

# The Star Adventurer

## Part 2

Roger Powell



### Eliminating Star Trailing in Wide Field Astro-photography

#### Recap

My previous article, *The Star Adventurer Part 1*, was about the *Sky-Watcher Star Adventurer* in its most basic form. This second article builds on that and will show how I am redeploing processes which were developed using my refracting telescope to improve the basic Star Adventurer performance.

#### New Techniques

The following astro-photography techniques have been (or will be) incorporated into my routine Star Adventurer set up:

- USB power to all devices except the DSLR camera
- dew heating.
- computer assisted polar alignment.
- automatic image downloading, to a laptop
- live image stacking from a DSLR, on a laptop.
- computerised guiding (a future option).

These techniques, some developed across several years using my astro-imaging telescope setup, are adapted for use with the Star Adventurer. They may seem a bit extreme to someone who does not use a telescope for astro-photography.

However, I am already used to going into the field with a laptop, 12 volt heavy duty batteries, an inverter, dew heating, USB power and the ability to live stack my images on the go.

I sometimes yearn for images wider than my telescope can provide. Hence my renewed interest in the *Star Adventurer* (which was sitting unused in its box) and its wide field capabilities.

The feature image above was a single 90 second exposure, taken with a lens set at about 14mm focal length. Without tracking, it would have shown star trails in any exposure exceeding 35 seconds.

## Power

A laptop battery will not last all evening, especially when distributing USB power to various devices, so I supplement it with a heavy duty 12 volt battery, which provides power as follows:

[12 volt battery] → [ 12 volt DC to 240 volt AC inverter] → [240 volt AC to 19 volt DC standard laptop inverter] → [laptop USB 5 volt DC] → [devices]



*Figure 1: 12 volt battery powering a Laptop Star Adventurer controller. Front view.*

Whilst feeling uncomfortable about utilising 240 volt mains power in the field, this part of the power chain is short and kept securely where dew cannot reach it. The two inverters can also double as hand-warmers!

With this system I can power the *Star Adventurer* body with a direct connection and its AA battery chamber can remain empty.

Power to the laptop, *Star Adventurer* and dew heater will be secure all evening. The only device needing battery power is the DSLR camera, which should be changed midway through the evening.



*Figure 2: 2024-09-18 Star Adventurer Laptop controller, powered by 12 volt battery. Rear view, showing 12V DC to 24V AC inverter (blue ends) and 240V distribution to standard laptop inverter (black) and 5V USB power (white) to dew heater.*

### **Dew Heating.**

Taking long night time exposures, it won't be long before your lens gets fogged.

Dew heaters which wrap around the camera lens are essential to secure your session from moisture.

My dew heater is a Haida HD4635 10 watt anti-fog belt, with a low/medium/high temperature switch.

It is powered at 5 volts DC from a USB power adaptor plugged into the inverter.



*Figure 3: DSLR with Dew Heater mounted on the Star Adventurer .Note also the PoleMaster camera mounted parallel on the Fine Tuning Mounting Assembly*

### **Computer Assisted Polar Alignment.**



I resolved the polar alignment issue on my main telescope by using *SharpCap* image capture software. It has a polar alignment feature which normally gets me an accuracy of less than fifteen arc-seconds.

To utilise this software with my *Star Adventurer*, it requires a wide angle camera to be attached in perfect alignment with the polar axis of the *Star Adventurer* body. The camera I use is a PoleMaster, with a view field of about  $11^\circ \times 8^\circ$ . You could use the PoleMaster software to polar align, but *SharpCap* is so much better.



*Figure 4: The PoleMaster camera provides a wide angle view of the Celestial Polar region, to provide accurate polar alignment.*

### **Image Downloading and Stacking.**

Because I use *SharpCap* for image acquisition with my telescope, I looked at whether I could also use its live stacking feature for my *Star Adventurer*. I attached a *Cam Ranger*, a device which I bought many years ago (but which is now superseded by an even more sophisticated model).

Maybe if your camera has its own wi-fi, you may not need the *Cam Ranger*.

The *Cam Ranger* is directly connected by USB cable to the DSLR camera. It automatically downloads each image from the camera and sends it by wi-fi to the *SharpCap* software on the laptop. It sets up a local wi-fi network, to which the laptop must be connected.

The *Cam Ranger* software is also installed on the laptop. It serves a dual purpose: firstly as an intervalometer to control the exposure time and number of exposures to take; and secondly it automatically downloads each image frame, via the wi-fi, to a dedicated sub-folder on the laptop.



Figure 5: The Cam Ranger wired up for 5 volt power(black connection), image control and acquisition (Red/grey connection).

