

## Newsletter for Week Ending January 25<sup>th</sup> 2020

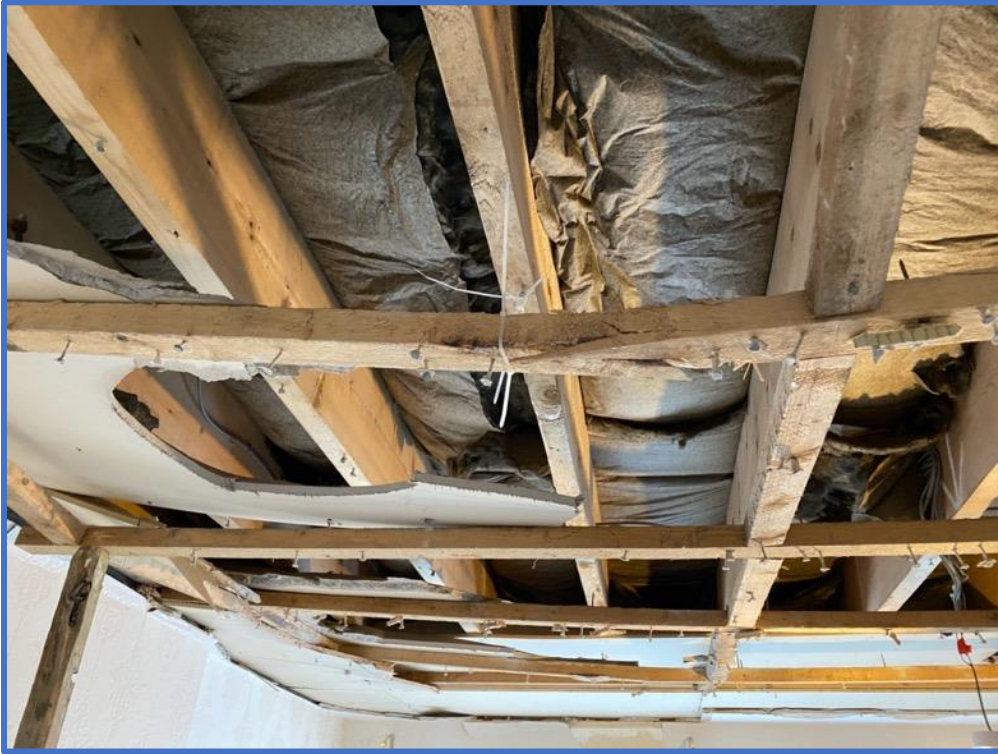
Welcome to the first newsletter of 2020 and I hope everyone had a great time over the festive season and that you welcomed in the New Year with renewed determinations and acceptance of life's challenges. I'm sorry that the planned delivery of this newsletter is a week late but I had to go to Scotland to my step-mother-in-law's house where here ceiling had started to collapse.

The house was built some 45 years ago and is a "four in a block" construction. This is essentially 4 houses separated by fire-resistant walls and ceiling. The fireproofing those days was apparently three layers of plasterboard and a 4 inch layer of sand to give a 1 hour fire rating.

On arrival it was obvious that something had failed as massive cracks had appeared across the whole width of the ceiling.



The insurance people came out to make assessment but without a cause like water or fire than they classed this as "wear and tear" and said that they were not responsible for the repairs, only the damage caused to any carpets or furniture under the contents part of the insurance.

