

# Skywatcher AZ EQ6-GT Review Part-1

Source website review: <https://www.firstlightoptics.com/blog/skywatcher-az-eq6-gt-review-part-1.html>

The new [Skywatcher AZ EQ6-GT](#) has had a successful launch and has been well received. Customer feedback so far is excellent and we have experienced zero returns but there is still very little in the way of in-depth reviews on the internet. To remedy this we sent one to Steve Richards for a long-term review :-)

Steve Richards is the author of 'Making Every Photon Count' and writes for The Sunday Times, BBC Sky at Night Magazine and BBC Focus Magazine.

Here is part-1 of his Skywatcher AZ EQ6-GT review:

## Introduction

The Sky-Watcher (N)EQ6 has always been a popular mount for imagers and observers alike, especially those with heavyweight equipment. However, not all observers want or need the added complexity of an equatorial mount and an altazimuth mount will do just nicely.

The new Sky-Watcher AZ-EQ6 GT mount gives you a choice in how you use it as it can be assembled and operated in either equatorial or altazimuth mode. In altazimuth mode you can even mount two telescopes at the same time using the standard hardware that is supplied with the comprehensive kit.

The AZ-EQ6 GT is clearly an evolution of the NEQ6 but one in which the manufacturer has apparently listened to its customers because, as well as its dual functionality, it has several new features that provide worthwhile enhancements over the earlier design.

I have the AZ-EQ6 GT on loan for a long-term review so this article is a preliminary look at the new mount that will be added to in the light of operational experience over the next few months.



## Specification of the review sample

Price: ~A\$3,000  
Weight: Mount 15.3kg, Tripod 7.5kg  
Max Payload: 18kg imaging, 25kg visual  
Power: 11v – 16v (3amp min.). 12v cigar lighter plug  
Database: 42,000+ objects  
Controller: SynScan

## What's in the box?



The mount arrived in two sturdy cardboard boxes. The first contained the mount with dual Losmandy/Vixen saddle clamp, SynScan handcontroller, holder for the handcontroller, power and data cables, a camera control cable, a 150mm counterbalance extension bar, a robust looking second saddle clamp assembly and some Allen Keys.

The second box contained the substantial stainless steel tripod, two 5Kg counterweights and a

metal leg-spreader.

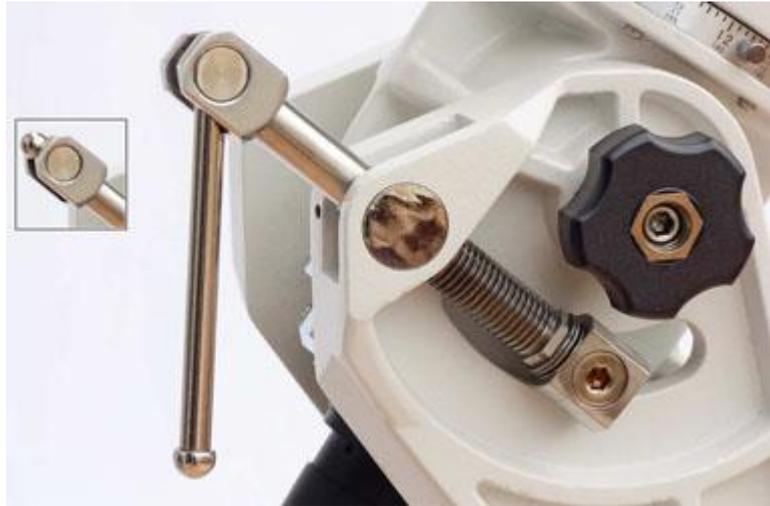
## Description

Finished in Sky-Watcher's normal white finish and trimmed with brushed aluminium components, the AZ-EQ6 GT is a very attractive and solid looking mount with more rounded lines than its predecessor which gives it a more 'finished' appearance. Surprisingly, the mount achieves this whilst shedding 0.8kg in weight which is sufficient to make a worthwhile difference when it comes to portability as it feels a lot lighter.

