PHOTOGRAPHING STARS – HOW TO GET STARTED

Photographing star trails is technically simple and can be visually stunning. If you have not photographed stars before, the following guidelines will give you satisfying results. Once you have a little practice you can play with the suggested settings to capture more creative night skies.

To reduce “light pollution” it is best to select a dry, clear, and preferably moonless night sky and a location as far away as possible from a town or city. Avoid shooting star trails during a full moon as the light from the moon will overpower the starlight in a matter of minutes. If you are shooting with something less than a full moon in the sky, ensure it is not in the frame.

Photographing long exposure star trails will drain your battery faster than usual and the drainage will be faster if you use the in-camera noise reduction function. Ensure this function is switched off; you can reduce digital noise later with readily available software.

On cold nights you may experience fogging of the lens. This can be lessened, and in most cases eliminated, by wrapping the lens in a few woollen socks held in place with elastic bands.

1. PHOTOGRAPHING STAR TRAILS TO OBTAIN STARS AS CIRCLES.

You will require (i) a solid tripod, (ii) a wide-angle lens, e.g. 16-35mm or similar, (iii) a remote cable or electronic shutter release and (iv) usually a few layers of extra warm clothes.

To start, use the following approach and settings:

a) **Set ISO to 100** or the lowest on your camera - this helps reduce digital noise.

b) **Set aperture to f5.6** - to capture plenty of light and give you brighter star trails.

c) **Switch off the lens’ image stabilisation function** (IS on Canon and VR on Nikon lenses).

d) **Set the lens focus mode switch to “Manual” (MF)** - this prevents the camera from trying to focus when you are shooting.
Set the lens focus to infinity - this works well in practically all cases. Remember not to ‘fiddle’ with the focusing ring on the lens once you have set it to infinity. If your camera has a “Live-View” function you can use this to help with focusing.

Set the camera shooting mode to “BULB”.

Attach a remote cable release or an electronic remote switch – you must be able to lock the switch so that the shutter will remain open.

Determine the position of the Southern Cross - use a compass or star chart to assist, if needed.

Compose the image preferably with a foreground object towards the bottom of the viewfinder. The foreground object gives perspective to the image. You select your own composition; the well proven rule-of-thirds seems to work nicely with star photography.

Using the cable release or remote switch, take the image. When you press the cable release button, ensure you lock it into the dedicated slot on the switch. As long as the cable release is locked in the slot it will keep the shutter open.

Use a torch to ‘paint’ your selected foreground subject. The ambient light will often be sufficient to illuminate the foreground object sufficiently or to form it as a silhouette. Initially ‘paint’ in gentle strokes of about 10 seconds and see how you go. An ‘over-painted’ tree or rock formation looks unreal. Before you commence ‘painting’ with a torch, inform other nearby photographers of your intention.

Continuous shooting for 25-30 minutes or more will give you circular star trails. Exposure time is a matter of trial and error – it can be anything from the suggested 25-30 minutes to hours, depending on conditions. I sometimes start with 5 minutes and check the result on the camera LCD and histogram. Then I keep doubling the time until I get an acceptable result. Longer exposures will give you more complete star circles.

Unlock the cable release or remote switch.

Enlarge the image on your camera’s LCD screen and in particular check for sharpness and digital noise. Digital noise will appear as ‘blotchy’ green and purple colours in the image. Much of this noise can generally be removed later using noise reduction software.

2. PHOTOGRAPHING STARS WITH THE MILKY WAY IN THE IMAGE

You will require the same equipment mentioned above. Some of the settings for ‘Milky Way’ photography are different to those used for capturing stars as a circle. The ones that are different are shown in red below. Use the following approach and settings:

Set ISO to 1600 or 3200 - depending on your camera’s ability to produce a good, clean image at these high ISO values. It will take a little experimentation with your own camera to determine this.

Set aperture to its widest value (f/2.8, or f/4)

Switch off the lens’ image stabilisation function.

Ensure the lens focus mode switch is set to MF.

Set the camera shooting mode to “Manual”, i.e. the ‘M’ mode.

Set a time of 30 secs.

Attach the remote cable release or electronic remote switch.
i) **Determine the position of the Milky Way in the sky.**

j) Compose image with the Milky Way positioned so that it is produces a balance to the selected foreground object in the frame.

k) Using the cable release or remote switch, take the image. **Do not lock the cable release button in the dedicated slot in the switch**

l) Use a torch to 'paint' the foreground subject. ‘Paint’ for about 10 secs. Try ‘painting’ with the torch light reflecting off the ground or a nearby rock rather than directly onto the foreground subject. This technique gives a more realistic ‘moody’ atmosphere to the scene.

m) Enlarge the image on your camera’s LCD screen and check for sharpness and digital noise.

3. **RAW or JPEG**

   It is not necessary to shoot in RAW but I think it is best to do so for one reason – white balance. You will find when you point your camera to the sky it rarely registers the white balance the way you will like it. Each shot is likely to be different with many factors determining colours in the night sky and no two nights will be the same. If you shoot in RAW you can alter the white balance later in Photoshop other conversion software to give you images that are most appealing to you.

