Graham's Photoblog Newsletter

For Week Ending 31st October 2020

The Canon EOS M50 Mk2 – A Big Disappointment!

There had been growing rumours that the Canon EOS M50 Mark II would bring exciting new features like a Digic X processor, a new 32.5MP sensor and uncropped 4K video, just like the EOS M6 mk2. Unfortunately, these were way off the mark, and the EOS M50 Mark II is a minor upgrade.

In fact, there doesn't appear to have been any real hardware upgrades at all. It's still a small, lightweight APS-C mirrorless camera, with the same 24.1MP CMOS sensor as before and the aging Digic 8 processor.

While the retention of that familiar sensor isn't an issue – it's tried-and-tested and produces very good images – the lack of a new processor means the EOS M50 Mark II appears to carry many of the same limitations of the mark 1, including that heavy 1.6x crop for 4K video. It also lacks Dual Pixel AF in 4K mode, which meant we really only really shoot in 1080p.

There's apparently improved autofocus, including Eye AF for stills and video (for the modes that support it), and support for vertical video shooting for those who use this format?

There are a couple of interface improvements, touch the screen to autofocus while you're looking through the EVF, (like the Panasonic bridge cameras) and there's also a new tap to record video button on the vari-angle touchscreen.

Lastly, the Canon EOS M50 Mark II is compatible with wireless YouTube Live streaming and Canon's EOS Webcam Utility software, so it can double as your Zoom cam when you're not out shooting.

It's not going to be available in all regions at launch and Europe will not see the camera until 2021.

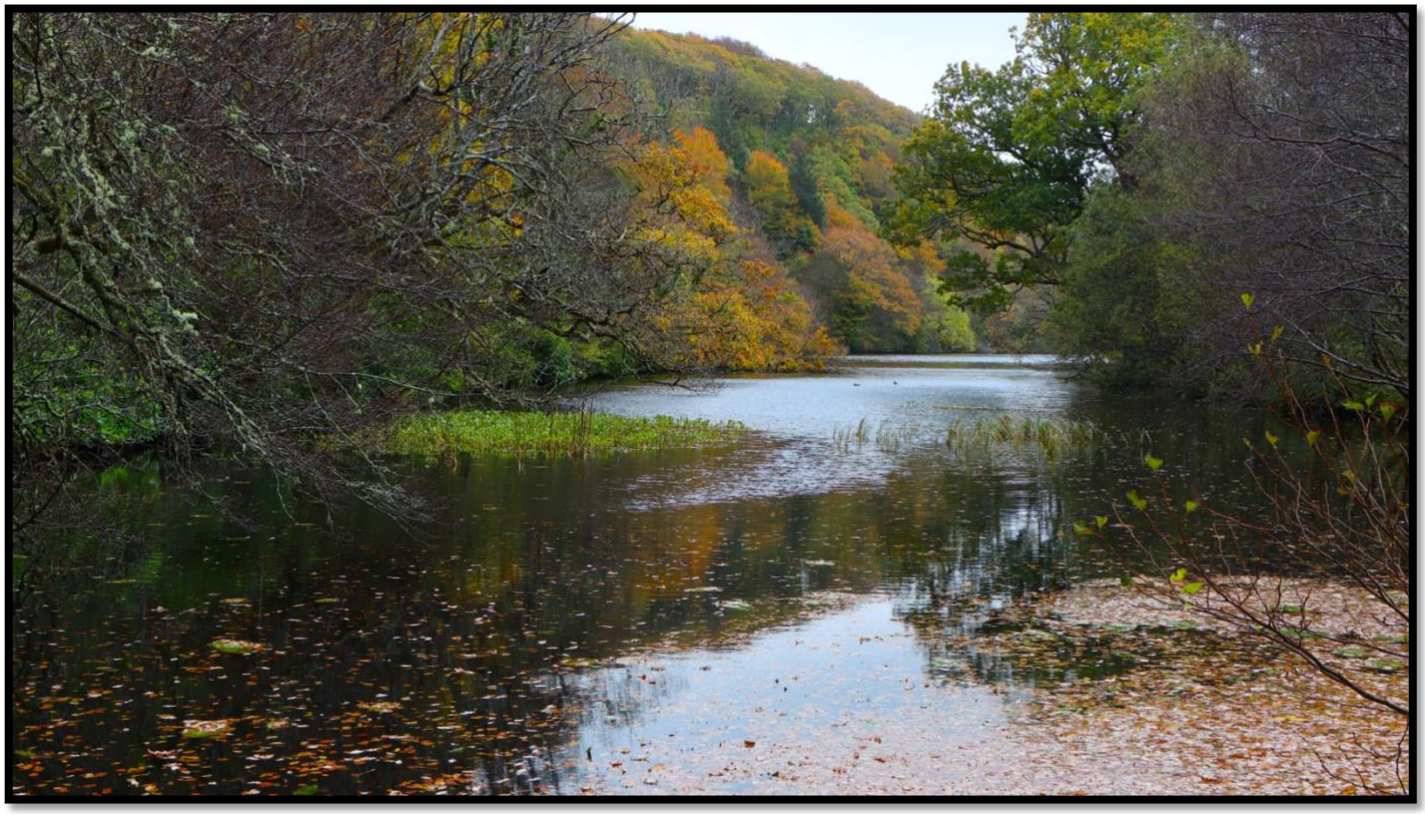
So it's not going to be a camera that I will be looking to purchase as I bought the EOS M6 Mk2 earlier in the year and now I'm glad that I did.
Canon seem to be concentrating all their efforts on the EOS R full frame mirrorless cameras.
Maybe we have seen the end of the line for the EOS M cameras?

Apple's iPhone 12 series is launched.