The mount ships with its own heavy duty tripod which is identical to that of the original NEQ6 so the mount will fit directly on to observatory piers designed for the earlier mount which is good news for people upgrading from the NEQ6.

The mount sports a 25mm diameter stainless steel counterbalance bar which is 207mm long but can be increased in length by a further 150mm using the supplied extension bar. This retractable bar is not only substantially fabricated but its locking mechanism makes its connection in the DEC axis very rigid indeed. A heavy-duty 12mm threaded toe protector ensures that the two 5kg counterweights cannot slide off the bar accidentally. In equatorial mode, the two weights and extension bar were just sufficient to balance a fairly weighty Sky-Watcher 250PX Newtonian Reflector with a relatively heavy Baader Hyperion eyepiece installed in the focuser.

Gone are the sometimes troublesome opposing altitude bolts. These are replaced with a very smoothly operating 16mm diameter hand bolt that works against two swivel blocks, one on the mount base and one on the mount head itself, to produce a very elegant solution to altitude adjustment that is simple to operate one-handed. The hinged Tommy bar on the end of the altitude adjustment bolt stows neatly away inside the bolt head when it has done its work and once the correct altitude has been selected, two substantial plastic knobs lock the mount head solidly in place. The ease of adjustment using this new system cannot be overstated!



The Azimuth adjustment method is unchanged, using two opposing hand bolts with 34mm diameter plastic knobs working against a central post.



A standard Sky-Watcher illuminated Polarscope with etchings for the Polaris circle, The Great Dipper and Cassiopeia for use in the northern hemisphere and Octans for the southern hemisphere is supplied already installed in the base of the RA axis.

In addition, there is also a software-assisted Polar Alignment routine requiring the alignment of at least two test stars (but

preferably three to obviate cone errors) followed by the selection of a further test star. This last star is selected after choosing 'Polar Re-Align' from the handcontroller's menu options and then centring it in the eyepiece. Once centred using the direction keys, the routine moves the telescope to an offset position and you then re-centre it manually using the altitude and azimuth adjustment bolts. This process uses a complex algorithm to correct any polar misalignment detected in the star's position.

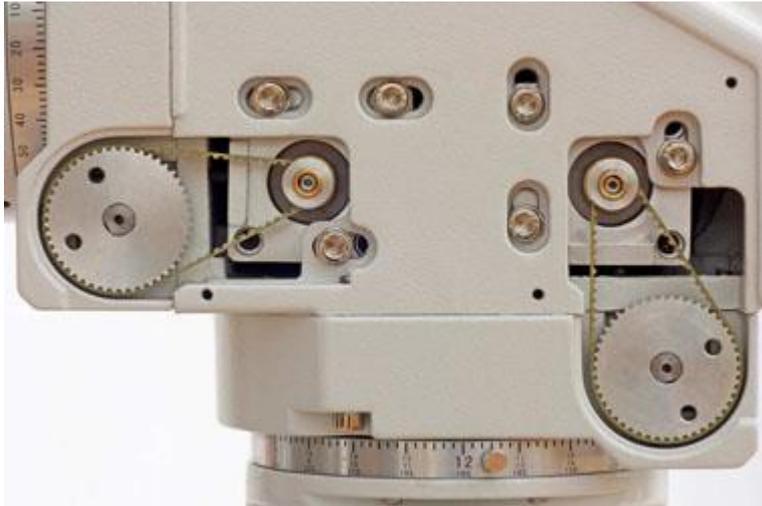
Gone too are the single arm clutch knobs for the RA and DEC axes. A very elegant three pronged capstan-shaped clutch locking mechanism works flawlessly on the DEC axis and unlike its predecessor, this doesn't shift the axis as it tightens. The RA clutch is a single pronged chrome finished capstan at the base of the RA axis surrounding the polarscope. Both clutches are a joy to use, especially with cold hands in the dark!



