

The Milky Way on a camera

Print it, fold it, take it out with you.

Fragments of the Universe
bhapstar.com

The whole technique, in one paragraph

Put a wide lens on a tripod, set the camera to manual, focus on a bright star, and take the same frame over and over for an hour or two. From roughly April to September the bright core of the Milky Way is up after dark. If a meteor shower happens to be on, the same frames catch that too.

SET EVERYTHING MANUALLY, THEN LEAVE IT ALONE

Mode	Manual	Nothing should change between frames
File	RAW	You will lift shadows heavily later
Aperture	Lowest f-number your lens has	Usually f/2.8. If yours stops at f/4, use f/4 and raise the ISO to match
ISO	3200 at a dark site	1600 to 2500 suburban. High enough for faint trails, low enough to keep the sky from clipping
Shutter	20s at 14mm, 15s at 18mm	See the chart below for other lenses
Focus	Manual, on a bright star	Magnify the live view and adjust until the star is smallest. The infinity mark is not reliable
White balance	Manual, around 4000K	Consistent colour across hundreds of frames
Long exposure NR	Off	It makes the camera pause for as long as the exposure itself, halving how much sky you collect
Stabilisation	Off	It corrects for shake that is not there on a tripod, and can add a wobble of its own
Drive	Continuous, remote locked on	Shoot without pause for hours

WHAT TO BRING

A camera that shoots manual and RAW, the widest and fastest lens you own, and a tripod that will not sag. Wide is better because it covers more sky. Fast means a low smallest f-number, which gathers more light. Around 14mm to 24mm at f/2.8 is close to ideal, and cheap in manual-focus form. If your widest lens only opens to f/4 that is fine: raise the ISO to compensate. Also bring spare batteries, a remote release that locks on, and a cloth for the dew.

WHERE TO POINT IT

From roughly April to September the bright core rises in the south-east after dark and arcs across the southern sky, highest around the middle of the night in midsummer. Any free stargazing app shows exactly where it is from where you are standing. Then put something along the bottom of the frame, a tree line or a dune ridge, because sky alone is a record rather than a picture.

IF THERE IS A METEOR SHOWER ON

Showers arrive on roughly the same dates each year, so a quick search tells you what is next. Almost nothing changes: the settings opposite are already right, so do not lengthen them. Rates build through the night, because early on the radiant is still low and much of the shower is below the horizon. If you can only stay out for part of the night, stay late rather than arriving early. Expect most frames to hold nothing, which is normal, and remember every one is still a Milky Way exposure.

HOW LONG BEFORE STARS START TRAILING

14mm	18mm	24mm	35mm	50mm
500 rule	500 rule	500 rule	500 rule	500 rule
NPF rule	NPF rule	NPF rule	NPF rule	NPF rule
36s	28s	21s	14s	10s
20s	15s	12s	8s	6s

The Earth turns, so stars drift across the frame. Leave the shutter open too long and they stop being points and become short dashes. Figures are for a 24-megapixel full-frame camera. The older 500 rule is generous; the newer NPF rule is stricter and holds up better on a modern sensor. Either is fine, and anywhere between them is fine too. If the Milky Way is the priority, stay closer to NPF.

AFTERWARDS, FROM THE SAME SET OF FRAMES

One cleaner Milky Way

Combine all the frames into a single image. Averaging many together is what removes the grain, and the difference is large.

A star trail

Stack the whole run and the stars draw curved lines as the Earth turns. A free second picture from files you already have.

A meteor shot

Pick the best frame and process it on its own. Combining several meteors onto one sky is fine too, as long as you say that is what you did.

Drive out to a dark sky

This is the single decision that matters most. Under city glow the background sky is brighter than the Milky Way itself, and no amount of processing brings back what the sensor never recorded. The same camera and the same settings an hour out of town produce a completely different photograph.

Spend five minutes on the framing

A frame of nothing but sky is a technical record. Put a tree line, a dune ridge or a person looking up along the bottom and it becomes a photograph. You are shooting hundreds of frames from a fixed position, so the composition you choose in the first five minutes is the one you keep. Then start the intervalometer, lie back and watch.

The full guide, with examples

Full walkthrough with example images, the reasoning behind each setting, and a phone version of this guide for nights when all you have is the one in your pocket.

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