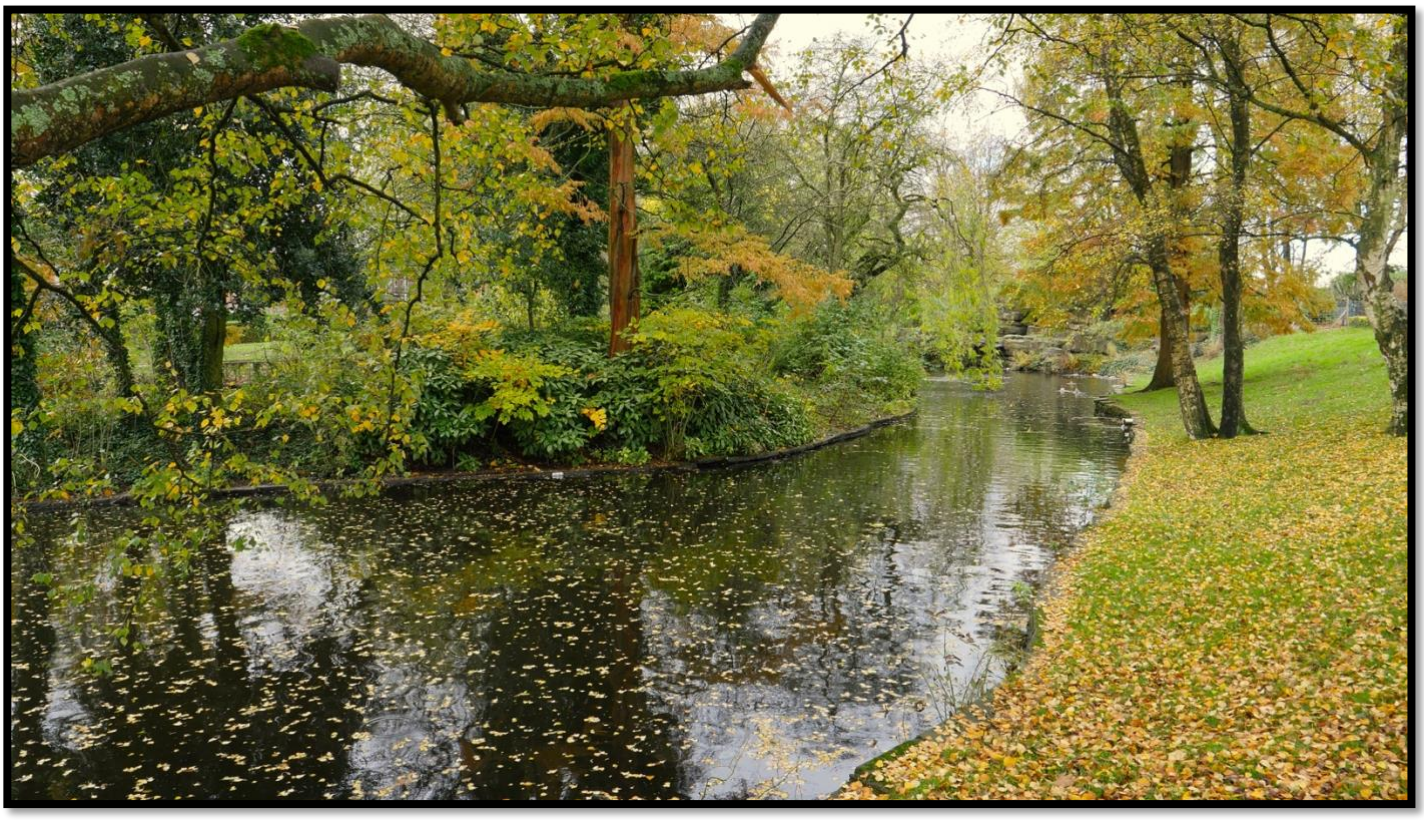
This graphic shows the relative sizes of all the iPhones from the iPhone SE to present. The iPhone 12 mini, iPhone 12 / Pro, and iPhone 12 Pro Max sizes fit nicely between the existing models.

From what I have understood from press releases etc., is that the iPhone 12 Pro's upgrades over the iPhone 11 pro really rely on software, whereas the iPhone 12 Pro Max gets all the software upgrades and a major hardware upgrade.
The iPhone 12 Pro gains the Ultra-Wide Night mode and LiDAR autofocus.
For the first time in several generations of iPhone models, we got the (26 mm) wide angle lens this year with an F/1.8 aperture.
It has been upgraded to F1.6 which means the camera will perform slightly better in low light, and it's also now a 7-element lens, which Apple claims offers better edge-to-edge sharpness (something that I am looking forward to as the existing lens on my iPhone 11 pro does show some edge softness!)
With the night mode now being extended into the ultra-wide lens as well it should pave the way for some really good festive images.
I think that the computational (AI) photography is gaining such incredible speed.
Not only within the cameras like Google's Pixel cameras as well as the iPhones and Samsung models but also in software post processing like Luminar AI.
Whether you are a fan of this "manipulation" is of course yet another story but it certainly gives us plenty of creative opportunities with our images.
With the disappointment in the Canon EOS M50 mk2 I'm almost certain that I will upgrade my iPhone X and iPhone 11 Pro camera to one of the iPhone 12 series.
It will most likely be the PRO Max as the extra screen size will be an advantage as I'm constantly having to use my reading glasses more and more these days and the iPhone 11 pro screen is already too small!

