

LIGHTNING PHOTOGRAPHY

Lightning photography produces some of the most startling images any photographer can take. To the novice onlooker a good shot will place you amongst the pantheons of the photographic world



Comments such as “you must have a really good camera” and “are you a professional” are common place; such is the mystery of the Lightning bolt.

Why does this force of nature elicit such reactions from us all, perhaps it is the power and majesty or even the elusiveness of this short lived but awesome creation of nature? Whatever it is people will always wonder at its power and might, and those that chase the ‘electric dragon’ will continue to search for that ultimate shot.

IS IT DIFFICULT

Well it’s lightning so it must be; after all we that capture this dragon must be gods amongst men. We hunt and stalk this beast venturing into its lair and with great daring do place our lives on the line to bring the populace these pictures of a legendary creature.

Ok enough of this romantic clap trap. I must have been infected by a cheesy romance novel somewhere in my past. In answer to the question “is it difficult”, it’s a bit of both. Yes it is easy to take a lightning picture in most circumstances but there are occasions where it becomes somewhat harder.

My aim in this article is to lay out the path to a successful capture of lightning in both daylight and darkness. To achieve this I will lead you through some fundamental aspects of photography you should understand first and then apply these to the task of capturing lightning. Remember capturing lightning does not necessarily mean it will be a great photograph, it still requires some

artistry.



LESSON ONE

Lightning is dangerous and it will kill you. Don’t ever forget that you will be using a piece of equipment that is constructed of metal parts and some wires. This will be attached to a tripod generally made of metal (unless you are uber rich), which will be stood on the ground. Electricity will find the path of least resistance when it travels to earth, please try to make sure it is not you.

If you are with someone who knows the ropes then listen to them, and if you are on your own play sensibly. Lightning is often more impressive if photographed from a distance so contain your inner action hero and be safe.

It is fun and it will get your adrenaline flowing, but can catch you out if you are not aware of where you are and what the storm is doing, especially at night. If you feel uncomfortable then take some action, even if it just to ask “are we safe here”. If the answer is “yes” and you are still not comfortable then take steps and do something about it. There have been many people who have died because others did not react and no one took the first step. If you are with a vehicle then the easiest way is to get back in the car. It is strangely one of the safest places to be. (Faraday cages if you have the urge to read physics).

Don’t forget with a long enough cable you can take pictures from inside the car, just remember to get the camera inside before you drive off, otherwise there will be tears (yours) and lots of laughter (Everyone else).

LIGHTNING PHOTOGRAPHY

Pay attention and stay safe.

Lecture over.

COMPOSITION

Remember taking a picture of lightning is no different to any other picture. It's only a photograph of a land or cityscape with some weather behind it. The lightning is secondary to the main photograph. Bear this in mind when you set up to shoot the storm.

The following image is a great lightning shot, but a poorly composed image.

This was one of those 'Oh crap' moments; we had all retired for the night when a great lightshow kicked off outside the motel.



It was throwing it down with rain and in my naivety I just threw the camera on the tripod got caught up in the moment and snapped away. End result cracking lightning bolt, composition sucks. Why, well I was stood above the line of offices next door and failed to use them in my composition, as a result they are cut off at the base, angled and have some perspective issues. It is horribly distracting. As the viewer you're eye will always be drawn to the offices rather than the lightning.

What I should have done is to man up, cover up the camera and walked to the street which was 20 yards to the right. A large good quality plastic bag is always worth having around for just those moments. Wet I would have been but I could have used the road and power lines to lead your eye down towards the storm and it would have worked better as a photograph.

Anyway this is not a composition tutorial, but it's one of those little things that people forget in the

excitement. Think about the photograph and the lighting will add the sparkle.

EXPOSURE

Ok now we are into the important stuff. Why am I jabbering on about exposure rather than heading straight into the action. Well getting the correct exposure will make or break the image. Sure you can fix it later but it's never quite the same as getting it about right in camera. This is especially important for everyone who uses the jpeg image format.

(Jpegs are a compressed format in which most of the processing is done in camera. As a result they tend to be limited in what you can do with them afterwards.)

If you have an understanding of exposure then by all means skip this section as it is aimed at the novice.

Taking a little time to consider this now will help focus your mind on the mechanics of recording the image. As a novice this will help in all your photography.

A correct exposure is a balance of how much light is allowed to fall on a sensor in the camera and for how long.

