

Graham's Photoblog Newsletter

For Week Ending 3rd October 2020



We're in Lockdown Again!

As I write this months newsletter in my town (Bolton in Greater Manchester) we have one of the highest rate of Covid-19 positive tests results in the whole of the UK.

Under new whirlwind restrictions we are subjected to similar restrictions that we placed upon us during the beginning of this pandemic in March of this year. No longer are we to meet family indoors or in our gardens, have to wear face coverings in all enclosed spaces, meet only with a maximum of 6 people in pubs and restaurants etc.

Even with the threat of £200 fines for not wearing face coverings and £1000 fines for not abiding by quarantine restrictions when returning from some foreign holiday destinations the local newspaper has reports of fines made on both individuals and local business who have broken these mandatory rules. We have had an Asian wedding of 60 guests where the limit is now 15.

Reports of people not wearing face coverings in barbers shops and beauty salons and people returning from holiday and going to work and on a pub-crawl infecting many people in the process.

Even now the shops and supermarkets are full of people who are not wearing face coverings and there has been a marked reduction in the number of shops having hand sanitiser available as you walk into them.

Our government have to be held to account for this liberal stance that they have taken on our health.

The new NHS track and trace app was introduced amid a big song and dance however it has major flaws which almost make it useless. One of the key components was the ability to feed into it if you had a positive test result. The app would then notify all those who had been in a 14 day window and exposed to you for 15 minutes or more however it has been found that the app will not accept these results from some test sites. It also has been built on Bluetooth which is known for its connectivity reliability and critically it allows the user to turn off track and trace if they want to – so if people want to socialise and flout the lay they can just turn off Bluetooth – absolutely ridiculous.

The scientists and advisors wanted more action to prevent this rapid increase in cases but no the government believed that people would do the right things with stupid slogans like “don't kill your Granny!”

Did they believe new university students would not party during freshers week and we now have several universities with thousands of students isolated in their halls of residence!

We have thousands of people protesting about their lack of civil liberties during these restricted lockdowns – all protesting without social distancing or wearing face coverings – some believe the virus doesn't exist and that it is all a conspiracy theory! Now I see Donald Trump has CV – perhaps now he will take it more seriously!

God, I fear for the future. I fear for the winter that is approaching and the number of other flu and cold virus that are usually prevalent at this time of year. And now I hear that there may not be enough flu vaccine due to shortages – and we have had how long to prepare for this?

6 months of restrictions might seem a tough line and many business's may fail but surely this is a small price to pay to keep us alive and well until science can provide a vaccine to keep us much safer in the coming years as Covid-19 looks like it's going to be in circulation for a very long, long time.

New Tutorial Uploaded – Panasonic Lumix Bridge Cameras Revisited Part 3: Getting the correct exposure



[link to YouTube Video](#)

Getting the correct exposure is key to creating great images.

The camera has its own, built in, light measuring system.

Let's take a look at, first of all, the facilities of the inbuilt options that you will find on most digital cameras. Mostly, the metering systems use groups of imaging sensor pixels to determine the scene brightness. The placement of these is not usually disclosed in the same way that the AF points are however, they follow the general placement of:

Whole area, centre weighted and spot.



whole area

centre weighted

spot

In the previous illustration of the three different types of metering you can see that the whole area and centre weighted gave almost identical exposures whilst the spot metering gave a slightly overexposed image with the highlights being just slightly clipped, making it impossible to match the other two in post processing.

It should be obvious then that some consideration must take place before selecting one particular method over the others.

The camera's metering system is designed to adjust the exposure so that the scene presented to it will record as if it was mid grey with a digital value of 127 which is midway between shadows at 0 and highlights at 255.

So, for example, if you individually photograph a black, a grey and a white card, all which totally fill the image area the resulting images will all be the same grey colour as the camera adjusts the exposure to make them appear as mid grey.

The camera always integrates to grey.

In the case of the whole area (or matrix, multi-zone depending on camera manufacturer's description of this method) it evaluates all the light levels from the pixel groups, used in evaluation, so it will respond to areas of brightness and darkness equally wherever they are in the scene.

This method is probably as good as you can get to "intelligent" metering.

When you look at the distribution of the pixel groups used in the centre weighted metering mode it favours the central area for the metering method. So it is better suited to scenes like portraits where the subject is mostly filling the frame.

The spot metering is the most precise in terms of selecting the area to meter from however this does require that you select an area that is a mid-tone to begin with.

Learning to see mid tone grey tones is a matter of practice but areas like green grass and red brick walls are often good starting areas. (turn your camera to monochrome mode and point it at various subjects to see the shades of grey). In an emergency you can also meter from the palm of your hand providing it covers the area used for measurement.

Remember it is you the photographer that is taking the image and you know exactly how you want it to be reproduced so the use of exposure compensation is often needed to correct for scenes that fall outside of the "normal" zone.