### RA Clutch DEC Clutch

Existing users of Sky-Watcher mounts will be quite at home with the SynScan handcontroller which was updated to firmware version 3.32 using the RS232 cable supplied with the kit. Various catalogues totalling in excess of 42,000 objects including Messier, NGC, IC, SAO, Caldwell, Double Star, Variable Star, Named Star and Solar System are available. However, the real bonus is that this mount maintains compatibility with the very popular and free ASCOM software, EQmod giving access to many more objects and offering comprehensive computer control using your planetarium software. Hitech Astro supplies a convenient USB adapter to implement the EQMod connection between the PC and mount.

The AZ-EQ6 GT continues to use stepper motors for its drive but these are augmented with 6,356 tic/revolution encoders on both axes which are used for improving GoTo accuracy but play no part in controlling the accuracy of sidereal tracking. These encoders remain functional with the clutches disengaged but the mount turned on so you can manually push the telescope about to another part of the sky should you wish to do so and the encoders will keep the system updated with where the mount is currently pointing.



The mount is even quieter than the NEQ6 which was always excellent in this regard. This relative quietness is no doubt helped by the hybrid drive system that uses a 48:12 reduction toothed belt drive from each stepper motor to the worm gear followed by a 180:1 worm gear reduction resulting in a total gear ratio of 720:1. This new drive system is very smooth and accurate in operation.

A common problem with many mounts including the NEQ6 is the relatively poor power connection that relies on a standard DC type plug. This type of plug is fine for static equipment but less so when the socket is part of a moving device as is the case with a typical Sky-Watcher mount. Sky-Watcher have provided a two prong plug and socket system on the new mount that incorporates a locking collar which is a huge improvement on the original and ensures that accidental disconnection cannot happen.

Included on the faceplate that contains the power connection socket, you'll find an 8 pin RJ45 handcontroller socket, a 6 pin RJ12 ST4 guide port, On/Off power switch, a red LED and a small 3.5mm stereo socket labelled 'Snap'. The Snap socket allows the SynScan handcontroller to initiate a sequence of up to 8 sets of exposures (with each set comprising exposure time and number of exposures) using an attached DSLR camera. A cable suitable for the Canon EOS range of DSLR cameras is included but cables for other camera makes can be ordered or you can make up your own lead using the wiring information included in the manual.

When the mount is used in altazimuth mode, the altitude adjustment bolt is adjusted towards the 90° point where it disengages from the mount's base swivel at about 88° elevation. The mount is then locked in place at 90° elevation using a 12mm diameter bolt, which in equatorial mode is retained in a threaded receptacle on the side of the mount. With the 'RA' axis now vertical, this becomes the azimuth axis and the 'DEC' axis becomes the altitude axis.



A single telescope can be mounted in the standard dual-size saddle clamp and counterbalanced with a suitable weight on the counterbalance bar. However, Sky-Watcher supply a second dual-size saddle clamp that affixes to the counterbalance bar and tightens securely onto a machined flat on the end of the counterbalance bar allowing two telescopes to be installed at the same time. The two telescopes balance one another by adjustment of the amount of counterbalance bar extension you provide. The second saddle clamp has a very

neat altitude adjustment to allow you to point both telescopes at the same elevation although there is no matching adjustment for azimuth.



### [Second Altazimuth Saddle](#) [Altazimuth Saddle Altitude Adjustment](#)

## **Conclusion**

The new AZ-EQ6 GT mount represents a worthwhile step up from the NEQ6 rather than a huge leap so it can be thought of as an evolutionary step. In part two of this long-term review I will be reporting on the use of the mount in the field for both observations and deep sky imaging. However, for now, there is no denying the appeal of a mount that can operate in both ALTAZ and EQ modes and this one certainly does this transformation in an elegant and substantial manner. Factor in the much improved altitude adjustment, new RA and DEC clutches, belt drive, reduced weight and elegant design and this mount becomes a very attractive package indeed.

