Collage produced using Pixlr Smartphone App

Welcome to this edition of the March 2023 newsletter.

There's no doubt at all that in the last few years smartphones have had a huge impact on the compact camera market. The sheer convenience of carrying a slim, lightweight, pocketable multitasking device can't be overstated. But there may be caveats of course, depending on what kind of photographer you are.

If you're a casual snap-shotter using your smart phone simply to record the odd interesting moment or the family outing then chances are you won't be "pixel peeping" the images from your device. However what if you want to enjoy a measure of dedicated photography or videography with your smartphone? In which case smartphone photography may leave you disappointed by the result, highlighting the fact that we do need to set our expectations at an appropriate level!

Setting Expectations – Can a Smartphone Replace a Camera

Mobile phones have tiny imaging sensors.

Today's compact cameras on the other hand generally have sensors which range from the small end (1/1.7") right up to APS-C. Even full frame cameras have diminished in size as they have become mirrorless.

Given the cameras and lenses that I usually carry in my backpack am I going to have to accept that the images coming out of a smartphone would be a step down in many situations.

Small sensors will also mean that shallow depth of field can be hard to achieve without resorting to that "computational blur look". Small sensors also mean visible image noise at higher ISO values.

Smartphone cameras also tend to rely on a main camera and additional cameras covering ultrawide and telephoto focal lengths.

Zooming on a smartphone usually tends to be digital (with an accompanying loss of quality) although one or two smartphones have a 'periscope' zoom lens offering true optical zooming.

The main camera will usually have the largest sensor and the most resolution.

So I decided to research more into what smartphones might be contenders within a sensible budget.

Smartphone Change #1

In February I decided that I wanted to test out Google's smartphones, the Pixel camera, as I had read good reports on their image quality.

I had a couple of older versions of Apple's iPhones so I decided to sell these to partially fund the purchase of a second user Google Pixel 6 Pro.

The actual phone looked good with very little cosmetic marks on it.

I wanted to test out the 3 back and "selfie" cameras as soon as possible as I had 2 days to "change my mind" if the phone was not suitable, for any reason.

The weather was very wet so I had to contend with some indoor testing using my usual test subjects – my 12 inch dolls!

As the phone supports JPEG and RAW (DNG) formats I decided to shoot with the combination of both. I did lots of tests with various lighting levels, subject distances and lens choice and then evaluated the results. I was shocked, and not in a good way!

When I looked at the DNG files some of them were terrible! They looked like very poor JPEG's with lots of artefacts and moiré.

Looking at the size of them they ranged from 12MB all the way down to 2 MB

Display P3 – 16 bit – 698 x 934 (0.7MP) – 300 ppi
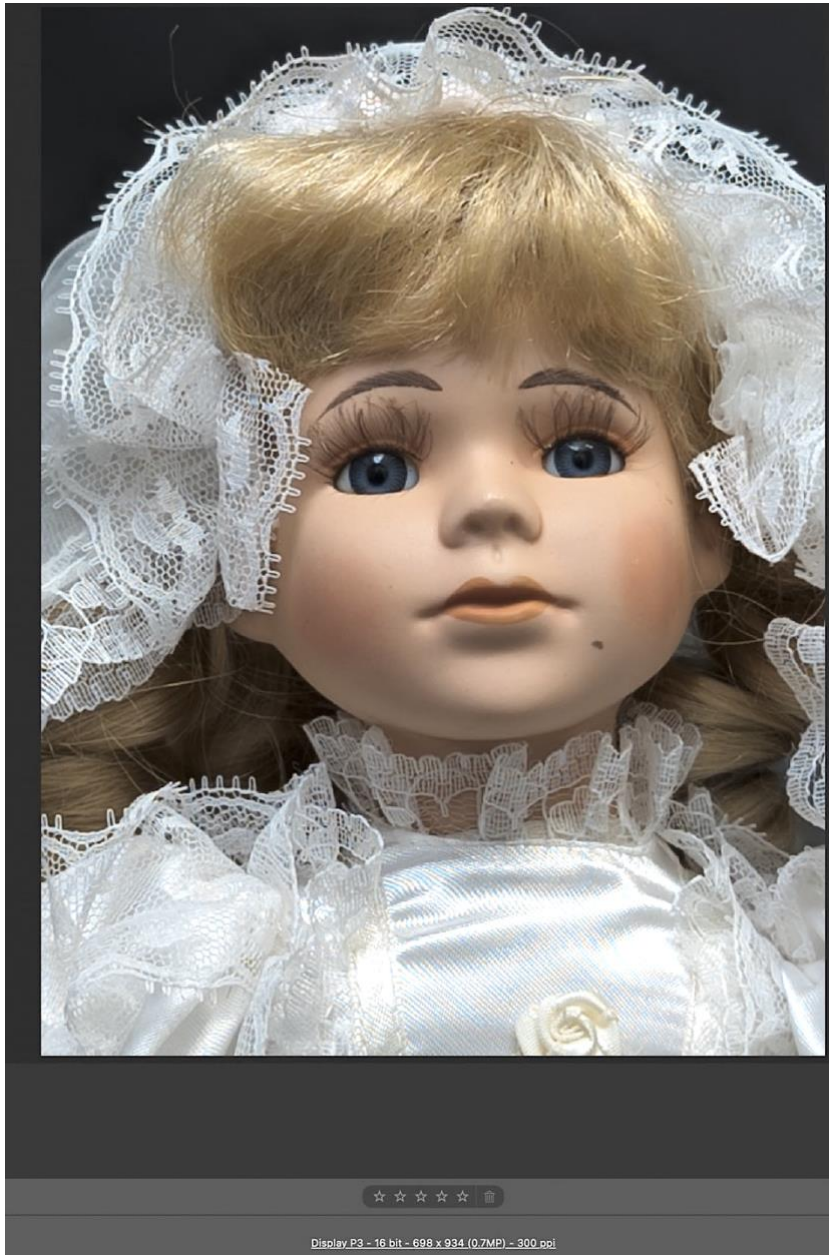
The image above was taken with the x4 zoom setting and you can see that the actual file recorded was only 698 x 934 pixels (0.7MP). OK for screen display but nothing else! Some of the x1 lens were also only 5MB in size and only half the full sensor resolution. Now I always assumed that a RAW file would always be the full sensor resolution so what was happening with the Pixel 6 Pro camera?