Mid tone grey is the key for correct exposure

Despite many claims by camera manufactures about the "intelligent" features of their cameras the truth is that they are simple not so. Here are a few reasons why I state this.

The camera metering system only concerns its self with scene brightness, or luminance. The camera knows very little about the scene that you intend to photograph. You can point the camera at any subject you care to think about and the camera simply does not know what you are pointing at.

In my career I have seen many examples of how the camera metering/scene type determination software is developed. By looking at the luminance and chrominance detail from the imaging sensor it is possible to build up some scene type models. Landscapes, for example, would see green and blue areas in the upper and lower parts of the image, a portrait would have facial features that can be recognised and close up modes could be determined from lens focal distance.

These can be used to allow specific scene type processing to occur. Boosting greens and blues in the landscape mode, selecting a smaller aperture for greatest depth of field etc. In the majority of cases the algorithms and camera image processing speed have meant that scene type detection works remarkably well, however, most manufactures will state in their operating manual for the camera that you should keep an eye on the icon on the lcd screen to ensure that it has selected an appropriate scene type for the image that you are shooting.

You may not want a landscape set of parameters applied to your portrait shot if the scene type determination failed.

Here is probably the best case for switching to the P mode of the camera. It still provides a high degree of automatic control however it disables the scene type detection thus freeing you from this possible problem.

As I have stated previously, the camera metering system is designed to set the exposure so that mid grey is correctly exposed as if the scene is always mid grey.

A mid grey card was previously used to provide a target area which could be used to set camera exposure. Based upon the reflectance of human skin and most of the scenery in our daily lives have this reflectance value.



A grey card used to determine exposure

By pointing the camera at the grey card (with 18% reflectance) the camera would give you the correct exposure which you could then dial into the manual settings.

This was a useful tool if you were shooting weddings for example where the camera would incorrectly expose for either the bride's white dress or the groom's dark suit.

By using the grey card, you are using a tool that the camera is designed to work perfectly with!

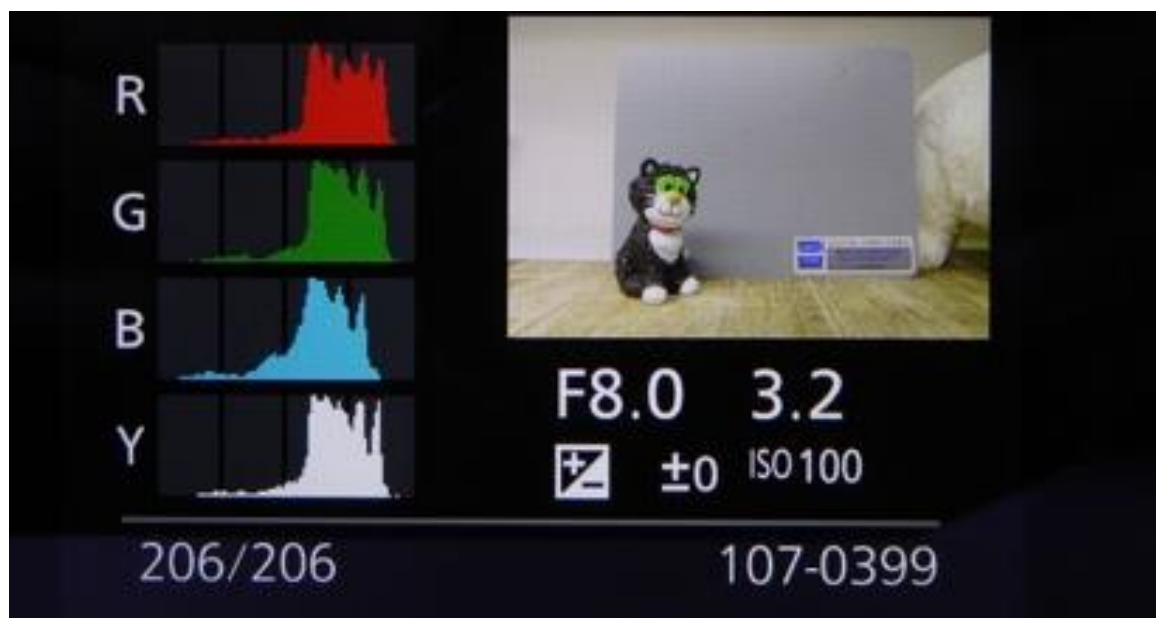
Today not many photographers carry this useful tool that not only can be used to give a perfect exposure but also assist in setting the correct neutral white balance operating point as well.

The problem that arises using a grey card metering system is that it is designed to be used in "normal" that is front lit or overcast daylight, it cannot give you the correct exposure for side or backlit scenes.