# Skywatcher AZ EQ6-GT Review Part-2

The new [Skywatcher AZ EQ6-GT](#) has had a successful launch and has been well received. Customer feedback so far is excellent and we have experienced zero returns but there is still very little in the way of in-depth reviews on the internet. To remedy this we sent one to Steve Richards for a long-term review.

Steve Richards is the author of 'Making Every Photon Count' and writes for The Sunday Times, BBC Sky at Night Magazine and BBC Focus Magazine.

Here is part-2 of his Skywatcher AZ EQ6-GT review. The first part of the review can be read here: [Skywatcher AZ EQ6-GT Review Part-1](#)



## Introduction

In part 1 of this long-term review I looked at the constructional features of the new mount with some general comparisons against the original NEQ6. The mount has a lot going for it especially as it has appeal to both astro-photographers and observers alike because of its dual identity – not many mounts are capable of making the transformation from an equatorial mount to an altazimuth mount as elegantly as the AZ-EQ6 GT.

Astro-photographers, however, require various attributes from their mounts to ensure the best quality images and the first of these is that it should be an equatorial mount. An equatorial mount follows the apparent movement of the stars across the sky in a smooth continuous arc whereas an altazimuth mount moves in a series of discrete horizontal and vertical steps. Although an altazimuth mount will keep an object centred in the field of view, over a long

period of time, the field of view will appear to rotate resulting in what is known as 'field rotation'. Field rotation produces elongated stars around the periphery of the frame which spoils the image but also indicates clearly that the main object must also have rotated and thus been blurred and distorted in the process.

What makes for a good Equatorial Mount for observing? The following attributes should be high on your wish-list:-

1. A solid platform on which to mount your telescopes to avoid unwanted vibrations from simple actions like focusing, or by wind buffeting.
2. For the majority without a fixed observatory - portability and ease of setting up for an observing session.
3. A ready method of achieving an accurate polar alignment.
4. An accurate GoTo system to help locate those dim objects.

If you are an astro-photographer, you'll want to add these attributes too:-

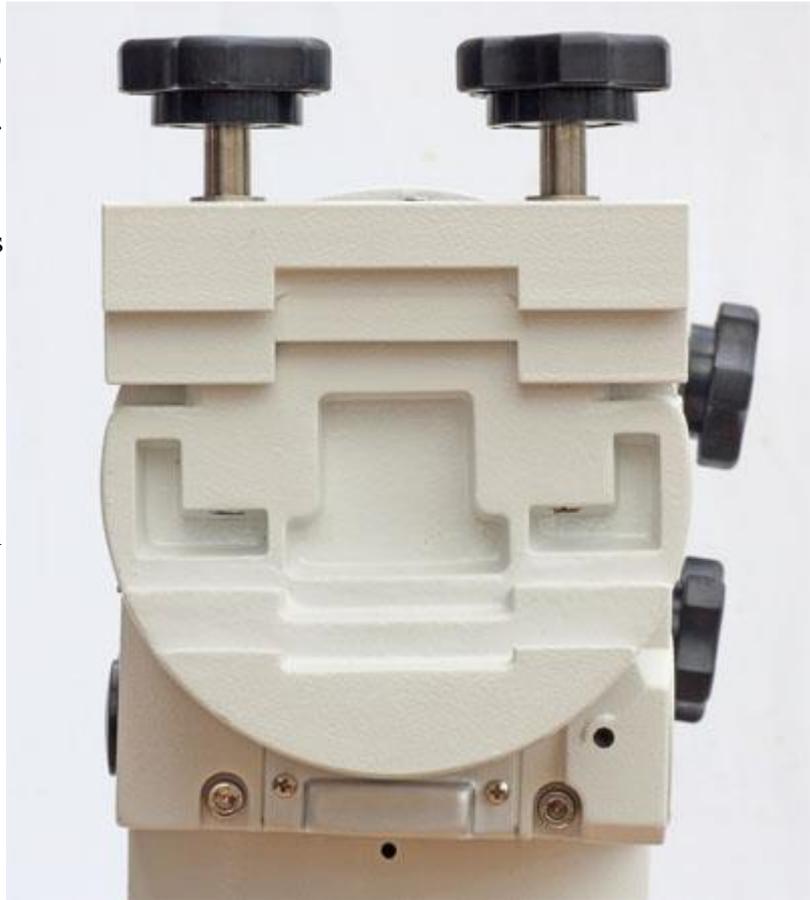
5. An accurate tracking system to ensure that the stars don't trail because if the stars trail, the deep sky object will be blurred and fine detail will be lost.
6. Periodic Error Correction (PEC) to correct any discrepancies in the tracking accuracy if you are not using auto-guiding.
7. The capability of autoguiding your mount for the ultimate control and correction of tracking.