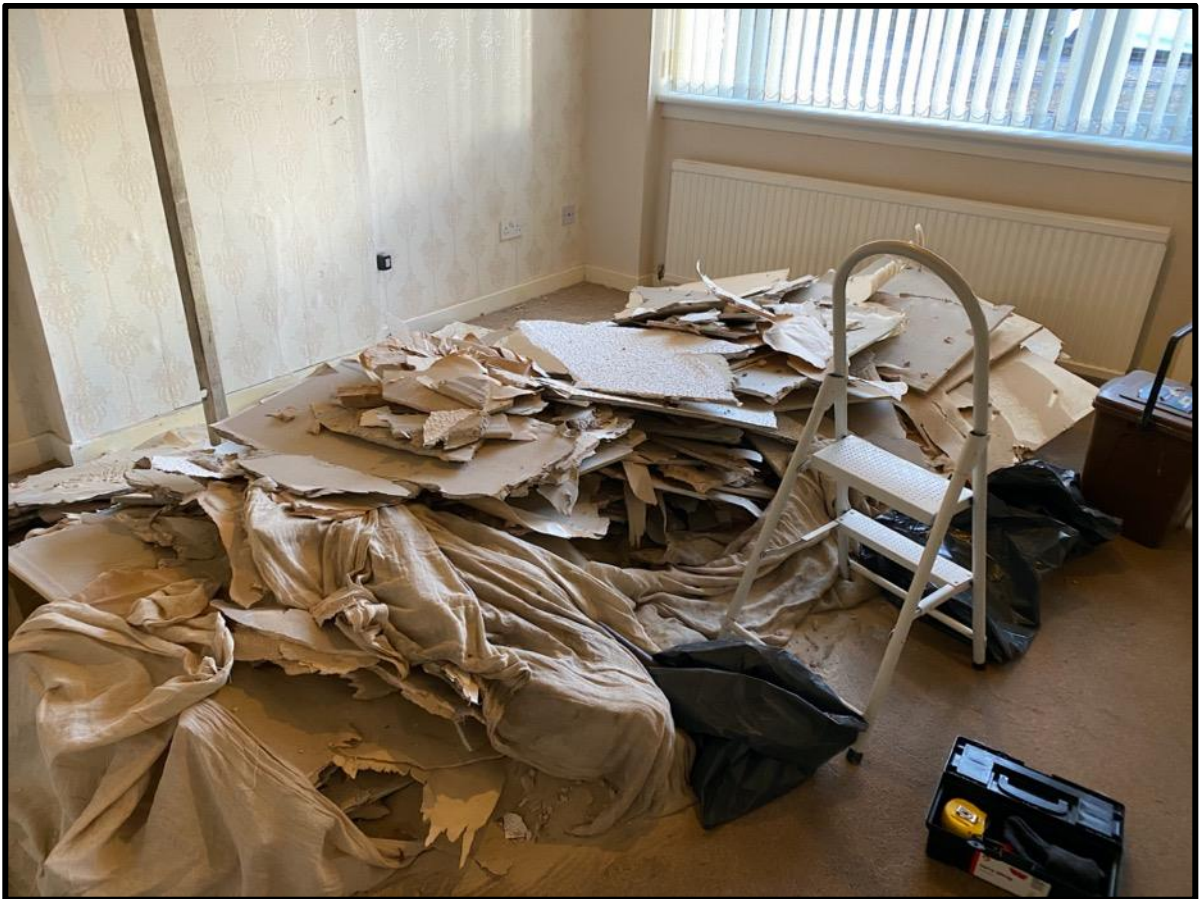


When taking down the ceiling it was obvious why the ceiling had failed. One of the supporting timber joists had a very large knot in it and that piece of timber was not nailed to the main joist above it. With the tremendous weight of the sand above it as the years passed and the timber began to dry the ceiling began to fall at this point.



The sand over the top surface of the 3 layers of plasterboard.

We removed 83 bags of sand in total from the whole of the ceiling, having to take it section by section.



It took 2 days to complete the removal of the old ceiling and remove all the clout nails from the joists ready for the builders to come in and re-install a new ceiling to today's fire/sound-proofing regs for Scotland.

It takes some believing that this sort of damage is not covered by any insurance company. Accidental damage, fire or water is covered but failures due to wear and tear are not. I sent all my images to the insurance company, although sympathetic still would not consider the claim – only for a new carpet damaged by all the sand that had ingressed into it.

The new ceiling has now been installed and plastered.

The walls now need to be stripped and redecorated but I'm getting someone to go in and do that.

I was totally wrecked after the physical efforts needed to bag and lift the bags of sand down to the 4 Cubic yard skip outside.

My wife did a great job of tidying up after all the old plasterboard etc had been removed.

## A New Year

Last year I made some ambitious resolutions and failed to achieve hardly any of them! So this year I'm not setting any targets for myself. Instead I will attempt to achieve more of a productive output in terms of video tutorials and eBooks.

I'm very pleased with the way the subscriber count is slowly increasing on YouTube and the number of people registering for this newsletter is also increasing. Please like and share my videos and please subscribe if you have not already done so!

You may have seen in one of my last videos in 2019 a warning about using the USB power banks and step up dc/dc convertors to raise the 5v USB output to 8.4volts needed by the majority of cameras.

If you are recording video and the USB internal battery protection circuit cuts in to prevent damage to the lithium-ion cell thus cutting off the load voltage you may find that the video file being recorded is corrupted.

In a worst case scenario (as happened to me) the power bank battery recovered and the output started again.

The camera powered up again and then depleted the USB battery more thus causing the protection circuit to operate again.

This happened several times with the frequency of shutdown/start up increasing until at some point the camera main pcb power supply failed causing extensive damage to the camera!

So the point learned here was to keep a watchful eye on the charge level indicator of the power bank and when it reaches 25% consider changing it out at that point.

Having considered some alternatives to the USB power bank & DC/DC convertor I have now developed a new circuit to utilise the latest electronic development using the USB-C Power Delivery methods.

The Battery banks employing USC PD have a much higher efficiency than using an external DC/DC convertor and this seemed a great solution to this problem.

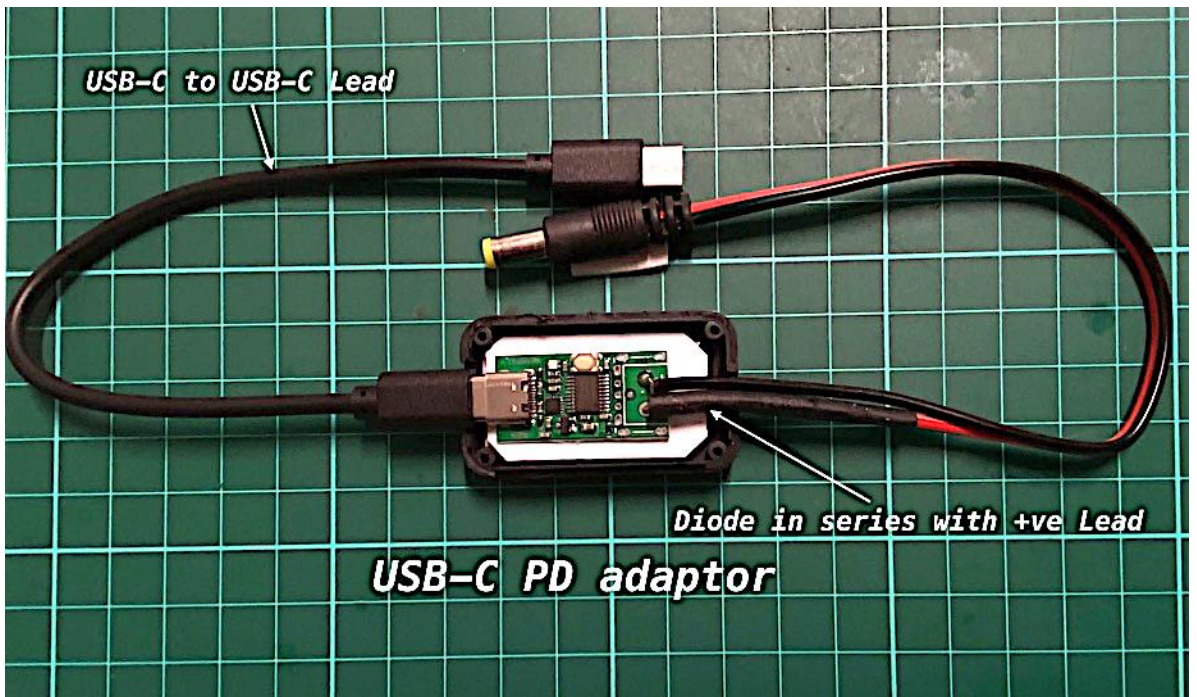
## USB-C Power Delivery Camera Adaptor Power Supply



This is the basic module that I purchased from Ebay But it is available on Amazon.com <https://amzn.to/34VFkPk> This module can negotiate 5v, 9v, 12v, 15 or 20v from the PD host device

The LED colour to voltage equivalences:  
Red 5V, Yellow 8-10V, Green 11-13V, Cyan 14-16V, Blue 18-20V.