4. **SINGLE SHOT OR ‘STACKING’ TO GET BEST RESULTS?**

   If you shoot “Star Trails as Circles” or the “Milky Way”, in one shot, as outlined above, your biggest enemy will be digital noise in the final image. It is best to reduce this noise at the shooting stage. You can achieve this by taking several shots using much shorter time exposures and combine or ‘stack’ them later on your computer.

   This is my preferred way to photograph stars. Using shorter time exposures means you can shoot with higher ISOs. This approach picks up many more stars without suffering the penalty of digital noise (as much).

   With higher end DSLR cameras and their improved sensor noise reduction, the ISO can be bumped up to ISO 800 and higher which will give you even more stars streaking across the sky.

   Using this approach means you will be shooting dozens and dozens of images so make sure there is plenty of space on your memory card and your battery is fully charged before you commence.

   To get started set your lens as before i.e. focus to infinity and focus mode switch to ‘Manual’. Compose your shot as before and use the following settings:

   - Set the aperture to its widest value.
   - Set an ISO 800 - you can alter this later if needed.
   - Set a time value of 30 seconds.
   - Set the camera shooting mode to “Manual”.
• **Set the camera drive mode to “Continuous” or “Continuous Shooting”** - this allows you to do non-stop shooting as long as the remote cable release or electronic remote is locked.

• **Take a first test shot** - check that everything looks OK, especially examining the histogram. If the test shot looks too bright lower the ISO number, or raise it if the image looks too dark.

• **If all looks good, lock the cable release and let the camera shoot continuously for say 30 to 40 minutes.** You can continue shooting as long as you wish (in practice, meaning as long as your camera battery survives).

• When the series of shots is complete, download them as per your usual method to your computer. Save them in a place that is easy to access when you decide to combine, or ‘stack’ them, using Photoshop or one of the numerous free software programs available on the internet.

• To find a number of examples of ‘stacking’ software, Google “software for stacking star trail images”; you will be overwhelmed with the choice. Here you will also find a rich source of tutorials on photographing stars and star trails. The program *StarStax* is a good one to try in the early stages.

5. **STACKING SOFTWARE – MOSTLY FREE**

a) *StarStaX* – a free piece of excellent software, available at [StarStaX](#). It loads on a Mac or PC and its most appealing feature is its speed. Simply open up the program and import the images you have taken as ‘stacked’ images. Click the ‘Start’ button and within seconds your composite image will magically appear. It has other great features for you to play with if you wish.

b) *Startrail.exe* – Mac users, note this only works on a PC and needs to be updated.

c) *Photoshop Stacking Action* – will do the job but it is slow and chews up too much memory.

6. **MAIN TYPES OF INEXPENSIVE REMOTE CONTROL SWITCHES**

There are three main types of remote control switches:

1. A simple cable operated switch – the shutter remains open as long as the button is pressed or retained in the “down” position. See Fig.1

2. A cable operated switch that has more sophisticated timing facilities. See Fig.2

3. A wireless version of #2. See Fig.3
7. CAMERA SPECIFICALLY MADE FOR ASTRO PHOTOGRAPHY

What if you had a camera *engineered specifically* to capture the visually stunning beauty of the night sky? You do.

In April 2012, Canon announced the release of the 60Da – a DLSR, tailor-made for astrophotography. To the best of my knowledge there is no similar camera on the market. It's designed to ensure accurate depictions of the reddish hues found when photographing the nighttime sky.

According to Canon, there's a "modified infrared blocking filter and a low-noise sensor with heightened hydrogen-alpha (Ha) sensitivity". A standard DSLR infrared filter limits the amount of Ha light that passes through to the sensor - to prevent unwanted colour artifacts in the final image.

In more understandable terms, the Canon 60Da camera uses an infrared filter that triples the transmission of light at the hydrogen-alpha wavelength, allowing for photographs of "red hydrogen emission" phenomena like the Horsehead and Rosette nebulae. Normal IR filters are tuned for the human eye, but block out wavelengths that many astral objects emit light along - the 60Da's filter fixes this and brings out the red colours of nebulae (a cluster of stars within a cloud of gas and dust) and other photographic subjects in space. At the time of writing (22/5/2012) I do not know if the 60Da can be used for standard photography.
It has an 18-megapixel CMOS sensor (APS-C), an articulated 3-inch Clear View LCD, a nine-point autofocus system and TV-out support, the Silent Shooting feature found on the new EOS 5D Mark III (eliminates shutter induced vibration) and a native ISO ceiling of 6,400, expandable to 12,800. It comes with a RA-E3 remote controller adapter (that fits into the remote control cable I mentioned above) as well as an AC adapter kit if you are near 240 AC power or a battery powered inverter and you wish to operate the camera for periods longer than the normal battery charge time. It uses the same LP-E6 battery found in Canon’s 60D, 7D, 5D Mk2 & 5D Mk3 cameras. It is ideal for shooting time lapse and HD movies of the night skies. It costs around $1500.00.

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