Think of it like sunbathing. Your beach shade is the aperture, the speed is how long you can take and you are the sensor. Under expose and you remain pasty and dull, overexpose and you know it, ouch! Just right and look at those white bits.

Too much light and the image will over expose.



The following image illustrates this very well. The settings on the camera were such that when the

lightning struck too much light was allowed to fall on the sensor for too long

LIGHTNING PHOTOGRAPHY

You will see there are bright spots which are pure white. This area is totally over exposed and as such there is no detail recorded in the picture. No matter how much effort you put in afterwards this image cannot be recovered.

Underexposing and image is exactly the opposite the image loses its detail in the dark area, and anything that is recorded as completely black cannot be recovered.

This picture illustrates this. Actually it illustrates nothing, its black.



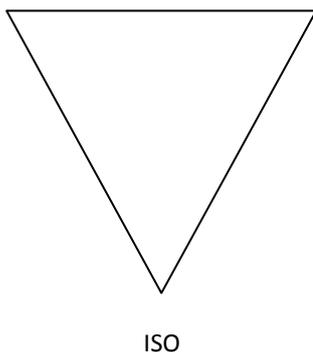
Having said this it is often easier to recover data from an under exposed image than an over exposed one.

HOW DO WE DEAL WITH THIS

Exposure is often described as a triangle in which the photographer has control over one or all of the corners.

Aperture

Speed



We will start at the bottom

ISO

International Standards Organisation, so that's the first question answered.

ISO was actually used when referring to the light sensitivity of film in the days before digital. It has made the transition across to the new technology and now refers to the light sensitivity of the digital sensor.

Simply put the lower the number the lower the sensitivity. E.g. ISO 100 is less sensitive than ISO 1000. The digital photographer has the advantage over their film counterpart as the settings are user controlled, whereas in film days, you chose the film and were stuck with its ISO rating until you changed it, bummer eh!

Why is this important? Well the photographer can set the ISO to aid in the endeavor to correctly expose a picture. The sensitivity of the sensor allows the camera to function in situations where there is low light.

This sounds terrific, as the light falls then increase the sensitivity of the camera and keep taking picture. Like all things that are too good to be true, there is a trade. As the sensitivity of the sensor is increased an artifact called noise is introduced onto the image.

The following image will give some idea of what you are looking at.



The higher the sensitivity the greater the noise and it will keep on getting worse until the images become unusable.

It can be dealt with by external software but it is better if it is not there to start with.

ISO is always best left at the lowest possible setting, especially when shooting in the dark. I know this is a bit odd but trust on this for now

LIGHTNING PHOTOGRAPHY

Thankfully we can set our ISO early and pretty much leave it to its own devices.

APERTURE

The Aperture controls the amount of light allowed to fall on the sensor at the back of the camera.

It generally controlled in the lens and by an Iris which expands and contracts to make a bigger or smaller hole.



F22 (Small hole)



F2.8 (Large hole)

To the eagle eyed this may not make a lot of sense as the large number has a small hole and a small number a large hole, but it does really. It's all about a math, Yuk! For this exercise just remember the Large number means smaller hole and less light and the smaller number is a larger hole and more light.

You will hear photographers taking about F stops. Risk persecution here I'll just say it is simply the iris setting. Yes I know! It's far too simple an explanation but it's a whole other session, and we can get away with it for now.

So the smaller hole is called f22 and the larger f2.8.

The direction is up or down, so if someone asked you to move one stop up, you need to let in less light so the dial moves up the scale towards the larger numbers, and obviously to stop down means you move the settings in the opposite direction.

Technical bit: A 'Stop' or 'Full Stop' will let in either twice as much light or reduce the light by half. Most cameras now operate in $1/3^{\text{rd}}$ stops which

means it takes 3 clicks in either direction to halve or double the amount of light.

Don't get too concerned about this for lightning, but I do recommend you have a read of some of the articles on line, or head to YouTube and have someone explain it to you. (I do recommend Adoramav, digital photography 1 on 1)

SPEED

Speed is the amount of time the sensor is exposed to the light. It is controlled in camera by the shutter.

Even today in the modern digital era the shutter is still a mechanical device that moves in front of the sensor. It's a bit like your eye lid blinking.

They speed is measured in fractions of a second. Generally speeds range from 30 seconds at the slowest up to $1/8000^{\text{th}}$ of a second at the quickest.

Some cameras have what is called the 'Bulb' Setting which is essence a manual control of the shutter.