## **The AZ-EQ6GT in use**

Despite appearing larger than the NEQ6, the AZ-EQ6GT is actually lighter and very easy to set up on the substantial tripod, being retained by a single long M12 bolt that is also threaded at its base to hold the cast aluminium leg spreader/eyepiece holder in place.

I moved the azimuth post 180° from its original position between two legs to immediately above a single leg to give a more comfortable kneeling position with more space when adjusting the polar alignment – this also gave me a 'north pointing leg' which is a handy precursor to future polar alignments.

The DEC head has a dual Losmandy/Vixen saddle clamp that is the same design as that of the NEQ6 and is much nicer than the usual locking bolt that can mar the finish of the dovetail bar. This saddle works well with both dovetail types and has two clamping bolts to clamp the saddle firmly on the bar. However, it does share a minor issue with the NEQ6 in that there are no guide rods in the design so the moving part of the saddle tips slightly when you tighten it. I resolved this by simply inserting a piece of card under the moving section to stabilise it, this solution worked perfectly.



There are various methods of polar aligning the mount, including aligning the polarscope engravings of Ursa Major (The Big ‘Dipper’) and Cassiopeia with these constellations in the night sky, matching the imaginary ‘clock face’ of the Polaris engraving with the Polaris position given by the SynScan handset or by using an automated routine using two alignment stars from the handset. The automated routine has already gone through some changes and, depending on which firmware version you are using, might even be absent. The current version 3.35 firmware seems stable and the polar alignment routine worked well. My own preferred method however was to use a phone app that produces a graphic showing the position of Polaris and then transposing this onto the view through the polarscope. Having placed Polaris in the correct rotation in the polarscope, it is then a simple matter of adjusting the altitude and azimuth bolts on the mount until Polaris is centred in the little Polaris circle engraved in the polarscope’s reticule. The single altitude bolt on this design really did make this aspect of the alignment much easier than on the NEQ6 and many other similar mounts.

With the mount polar aligned, the next stage is to carry out a star alignment to map the handset’s sky model to that of the real sky. For observing sessions, where a range of different objects were going to be viewed over a large part of the sky, I normally used a two star alignment although a three star option is also available. For imaging, where I would be staying put on a single object for the whole session, a one star alignment was more than sufficient. The start point for any star alignment process with this mount is with the counterbalance bar pointing downwards and the telescope pointing upwards. If this is carefully carried out, the first alignment star normally appears comfortably within the telescope’s finderscope and more often than not, within the telescope’s eyepiece when using a short focal length instrument.