It's Autumn (in the northern hemisphere) and the trees are changing rapidly



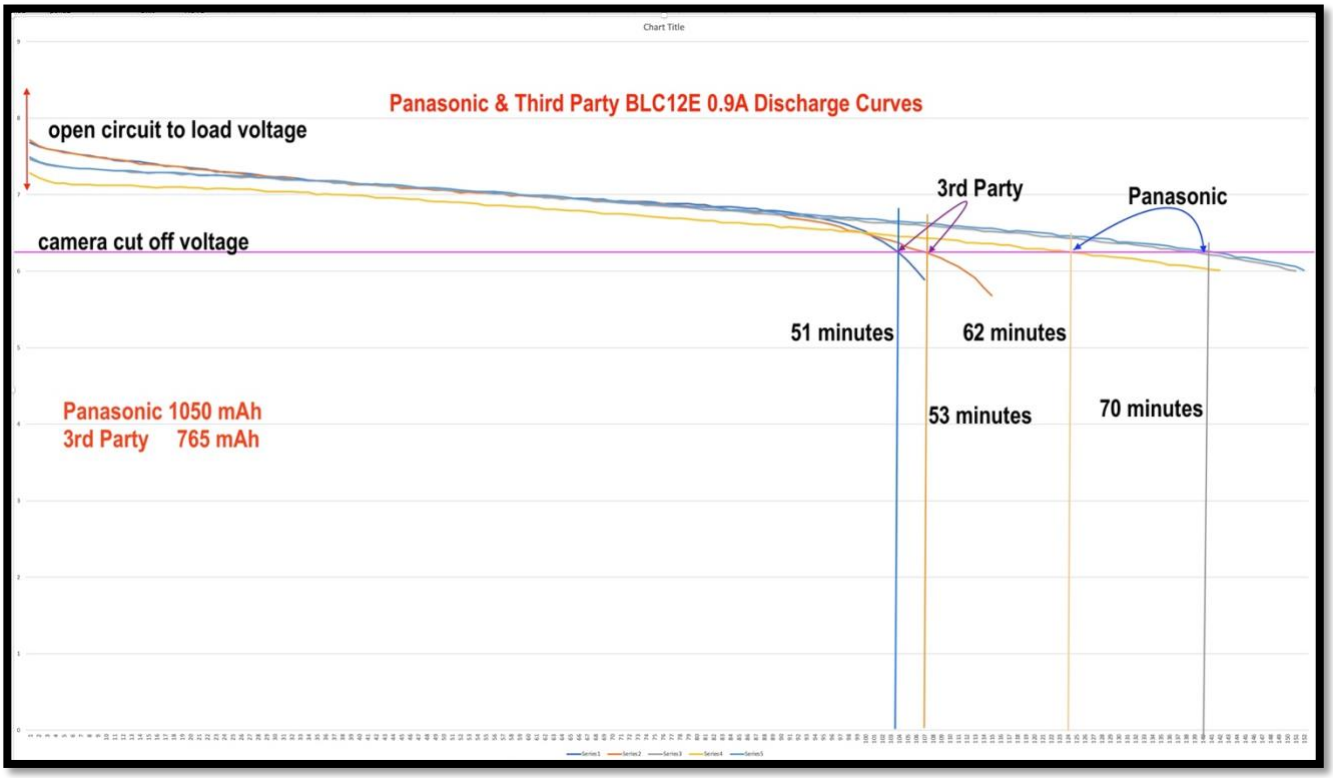
It's surprising how autumn has crept up upon us this year! Normally we can plan to go out with our cameras and try to capture some great, colourful, landscape images.
With seeing such weather variance recently it has meant that this change has happened quite quickly.
I think it best to capture these scenes on an overcast day, even drizzling with rain, as this seems to add vibrance to the images.



Third Party Versus Panasonic Batteries

In my previous newsletter I mentioned that I had gone out on a photoshoot only to find that I had packed some batteries that had not been charged and I came up with a simple voltmeter solution to check the battery voltage as I pack them into my bag now.

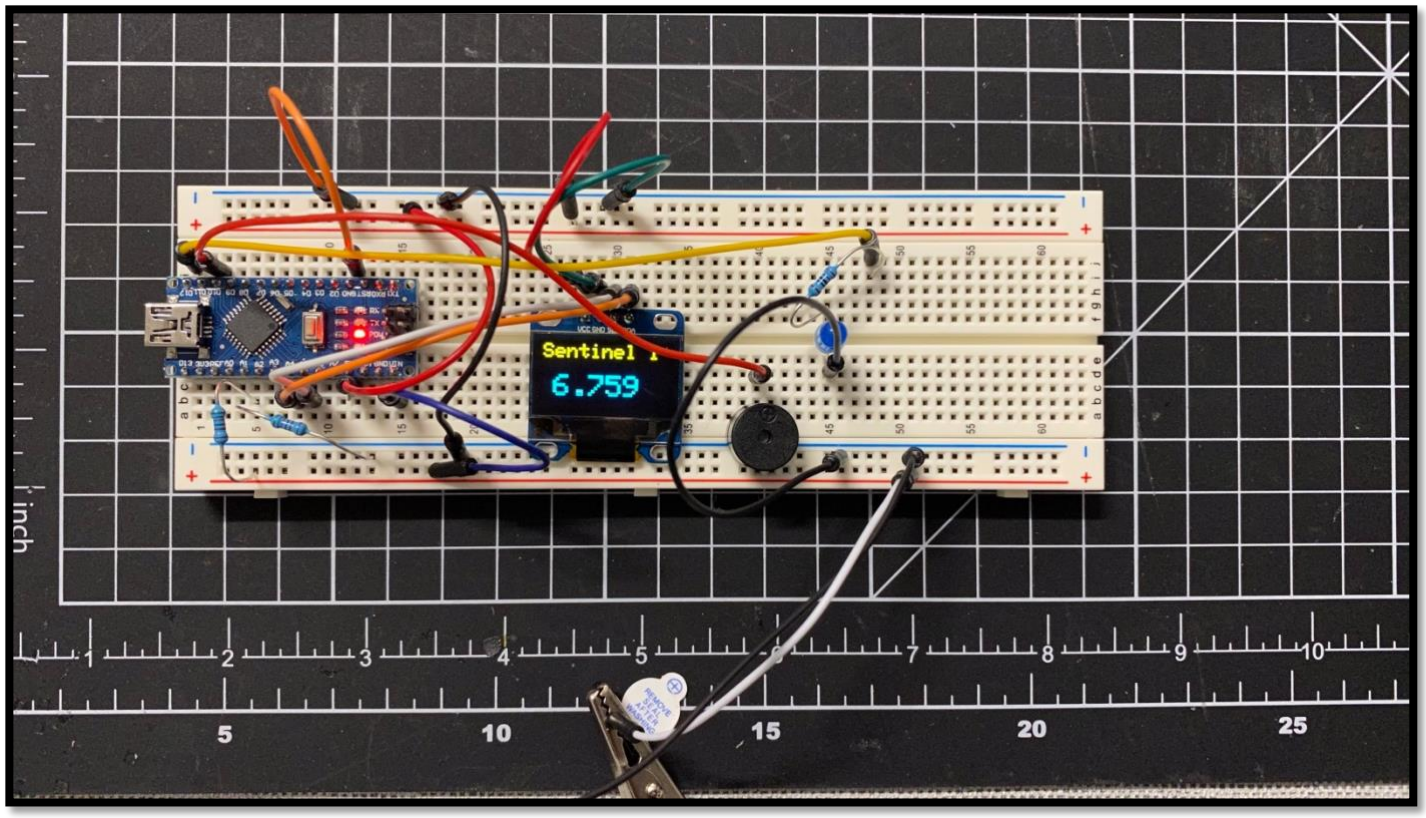
Further investigation showed that it was a more extensive problem and revealed that the third party DSTE batteries that I had usually bought, and had recommended, turned out to be quite poor performers after about a year's worth of use.
I did quite a lot of experimentation using a constant current discharge circuit equal to that of the typical currents found in our bridge cameras during shooting and the results were quite illuminating.



