in the northern hemisphere at least) it's nice to be able to continue your photography indoors and stretch your imagination with all sorts of subjects from Christmas decorations, flowers, models still life and other subjects.

By adding textured backgrounds, or using back projection (using a laptop screen as the source) to produce convincing backdrops you can create some fantastic images!

A block of polystyrene foam, artificial snow and an image on my LCD monitor I could create the following image. The distance of the LCD screen to the camera allowed a convincing depth of field. Again, simple lighting from a diffused flash gun to light the plastic models.

A new addition to my desk

This little cheeky chap caught my eye whilst we were out shopping.
My challenge was to capture an image with the lamp illuminated without the facial features burning out because of the proximity.
The final image is a composite.
One with the light off and illuminated by an overhead light

Then a second exposure of the light bulb turned on but exposing for the highlights.

From that image, I used the lasso tool in photo shop to "cut out" the globe of the lamp and then composite it back into the original image.
The final touch was to add just a slight spot light render to add a slight look of flair from the light.
He will take pride of place on my computer desk to add a touch of hilarity!

Vertical Video

When smartphones started to be the massive success that they have become it was irritating to see using the camera in portrait mode to film video clips. It seemed that every time I saw video being recorded with these devices it was in vertical format.

Didn't the user recognise the fact that 16:9 HD format is a horizontal format. I can't imagine watching a vertical video on a 55-inch LCD 4k TV.

But wait a minute, these users were posting to Facebook and Instagram and other social media platforms where the norm was to film and post vertical video. Studies by these large platforms screened some adds in vertical format and saw a massive increase in viewer watching rather than skipping through. For smartphone users who text with one hand and hold the phone vertically to swipe through messages and chats the inconvenience of turning the camera through 90 degrees to watch a video was a pain.

YouTube have embraced the vertical video format as well and more and more video content is being viewed on smartphone devices as people commute into work etc., that it is inevitable that more and more video content will be generated in this vertical format.

It will take more planning to put together a production that flows correctly but I have no doubt that even with the resistance to change this vertical format is one that isn't going to go away – so maybe I'll have to think about embracing it?

Rear control switch replacement on the FZ200

The rear switch on the FZ200 has now been identified as a potential failure item. Many users have had to have the switch replaced at an authorised Panasonic repair centre, some luckily, under warranty.

In the next couple of weeks, I will be replacing the switch on my FZ200 and will do doing a "how to" video.
The switch is now available from Amazon in the US and UK and you can evaluate whether the repair is something that you might want to attempt if you have this switch failure.
There is the Qmenu "work around" for this failure but it isn't as convenient as the multi-function switch.

There are some great Pentax K mount lenses available on places like Amazon and EBAY which, by using a simple adaptor flange, work very well with the Canon M series cameras and the EOS EF/EOS M adaptor.

Lenses like the 50mm F1.7 become very nice 85mm F2.2 equivalent ideal for portraiture. The lenses have manual aperture control and manual focus which is necessary for them to be used on the EOS M body.
The m42 threaded lenses can also be adapted and again there are many examples of these lenses up for sale as people are selling off their 35mm film cameras as they have adopted their smartphones as their new "go to" camera.
I chose the Pentax lenses as they did produce some excellent quality glass for their Asahi Pentax cameras and some of the SMC (super multi-coated) lenses like the 105mm Super Takumar were beautiful to use.
I will be doing a video shortly on how these lenses can open a new world to your photography as they have their own personality that they bring to your stills and video work.