

Spectrum Scientifics' Store Blog

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5 Tips to use an Telescope with an Equatorial Mount (the easy version)

April 12, 2016

In past entries in this blog we have discussed the merits Equatorial Mounts vs Altazimuth mounts (<http://wp.me/p1h3zJ-cv>) on telescopes, but we never actually went into much detail on how to properly use one of these mounts. Here are some basic hints for a beginner first trying to use an equatorial mount. Note that this are not hints for precision alignment – they are strictly for the beginner so they do not get overwhelmed! Speaking of which



1) Keep you mount setup as simple as possible at first.

Look at telescope instructions for equatorial mounts and you'll see a lot of information on adjusting setting circles, using a polar axis scope, and other heavy duty details. Here's a hint: If you don't plan on doing astrophotography or long, long viewing sessions you don't need all of that setup! Here is what you need to do:

2) Set the latitude scale to your latitude and aim the polar axis so

it points north

That's a lot of words there, but we'll simplify, and use pictures! First of all you need to set your mount's alignment to match your location on the globe. The alignment is set from the latitude scale on the side of the mount, near the bottom. Here is where it is on a small telescope:



There's three small parts to this. First is that arrow thing pointing at numbers. You want that arrow to point a number that is very, very close to you own personal latitude. Go and get a map if you need to. We hvae ours set at 40 degrees because that is the latitude of our store in Philadelphia. Or at least it is close to that.

The next part is to aim the mount so that the Right Ascension axis is aimed north. This helpful picture will point out which part of the telescope that is.



Point that shaft (after adjusting the latitude) north. Try to be as accurate as possible but don't get hung up on it, use a compass to help out.

Once you've done that, congratulations! You have done a basic polar alignment! What this means is that shaft you aimed is now parallel with the Earth's axis and if you were able to look through it, it would be aimed roughly at the North Star (polaris).

This is a rudimentary alignment and is perfectly acceptable for most beginners. If you move into more advanced things like astrophotography you will need to be much, much more precise in your alignment.

OK, so that was easy but now is the hard part, you have to change how you think about things:

3) Stop thinking in terms of up & down, left & right, start thinking in terms of Right Ascension and Declination.

OK, so an altazimuth or Dobsonian telescope moves in up/down left/right, which is easy to figure out, but lousy for tracking. Equatorial telescope move in Right Ascension and Declination, which is a bit harder to understand.

Basically, if you watch stars in the sky move (or seem to move as the Earth rotates) you will notice they move in an curving arc through the sky. By setting up your telescope as in part #2 you have set your telescope so that it can track those objects as they move. The trick is now you need to move the telescope in Right Ascension and Declination, not up/down left right. This is a change of mindset that you will need to adapt to use the mount properly. The graphic may help with understanding it (although we had to use a straight line instead of a curve for Right Ascension).

So when you are on one celestial object and need to move it to another you can't just go "a little to the left, then point the telescope up a lot more than it is now. You have to move the telescope in Right ascension, then move it almost diagonally in Declination to get on target. This can be frustrating to learn. With larger Equatorial mounts and a Star Atlas this can be easier by simply 'aiming with the setting circles', but setting the setting circles up complicates things more than we are trying to do for this blog post.

So year, you will have to practice this type of motion until get used to it. But keep in mind that as you move your telescope you might notice something:

4) Your Equatorial mounted telescope will never, ever look like it does in the catalog while in use.

OK, so remember this picture from the top of this blog entry?

Well it is something of a lie. A big fat lie.