In our camera the battery charge indicator, visible on the LCD screen, shows the relative state of charge remaining in the battery. When it reaches about 6.6volts the indicator begins to flash red and shortly after this the camera shuts down at 6.4v to prevent the cell becoming over discharged.
In fact the battery itself has internal circuitry to prevent this from happening and this is normally around 6.0 volts so there is some margin of safety.
From the graph you can see the 3 Panasonic batteries ran between 62 minutes and 70 minutes until the 6.3 camera cut off voltage was reached.
In contrast the DSTE batteries dropped out between 51 and 53 minutes.
Doing a cell capacity test showed that the rated capacity was not reached until the internal cell protection cut in, not when the camera cut off occurred. So realistically the Panasonic battery gave 1050mAh against the rated 1200mAH and the DSTE returned 765mAH against their rating of 1700mAH.
Now cell capacity is directly related to the weight of the lithium ion electrolyte and electrodes.

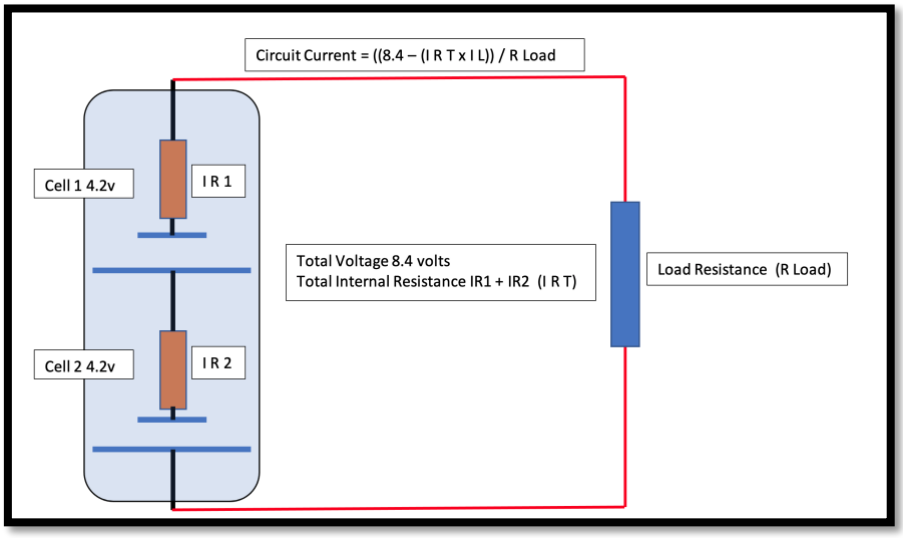
So the DSTE battery should weight about 40% more than the Panasonic ones but as you can see from the scales above they are actually lighter! So there is something amiss with the claims for these batteries and the performance drops off quite alarmingly after 12 month where the Panasonic cells are still showing almost full capacity even after a couple of years usage!

For extended shooting times, especially when using the video mode, I use an external lithium battery pack and a dummy battery in the camera.
The experimentation gave me the idea of a “battery sentinel” that would give me a visible warning of the cell voltage approaching the 6.6v cut off point in the form of a bright blue LED and at 6.5 volts an audible warning in the form of a piezo electric sounder.
As you can see from the above images the warnings are quite visible as well as an accurate readout of the actual cell voltage.
I used an Arduino nano single board microcontroller to build this unit into a small plastic enclosure.
I used a small OLED display to facilitate the readouts.
I first “breadboarded” the unit and then constructed the final version which would fit inside a small plastic housing.



The proof of concept model under development.

After getting back into Arduino programming, which made quite a challenging break, I decided to look at how to identify “bad” batteries through measuring their internal resistance.