The Pixel 6 Pro has 3 lenses: 2.35mm, 6.88mm, and 19mm.

The user can apply a zoom ranging from .7x to 20x.

The camera then:

(1) decides which of the 3 lenses to use,

(2) digitally crops the image to somewhere between 12.5MP and .5MP, and

(3) uses software to resize the final jpeg back to 12.5MP.

This is normal for jpegs, but what I expected is that the raw file would always contain all the data from which ever sensor was used. No cropping. No compression. If any digital zoom was applied, either by the photographer or by the camera software, the raw file would not be affected. The jpeg matches what's on the camera screen. BUT the raw file matches whatever hits the sensor.

For some reason, the Google engineers have decided to do something different. The RAW file only contains the information that the cropped jpeg shows. It matches whatever was on the camera screen when the shot is taken.

What does this mean? An un cropped photo taken on any of the lens produces a roughly 12MP raw file that's about 11MB in size. But if you zoom, say choosing the 2x, the raw file is now 4x smaller: only the information from the zoomed sensor area shot is included. So you get a 3MP file that's under 3MB.

OK it's a 50MP sensor and we know it's down sampled by x4 giving a 12MP equivalent but we should still get 11MB of image data.

Where this is especially maddening is if you choose 4x zoom. The user has no control over whether that setting uses the 19mm lens, or the 6.88mm lens with a 4x crop. If the latter, the raw file is .7MP and less than 1MB; effectively useless.

Light level also played a part in which lens was used. If you chose x4 lens in poor light the camera would select the x1 lens and crop it to the same magnification as the x1 lens is F1.9 where the x4 is F3.5 so the image would contain more noise due to increased ISO.

On screen there is no indication as to what lens is actually used or what file size is going to be produced.

To add to the problems I noticed that a lot of the x4 lens shots showed some motion blur – yet the phone was mounted on my sturdy studio tripod and all the shots taken with the 3 second timer.

I noticed that the screen was pulsing up and down – presumably due to the optical image stabilisation and this was continuing during the exposure as the blur depended upon the shutter speed. The longer the exposure the more the blur was obvious.

It was at this point I decided to invoke the option to return the phone and get a credit. (The policy of CEX in the UK).

Smartphone Change #2

After a little more experimentation before I returned the Pixel 6 Pro I discovered some of the reasons for the reduced DNG file sizes but the OIS shake was too much to tolerate and hence the return.

Looking over the specs of the newer version, Pixel 7 Pro, it seems that the lens configuration has changed and the telephoto lens now supports x5 optical zoom so I decided to take a chance and purchased one which was second user however the box contents were unopened so it looked brand new with no marks anywhere.