In my video I metered of a grey card and then set the shutter speed, aperture and ISO into the manual exposure controls and shot the scene in the same light. As you can see the exposure is perfect.



Another way of verifying that exposure is correct is to use the camera "Histogram" feature. The histogram is a graphical representation of the number of pixels in the image from 0 value in the shadow region to 255 in the highlights.



Interpreting the visual representation can give some clues as to how the image will be captured before the shutter button is pressed and then when reviewing the image in the camera image playback mode you can review the actual stored image parameters.

There is no such thing as a "perfect" histogram as some interpretation has to be applied.

However, in general terms you want the mid tones of your image to be centrally displayed in the area between the 0 and 255 (or black to white).

Any true blacks in the image should be towards the 0 position and similarly pure whites (not blown highlights) should be towards the 255 position. If the blacks of your image are tending to be compressed towards the left hand side, then this is an indication that you are probably underexposing the image and thus “crushing” the data (image tone information) and thus losing this detail. Similarly, if the blacks start well away from the left hand side you are overexposing the image.



Some cameras give extended displays to also show the individual red, green and blue channel data from the image captured.

In the image shown above you can see the R, G and B channels and the luminance | “Y” values. With the colour channels displayed you can see if any of the colours have reached full saturation and beginning to loose detail in tone, just as you can see “blown highlight” detail. The white balance of the image can also be interpreted. If the R, G and B curves are in a vertical line then the white balance will be accurate and not showing any particular colour bias. However, if the curves are not aligned it means that there is a white balance problem as shown in the image below.



The blue channel data is offset to the right of the red and green which will force the image to appear blue. Note in the displayed image the grey card appears to have a blue cast and the blue data is skewed to the right. If the data doesn’t crush against either side of the display, then the white balance could be recovered in post processing.

Understanding how the visual representation of the camera image data does take some practice. Turn on your camera histogram feature (see your camera manual how to do this) and replay some of the images on your memory cards.

Look at your well exposed images to get an understanding of how that graph shape looks compared to images which are badly over or under exposed.

Remember however, that this again is just another tool to help you get better images from your camera but it should allow for personal adjustment so that the image you capture is correct.

As an example a perfectly exposed “high key” image will show very little data from the mid-point towards the black 0 value with maybe a peak towards the 0 point.

Similarly, a “low key” perfectly exposed image will show very little data from the midpoint to the 255 values but maybe a peak towards the 255 point.



The image above shows the white details (the overcast grey sky) hard against the right hand side indicating that there will be no detail in this part of the image.

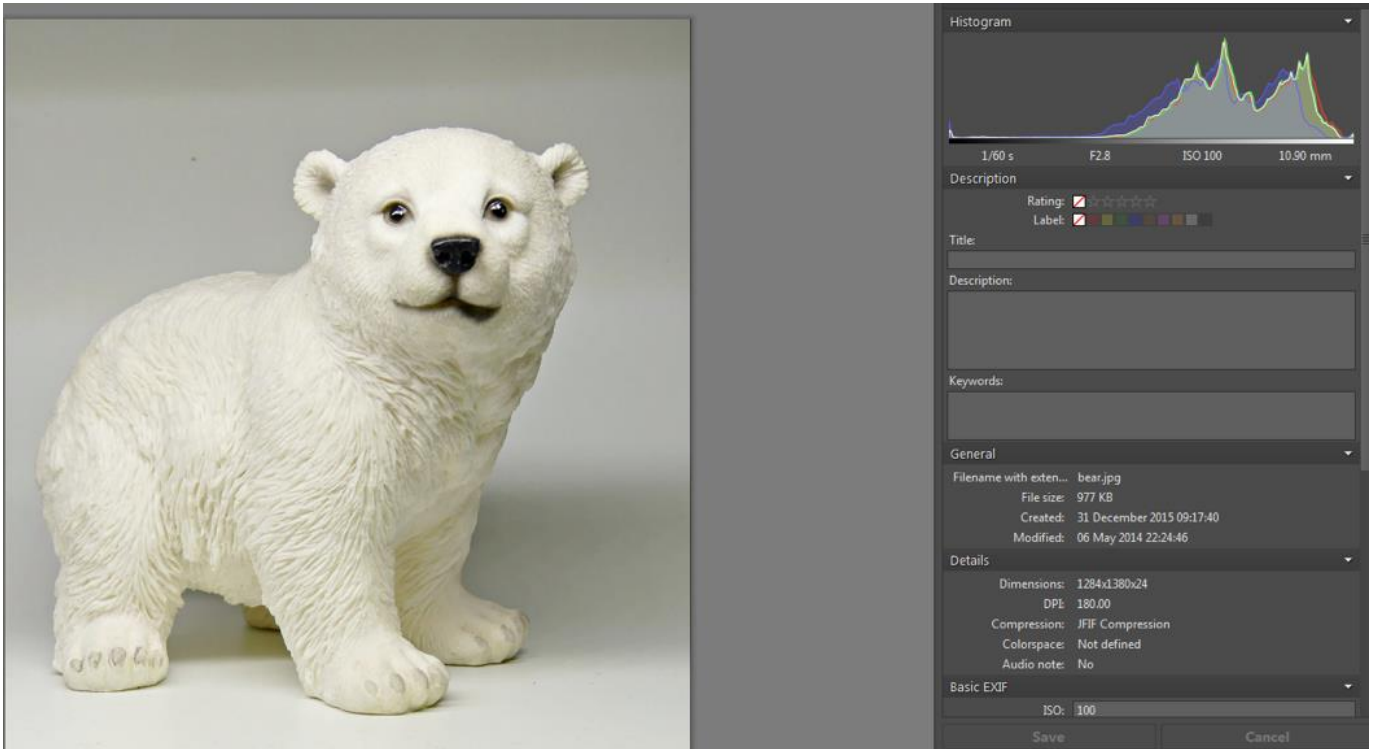
The blacks are starting away from the 0 point; the image is thus slightly overexposed.