By using this module and inserting a silicon diode in the output +VE lead the 9v is dropped to 8.4v that meets the camera input specification.



Here I have mounted the PCB into a small plastic box. I filed the slot in the plastic case to allow the USB-C plug to fit the USB port on the board.

In series with the +VE lead I soldered a 1N5817 (3amp diode) to provide a 0.6v dc drop to bring the voltage down to 8.4V

The lead is terminated with the correct barrel plug for the dummy battery used or can be the standard 5.5mm x 2.1mm and then adapted to suit.

The ZY12PDN is programmed to negotiate the 9V by first of all holding down the small push button whilst inserting the USB-C lead connected to a USB-C PD source.

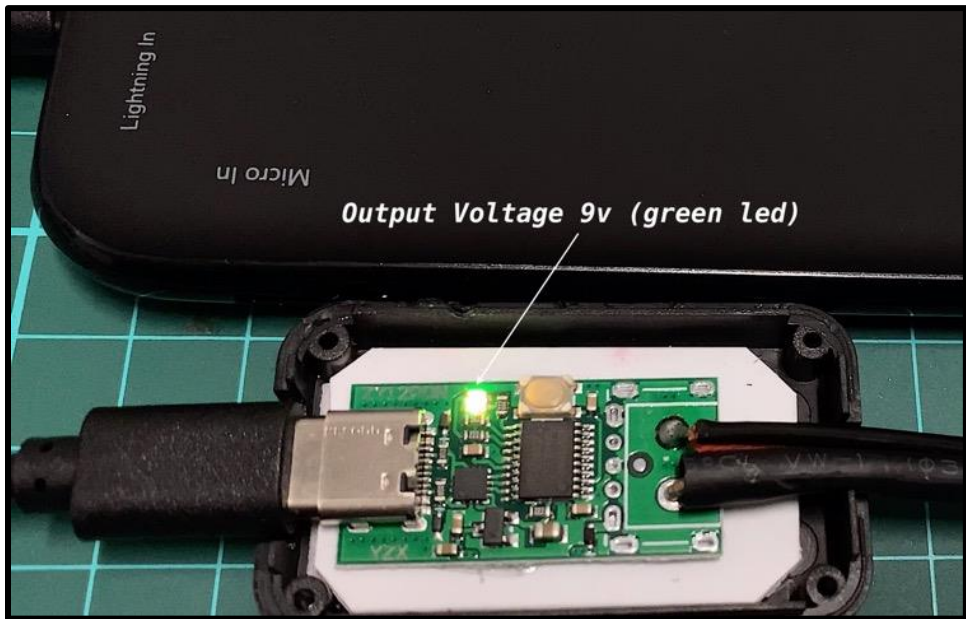
The LED will flash multicoloured for a couple of seconds. Then you can set the 9V by pushing the button to go to the green LED coloured indication which is 9V. Red is 5V.

Once this is set to program the voltage press and hold the button until the LED goes out. Disconnect the lead from the USB-C PD source and then reconnect it to verify that the unit powers up with the green LED indicator.

With the USB-C PD power banks I found that if the lead was connected and the unit went into sleep mode because of no load being detected that if you just pushed the power on button on the power bank to “wake it up” quite often the USB-C PD outlet would default to 5v as the remote slave unit did not negotiate the 9v output, on power up.

It was always better to disconnect the USB-C lead from the power bank and then insert it when needed. This “wakes up” the output and negotiation happens correctly.

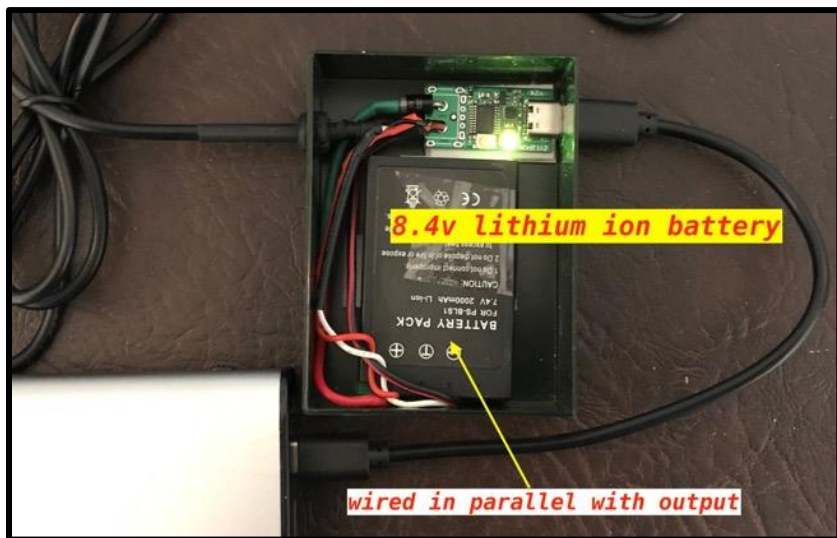
It's probably a good idea to drill a small hole in the top of the plastic box so that you can observe the LED. This way you can see that the 9V has been correctly negotiated by the unit.



### **USB to 8.4v Adaptor with Power Bank Swap Out Back Up.**

Some time ago I published an idea to build a USB powered 8.4V camera power supply which had the facility of an on-board back up battery which allowed the power bank to be swapped over as the charge remaining dropped to 25%.

With my latest tech-talk about the dangers of dc/dc adaptors with power banks I thought that I would re-visit the design and build a fully operational prototype unit.



So with the ZY12PD unit I fitted this into a small plastic case which was sufficiently big enough to hold a 8.4v Lithium-ion battery as well. I had an old 2000mAh battery from a previous camera so this was an ideal choice. Any battery with a 1500mAh capacity would do.

In this design I used the more commonly available 1N5400 silicon diode which is also rated at 3A. The resulting 8.4v output from the unit provides a charging current for the lithium-ion battery as well as the camera power supply. The ZY12PD is programmed as before to deliver 9v.