Pixel 7 Pro x5 lens DNG

So here is an Adobe Lightroom processed DNG image from the Pixel 7 Pro.

It is the full 13MB file, as you would expect, which shows very good rendering of the hair on the doll and good detail in the eyelashes.

After dozens of test images at different distances, light levels and lens used I have managed to get a fairly comprehensive understanding of why the DNG files are sometimes not the full size and why sometimes the expected lens zoom is achieved by digital zoom applied to the x1 lens.

Even the out of camera JPEG's look very good with less aggressive sharpening than I saw with the Pixel 6 Pro.

I will be doing some outdoor testing with some video test files and by the time this newsletter reaches you there should be a YouTube video documenting what I have discovered.

Main, ultra-wide and periscope tele cameras

Ok, can these cameras deliver the quality of images that I would expect from them?

X1 main lens RAW file processed with Adobe Lightroom.

400% crop from the image above

X1 main lens RAW file processed with Adobe Lightroom.

400% crop from the image above

The main (x1) camera is a 50-megapixel 1/1.31 sensor, featuring 1.2-micron pixels, omnidirectional phase-detection autofocus, laser autofocus, and Optical image stabilisation. The lens has a 26mm equivalent wide angle field of view with a F1.9 aperture. The 50MP are quad pixel "binned" where 4 pixels are combined to give the equivalent of a larger pixel to gather more light and hence the effective resolution is just 12MP. This is the same with the new 200MP Samsung sensors which use 16x binning to again end up with a 12MP sensor equivalent. I'm not sure about the way that these sensors actually work as whether they use the binned pixels for colour data and use the higher resolution for the luminance (black and white data) to end up with an image having higher resolution but les noise.
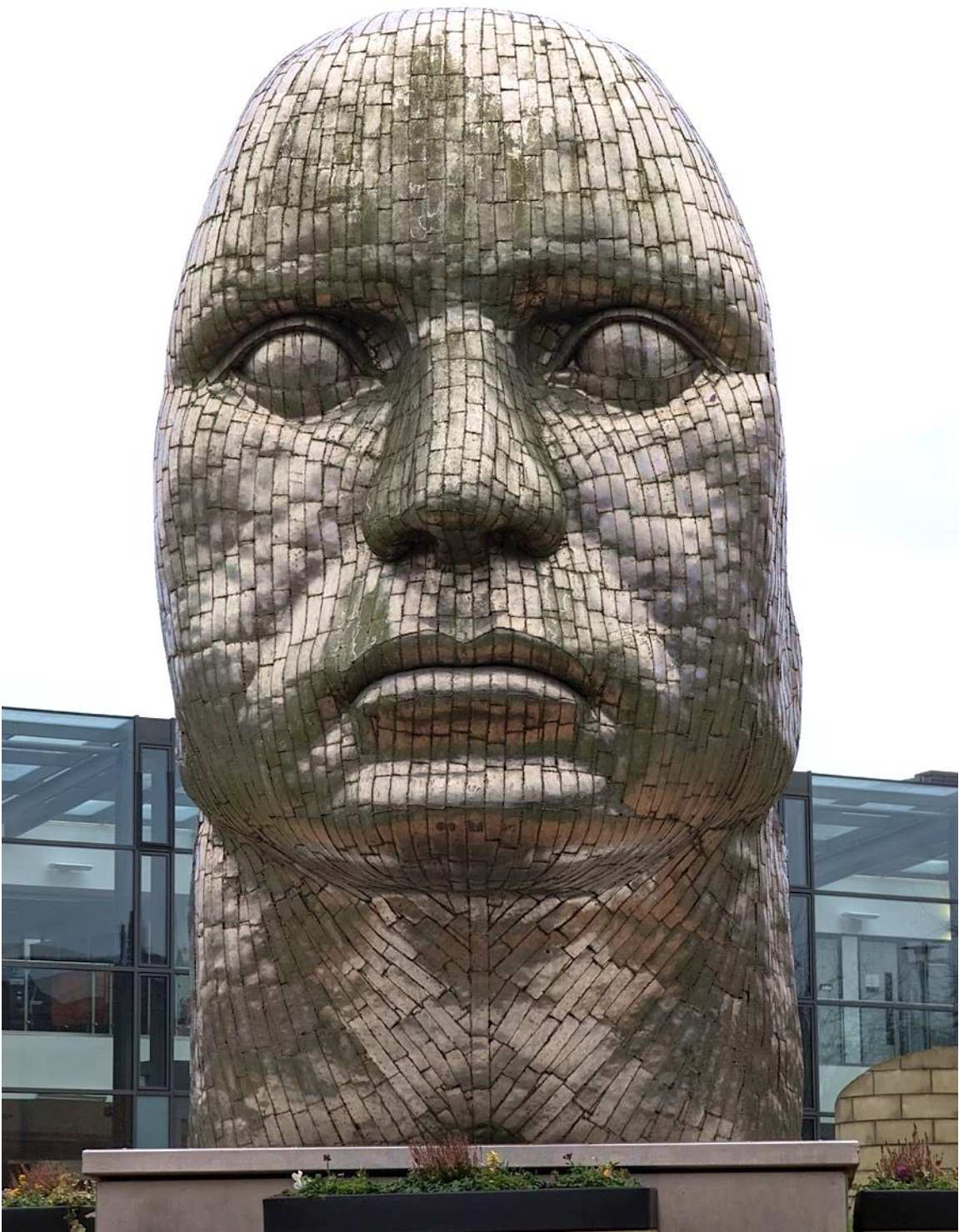
X1 main lens RAW file processed with Adobe Lightroom.