Should you set exposure using the histogram?

Well if the image is based on a good distribution of tones – ones where most tones would be seen central in the histogram then these would give a good indication as to the correctness of exposure.

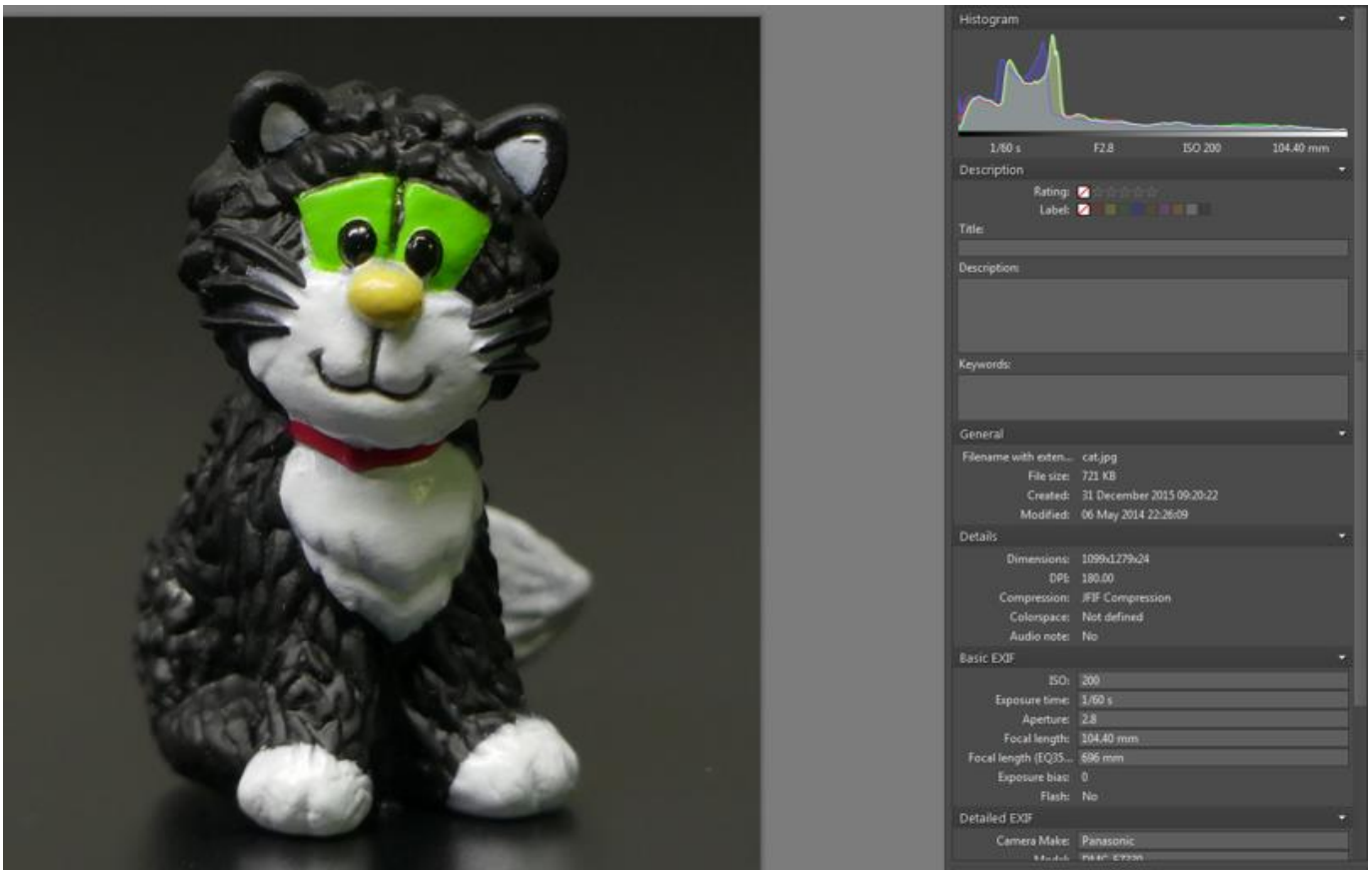
Does that mean that then the histogram can be used then to judge exposure? Well not quite.