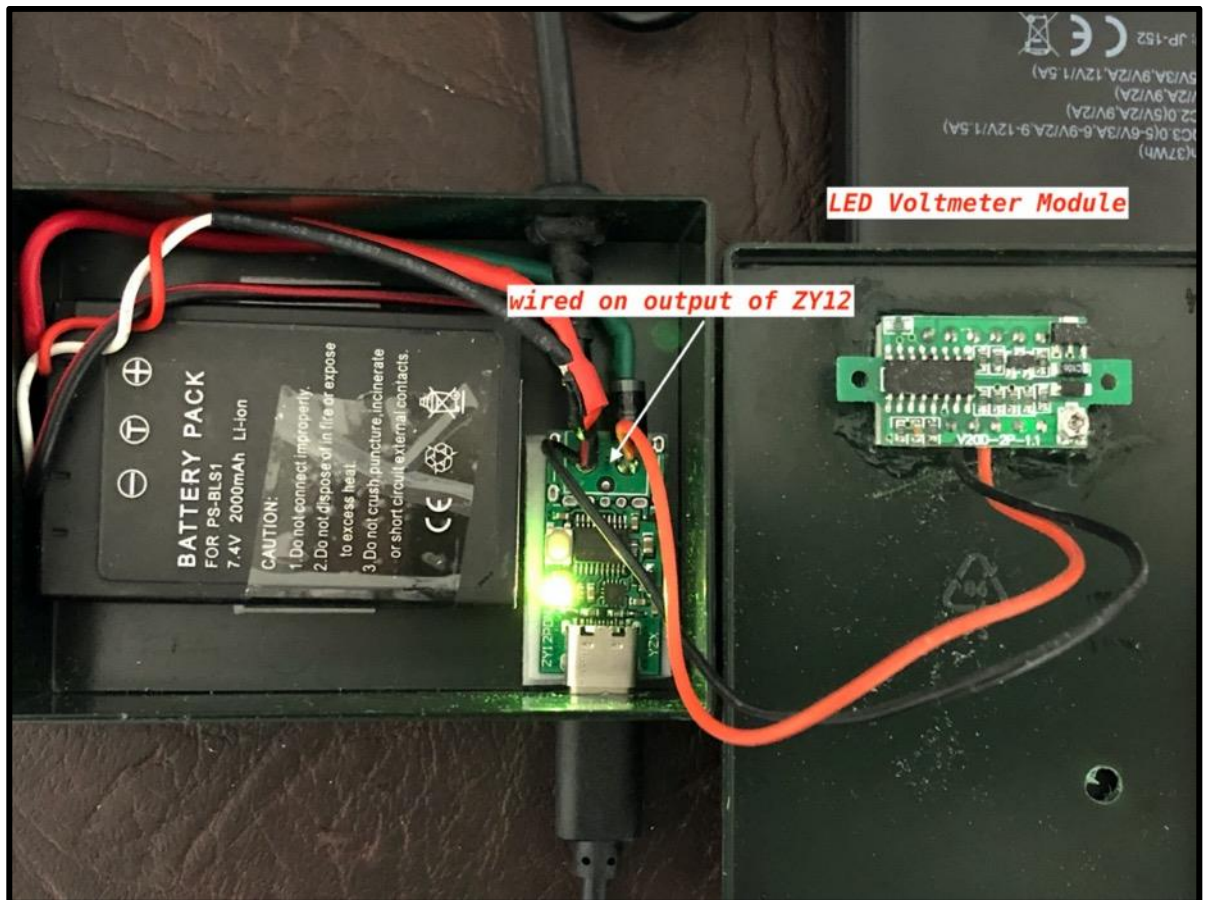
After some time testing the unit with several cameras I soon discovered that during the cameras standby operation the current from the power-bank was too low to keep the power-bank “alive”.

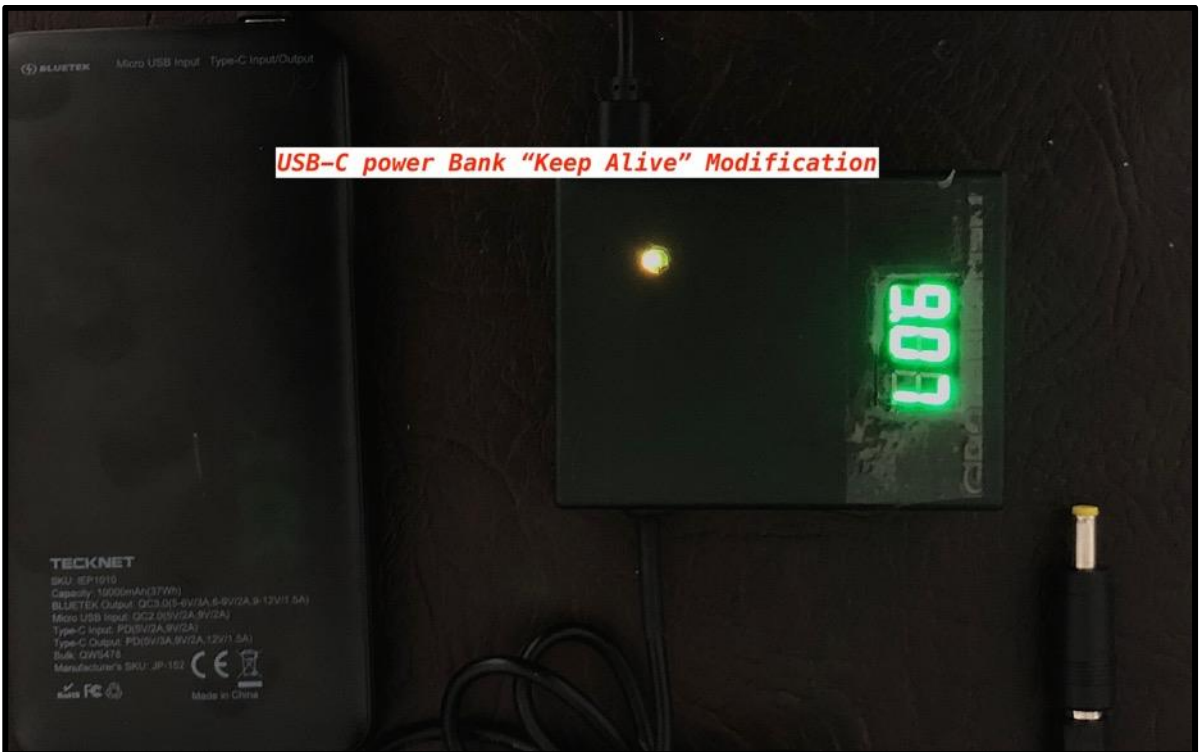
To get the unit to deliver the output voltage again meant disconnection and reconnection of the device again.