0.5X ultra-wide angle lens (JPEG)

400% crop from the image above

X5 telephoto lens (JPEG) from the same position as previous images

The x5 lens is a "periscope" type camera to achieve the lens to sensor distance required for this type of lens configuration.

It is increased from the x4 lens of the previous Pixel 6 pro camera lens.

X1 lens used in portrait mode to add some background blur

X1 lens used in portrait mode to add some background blur

5 x 7 inch prints

Looking at the enlarged screen views, even from RAW (DNG) files the finer image details are still aggressively sharpened by the AI processing even of the DNG files. Google use the data from 2 lenses, in some situations, to achieve a composite image with more detail.

The night shot mode captures multiple images and make a composite.

This image was taken with hand held night shot mode – I could not see in the room!

I think the final image says it all about Wigan!

So what comes next?
Do I decide to reduce my ever growing camera collection to just the Fuji XT-4 and the 75-300mm lens or the GH5 mk2 and keep my Olympus Pro lenses or the Canon EOS M6 mk2 and my Canon lenses?

I'd be unhappy to part with any one of them but seriously I don't need this extensive collection anymore as my needs have changed both photographically and in my ability to carry a heavy backpack.

Maybe I look at Samsung's new Galaxy S23 Ultra as I am seriously impressed with my S22 Ultra.

The Sony Xperia Pro is a very attractive beast with its ability to act as a field monitor as well as a smartphone. It's expensive but with trade ins that is a definite possibility.

A beautiful sunset captured with the Google Pixel Nightsight mode.

[Link to Intro Video](#)

Several requests to provide some "dumbed down" tutorials on how to capture decent images and video with the FZ80/82 camera has prompted me to spend a little time and try to provide a series of videos with the aim of achieving this.

A landscape shot with the Panasonic Lumix FZ80/82

Long telephoto shot with the Panasonic Lumix FZ80/82

Wildlife shot with the Panasonic Lumix FZ80/82

This extremely popular camera does require a degree of understanding to produce consistent and repeatable results.

Sometimes the results can be outstanding and on the next outing the results look terrible. The key is understanding why the change in image quality has occurred. Overlooked contributory factors can be atmospheric, hot and sunny days can wreck distant long telephoto captures.

Slow shutter speeds with long zoom setting are more of an issue than most people understand as well as the need to keep away from digital zoom in the set up.

I am hoping to build the series starting with fully automatic modes and how you can tame the camera settings to overcome some of the associated problems using this mode.

A lot will depend on viewer feedback and my own ability to try and put over some complex topics in an easy to understand format. If anyone has any suggestions I am really open to receiving them mailto:support@grahamhoughton.com?subject=Ideas for FZ80/82 Beginners Tutorials

Telephoto shots Panasonic Lumix FZ80/82 iA mode.

I maintain that every image from a digital camera can benefit from some post processing. Take a look at this out of camera JPEG file from a trip to Edinburgh a couple of years ago. A dull day producing a very low contrast image.

Compare that to this same image adjusting contrast and saturation

It looks much better as the extra contrast brings out more apparent details in the buildings.

Again an image captured in very overcast lighting can be processed with increased contrast, saturation and a little warmth added into the image.

Of course other parameters can be changed like adding some slight sharpening or using some denoise program to clean up any high ISO jpeg noise from the images.