Let's look at two examples where the histogram might believe you to think that the exposure was incorrect when in fact the scene was manually metered and exposure set in the manual mode.



Histogram in editing program (same as camera information)

You can see in the histogram the distribution of the image tones is between the middle and the 255 point. If you look at the 0 end of the scale you might just be able to see the pure blacks of the image and on the right the pure whites.



In this example all the image data is mainly in the middle to 0 portion of the graph, blacks starting correctly and whites being captured without clipping occurring.

In conclusion then, the histogram shows the total distribution of tones in the image and is not necessarily a good indication as to correct exposure as this depends not only on the scene being captured but also on your, as the photographer's, artistic impression of the scene also.

Some photographers glance at the camera data after each exposure, mainly to check for any of the tones right at the edges of the histogram that would indicate either blown highlights or crushed shadow details. However, I rarely find enough time to do this.

It doesn't make you more of a "great photographer" if you check every exposure and histogram however it can help you to understand light a little more fully.

There is also a school of thought with digital photography to always expose, particularly low contrast images, keeping the distribution of the tones to the right of the histogram.

The theory is that noise occurs in the darkest areas of an image (shadows) and if you can move the exposure away from this part you will reduce the noise.

In post processing you can increase the contrast of the image if you require it.

Whilst there is some justification in this method you must ensure that in pushing everything to the right that the highlights do not become clipped as it will be impossible to retrieve any detail in these areas.

The ETTR or expose to the right method is born from the theory that as CMOS (or CCD) imaging sensors are linear analogue devices unlike photographic emulsion which has a logarithmic response to changes in light intensity.

Most state of art imaging sensors and subsequent signal processing software result in a dynamic range of anywhere between 8 stops in compact type cameras to 12 or 13 stops in full frame sensors.

Data from the analogue to digital convertor which converts the effective light intensity captured by each pixel of the imaging sensor is essentially linear.

However, our eyes aren't capable of processing linear data smoothly as they are essentially logarithmic devices.

This means that a doubling of analogue value, or its equivalent digital value, doesn't give an equivalent doubling of brightness seen in the image.

This is where we have to apply some form of tone curve to correct this.

It can be done if you are shooting and creating a RAW file and then subsequently using a RAW conversion program to turn the data into brightness values or via the JPEG processing engine within the camera which will then apply any tone curves derived from photo styles, scene types or filters etc.

The analogue to digital converter in the camera usually converts the input analogue voltage from the photodiode into a digital value represented as a 16-bit word, however not all 16 bits are used – normally 12 or 14 bits are.

14 bits gives us the capability of recording 8192 discrete brightness values in each colour channel. If we now, consider a full frame sensor with a wide dynamic range of about 12 EV units (f-stops).

The brightest tones (the highest output voltage) are digitized with 8192 values
The next brightest tone has 4096 values

Each successive f stop contains just half of the preceding steps tonal values.

So summarised this would be;

Brightest image pixel	8192 values	ev12
Next brightest	4096 values	ev11
Next brightest	2048 values	ev10
Next brightest	1024 values	ev9
Next brightest	512 values	ev8
Next brightest	256 values	ev7
Next brightest	128 values	ev6
Next brightest	64 values	ev5
Next brightest	32 values	ev4
Next brightest	16 values	ev3
Next brightest	8 values	ev2
Darkest image pixel	4 values	ev1

Total 16384 discrete levels for each pixel ranging from black to white, however when the image is processed to JPEG the range will become 256 discrete levels for each colour!

To explain why the shadow or darkest areas exhibit more noise we have to consider the ratio of the signal values to the noise floor (noise that is always present – background electronic noise).

With the large data values, the ratio is very high but represents a significant part of the lower value f-stops.

Okay, but what does that imply for images which have low brightness levels.

If we allow the camera to record all the image data into the darkest f-stop conversion region we are using a very low signal to noise ratio and the resulting image will show more of the random image sensor noise (shot or photon noise).

If we adjusted the exposure so that the image data moved further to the right, then the signal to noise ratio becomes higher and the visible noise lower.

At this point it is worth stressing that we are concerned here with RAW data, not the resulting image from JPEG processing within the camera.



As an example, on the next page are two images shot in extremely low light, camera ISO was set to ISO 6400, F3.2 with 0.4 and 0.8 seconds.