After carrying out a 2 star alignment, using the bright stars Arcturus and Vega as my alignment stars, I chose the tiny planetary nebula, M57, The Ring Nebula as my first target, followed by globular clusters M13 and M92 and all three objects were presented perfectly centred using my 5mm eyepiece and 600mm focal length refractor. Moving on to the much larger open cluster M44, the Beehive Cluster, I found it perfectly centred in my 17mm eyepiece even though it was located on the other side of the meridian. Galaxies M51, M81 and M82 soon followed and every object I chose was easily located within my telescope's eyepiece so I was rather impressed with the accuracy of the GoTo system. I was pleased to note that the noise from the mount when slewing was very low and movements were very smooth. For each GoTo command the mount performed a major slew followed by some fine adjustments before beeping to confirm that it had finished. During my observational testing, objects remained near the centre of my 17mm eyepiece for well in excess of an hour.

A rather nice feature, if you want to move very quickly to a new target, is that you can unlock the clutches and manually, move the telescope to point to a new location and the mount encoders will keep track of where you have moved to. When you re-engage the clutches, the operating system will continue as normal.

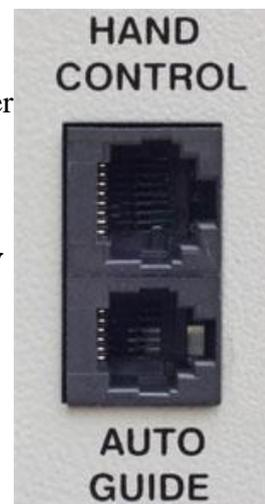
The AZ-EQ6GT is ASCOM compliant but more than this, it is fully supported by EQMOD\*. This is a real bonus because, good though the SynScan handset may be, EQMOD makes operation of the mount quicker and more intuitive with full control being handed over to your planetarium software or other ASCOM compatible software.

## **The AZ-EQ6GT in use for astro-photography**

Moving on to astro-photography, I measured the periodic error at 25.4 arcseconds peak to peak with an RMS value of 7.7 arcseconds which is an improvement on a typical NEQ6 mount and this was delivered smoothly so was easy to autoguide out using typical 2 second guiding intervals.

The mount has a built in industry standard ST4 guide port but if you use EQMOD, you can guide the mount using pulse guiding as an alternative. Should you wish, this latter option will open up the possibility of running Periodic Error Correction (PEC) and autoguiding at the same time, although I tend to rely purely on autoguiding for correcting tracking errors.

To give an idea of what the mount is capable of unguided, I took a sequence of 120 second exposures of the globular cluster, M3 using a Canon EOS 450D DSLR camera and my 600mm focal length refractor. I was very pleasantly surprised by the quality of the star shapes that I captured with no PEC or guiding in operation.





**Cropped 120 second exposure of globular cluster M3**

## **Conclusion**

The build quality that I discovered in part 1 of this review gave the promise of good things to come from the field-testing and the Skywatcher AZ-EQ6GT did not disappoint. Quick and easy one person assembly despite a good payload capacity, simple polar alignment, easy star alignment, accurate GoTos and straightforward guiding make this a compelling purchase for those interested in a good equatorial mount for astro-photography. Observers too will appreciate the GoTo accuracy which covers the whole sky even from a simple two star alignment.

\* *Information on EQMOD can be found on First Light Optics' website [here](#).*

# Skywatcher AZ EQ6-GT Review Part-3

The new [Skywatcher AZ EQ6-GT](#) had a successful launch and has been well received. Customer feedback so far is excellent but there are still only a handful of reviews on the internet. So, to remedy this, we sent one to Steve Richards for a long-term review 😊

Steve Richards is the author of 'Making Every Photon Count' and writes for The Sunday Times, BBC Sky at Night Magazine and BBC Focus Magazine.

Here is part-3 of his Skywatcher AZ EQ6-GT review - Altazimuth Mode and Final Summary. The first part of the review can be read here: [Skywatcher AZ EQ6-GT Review Part-1](#) and part two here: [Skywatcher AZ EQ6-GT Review Part-2](#).



## Introduction



In part 1 of this long-term review I looked at the constructional features of the new mount with some general comparisons against the original NEQ6. This initial review was followed by a closer look at the mount when set up in Equatorial mode. In this final part of the review I'll be looking at the mount from an observer's point of view rather than an imaging one with the mount set up in Altazimuth mode.