I decided to add a local “current drain” which would act as a “keep alive” condition. Rather than just using a resistor across the power supply I decided to add a LED voltmeter.

This unit has a quiescent current of around 20mA and this was sufficient to prevent 1 of my 3 PD power-banks from going into sleep mode.

I subsequently had to increase the current to 44mA by adding a 390 ohm resistor in parallel with the voltmeter to increase the current to 44mA. This worked with all three units.







By placing the LED module before the diode it monitors the ZY12PD output and in this position the Lithium-ion battery does not reverse current the system and keeps the LED Voltmeter off when the power-bank is disconnected.

### Experimental HD Recording Using a HDMI Capture Card



For a while I have the notion to try and capture the HDMI video output from my Panasonic Lumix bridge cameras (like the FZ1000) to enable me to use several cameras to provide a better coverage for my YouTube tutorial etc.

I recently upgraded by 2014 Macbook air to a 2018 Macbook Pro so this gave me the processing power to use a HDMI to USB-C video capture card.

To record the captured video I used the free OBS (Open Broadcaster Software) program. As most of my videos are going to be only 1080p this would be an ideal way of setting up to capture multiple camera views using a simple HDMI switch (even though there is a 3 second switch over - which can be edited out).

My first attempt was to film the video of using 4K photomode on Panasonic cameras.  
[https://www.youtube.com/watch?v=9-Meomt\\_7Yg](https://www.youtube.com/watch?v=9-Meomt_7Yg)

I soon discovered that when I tried to edit this program that the audio input was switching as I changed camera viewpoints.

I have subsequently learned how to lock the input to just one audio source. However that lead to other problems like lip sync issues.

The HDMI is always lagging the audio so it is necessary to add a fixed audio delay to the audio captured by the HDMI capture card. Fortunately

OBS has a facility to do that.

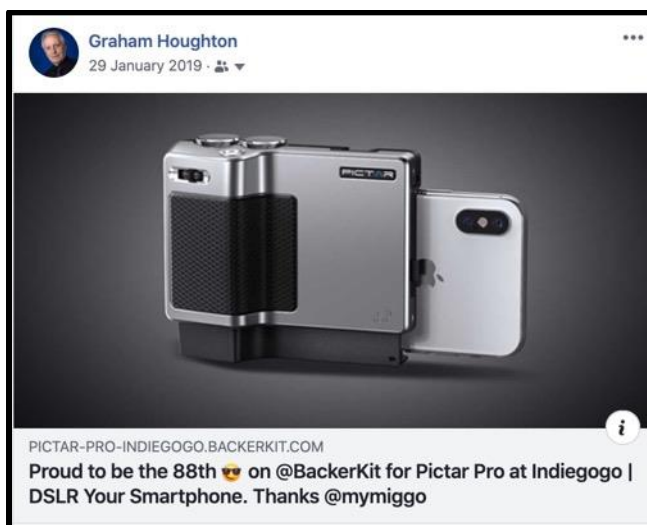
I'll be adding to the rig in the next few weeks to polish the production.

## The PICTAR PRO “DSLR for your Smartphone” Review



In October of 2018 the Kickstarter group launched the Maggio Pictar Pro grip for Smartphones for crowdfunding.

From the original specification this looked a reasonable project and in January 2019 the website opened the doors for early backers. I was one the first 100 backers to fall for the project!



I guess from design issues/production difficulties the product, which should have shipped March 2019, was only delivered at the end of December 2019.

I purchased the option with a Qi wireless charger built-in as I have two phones with Qi charging options.

It turns out that the unit will only charge my iPhone X and not my iPhone 11 pro.

There are many people reporting this problem on the forum for this project.

The Pictar Pro doesn't use Bluetooth or Wi-Fi to control the smartphone it uses ultrasonic sound. It still appears to work with an external mic attached so the sound level from the transducer is quite loud.

In conjunction with the Pictar app for Android or IOS devices the whole concept of the product is realised.

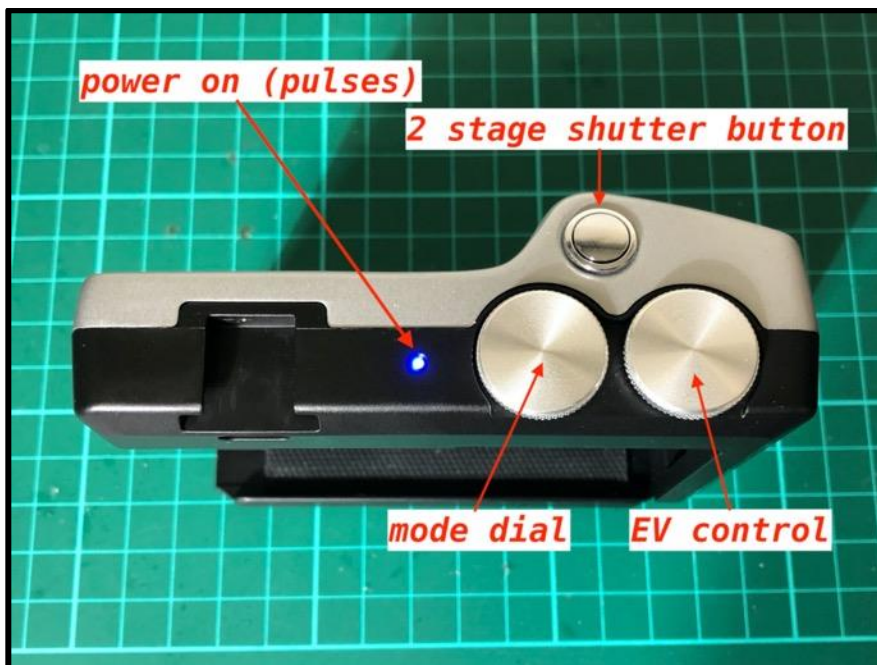
There are 9 control modes that the device can select with one of the control dials and the other dial controls exposure compensation.