The first image is the exposure as suggested by the camera and the second image is where I pushed the exposure to the right until the brightest whites just started to show the highlight clipping warning.



Camera: Panasonic Lumix FZ1000 RAW mode.

There may be a very slight reduction in noise from the second image which had the EV slider reduced by 1EV in Adobe Light room (no other processing to either image).

In conclusion this method can only be applied to a limited number of images, those with very low contrast, as the process of shifting the exposure towards the highlights becomes perilously close to the highlights becoming blown out which, in my opinion, is worse than some additional noise from a correctly exposed image.

Exposure compensation

Exposure compensation is a term applied to either increasing (plus) or decreasing (minus) of the normal exposure to suit the subject's condition or the desire of the photographer to purposely change the resulting image.

As I have stated previously the camera's metering system is not infallible and sometimes produces results which do not represent what the normal exposure should produce. As a result, exposure compensation is needed to correct for this.

Exposure compensation is usually set by the camera EV values, sometimes marked as +/- and offer a range of adjustment of plus or minus 3 EV or plus or minus 5 EV units.

Each EV unit is the equivalence of 1 full f-stop or doubling or halving the shutter speed value.

As an example a scene with a solid white colour (as in snow scenes) the extreme reflectance of this type of subject causes the metering system to underexpose the image leaving it dark and grey.

Similarly, a scene in which there is a lot of black (as with a black cat against a dark background), the very low reflectance of the scene will cause the metering system to overexpose the image.

In the first example the situation would be improved by dialling in about one and a third ($4/3$) to 2EV positive EV compensation and in the second dialling in about one and a third ($4/3$) negative exposure compensation.



An example where -EV is needed – when the background is darker than the foreground

Auto bracketing

There is usually a convenient feature found within the camera operating modes which allows the camera to make a series of exposures (usually three to five), each at a predefined increment from each other.

This is an invaluable feature when faced with a tricky lighting situation or one of those "once in a lifetime" situation where some photographic record of the event is needed.

In addition to the camera incrementing the exposure from each shot to the next, the order in which it does this may also be specified. Normally the sequence gives Normal, Under and then Over exposed image sets, however, it can be changed to the more familiar under, normal, over exposed sequence if so required.

REVIEWS

I have reviewed three products over the last month and they have been uploaded to YouTube.



FeiyuTech Vimble 2S Review

The Vimble 2S is a three axis gimbal designed for smartphones.



HOLLYLAND MARS X REVIEW

The Hollyland Mars X is a HDMI Video Wireless transmitter for smartphones and tablets.

FeiyuTech Vimble 2A Review



The Vimble 2A is a three axis gimbal designed for action cameras.

Projects for Photographers

If you have followed my blog for any period of time you will have learned that I love to “mess around” with ideas to help with my photography.

Usually most end up in the scrap bin however a few do make it to a workable project and I detail one here which I find is a very useful gadget and easy to build.

Lithium-ion Battery charge indicator

This project was conceived after I inadvertently went out on a shoot for a video tutorial with three batteries which were almost fully discharged (should have been recharged and put back in the storage bin). I know that this is due to my poor organisation but the finished project does help to ensure that I always use fully charged batteries when I go out. It also has possibilities that I will expand upon for later newsletters.



The unit is a standard USB powered battery charger for the BLC12E lithium ion batteries used by most of the Panasonic Lumix bridge cameras.

Into which I fitted a 3 digit LED voltmeter (less than £2 on Amazon).

It provides a very quick way of establishing the terminal voltage of the batteries and hence an idea of the charge level.

A fully charged battery will have a voltage of around 8.2-8.3 volts and one that is almost discharged will be in the region of 6.5 volts.

As the voltmeter consumes about 30mA current it provides a slight load which gives a more realistic terminal voltage rather than being measured with a higher impedance voltmeter.

During charging it shows the voltage being supplied to the battery and you can see when the battery is fully charged as the voltage will be close to 8.3 to 8.4 volts.

The project requires minimal tools and the soldering is very basic as only two wires need to be connected.



Start of the modification

The batter charger used: <https://amzn.to/34ljQwG>



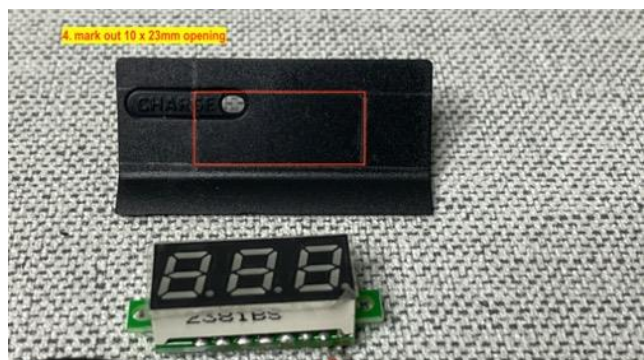
Begin by removing the label to remove the concealed 2 screws beneath it.

