

Photographing the Milky Way



There are some basic rules and steps needed to photograph the Milky Way.

- Choose a dark sky area, no light pollution. Check www.darksitefinder.com for maps showing the levels of darkness in your region.
- Stay away from moonlit nights. The closer to the new moon, the better.

The two items listed above can be for sure deal killers for photographing the Milky Way. Finding a dark area and not having moonlight are imperative!

Next, Equipment! You can probably do this type of photography with less equipment but this is what I use and it has worked well for me.

- Use a camera with as large a sensor as possible. (I use a Canon 5DIII and 7DII)
- Choose a wide, fast lens! My 17-40 is an f/4. f/2.8 is preferable and if you have something wide and faster, use it for sure. I have shot with an Olympus OM-D-M10 and a 7-14/2.8 lens. This is a small sensor camera but worked OK.

- Use a sturdy tripod. I mean something ROCK SOLID. My tripods have hooks underneath to hang weights (my camera bag works well as a weight) to add to their steadiness.
- Batteries are important! Digital cameras use a lot of power when shooting. Charge your battery before doing any night shooting. Carry a spare battery that is fully charged as a back up.
- Carry a small flashlight, both to see what settings you are using and for Light Painting (see below). I also have a head lamp that I take with me for walking out of wherever I have been shooting after it gets really dark!
- Chairs are a great option. I have a camp chair that I like to take to sit on during the long exposures.

Technique and Procedures

- BEFORE it gets dark, pick the lens and camera you are going to use and use the combination at the wide focal length and focus on something far away, a tree, a hill, a water tower; something in the distance, then
- Turn off autofocus! Use a piece of duct tape and tape your focus ring so that you do not accidentally move the focus while working in the dark. This is critically important. The stars may look like dots on the cameras rear screen but on a computer monitor, if not focused correctly, they will look like soft circles of light.
- Determine the position of the Milky Way if possible. I use an app for my iPhone called Sky Safari which shows me precisely where the Milky Way will be both now and in the future. This helps me predetermine a set up location with the foreground I desire in the finished photograph.
- Using the app, I find my location and set up the camera and tripod in roughly the position I think will work best. I look thru the viewfinder and using the app, determine where the Milky Way will be when it is dark enough to photograph.
- Select the ISO, shutter open time and f/stop you will be using and set these. Rough guidelines are: ISO 1600 to 3200; shutter open time of 15-20 seconds and f/2.8 - note: these are good starting points. You can adjust as you go.
- Make sure you remove any dark filters! Personal experience with a polarizing filter on a wide lens made this an integral part of my checklist.
- In your menu items, if your camera has these options, set your Long Exposure Noise Reduction* to "ON". If you have High ISO Noise Reduction as an option, pick this if shooting JPEGS. For Raw files, set it to "OFF". You can clear that type of noise in Lightroom or other raw converting software.
- My cameras have shutter speeds all the way to one minute so I choose "M", manual mode and set the shutter speed to 20 seconds as a starting point. I choose the wide open setting on the aperture. I also set my ISO to 1600 as a starting point.



- Wait for DARK! It usually takes about 90 minutes after sunset for the skies to be dark enough to photograph the Milky Way successfully.

Post Processing

- I use Lightroom almost exclusively for processing images. For the Milky Way, I suggest (in Lightroom) selecting the Brush Tool, and “painting” over the Milky Way a couple of times, then use the Clarity slider, moving it to the right. This enhances the stars and background making them show up better. Make sure the brush feather is set to 100%. You don’t want a sharp edge
- White balance is anybody’s guess. I start with “Shade” and tweak from there.

Light Painting

Light painting is basically just what it says, painting the foreground objects with light from your small LED flashlight. It doesn’t take much as long as the objects you are lighting are fairly close. An island in the middle of the lake would take some serious candlepower! For trees, statues, etc that are fairly close, you would be amazed at how little light you need to add to make them look just fine in your images. Once you have the Milky Way dialed in, try your hand at light painting. I never get it right in one shot! I might have a dozen tries to get one good image.

Group Shooting?

I have done group night shooting but trust me, the fewer people, the better. Everyone’s cameras are different. Exposure times are different. Screens on the back of cameras keep coming on as exposures finish. People turn on flashlights at inopportune times. Light painting is almost impossible if everyone is doing their own. In group situations, I try to be the painter and try to get everyone set to an exposure time about the same duration.

The “500” Rule

The maximum shutter speed you should be using IF you want the stars to appear as points is determined by this simple rule: $\text{Shutter speed} = 500/\text{Focal Length}$. An example; let’s say you want to use your 50mm f/1.8 lens for night shots. $500/50=10$ so your longest exposure time should be 10 seconds, otherwise you will get elongated stars, not points in the sky. This is the reason we try to use fast, wide angle lenses for the Milky Way.

*Long Exposure Noise Reduction - All digital cameras generate noise. The longer the exposure the hotter the sensor becomes, the more noise your camera produces. Almost all cameras have a built in correction for these long exposure issues, a way to reduce the effects of noise in the long exposures we need for night shooting. Basically the camera shoots the regular image, closes the shutter and shoots another image with the shutter closed. This generates the same noise as the regular exposure. The software in your camera then subtracts the noise exposure from your real exposure then writes the result to your storage card. What will happen in the field is that a 15 second exposure turns into 30 seconds; a 30 second exposure turns into a full minute. During this time, you can’t be taking another photo!