The heron was captured at ISO 1000 on the Panasonic Lumix FZ80/82 at 600mm EFL

With added contrast and slight sharpening followed by denoise with Topaz Denoise iA
The image takes on a new look.

Unprocessed file from Panasonic FZ80/82   *Processed file.*

On one or our dining room walls we have a mirror with diamond shaped bevels.
I noticed that when the sun was shining that at a certain time of day the light refracted by theses bevels projected several feet across the room and made an image on the opposite wall. I don't think that I have seen such a clean separation of the ROYGBIV colour streaks before. The iPhone 13 hasn't captured the orange and blue correctly as the blue looks cyan and the orange looks more red than I observed. The image only lasted for a few minutes as the sun changed position. If it appears again I'll test it with other cameras to see how they respond. You can image what the early physicists must have thought when they first observed this phenomena!
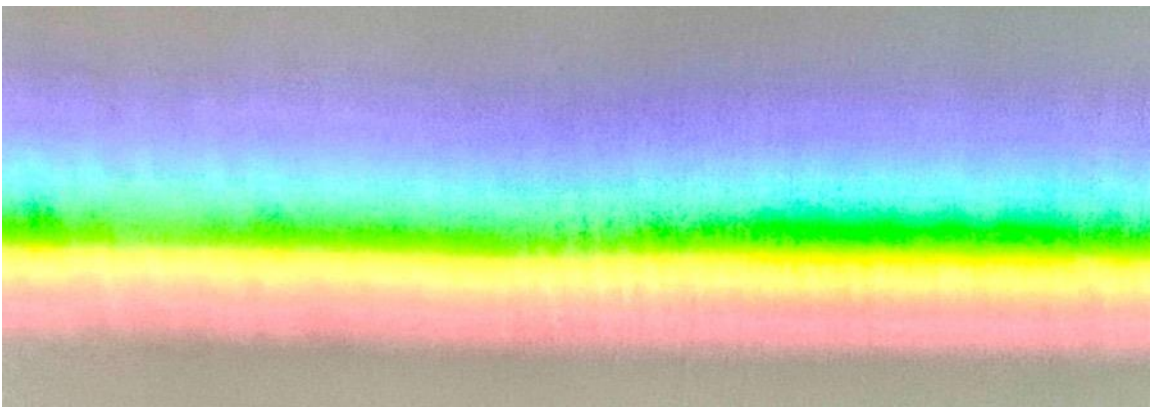
Another Smartphone!

Yes I was tempted by the early adopter pre-order discount on the Samsung Galaxy S23 Ultra. I took delivery on Friday 17th February, fitted a screen protector and bumper case and went out to test the cameras.

Unfortunately it was another damp and dreary day and by the time I went out the light was fading quickly.

So on the Saturday I took the phone and captured a few shots around Wigan whilst my wife did some shopping.

I also did my usual studio tests just to see how it performed against the S22 Ultra and the Pixel 7 Pro.

X3 Telephoto shot from the S23 Ultra

For the Expert Raw mode Samsung have now turned to Adobe Lightroom to process the DNG files.

I'll have to "tune" the display brightness as it made the images look under exposed and using EV compensation caused the images to be over exposed so I started to rely on what the camera histogram was showing rather than the screen display. With "adaptive" brightness or many levels to play with I will have to see which gives the most consistent results both indoors and outdoors. I can't say I had the problem with the S22 Ultra.

X10 telephoto shot from the S23 Ultra.

X1 Portrait mode on the S23 Ultra

X3 Portrait mode S23 Ultra

So far the results are encouraging and there is still a lot of testing to complete before I have a definitive answer on which is the best smartphone for me.
For this kind of use and simple web illustrations actually any of the modern smartphones will fit the bill perfectly.

S23 Ultra x3 telephoto shot.