The *SharpCap* software is set to monitor that particular sub-folder and it stacks each new image when it arrives. The progress of the image, as it is stacked, is monitored in *SharpCap* on the laptop.

### **Computerised Guiding.**

This is one for the future for me.

The *Star Adventurer* has a guiding port and I will have an inclination to utilise it if I find that the longer images taken with a narrower field lens continue to include any unacceptable star trailing.

It requires the purchase of a small guide-scope and camera and uses free PHD2 software to control the guiding, in the same way most amateur astronomers do with their telescopes.

The only difference is that a telescope mount is guided in both Right Ascension (RA) and Declination (Dec), whereas the *Star Adventurer* only guides in RA.

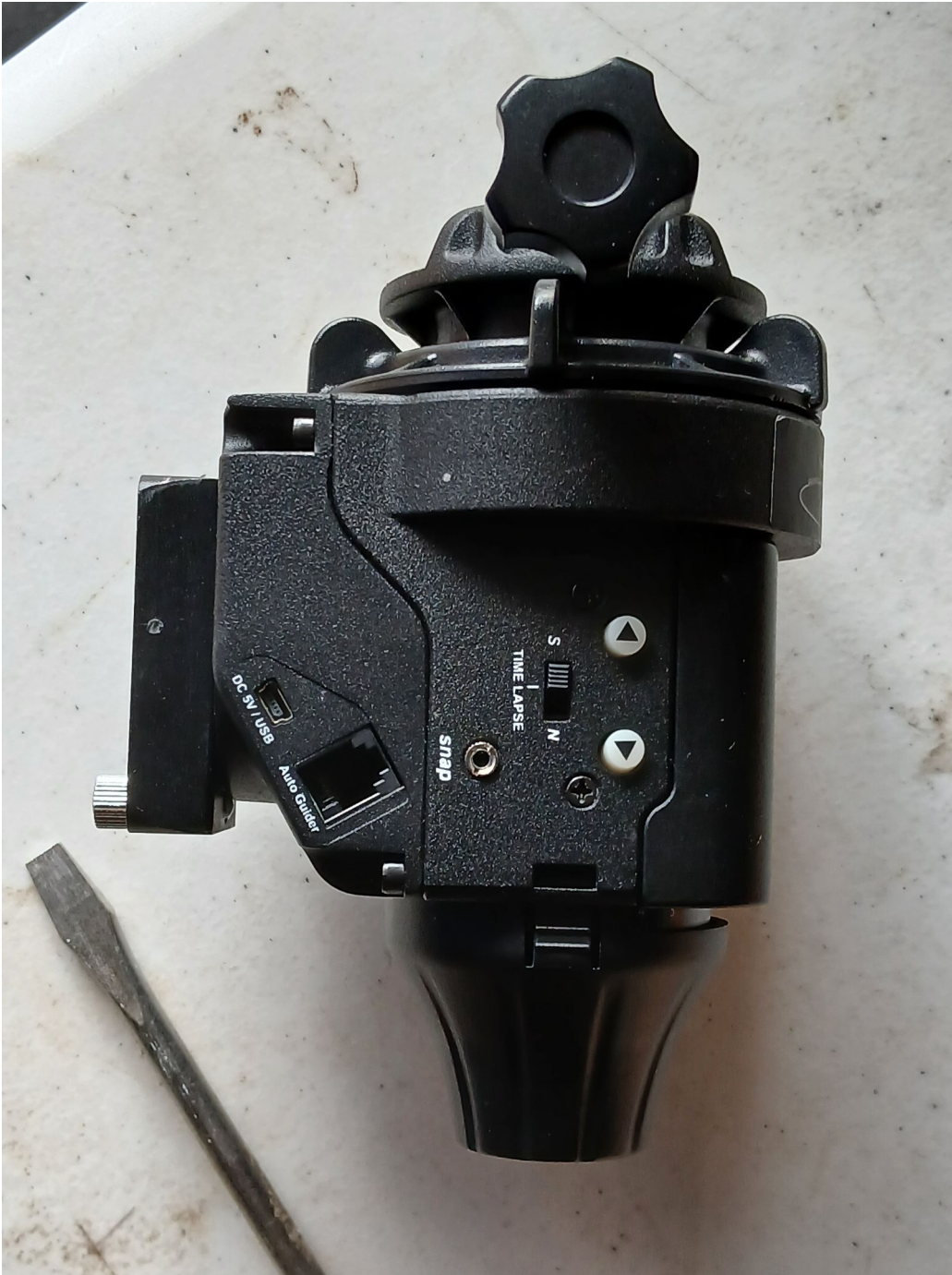
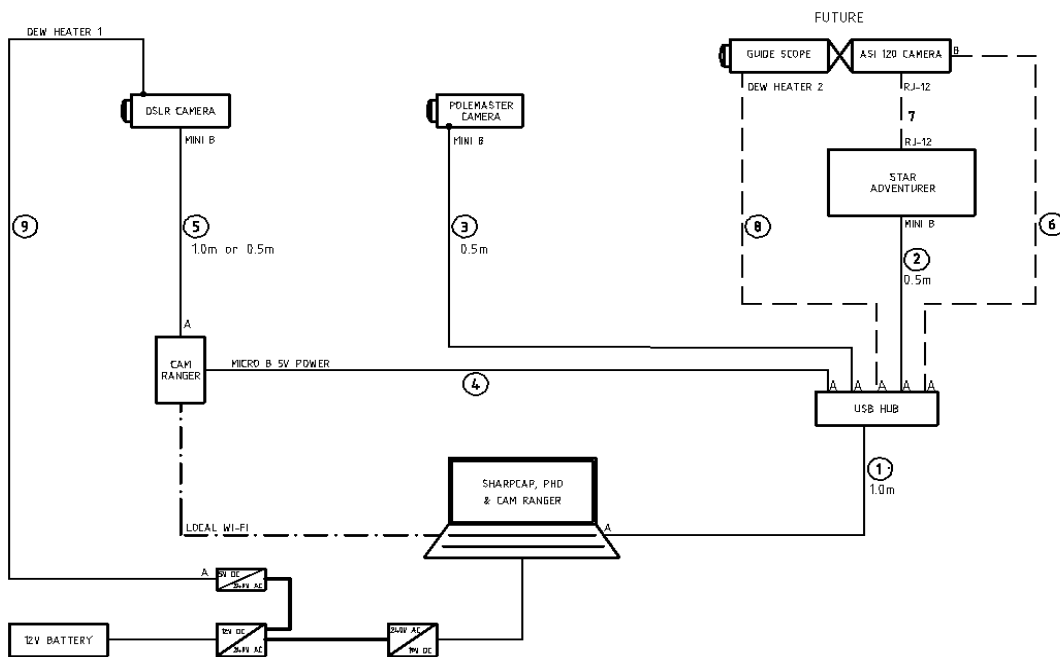