Then remove the other two case screws

A small cross point screwdriver is needed.



This is the unit once the screws have been removed.



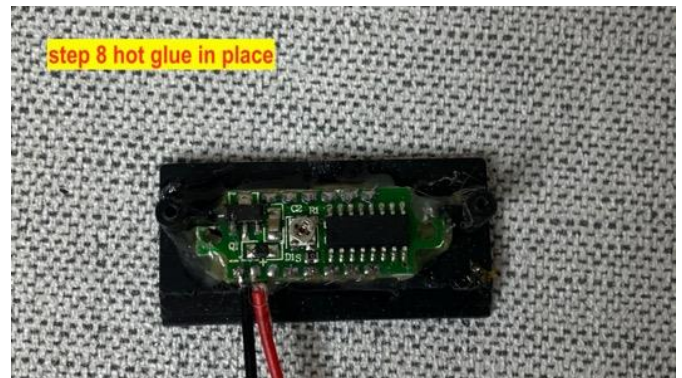
The top cover needs to be marked out for a 10mm x 23mm opening in the position shown.



Before cutting out the hole the LED charge indicator light pipe needs to be removed – use cutters or a sharp craft knife.

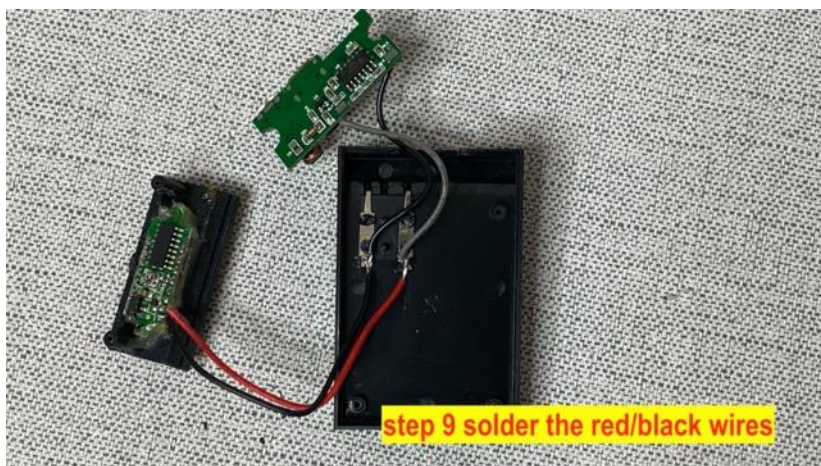


Remove the section by drilling a series of small Holes just inside the cut lines. Then use a craft knife to cut between the holes. Use a small flat file to file the edges to the profile of the hole marking lines.



Check the fit of the display <https://amzn.to/36rSDLy>

and then hot glue in place (push all the way forward)



Solder the red and black wires from the voltmeter panel to the terminals of the unit (black to black, red to grey)

Re-assemble the unit and it is ready to go!



Another example where I glued the voltmeter to the top of the charger rather than cut a hole in it.

It really depends on the style of the charger as to how the voltmeter can be fitted.



Two completed units (one damaged with a heat gun from an earlier project!)

FREE Editing SOFTWARE



Boosting an iPhone sunset over the central pier at Blackpool.