S23 Ultra x10 telephoto shot

My latest video for the Panasonic Lumix FZ80/82 part 3: Aperture & Shutter Priority Modes
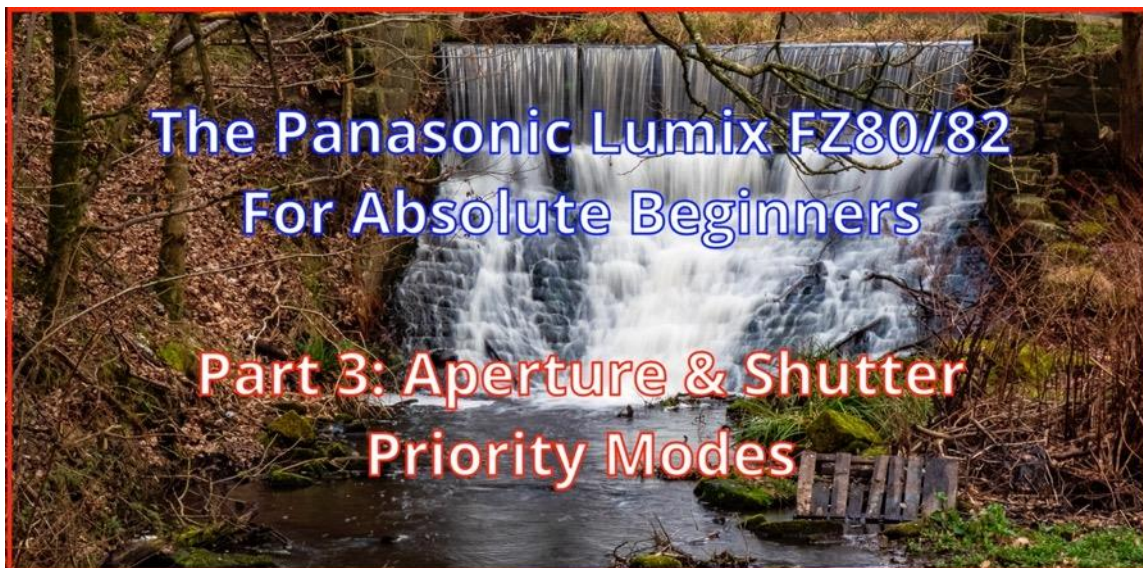
In this video I take a look at the use of Aperture & Shutter Priority modes and why Shutter Priority is the best choice for this camera. Showing the use of a wide angle lens hood to both protect the lens and also to act as a shade in bright lights and shooting towards them.

Link to YouTube Video

Lighting Small Things

Lighting small objects is subject to the same general needs as any other object. Generally we want to show its shape, its form and its texture.

This means carefully using both key and accent lighting to develop the image as we see fit.

The biggest problem is trying to scale down the light sources to match the subject.

In this instance, it wasn't really an issue, as small LED light panels are quite possibly the ideal size for these models, although the smallest models may have an issue.

I use the pocket 4 x 6 inch panels for these smaller models and a 10 inch square panel for other desktop shots.

A bare LED panel will still give a low contrast (soft) light on a small item, due to the relative size of the source in relation to the model.

To create a harder light, you could do one of two things.

Either move the LED light panel further away.

Although this means it's more difficult to control exactly where the light affects the model, and is likely to just flood the scene.

Or you can mask off the front of the LED light panel, creating a small aperture for the light to come through. Black tape is ideal for this.

The above image was lit with just one diffused LED light panel suspended above the model.

This was my attempt to emulate the very large panels used by real car photographers in large studio backdrops. Techniques like using white boards to add accent lines can be used and black card can be used to force darker areas.
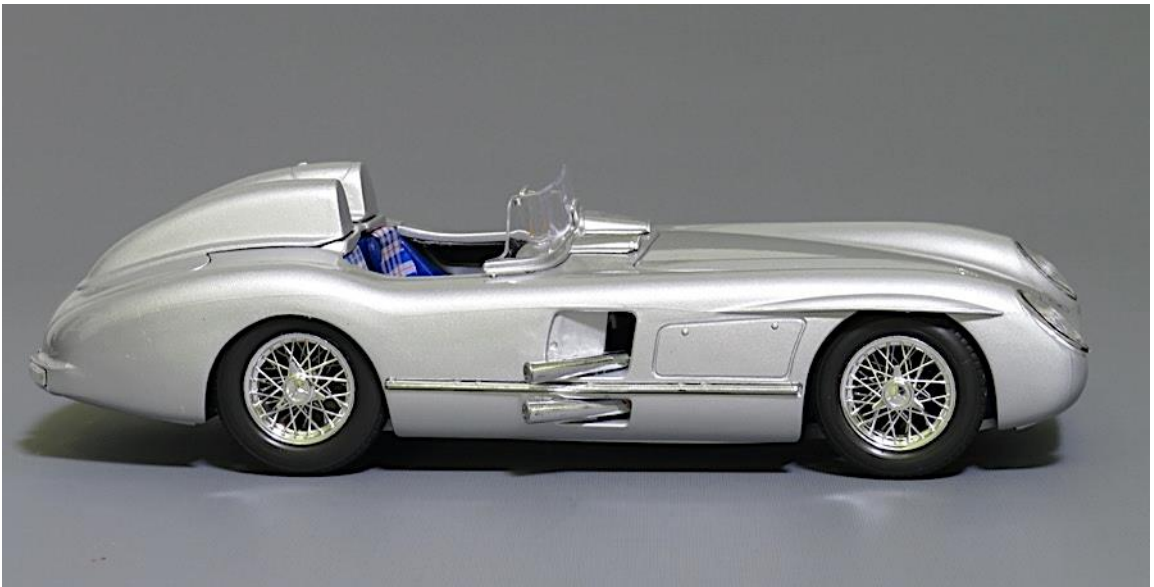
Moving the panel higher causes the light to become harder and produce more defined shadows.