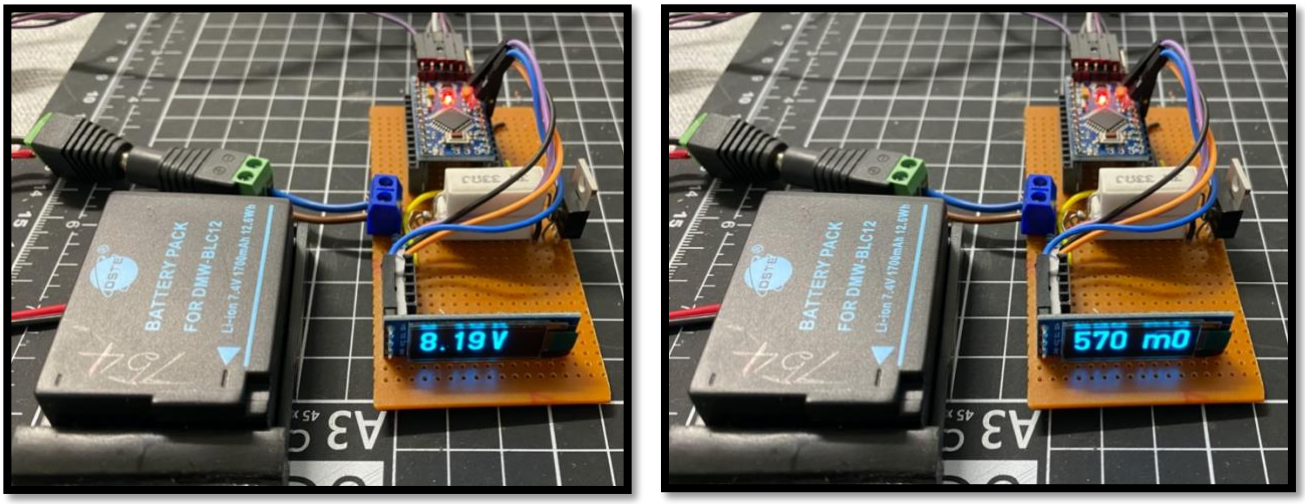


The BLC12E battery schematic

The BLC12e lithium ion battery consists of two cells connected in series to provide the 8.4volts.
Each of these cells has its own internal resistance. This resistance increases over time as the chemistry within the cell ages.
This internal resistance is responsible for the lower capacity and the heating of the cell during charging and discharging. This heating can actually cause swelling of the plastic battery case and make it almost impossible to remove from those cameras which support internal charging.

To calculate the internal resistance it is necessary to connect a known load resistance to the cell under test and measure the open circuit volts and then the voltage across the battery as the load is applied.

Using Ohm's law the internal resistance is the delta Voltage/delta current. (R= V/I)
To automate the measuring of the batteries I once again turned to the Arduino microprocessor which I could program to measure the voltages via its analogue to digital converter and to switch in the load using an N-channel mosfet.
I chose a load which would be representative of typical camera current (500mA.)



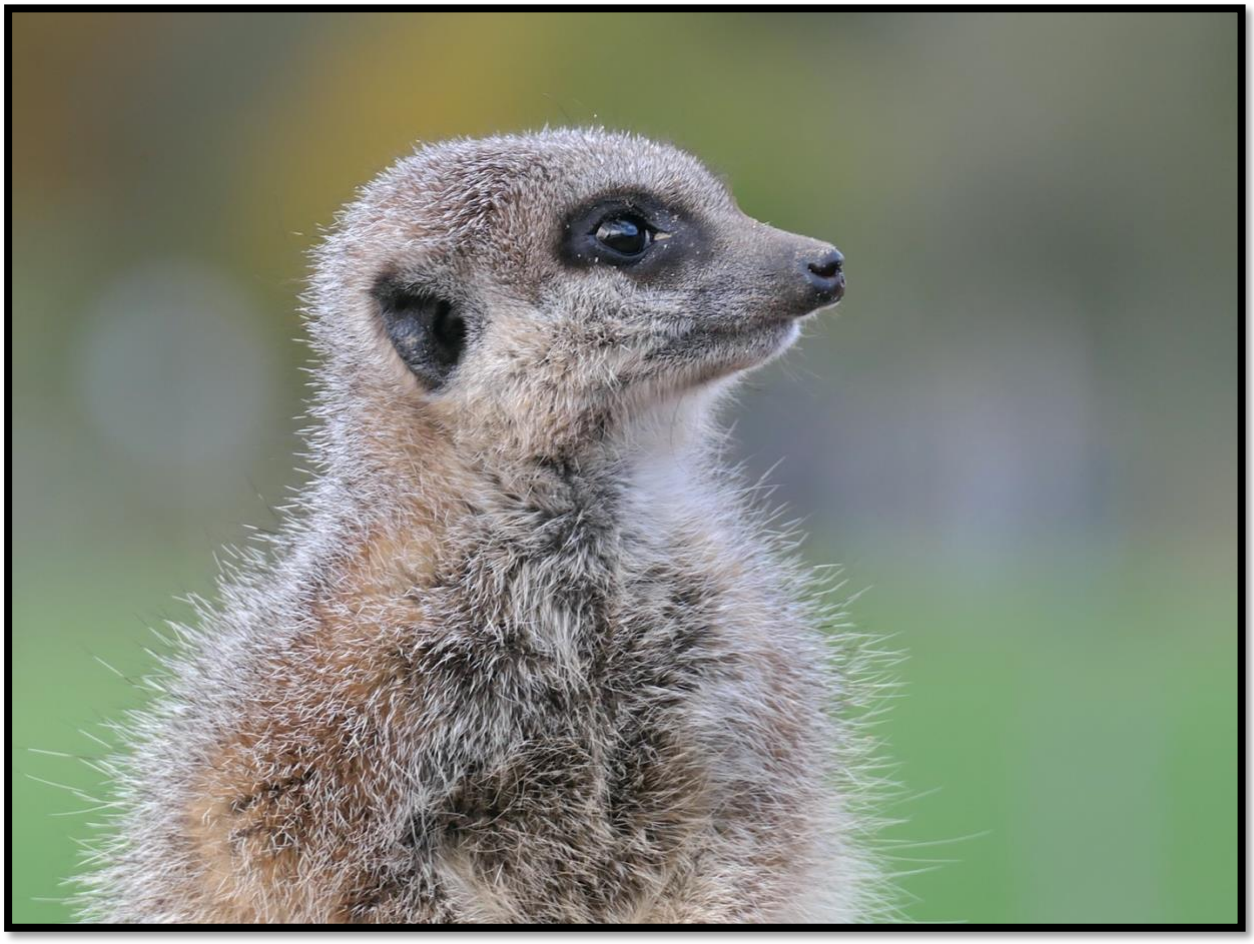
The circuit in proof of concept stage

To give an indication of the battery voltage before the load is applied I display this on the small OLED screen and then the microprocessor switches in the load by turning on the n-channel mosfet.
The analogue to digital converter then reads the new voltage and then I can calculate the resistance.
There's a small margin of error due to the resistance of the connecting cables and the internal resistance of the mosfet however it is useful for comparative measurements between batteries to identifying those which are failing.
When time permits I'm going to modify this to add a current sense and higher precision ADC unit so that rather than calculate the circuit current I will have an accurate reading and measure the volt drop across the mosfet so that this can also be taken out of the equation used to calculate the cells internal resistance.
I'm sure that if we end up with a total lock down in the next couple of weeks that designing electronic projects will be a great escape for me as it will not be possible to go out of area to take pictures etc.