For night time and lightning speeds are always towards the slow end of the scale.

EXPOSURE SUMMARY

So in order to take a photograph we need to set the ISO, which is always best set at the lower end of the scale.

Once we have that set we can take control of the camera. Most cameras have setting which allows full manual control, semi automatic (Aperture or Speed) or full automatic control; we as the photographer choose how we want to interact with the camera.

Every camera is different I recommend you take time to study the manual and get comfortable using the controls long before you head out. Remember you'll be taking photographs in the dark so it pays to know your equipment.

LIGHTNING PHOTOGRAPHY

Here are some of the common modes

P or PV: Program mode, this is the happy snap

Strange as it might sound even the Nikon d4 has one of these.

A or AV: Aperture mode, this allows the photographer to control the iris, allowing in more or less light. The speed of the shutter is controlled by the camera. This is often used to control depth of field (How much is in focus in front and behind the subject). This is another subject and I will not be going into here. Rest assured depth of field is not generally an issue in lightning photography and we don't need to worry about it for the moment.

S or TV: Speed mode, this allows the photographer to control the speed of the shutter, and leaves the camera to control the aperture.

High speed will freeze frame an image, so the faster the shutter the sharper the image you will take. It is great for those action shots and I would be recommending this mode if you find yourself in the presence of a tornado.

A little tip here is to set your shutter speed to a speed which equals or exceeds the focal length of the lens. By doing this you should always have a nice steady sharp shot when you hand hold the camera.

For example: If you have a kit lens say 18mm to 50mm in focal length (Look at the numbers on the front of the lens)



Then set your speed either 1/18th of a second at its widest or 1/50th of a second at its longest (Zoomed in) or faster then you will be able to hand hold the camera and not introduce any shake or blur.

M or MV: Manual mode does what it says on the tin. You get to choose aperture and speed for the camera. I love this mode because it gives total freedom, and we will be using to take lightning so be brave.

NIGHT TIME AND LOW LIGHT LIGHTNING



So now we start, whew.

I am starting with low light and night time because for the beginner it easier and a lot less frustrating. The odds of capturing lightning at night are far better that during the day.

1st thing: Night time photography as opposed to low light Lightning photography is different. Let me explain

The aim of night photography is to allow as much ambient light as possible, gathered from the surroundings to fall on the camera sensor in order to correctly expose the picture. This takes time and patience but can be very rewarding. Lightning



will disrupt the ambient light much in the same way as a flash gun does, so a long exposure with a sudden flash can cause the image to over expose.

Night time lightning photography is using the darkness to prevent light falling on the sensor,

LIGHTNING PHOTOGRAPHY

which allows the photographer to keep the shutter open and thereby increase the chance of capturing the beast.

STEP ONE

Gather your kit:

At a minimum you will need a camera, which has the capability to allow slow shutter speeds, or better yet the 'Bulb' setting.

Speed settings of 1 second through to 30 seconds are best.

A tripod, choose one that is capable of holding your camera still. Cheap is not always best.

A remote shutter trigger: Every camera seems to have a different mechanism. Being a Nikon user I can really only comment on that brand. Be careful when buying a camera as some of the older models did not have this facility. The newer ones tend to have an infra red remote trigger. The more expensive have a wired trigger. Find out which one will operate your camera and make the purchase.

If you cannot afford one or just plain forget don't worry, you can use the self timer built into most cameras.

The reason you use a remote trigger is to prevent camera shake. If the camera moves or is touched during a slow shutter speed exposure a phenomena called camera shake comes into play. The effect of the camera moving even just a minute amount can create a blurry image. It's amazing how many photographers think their images are out of focus when in fact the camera just moved.

Memory cards (The more the merrier)

Spare camera batteries.

A torch to check your settings and help get things set up. Car headlights are also a good substitute.

Ebay is always a great place to look for aftermarket kit if cost is an issue.

Got all that kit, then slap in a memory card and get ready to go. (Unless you have a means to download the images make sure you have lots of cards because once the bug bites you will take loads of photographs).

STEP 2

Know your camera:

A lot of modern cameras now have an auto iso setting, including cameras such the D3s. If you can find out where this setting is in the camera menus and turn it off.

What happens if it remains on is the camera faced with darkness tries very hard to be helpful and if it can't change the speed or aperture or they go out of range it will increase the sensitivity to compensate. As a result noise is introduced to the image.

Once you have found it set the ISO to its lowest setting, normally between 50 and 200 depending on your camera.