A white card was used to bounce light back onto the side of the car to fill some of the shadows created.
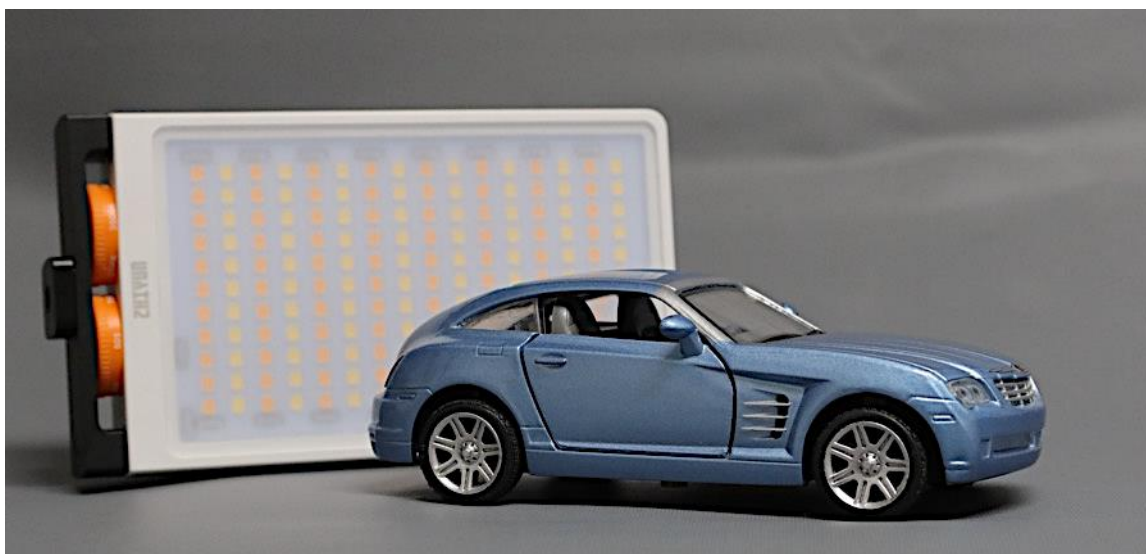

Image showing the size of LED panel compared to the model.

The LED panel was held approximately 150mm (6 inch) above the model at ½ power 1/200 sec, F8 ISO 200 using the Canon G7X mk3 in macro mode.

The background was just a roll of grey paper to form an "infinity curve"