On the front of the unit is the two stage shutter button – focus and capture. There is also a zoom lever to control the digital zoom of the lens.

Pushing in the lever in its central position allows the zoom speed to be set.

With cameras with more than one front lens, depressing the EV control wheel down selects the lenses.

Unfortunately the super wide 0.5X lens of the iPhone 11 Pro cannot be selected in this mode.



On the top of the grip is a cold-shoe mount for accessories such as LED lights and microphones.

Underneath this is a slot which is used to attach an optional optical viewfinder.

As the viewfinder is inserted a magnet triggers a hall effect switch and the software then shrinks the image to the size required by the lens of the viewfinder.



There is a slot on the side of the unit through which a microphone can be inserted into the smartphone.

Unfortunately it needs any case to be removed from the smartphone to facilitate this.



The grip has a spring loaded clamping plate to hold the smartphone securely in the grip. The grip features two control wheels. One controls exposure compensation and as you depress the control wheel it switches the front facing camera lens, if a multiple lens camera is used.

The other control wheel allows the user to select the mode of operation from 9 different operations:

Manual, Shutter Priority, ISO priority, Auto, Video, Macro, Filters, Selfie and Sports mode.

This button can also be used to switch to the rear facing camera for selfie mode.

The blue LED is used to indicate that the unit is powered on and the charging status (blinking when charging and steady when the battery is fully charged).

The "Pictar Pro Charge" version of this unit has an inbuilt Qi power charging circuit so it can wirelessly charge connected phones (some exceptions) and the 1400mAh battery won't top up modern smartphones).

Wireless charging is started and stopped by simultaneously depressing the two control wheels.

Charging is automatically cut off after 30 minutes to preserve the grip battery life.

The app I found to be quite unstable. Sometimes the operation of the two control wheels resulted in multiple actuations and in a number of cases the app actually froze. I had to re-boot my phone as stopping and starting the app had no effect.

A lot of people have complained about the very firm pressure needed to operate the shutter release and I think this is going to be the weak point to this device.

There's no doubt that this grip adds extra functionality to the attached smartphone - especially as you can operate it with gloved hands - a blessing in winter.

However the extra bulk makes it almost impossible to put it in your pocket. The addition of the extra optical viewfinder also negates the idea of a compact, pocketable and ready to go camera.

There is also an issue with the triple lens iPhone 11 Pro. The app does not allow access to the 0.5X super angle lens!

In general I think the build quality leaves a little to be desired and the fact that it took 1 year longer to reach production stage may signal the problems that they had with design/manufacture and or software.

If you are thinking about Pictar Pro it may be worth considering some of the negative issues - especially registration of the barcode.

If you lose the barcode you have a non-working Pictar!

*UPDATE... Pictar have now recognised this as an issue and have provided a generic barcode to use if you get into this situation. (the registration also store the barcode image in your photos gallery)*

In honest truth, I'm not overly impressed by the unit.

The additional weight and the fact that it is no longer pocketable as a "ready to shoot" camera probably means that it is unlikely to be taken out very often.

I did take it with me on a family day out and whilst it did perform OK and it allowed me to shoot with my gloves on (we went to the Ice cavern show in Manchester just before Christmas).

I did a fuller review for YouTube here <https://www.youtube.com/watch?v=VOHQnYtJxik>

I also did a “tear down” of the unit to see how it was made and what electronics it inside. You can find this here on my photoblog . <https://www.grahamhoughton.com/reviews-2/>

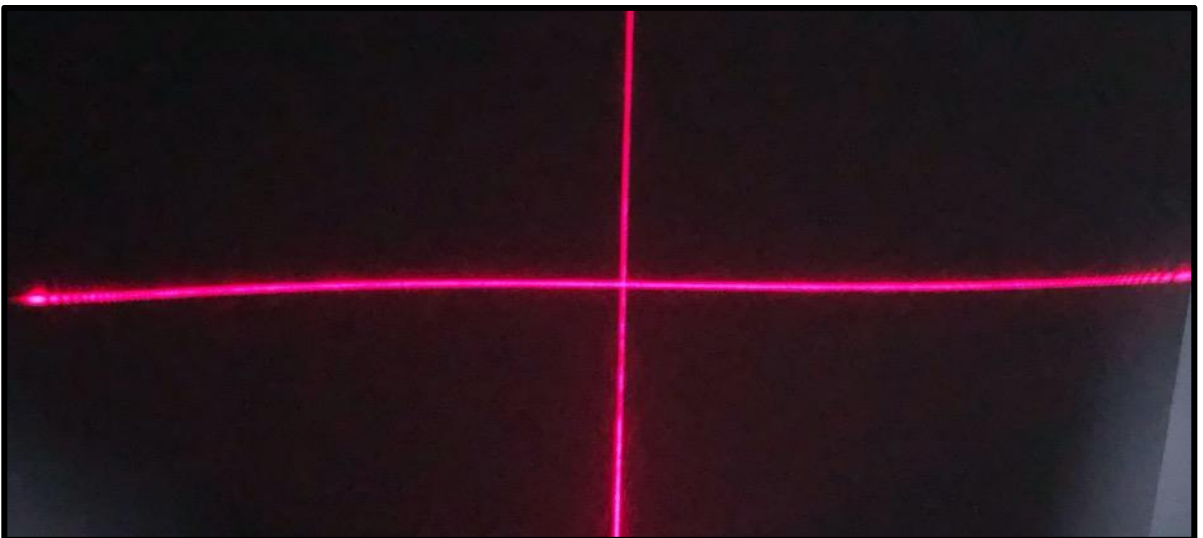
### **How Can You Tell If You Have a Bad Optical Quality Lens Filter?**

A while back when I was testing the cheaper filters I came across one particular ND8 filter that I had bought which caused severe distortion (blurred parts on the captured image). This prompted me to see if there was a quick method that I could assess the quality of filters in my collection by just visual means.



One quick method is to look through the filter at arm's length and then make a small circular movement with the filter whilst observing the view through the filter. Any visual disturbance will show up as areas in the image which move as you move the filter.

In the case of this filter it was quite a pronounced area which looked to be shifting as the filter was moved.