Kimafun Dual Wireless Microphone 50% Off for Readers in the USA (only)

The model KM-G102-5 dual transmitter system that I reviewed is undergoing a 50% off promotion. The promotion deadline is November 8.
https://www.amazon.com/gp/mpc/AQYBGF1XCAI6X

A trip to the farm



A meerkat study!

On a wet Monday afternoon we met with grandchildren at a local farm to visit the animals. Under out lockdown we are only allowed to meet outdoors in parks etc. They weren't too keen on handling some of the pets there such as chicks and rabbits and more happy with a tractor and donkey ride! Meanwhile I took the FZ10002 and manged to bag a couple of the meerkats before the heavens opened!

Whilst Harrison was having a donkey ride I did manage to get this severely backlit picture with the FZ10002 with the lens set at 260mm zoom and -2/3 EV. A couple of seconds before this shot was taken it was overcast and raining! Of course it is Halloween this weekend and quite a few dolls around the farm!

Digital Image Noise and how to Minimise it

A quote from George Eastman

"Light makes photography. Embrace light. Admire it. Love it.
But above all, know light.
Know it for all you are worth, and you will know the key to photography."

I started this discussion with this quote as "light" is the key to getting images with as little digital noise as is possible. Let's look at the 3 principal elements which govern our exposure.
Aperture and shutter speed directly adjust the light reaching our sensor. By opening up the aperture to let in more light or by extending the shutter speed to allow the light to integrate longer on the sensor we have two fixed, but inter-related, ways of making an exposure adjustment.
ISO plays a more specific role regarding exposure and light, and it would appear as simple as that.
Expressing this simplistically, increasing your ISO setting will increase your camera overall sensitivity to light, brightening your image.
So then, if you're shooting in a low-light situation and your photos are coming out underexposed, just increase the ISO level and brighten it up. That's so obvious?
Yes and no! This would be a pretty short discussion if that's all there was to it.
Adjusting any element of the exposure triangle will introduce a number of variables that affect how your image appears.
Once you understand these variables you can learn to anticipate them when you're shooting in manual mode, balancing the entire triangle to get the best exposure for your needs.

Taking a further look at ISO shows that ISO has a bit of a history. You may have heard it referred to as "film speed" because in film-based photography the actual film you use determines your ISO.
Traditional film is made with different levels of sensitivity to light, so a film speed (or ISO) of 100 produces negatives which are very differently from those captured with a film speed of 800.
That means when you're shooting with film, you determine your ISO once (when you select a roll of film to put in your camera) and then you're stuck with that ISO until you finish the roll.
Thankfully, It's a lot more flexible with digital photography!
The ISO setting on your camera is simply a measure of how sensitive your camera sensor is to light, and you can change it quickly and easily between exposures.

While aperture and shutter speed describe physical functions – with aperture being determined by the size of the opening in your lens, and shutter speed being controlled by the timed opening and closing of a leaf shutter in our bridge cameras or a curtain like shutter in our mirrorless cameras.
ISO as we know it in the digital age is more of a computerised function.
All digital cameras contain microcomputers, and one role of these microcomputers is to process the digital information from the sensor prior to it being stored on our SD card.
ISO is a feature that can manipulate the digital value by mathematical means.
This means our images can be artificially brightened by increasing the values of the individual pixels in the image.
Our images are often degraded by noise and noise removal is an important task in Image processing.
In general the results of the noise removal have a strong influence on the quality of the image processing technique.
Several techniques for noise removal are well established in colour image processing.
The nature of the noise removal problem depends on the type of the noise that is corrupting the image.
In the field of image noise reduction several, so called, linear and non-linear filtering methods have been developed.

Image noise is random (i.e. it is not present in the object that is being captured) variation of brightness or colour information in images, and is usually an aspect of electronic noise.
It can be produced by the sensor and the associated processing circuitry in a digital camera.
The original meaning of "noise" was, and remains, "unwanted signal"; that is unwanted electrical fluctuations in signals received by AM radios caused audible acoustic noise ("static").
By analogy unwanted electrical fluctuations themselves came to be known as "noise".
Image noise is, of course, inaudible.
The types of noise seen in an image can range from what are called Gaussian noise, salt and pepper noise or shot noise.