How to get your free copy

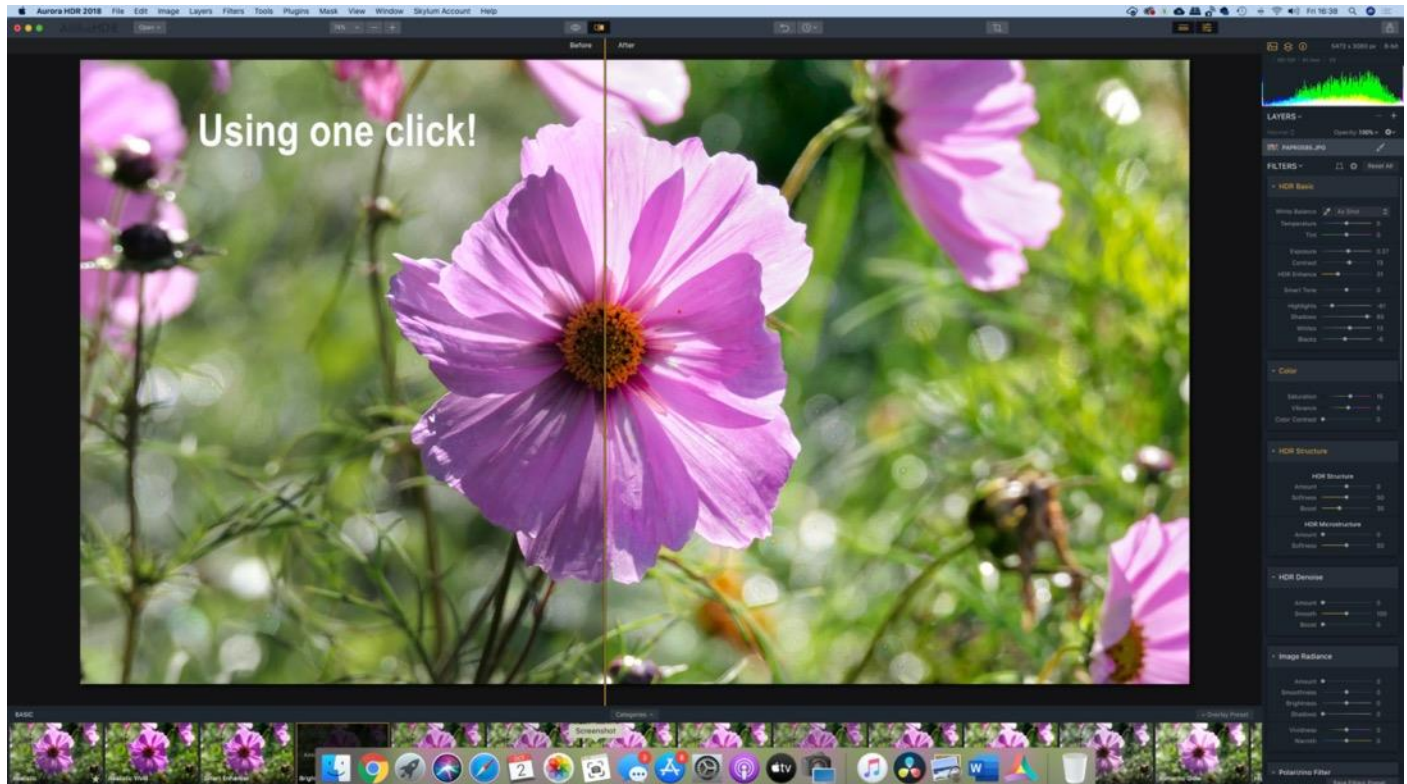
To download Aurora HDR 2018, which originally sold for \$99, simply go along to the special, secure landing page at skylum.com/ap-aurora. The software is available for Mac and PC. *Thanks to Paul Cornes for this suggestion.*

This offer was listed as available until 29 May 2020 (**but it is still available as of publication**). You will need to confirm your email address in order to get a second email with the download links and code. To learn more about this software which can be used with bracketed exposures to create a HDR look or you can create an HDR image from a single image then take a look at <https://skylum.com/aurorahdr>

If you like the 2018 version and want to take advantage of a subsidised 2019 version there is a link to upgrade earlier versions. In the UK the special upgrade is £54 from a retail price of £99.

It can also be used to do standard editing of RAW or JPEG files if you don't want to go for the HDR look.

All of the adjustments can be made to standard images such as denoise, brightness and contrast etc



Just one click of the bright pre-set lifted the shadows of the heavily backlight flower. Before – left & After - right

Here's what Paul said!

This software is in PC and MAC format. Both have an ability to fuse 3 images taken off tripod (wide-angle is best) even if they are not framed identically.

Aurora HDR, like most HDR programmes, works best with RAW images, but in practice will work well with JPEGs especially if you have not got them "over-sharpened, over-contrasted and over-noise-reduced" ! For me this has been a revelation in photography - and has given some of my old compact cameras a new lease of life. Given that many old Lumix models with AEB and the ability to control image settings are now selling in the <£20 range, or are laying idle at the back of cupboards - perhaps you might look at this in one of your next YOU TUBE shows.

With early model Lumix G and GF cameras, the impact of HDR is even greater. For old images taken as single shots, Aurora 2018 also does tone mapping onto single shots. This really works much better with RAW images, but can still be a rapid fix to JPEGs that is worth a try as a way to avoid the slow 10-minutes-a-frame workflow rate of photoshop that could be required as an alternative to rescue blown skies and muddy shadows. Thanks for all the hard work you have been putting in with your work. Very best wishes - Paul in Bristol

In closing!

I just want to say a very big thank you to those of you who make their Amazon purchases through my affiliate links.

The money doesn't amount to much but over time it adds up and it allows me to purchase small items like the battery chargers and voltmeters used in this month's projects page.

Please also remember to click a least one link in the newsletter to keep the subscription alive as I will have to look at removing some of the subscribers who haven't clicked or opened any of the last 6 months newsletters but who subscribed before this period. I have to do this as I have to keep under 2000 subscribers for free use of the mailchimp program. I have two accounts with 2000 members in each.

From my archives and pushed through Aurora HDR 2018



Until next month, stay safe, stay well. **Graham**