When I projected a cross-hair laser pointed at 45 degrees to the surface of the filter and looking at the reflected image on a white wall in a dark room I could see the bow in the image line.



I then looked at the reflected image of a led strip lamp in the filter and you can see the distortion of the straight lines of the lamp. I added the red straight lines to emphasise the narrowing and widening of the image.

You might be also to see other slight blemishes in the coating of the ND filter. I removed the glass and will use the filter mount for other purposes!

Another test is to photograph a newsprint sheet with and without the filter and look for any differences in image sharpness. Filters like circular polarising ones with two elements of coated glass in them can really affect fine detail – especially budget range ones.

### **Shooting Modes, Select the Right one for You.**

I shoot almost exclusively in the aperture priority mode “A” or (Av on Canon models) on the mode dial. Let’s consider some of the reasons.

I prefer this setting because it gives me a very simple method for controlling the light that comes through my lens, without having to concern myself too much with shutter speed or ISO.

Of course, I do need to take those other two factors into consideration when I’m photographing but those are pretty much secondary considerations.

When using the Panasonic “bridge” cameras and especially the 1-2/3 inch sensor ones (FZ80/82/FZ200/FZ300/FZ330) it is really essential that the maximum amount of light is allowed to reach the sensor surface in order to produce images that have reduced noise.

If you aren't already aware, a lens's aperture primarily controls two things. Firstly, as I mentioned above, it controls how much light passes through the lens to reach your camera's sensor. It also controls how much depth-of-field there will be in the final image.

To new users of any form of camera, albeit analogue (film based) or digital the Aperture scale is perhaps one of the most confusing elements of photography.

In a nutshell, the aperture is the mechanism which consists of a series of metal blades which are arranged to form a circular hole through which the light passes.

When we talk about the maximum aperture of a lens system, it is when the hole in the blades is the biggest. Conversely the minimum aperture is when the blades are closed down to form the smallest diameter hole.

There is a direct relationship between the size of the hole and the focal length of the lens and it is this relationship which gives rise to the familiar aperture scale.

The aperture number – more commonly referred to as the F-stop is the ratio of the diameter of the aperture to the focal length of the lens.

For example if we have a 50mm focal length lens and the diameter of the aperture blades is 25mm the “F-stop” is  $50\text{mm}/25\text{mm}$  which is 2.0 – or F2.0

Similarly if the diameter is 12.5mm the “F-stop” is  $50\text{mm}/12.5\text{mm} = 4.0$  or F4.0



The lens focal length and maximum aperture are engraved or silk screen printed on the lens decal plate (in my image here it is of a 18-55mm kit lens which has a maximum aperture at the widest angle setting of F3.5 and at the longest focal length becomes F5.6)

The F-stop numbers have a sequence which by an increase in one F-stop will decrease the amount of light reaching the sensor by a factor of 2. Thus going from F2.8 to F4.0 (which is 1 F-stop smaller) reduces the light reaching the sensor by one half.



Opening up the aperture from a smaller F-stop to One F-stop larger increases the amount by twice thus going from F5.6 to F4.0 doubles the amount of light reaching the sensor.

This “reverse” aperture scale is what confuses people the most. When we talk about “maximum” apertures these refer to the smallest values in the aperture scale.

If we consider “Full” F-stop incremental numbers we have a scale such:

F2.8 – F4.0 – F5.6 – F8 – F11 where F2.8 is the Maximum aperture and F11 the Minimum aperture.

Expressions commonly used are “Stopping down by 1 F-stop” means going from a lower number to a higher number (F5.6 to F8 for example)

The other expression like “Opening up by 1 F-stop” means going from a larger number to a smaller number (F5.6 to F4.0 for example).

What are the consequences of changing the aperture numbers?

Well we now know that this results in an increase or decrease in the amount of light reaching the sensor but there are two other considerations that must be made when selecting the aperture value.

One is the effect on increasing the sharpness of the lens when stopping down by reduction of aberrations and the other is the effect of reduction on sharpness when stopping down due to the effect of diffraction caused by the rays of light being effected by the size of the aperture.

So between fully open and fully closed there is an aperture known as “the sweet spot” which gives the sharpest image centre to edge at a particular focal length.

It’s best to determine this yourself by photographing a sheet of newsprint, at the usual working distance and focal length, at the complete range of apertures available at that focal length. Examine closely the image to determine the sharpest overall aperture.

If lighting conditions permit then this would be the aperture of choice for shooting.

In the case of the 1-2/3 inch sensor cameras like the FZ200/300/330 which have a constant maximum aperture of F2.8 you will probably find that F4 is the most suitable aperture.

With the type 1 inch sensor cameras like the FZ1000/2000/2500 then the maximum aperture will depend upon the focal length that you set but again if you select F4 at the widest angle setting then as the aperture changes to a smaller value as you increase the amount of zoom applied you will probably maintain maximum overall sharpness.

We can’t go far into this discussion about aperture without mentioning Depth of Field (DOF).

As you stop down a lens from a maximum to a minimum aperture size so the DOF increases.

However to complicate this we have the effect of the size of the sensor and the resulting “Crop factor”.

The “crop factor” is the ratio of the diagonal of the sensor compared to that of a full frame camera sensor diagonal measurement.

In the case of the 1-2/3 inch sensor cameras this ratio is 5.4. The effect of this is to produce and “Equivalent Aperture Value” which gives the effective DOF of a full frame lens when set 5.4 F-stops smaller than the aperture value of the 1-2/3 inch sensor.

So if the FZ300/330 is set to F2.8 then it will produce an image on the sensor with an equivalent DOF of F16 on a full frame camera with a lens of the same focal length.

This is why it is hard to produce shallow depth of field images because we have a very large equivalent starting aperture of F16.

With the type 1 inch sensor the crop factor is about 2.4 so the F2.8 maximum aperture gives the same DOF as F5.6 on a full frame camera with the same focal length lens.



If you look at the FZ200/300/330 lens you will see the focal length of the lens.

Surprisingly it is not 25mm-600mm as we have been led to believe but it is 4.5mm to 108mm.