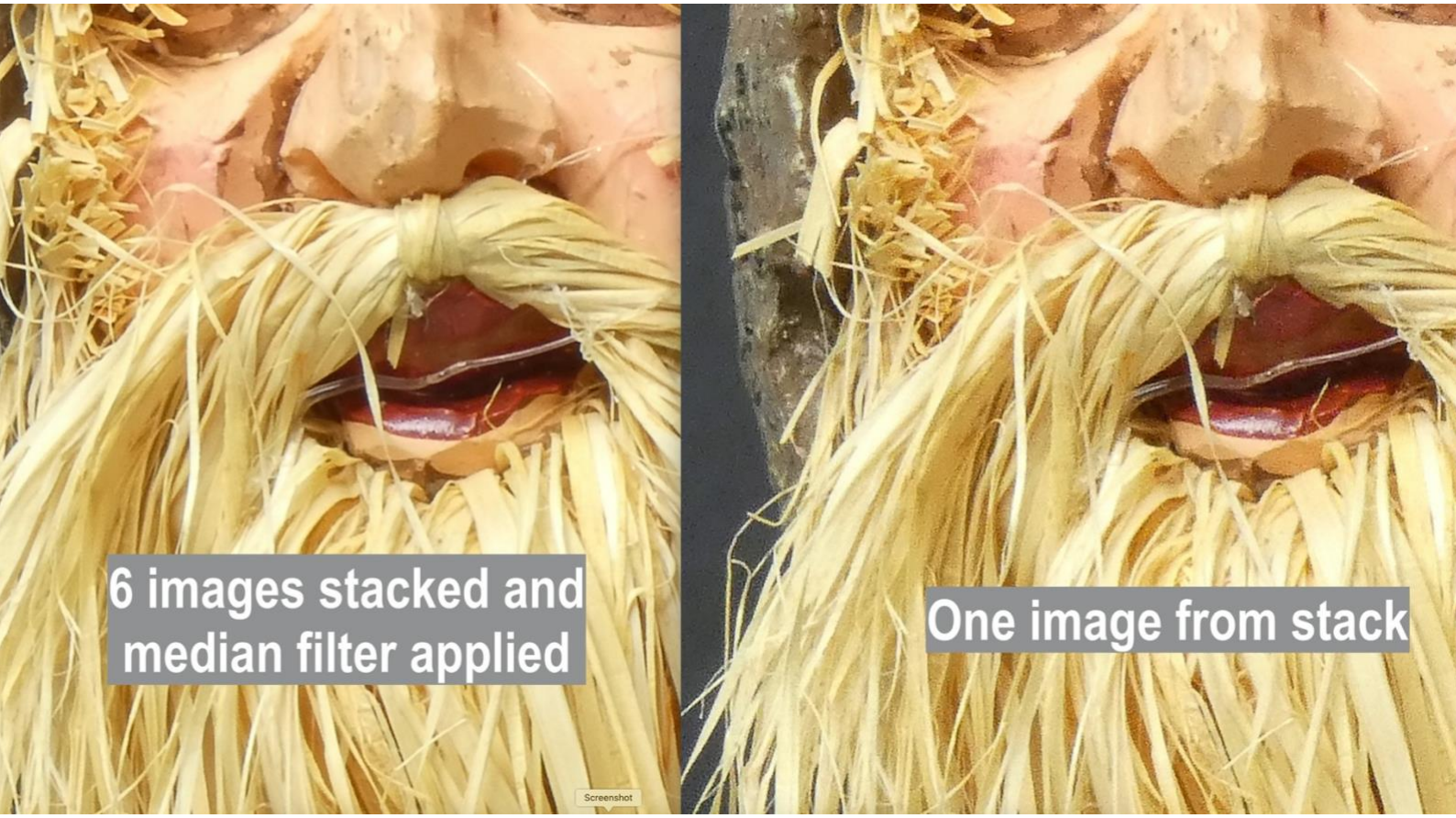
Gaussian noise in digital images arise during capture e.g. sensor noise caused by poor illumination and/or high temperature of the sensor itself.

An image containing “salt-and-pepper” noise will have dark pixels in bright regions and bright pixels in dark regions. This type of noise is usually caused by analogue-to-digital converter errors.
It can be mostly eliminated by using dark frame subtraction, after the exposure, and interpolating around dark/bright pixels.

The effect of shot noise, seen in the lighter parts of an image, from an image sensor is typically that caused by the variation in the number of photons sensed at a given exposure level.

When looking at noise reduction methods for post processing we can use “non-linear” filters.

A median filter is an example of a non-linear filter and, if properly designed, is very good at preserving image detail. Usually it is employed after stacking several of the same image together so it is really only suitable for static subjects



Here the result of 6 images that were imported into Photoshop as a stack and then median filter applied.

In this example you can see the image noise in a ISO 3200 image compared to one at ISO 80 (300% enlargement). You can see how the image has lost sharpness and some contrast.

As noise manifests itself in the darker areas of our images you can use this knowledge and try to shoot in brighter conditions, choose lighter background rather than dark, change camera angle to reduce darker backgrounds use reflectors or artificial light to add extra light onto your subject.

There is also a technique called Expose to the Right (ETTR) and this means that you deliberately overexpose the image so that the shadow areas are recorded with higher digital values.

You must watch the histogram carefully to ensure that any of your highlights are not clipped.

It really means that you shoot in RAW mode and then pull back the mid tones to where they should be. When you have done this the shadow areas should show less visible noise.

A highly enlarged view to show the ETTR processed image compared to the normal exposure.
If you can expand your image on your reading device you should be able to see the reduction in overall image noise.
The ETTR image was +1 EV and pulled back by -1EV in photoshop.

Help! I can't set a 1 second Shutter Speed

I sometimes get emails from subscribers who simply can't set a 1 second shutter speed with their Panasonic Lumix bridge and mirrorless cameras.
That's an easy one to answer. If you're using 3200 ISO, the longest shutter speed available is 1/2 sec. At 6400 ISO, it's 1/4 sec. It is documented by Panasonic, but very sketchily.
I know about the limitation because I've written the user guides for a lot of these cameras!

Night Mode on iPhones

Without night mode

With night mode

The computation power of the later iPhones is really impressive. It's obviously done by combining (probably mean averaging) 6, ½ sec ISO 1000 images to reduce the noise and increase the brightness of the image.
The second image using night shot mode is perfectly aligned even after a 3 second exposure!
You can see detail in the clouds which I couldn't see at the time.

An enlarged section from the image shows the amount of detail and lack of noise.
I wish that mainstream camera manufacturers would wake up and start to employ this sort of software processing within our cameras instead of the usual filters that likely nobody uses anyway!
With the new iPhone 12 having this night mode extended into the super wide lens I think that will make it very attractive for capturing city festive light displays etc.
If anyone has purchased the iPhone 12 or iPhone 12 Pro what are your first impressions of the new camera system?

What light source for photographing floral displays?

Some weeks ago I was asked this very question and it is one that probably applies to other product photography as well.
Well all my lighting now is LED based. I stopped using the large fluorescent daylight photography bulbs in their large soft boxes as I really don't have enough floor space to accommodate a couple of these large units some time ago. Actually just thinking about that I can't think what happened to them as they did come in large carry bags. Note to self – find them maybe an Ebay opportunity and raise some extra cash for the iPhone 12 Max purchase!

We only had an old, withering, display for me to capture but I think it illustrates the points.


spotlight with 7 inch reflector


spotlight with 7 inch reflector and diffuser

The large ring light produces a flatter light and the light also spills over onto the background (which was pure white) to add a little light without having to use a secondary light.