Altazimuth mounts track objects as they move across the sky, using two axes in discrete horizontal and vertical steps, unlike an Equatorial mount which tracks objects in an arc using the movement of a single axis. Because of this movement, they can be set up in any position and don't have to be polar aligned so set-up time is reduced. This stepped movement makes them unsuitable for long exposure imaging but they are fine for observational use where their more intuitive pointing makes them easier to use than an Equatorial mount.

Although polar alignment is not required, the mount does need to be mapped to the night sky and this is achieved by carrying out a simple 2-star alignment process. After this has been completed, you can choose celestial objects from the extensive 42,000 object database to slew to.

## **The AZ-EQ6GT in use**

Two-star alignment is quick and straightforward. Choose a bright star in the night sky that you can readily identify and scroll through the list of alignment stars to find it, select it and then manually slew the mount using the direction keys on the handcontroller until the star is centred in the telescope's finderscope and press the 'Enter' key. For the first part of the

alignment, using the finderscope, you can also choose to undo the mount's clutches and manually push the telescope until it is pointing at the first star. Finally, you centre the star through the eyepiece of the main telescope and press 'Enter' again.

The system will ask you to select a second alignment star from the star list which will set the mount slewing to the new location using the position of the confirmed first alignment star as its known start point. Once the slew has been completed, you centre the star in the finderscope and then fine tune the pointing by centring it in the eyepiece of the main telescope. A final press of the 'Enter' key confirms the mount's alignment.

With alignment completed successfully, I set off on a journey of discovery to locate a wide range of objects in various locations in the night sky. Most objects appeared comfortably within the 2° field of view of my 17mm Hyperion eyepiece and 618mm focal length refractor but GoTo accuracy was not as good as it had been when using the mount in Equatorial mode. However, Skywatcher are aware of this anomaly and are working on a solution that will be addressed in a future firmware upgrade.



Having tried the mount with a single telescope counterbalanced horizontally with one of the supplied weights, I then mounted a second, shorter focal length telescope, to the secondary dovetail saddle. This provided a very secure mounting and the fine adjustment of the altitude setting on the saddle assembly made it fairly easy to align the two telescopes with one another in the vertical axis. I found it very convenient and, to be honest rather fun, to swap between the narrower field of view of the larger instrument and the wider field of view of the smaller instrument so easily and I can see that dual telescope observing could become rather addictive!

## Conclusion

The Skywatcher AZ-EQ6GT proved to be a very accessible mount when used in Altazimuth mode, was quick to assemble and align and great fun to use with two telescopes of different focal lengths and with differing eyepieces to allow the viewing of the same object at two different scales.

Skywatcher have an excellent reputation for resolving issues with their mounts (the earlier automated polar alignment routine issue being a recent example) and I have no doubt that the reduced pointing accuracy when using the mount in Altazimuth mode will be resolved in a forthcoming firmware upgrade. For very dim and more obscure objects, which by their very nature can be difficult to find through the eyepiece, I'd prefer to use the Equatorial mode, for its increased GoTo accuracy, until the revised firmware becomes available.

## **Final Summary**

Having used this mount extensively over several months for both imaging and observing I was delighted with its performance. Being used to a fixed observatory platform, I did wonder if setting this instrument up each time for an imaging or observing session would be a chore but this was not the case and I often used the mount for observing while my imaging equipment in the observatory was working away on its own. The mount didn't show any unusual behaviour at any time and performed as a very mature product, especially when used in Equatorial mode for either imaging or observing.

Unless its duality is important to you, I wouldn't suggest upgrading to the AZ-EQ6GT from the original NEQ6 but as an upgrade from any mount of lower performance or payload capacity than an NEQ6 this would be a very good choice indeed and it has certainly re-kindled this imager's interest in observational astronomy!!

**Highly recommended!**