

## Quick and Accurate Polar alignment using your CCD imager

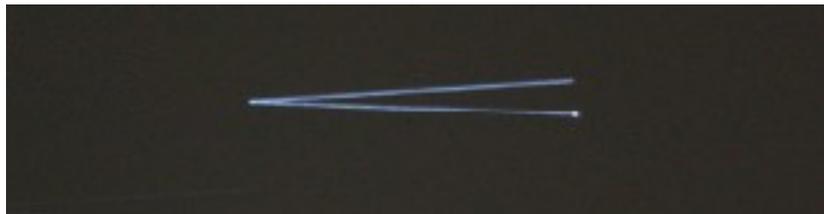
The best way to assure you have an accurate polar alignment is to measure and correct the actual drift caused by any misalignment. With the aid of your astro imager, you can accurately detect, record, and correct this drift in just minutes. There are programs available that will do this for you, but it's so easy to do that all you really need is your CCD or DSLR imager and your telescope.

Here is what you do.

Setup and align your telescope normally, with CCD or DSLR installed and ready.

1. Set your telescope to point south and at 0 degrees DEC. (At the equatorial plane.)
2. Find a 5<sup>th</sup> or 6<sup>th</sup> magnitude star (a dimmer star can be used)
3. Focus your imager on the star..
4. Once focused, move the star to the west side of the image field.
5. Set your telescope to its lowest drive speed. Typically a guide rate.
6. Set your camera software to take a 105 second exposure. (The first five seconds will mark the starting point of the target star on the resulting image.)
7. As soon as the first five seconds have elapsed, press the West button on the telescope keypad to cause the star to move to the opposite side of the sensor.
8. For the next 50 seconds, continue to move the telescope West. As soon a total of 55 seconds has elapsed, immediately reverse the telescope direction.
9. When exposure has finished, stop moving the telescope.

After the image has downloaded, you should have something that looks similar to the image below.



What you see is the angle of deviation. You want to make the < a solid line. To correct this, you have to make adjustments to the azimuth **on the telescope mount**. Since the initial star point is lower than where the exposure finished. This tells us that the telescope is pointing too far West. So to fix this, make a correction to the azimuth control to move the telescope East.

Take another exposure using the same steps 5 thru 9 as above and compare the images. The new image should be similar to the image below.



If the angle is greater, you adjusted the azimuth the wrong way. If the angle is reversed (the initial star point is now above the lines), then you adjusted the azimuth too much. Continue to make adjustments to the azimuth on the mount until you image looks like the image below.



Once you get to this point, your east-west drift is now zeroed out. Time to correct your north-south drift.

### **North-South Drift**

Find a suitable target star on the East or West horizon. Follow steps 5 thru 9 above. To adjust the drift, you will be adjusting the altitude on the telescope mount. Repeat until you have a horizontal line similar to the image above.

After you get the altitude adjusted, you can go back and check the azimuth again. If it's still good, you're finished.

It's that easy. Remember, you can increase the accuracy by taking longer exposures. You can even let the star track run beyond the FOV, as long as the track comes back close to the starting point.

(Version 1.01 , Nov-2010, correcting for error in north-south drift method, and adding comments on letting the star track go beyond the FOV.)