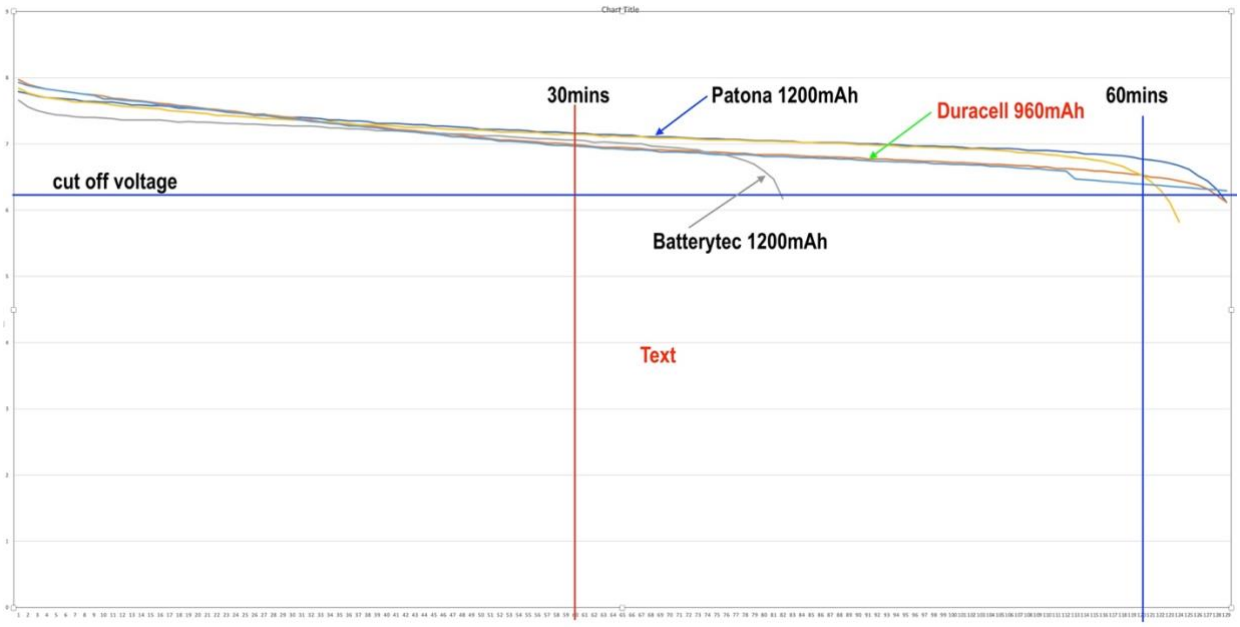
The overhead light panel provides again a slightly diffuse light but even and again illuminates the background.
The 7 inch LED spotlight without a diffuser causes a bright, contrasty light and some hot spots if the exposure is not set correctly for the highlights.
Adding a single layer of nylon diffuser spreads out the light and just knocks a little off the hard shadows.
A white card reflector would probably help to reduce those even further.

I'll get some fresher flowers and do a better job of the shoot with some lighting diagrams but I just wanted to acknowledge the work in progress.

Update on third party camera batteries

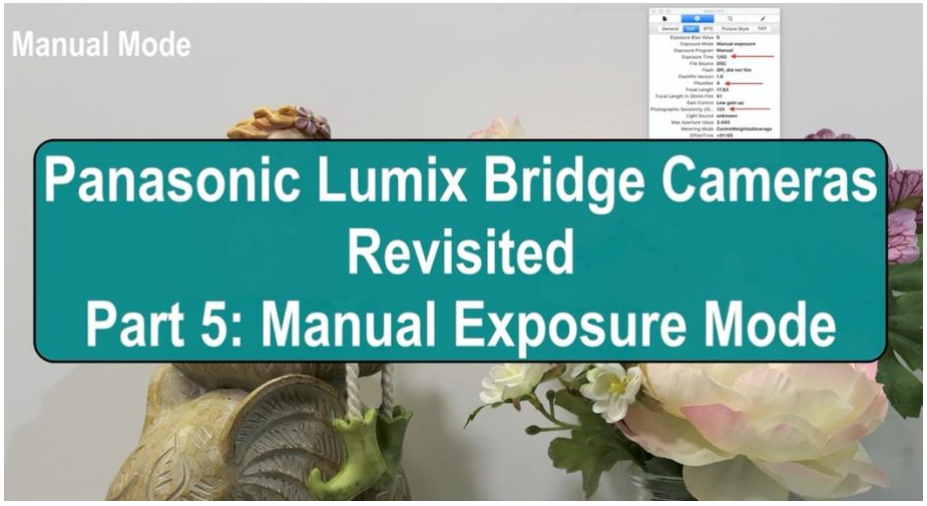
I purchased a small sample of the Panasonic BLC12E replacement batteries for a long term reliability test.
They range from £12 to £23 per battery, the Duracell being the most expensive but offering a 3 year guarantee against failure and also damage to your equipment should they fail catastrophically.
The battery however is only 930mAh compared to the others at 1100mAh.

Although the batteries do not reach full efficiency until 4-5 discharge – charge cycles I decided to run a 1A (1C) discharge test just to see the initial capacity.



From that you can see that the Batterytec battery was fully depleted after 30 minutes whilst the Patona and Duracell approached the theoretical 60 minutes.
I'll be measuring the internal resistance, the physical dimension of the batteries (as some swell during their lifetime making them difficult to insert and remove from the battery compartment in the camera), their open circuit voltage after a 1 month resting period followed by several rapid charge/discharge cycles to stress them a little and the temperature rise during charging.
I'll also put them in the freezer for 24 hours and then do another discharge test to compare to the Panasonic battery which still performed for its full charge duration – this was a surprise as typically lithium ion cells do not like cold conditions!
Watch this space for updates as I progress with the tests.

Part 5 of the Panasonic Lumix bridge camera revisited: Manual Exposure
This is now available on YouTube: https://www.youtube.com/watch?v=_K46xXZjIRI



One again, thank you for your continued support by using my Amazon affiliate links – they do help in allowing me to purchase items for test and review.
Until next time stay safe, stay well and if you celebrate Thanksgiving have as near normal family experience as your local regulations allow. ***Graham***