Figure 6: The Star Adventurer body, showing USB power input and autoguiding port.



Figure 7: The wired up Star Adventurer.

## USB Connections



STAR ADVENTURER BLOCK DIAGRAM

RP  
2024



## SharpCap Software

*SharpCap* is invaluable for my main telescope activities and I'm using it now with the *Star Adventurer* for polar alignment, image acquisition and live stacking. A free version is available but a small annual pro-licence fee of £14.00 (GBP) is required to use the polar alignment and other advanced features.

## Cam Ranger Software

The software comes with the purchase of a *Cam Ranger*. It permits you to make exposure settings from a laptop (or other device), use it as an intervalometer and automatically download images from the DSLR camera.

## PHD2 Software

This is free software, used world-wide by most amateur astro-photographers, to obtain precise guiding in RA and Declination, although the *Star Adventurer* will only guide in RA. I have not yet obtained the required hardware for auto-guiding the *Star Adventurer*.

## Results

The 500 rule can be extended but likely not eliminated. Trailing may still occur with narrow field lenses. With a reasonable polar alignment of 30", I was able to use a 13mm lens to take a 360 second exposure which only trailed when zoomed in. On that basis, I was able to expose for ten times that achievable for a non-motorised mount.

The 90 second exposure for the feature image heading the page shows no sign of star trailing. Without the *Star Adventurer* it would probably only permit up to 35 seconds to avoid trailing.



Figure 8: The *Star Adventurer* wired up, with lap top and power supply on adjacent table.

When I used my 50mm fixed lens (10 seconds with the 500 rule) with a 30s exposure, the image was ok but at 90s, the trailing became obvious.

The experiment will be ongoing but I have proved that it is possible to take five minutes exposure at 13mm and also thirty second exposure with a 50mm lens.

## Conclusion

So, is the *Star Adventurer* worth purchasing, when we now have smart telescopes such as the *Seestar* which are 100% automatic?

Chalk and cheese.

For newcomers without astro-imaging experience or a suitable camera, who wish to take narrow-field shots of popular deep sky objects with a minimum of fuss, I think the smart cameras would be a very attractive option.

For astronomers who are experienced in polar aligning and who want to supplement their telescope work with wide-field vistas using their own versatile DSLR camera with wide-field lens options, the *Star Adventurer* would be a great choice.



Figure 9: An elevated view of the wired up *Star Adventurer*, with laptop and power supply alongside.

## Further Information

- ◆ All images © Roger Powell
- ◆ This article was first published on [Cosmic Focus](#)