Find out how to turn the camera to full manual mode and get some practice using the controls.

Attach the camera to the tripod and set it up with the remote. Play with all the settings until you have at least a grasp of where they are and how they work.

Turn off your autofocus and learn to focus the camera manually using the focus ring where possible. Find out how to focus the camera on infinity, usually indicated by this symbol ∞

STEP 3

Find a storm.

Set up the camera. This might sound a little odd, but if you have the time and can do so safely then

LIGHTNING PHOTOGRAPHY

look round the area. Find somewhere where there is something in the foreground such as farm machinery or a house. Try to consider the composition of the image.



give it scale.

Remember this is a huge and imposing event; make sure there is something to

Once you're happy get the tripod set up with the camera attached.

Turn the camera to full manual control and attach the remote.

Start by setting the shutter speed to 30 seconds or the slowest speed possible.

Avoid bulb if you can as it introduces another thing for you to think about. ('Bulb' is the manual shutter setting. When a camera is in 'Bulb' the first press opens the shutter and the release or in some cases the second press closes it. It allows for shutter speeds in excess of the 30 second maximum.)

Set the aperture to f8. This setting will be close to maximizing the depth of field.

If you have a zoom lens then zoom out to its widest setting (Smallest number) this will maximize the chances of capturing the shot.

Turn off autofocus and use manual focusing. Focus the camera on infinity and if you are confident try to turn it back by a tiny amount.

Take a picture. Once the camera has finished then take a look at the picture on the LCD viewer. If it is too bright then step the camera up by $1/3^{\text{rd}}$ of a stop. Remember move the aperture towards the larger numbers so from f8 you would increase to f9. Take another picture and check the result. If it is too dark then move the aperture the opposite direction (Step down). So from f 8 you would reset to f5.6.

Keep doing this until you are satisfied with what you are getting.

In this case the lightning will be acting as a flash gun and its light will be creating the exposure for you.

Don't get frustrated as not all bolts are the same intensity and nor do they fall in the same spot. You may get some over exposed images or some under. So long as you keep your aperture around f8 you should get nice sharp images.

If your images are constantly over exposed then try speeding up the shutter. For example take it from 30 seconds to say 20 seconds. This will have much the same effect as stepping up the aperture.

It is very much a case of suck it and see what happens but the combination of speed and aperture should maximize your chances of success

Don't forget as the storm moves the light may increase or decrease depending on how close it is.

Just keep practicing.

I'll attach a checklist at the end of this so you can keep it with you.

DAYLIGHT LIGHTNING PHOTOGRAPHY

Well here is a different beast, the elusive day time shot.



In many ways this can be the more satisfying cousin to night time as the challenges are just that much greater.

Composition is obviously more of an issue here as you can see the

landscape and you are in competition with daylight which always will have an impact.

There are many people who will tell you that the answer is a ND or neutral density filter, and you

LIGHTNING PHOTOGRAPHY

will meet some of them. Please let me assure you this miracle is not quite the miracle it might seem to be. How do I know, I was one of them until I tried it.

Let me explain. The ND filter is in essence a sunglass for your camera. They are grey filters which come in a range from light grey right through to almost black. Placing these in front of the lens will reduce the amount of light able to get through to the sensor. The reason they are titled Neutral is because they should not affect the colour balance of the images.

The concept of using them in daylight lightning photography is the same premise as night time. By reducing the light, the photographer can increase the time the shutter remains open thereby allowing lightning to be captured. Grand plan but it does not work. Physics comes into play.

Ambient light (Daylight) is bright even on an overcast day. ND filters cannot reduce the amount of light sufficiently to keep the shutter open for the same length of time as darkness allows. Remember at night we are using the darkness to keep the shutter open so that we have a better chance of the lightning exposing the photograph for us. In day light the lightning cannot do this

The lightning is actually competing with this ambient light.

Try this as an experiment. Next time you are in the car turn on the headlights. At night they are bright and help you to see the way. During the day they become ineffectual as they have to overcome the ambient lighting. Put your sunglasses on, it makes no difference you still can't see the headlights.

Here is one I took using an ND filter.



You can see here the image is dark and grainy. I managed to get this to 13 seconds at f22 which is not far off night conditions, but the lightning is barely visible.

Just to prove the lightning is there here is a processed version.



The image comes up and with some work could be usable, but the lightning is dwarfed by the ambient light.