Where the equivalent focal length comes into effect is the result of the crop factor again. So the widest angle of view is calculated by multiplying the widest focal length (of the native lens) by the crop factor. So in this case it will be  $4.8 \times 5.4 = 25\text{mm}$ .

Similarly the longest focal length is  $108\text{mm} \times 5.4 = 600\text{mm}$ .

The light gathering capability is still F2.8 but the equivalent aperture is F16 for DOF calculations and the 25mm is the equivalent field of view as the 25mm lens on a full frame camera.

Incidentally the effect on ISO equivalence is found by multiplying the crop factor by itself i.e. the value squared. So ISO 100 on our 1-2/3 inch sensor actually produces the same degree of image noise as  $100 \times (5.4 \times 5.4)$  or ISO 3200 on a full frame camera with a sensor of the same fabrication process i.e. CMOS or BSI CMOS. So you can see if you set ISO 800 on the 1-2/3 inch sensor camera it will be the same as setting ISO 25000 on the full frame camera!

It's an important consideration as to get any chance of a fairly decent image we must always try to set the ISO to the lowest native value that the camera supports. ISO 100 or ISO 125 depending upon the camera sensor type.

The second choice after Aperture priority would be Shutter Priority S (Tv on Canon cameras) on the mode dial.

I would choose this mode when the subject that I am shooting is moving and I want the subject completely frozen.

To do this it is usual to select a fast shutter speed, in the order of about 1/500 sec but this will depend on the distance the subject is to the camera.

Closer needs a much faster shutter speed as the image movement across the pixels on the sensor is further.

Capturing birds in flight again may require faster shutter speeds to arrest any wing motion.

Conversely if you want to create intentional motion blur such as panning a subject to create an intentional background blur.



We may want to create those silky waterfall pictures and a longer exposure (1/2 to 2 seconds) may be required depending upon the scene brightness.

It is usual to use neutral density filters in these situations to reduce the amount of light reaching the sensor.

As usual with all photography there are many ways to achieve the final image and choosing the correct mode should be based upon your own needs.

If you shoot just general pictures such as landscapes and family birthdays etc Aperture priority is probably the best mode.

Any sports of natural history/wildlife may require the use of Shutter priority to achieve the best results.

### **Shooting in Snowy Conditions**

I've had a couple of emails recently from lucky people making tours to Antarctica and Iceland who wanted to know what the best settings to use on their cameras to hopefully capture some great images of their trips.

Maybe in Europe and North America you may be planning skiing trips and will be taking images with your cameras or smartphones then the following guidelines maybe useful if you want to avoid the usual result of shooting with snowy scenes which result in grey, flat and lifeless images.

Here's a typical shot when you don't make any adjustment to the exposure



As you can see the image is underexposed caused by the cameras exposure system being fooled by the expanse of white compared to foreground detail.

Whilst it may be possible to recover this in post editing you may lose some of the highlight details. The edited JPEG image is shown below.



When you encounter these conditions it is best to realise that the camera metering system will be “fooled” and make some exposure compensation adjustments.

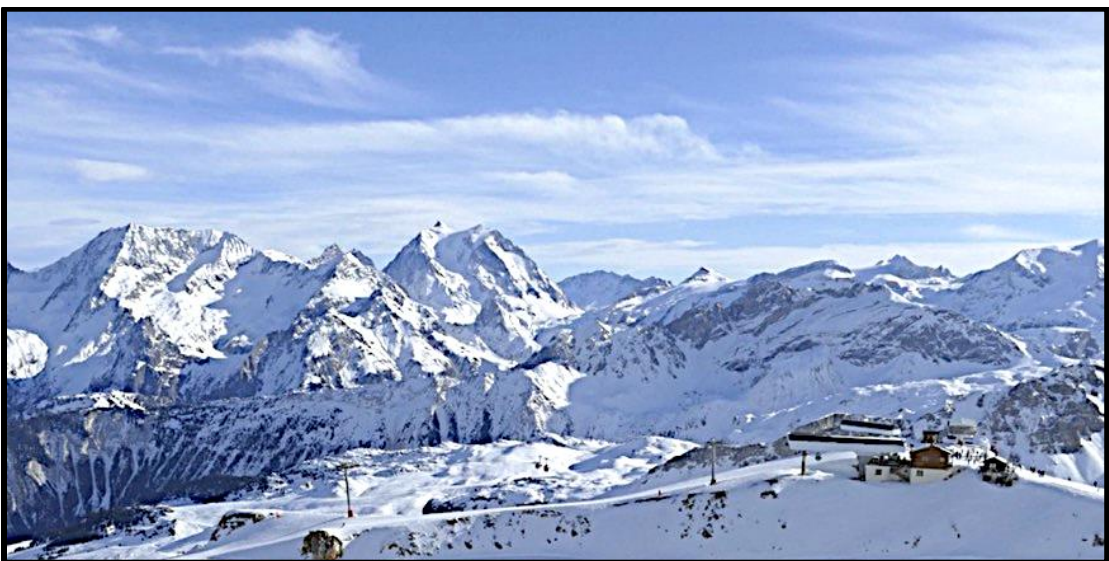
To do this you would use the EV adjustment facility of your camera. With a smartphone normally tapping and holding on the area and dragging the brightness adjustment slider adjusts this.

Depending upon the ratio of the foreground to the background brightness you may need to add something like +1 or +2EV units to compensate for the under exposure.

In this image I had set +2EV units to get this image.



White balance is not normally a problem but you can expect to see some blue in shadows and a circular polarising filter may help to accentuate the blue skies.



## Year on Year Calendar Template



If you like to make your own calendars then I have a Microsoft Word Format template which you can download from my photoblog downloads page.

<https://www.grahamhoughton.com/download-section/>

## A Free Copy of Luminar 3 Photo Editing Program for Mac or PC



If you want to try a Photoshop alternative then why not take advantage of this complimentary, fully working, copy of Luminar 3 from Skylum.

As the later version Luminar 4 is now out this is an ideal introduction to scene base corrections of your images. There are many tutorials that you can watch when you register your email address for your unique activation code for the program.

Luminar 4 offers AI features like automatic sky replacement if you like the Luminar 3 program

To get the program type the link in your Browser bar (not the Google search bar)



Submit your email address and you will get the link for the program and your activation code. Enjoy! Until next month, take care. *Graham*