Affinity Photo 2 Beta
If you have purchased Serif's Affinity Photo2 then you may have had an email inviting you to participate in the new 2.1 upgrade Beta trial. I've downloaded and installed the program which runs in parallel with your existing 2.0 program.
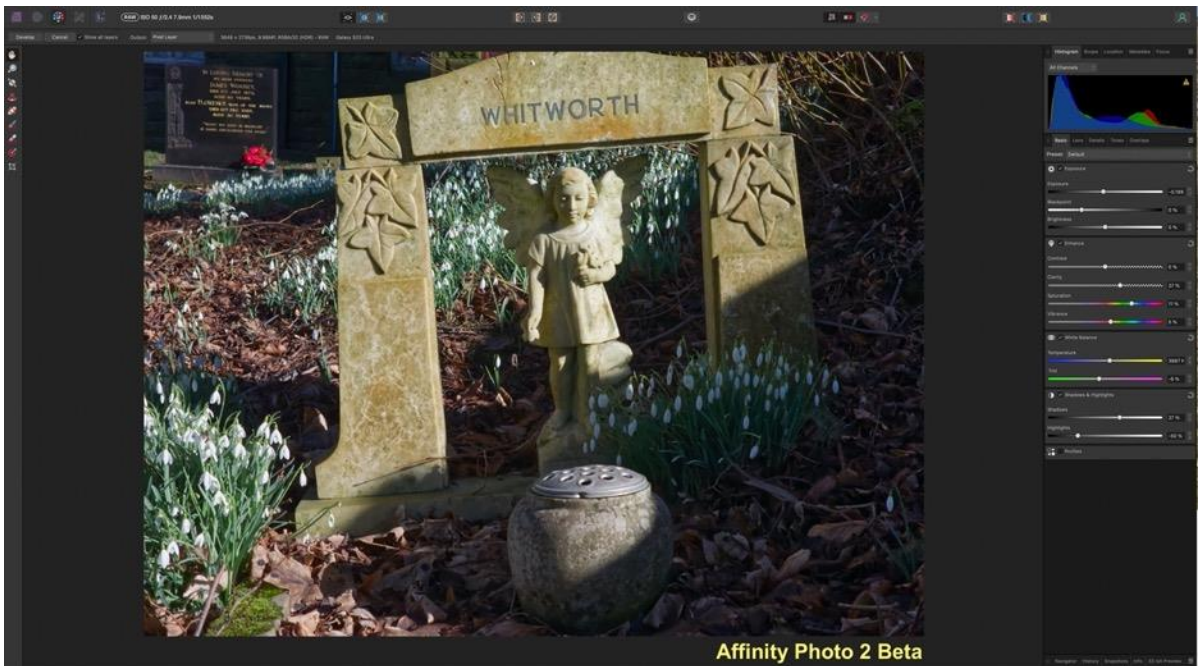
A screen grab of the 2.1 Beta program

There are a number of minor bug fixes and improvements in this Beta version however it still looks and feels like the 2.0 version.

I've been testing this since I purchased it last November as an alternative to my Adobe CC subscription in which I use Lightroom and Photoshop.

It has grown up into quite an impressive program supporting focus stacking, HDR and panorama generation.
It isn't as fully featured yet as the Adobe programs, or maybe I haven't got to grips with the new layouts and operation.

As yet there is no camera profiles for Panasonic cameras such as the bridge camera range and as yet no profiles for the more recent smartphones.
There is no "auto" mode to get you somewhere near with your basic RAW file conversions so it does take considerably more time than in Lightroom for example.
Some of the program features actually work better than Adobe so I'm trying to find a middle ground of acceptable changes versus what I already know and understand and can quickly get out an edit to any file that I want to edit.

Even the latest smartphones like the Galaxy S23 Ultra and the Google Pixel 7 Pro are supported in the RAW file editing of Lightroom and Photoshop.
I wish that the serif programs supported this.
The two images, next page, were produced in Lightroom and Affinity Photo 2.1 Beta form the Samsung Galaxy s23 Ultra smartphone x3 lens. Apart from my edit being slightly warmer on the Lightroom image there is nothing between them

Lightroom (top) Affinity Photo 2.1 (lower)

I printed out a few of the Samsung Galaxy S23 Ultra images to A4 size (roughly 10x8 inches) and they look very acceptable even considering that the printer used is only a 3 colour ink printer and not exactly photo quality.

Nevertheless the detail is there in the prints so I have no doubt that prints made with a proper photorealistic printer or from a commercial photo lab would be excellent quality.

Now I've satisfied myself that the image quality for photos is probably good enough for a lot of my imaging needs I will begin to test out the video capabilities of the Google Pixel 7 Pro and the Samsung Galaxy S23 Ultra.

I have been using the iPhone 13 pro for the whole of the latest video tutorials and it seems to be able to produce good enough video shooting at 4K 30p and used on a 1080 30P timeline for YouTube.

Audio has been recorded using a mixture of Rode Wireless Go II and the smaller IOS compatible lavalier mics

The Panasonic Lumix FZ80/82 Shutter Count Determination

From a response for information about the FZ80/82 service manual I got a response from a newsletter reader, Frank Canha, and here is the way to determine the shutter count.

Select P mode;

Press and hold simultaneously the AF/AE LOCK, DISPLAY and RIGHT ARROW (WB) buttons, while turning the camera ON;

Now, press and hold the AF/AE LOCK button together with the MENU/SET and LEFT ARROW buttons;

Repeat the last step, hold the AF/AE LOCK button, while pressing the MENU/SET and LEFT ARROW buttons.

Write down the number next to PWRCNT. This is how many times the camera has been powered up;

Write down the number next to SHTCNT. This is the shutter activation count;
Write down the number next to STBCNT. This is the number of times the flash has fired;

Switch the camera off to revert back to normal operating mode.

Well I think that's about it for this extended version of the newsletter so until next time take care, stay safe.

Graham