The science is covered by many lengthy articles using science such as the inverse square law and reciprocity laws.

Always remember the camera is using the available light to create a correct exposure, it is possible to fool it but always difficult and not always fruitful.

Well on that depressing note how do we manage it? Well it's not much different to night shooting except the photographer needs to have their wits about them.

Set the camera up as you would for a night shoot.

Composition

Tripod

Manual focus

LIGHTNING PHOTOGRAPHY

Lens at its widest angle

Remote trigger

ISO at its lowest setting

From here the advice diverges, so this is my technique. I find it works for me, but there are lots of others out there that may suit you better.

The time spent composing your image will pay off here, as some of the daylight shots can be very spectacular.

Most important thing to remember here is you are taking a landscape shot and the lightning is an added bonus. It is imperative you expose for the ambient light and not worry about the lightning, you can't expose for that anyway. You would be very unlucky to have a bolt so bright as to over expose the image. It would have to be pretty close and I think it would be underwear change time.

Set the camera to Aperture priority and select an aperture of between f10 and f16. This will restrict the amount of light but give you maximum depth of field. You can increase the f number to your lenses highest setting but that sometime can affect the sharpness of the image. It is up to you.

Allow the camera to control the Speed. This will allow you camera to correctly expose the photograph for you.

Point the camera towards the storm and using your trigger press away.

It is very difficult to time it perfectly, but every bolt is different, so some will linger longer than others. With luck you will manage to pick up a few shots.

I found it was a ratio 200 shots to one strike, but those odds will come down with a more active storm.

Some remote triggers will allow time lapse or just a blunt continuous press of the trigger; this is another alternative to trying to time the shot. Listen to the videos from storm chases. You can

often here the clicking of camera shutters in the back ground. That's if you can hear it over the oohs and aahs not to mention the expletives.

There are devices that you can use called lightning triggers. I have yet to use one, but they are a trigger that reacts to the flash or pulse of the lightning strike. Being a machine the reaction time is always going to be quicker than that of a human being.

The purest will always say do it yourself that's the fun. The trigger will certainly takes the guess work out of it. I suppose it depends what is important to you, getting the photograph or experiencing the storm.

Rest assured the miracle trigger is not a guarantee for day light success. The trigger will be fast; unfortunately the camera being mechanical will lag behind, so there will be a few missed bolts whatever you do.

SUMMARY

Taking lightning photographs is fun and rewarding. The effort put in getting to know you equipment before you go will help a lot.

I know from my experiences last year that not fully understanding my camcorder lead to a load of poor footage. Hopefully I fix that this year.

Don't get frustrated and I can pretty much guarantee you will have some shots you will be so chuffed with. You friends and family will be in awe of your skills.

LIGHTNING PHOTOGRAPHY

Night time

KIT

- Camera
- Tripod
- Remote trigger
- Memory cards
- Batteries

SETTINGS

- ISO to manual
- ISO to Lowest Setting (50 – 200)
- Camera to Manual Mode (M)
- Focus to Manual
- Aperture f8
- Speed 30 seconds

TECHNIQUE

Set the ISO before setting out unless you are very confident to do it in the dark.

Ensure the batteries are charged and the memory card has loads of space

Camera on tripod and attach the remote cord or switch on the remote trigger. (Make sure you practice this before going)

Point the camera at the storm and compose the image

Focus the lens on infinity and then turn it back a very small fraction

Aperture to f8

Speed to 30 seconds

Take the picture.

Check the result and adjust.

Too bright, move the aperture up towards the larger numbers (f11)

Too dark move the aperture down towards the small numbers (f5.6)

Day Time

KIT

- Camera
- Tripod
- Remote trigger
- Memory cards
- Batteries

SETTINGS

- ISO to manual
- ISO to Lowest Setting (50 – 200)
- Camera to Aperture priority (A or TV)
- Focus to Manual
- Aperture f11-f16
- Speed Handled by camera

TECHNIQUE

Set the ISO before setting out unless you are confident how to do it.

Ensure the batteries are charged and the memory card has loads of space (More so than night time)

Camera on tripod and attach the remote cord or switch on the remote trigger. (Make sure you practice this before going)

Point the camera at the storm and compose the image

Focus the lens on infinity and then turn it back a very small fraction

Aperture to f11 – f16 (The bigger the number will slow the shutter speed down)

Leave the speed to the camera

Take the picture and keep taking until you succeed, the camera will deal with the exposure for you.