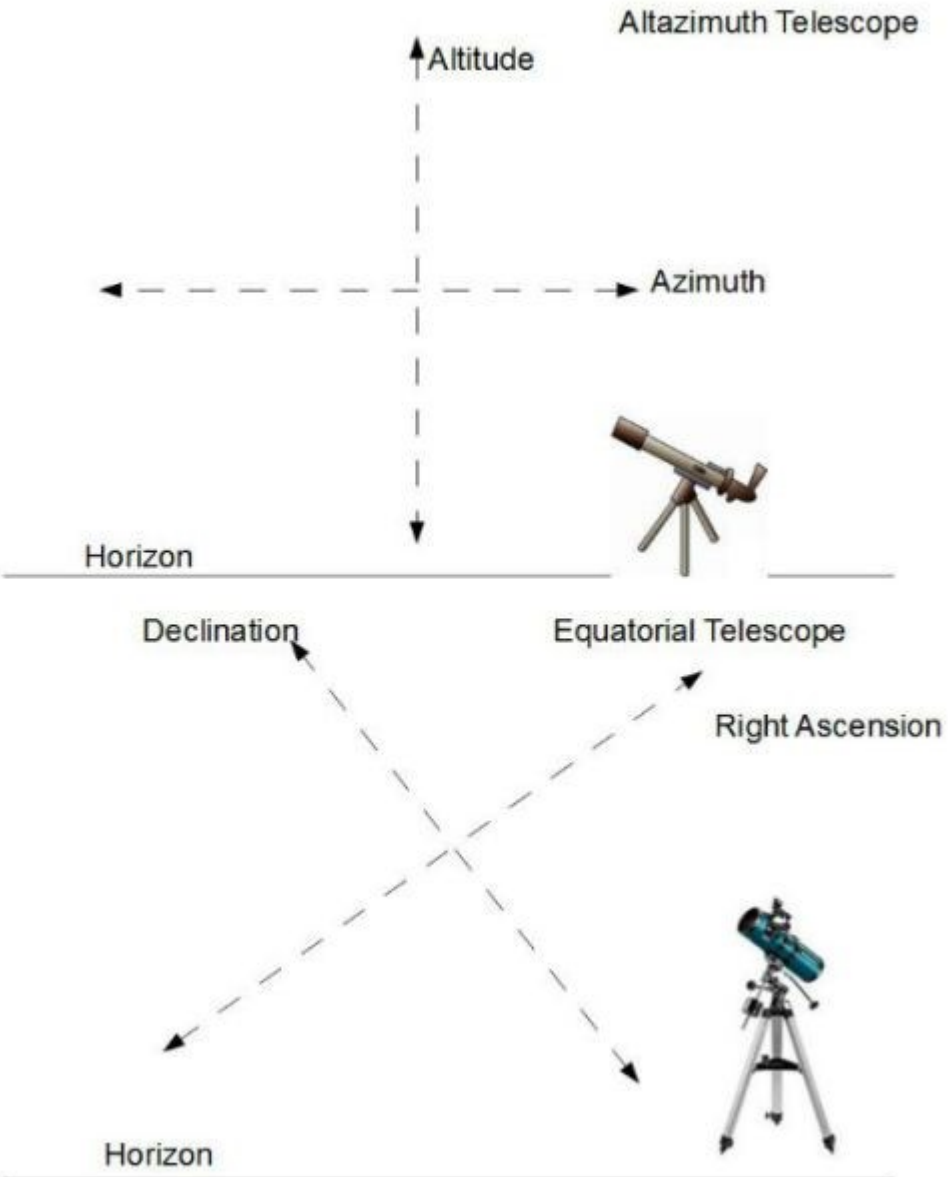
Oh, it *looks* nice. The telescope looks at its most attractive in that position, which is why *almost every EQ telescope from every company shows it in that position.*

Believe me, they have tried to show it in other positions, but it just is just not photogenic at all.

See here's the thing: Did you notice that large weight sticking on a pole down from the telescope's tube? That is called a *counterweight* and it is there to balance out the weight of the optical tube as it is being aimed. But in that position shown (pointed straight down) it isn't doing *anything!*

Because in reality, the telescope will more often look like this (or at least aimed like this if it were

outside):



This is of course, shot indoors, but it give you an idea of how the telescope mightbe aimed. This is shot from the front (North) of the mount so the telescope would be pointing West. Now the telescope's coutnerweight is actually doing something, but it would be doing even more if the telescope were pointed North or South, because the it would look like this:

Now the counterweigh t is really doing its job.

So, about moving the telescope's into position:

5) Use the slow motion controls for when you are close to your target, move the telescope by loosening th

e lock screws for anything larger.

OK, so you might have noticed these spindly plastic knobs extending from the mount. Here, we marked them on this picture in red.

These are the slow motion controls, they allow you to aim the telescope, and the one in Right Ascension will allow you to track an object as it moves through the night sky with the turn of its knob. These things are awesome and one of the main features of a Equatorial Mount.

And you should only use them once you are very close to being where the object is you are viewing.

The slow motion controls can't move the telescope very much –



Yes, that one.



they can go a few degrees but then they will reach their limit and won't move the telescope any more. You should try to avoid reaching this limit as it is hard to backtrack and you might need that slack later on.

So for larger movements it is better to loosen the lock screws (marked with blue arrows (at least the ones still in the picture)) and move the tube by

hand, rotating in in R.A. and Declination as needed. Once you are close to the target object, tighten the screws (critical!) and use the slow motion controls.

These hints should give you a rudimentary idea of how to operate your equatorially mounted telescope. There is a learning curve here and you will need to adapt to it. But the benefits make it worthwhile, clear skies!

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Comments on: "5 Tips to use an Telescope with an Equatorial Mount (the easy version)" (2)

clearskies2016 said:

May 6, 2016 at 10:31 am

Declination I have down, but right ascension I'm still working on. When they say 4h or 8h how do I find that in the sky?

newbie said:

September 7, 2018 at 3:37 pm

Finally! I just got an equatorial mount, and it came without instructions on how to use it, only how to assemble it. After playing around with it for a while I was convinced that the pictures I found of equatorial mounts were not showing the correct way to use the it (except for the photos on

Wikipedia: https://en.wikipedia.org/wiki/Equatorial_mount). Glad to see it in writing.

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