

Sky-Watcher's Fast Astrograph

The Quattro reflector series promises photographic speed at an affordable price.

Sky-Watcher Quattro 8-inch Imaging Newtonian

U.S. price: \$610

Available from skywatcherusa.com and dealers worldwide.

The Sky-Watcher Quattro 8 is an 8-inch f/4 Newtonian reflector designed primarily for deep-sky imaging with DSLR cameras. The unit tested had a standard steel tube finished in Sky-Watcher's trademark black-sparkle enamel paint.

ALL PHOTOS BY THE AUTHOR



ASTROPHOTOGRAPHERS pursuing deep-sky quarry often desire a generous focal length, which produces enough image scale to resolve small details in their targets, but would prefer not to sacrifice focal ratio to get it. A telescope with an f/ratio faster than f/6 is ideal for keeping exposure times short. This is especially desirable when shooting with DSLR cameras whose uncooled sensors always exhibit more noise than cooled astronomical CCD cameras.

While we can boost the ISO speed of DSLRs, this comes at the cost of increased noise in each photo. Lowering the ISO reduces noise but requires longer exposure times, meaning fewer images and targets shot

WHAT WE LIKE:

- Fast, f/4 optics
- Solid, precise focuser
- Well-corrected field with optional coma corrector
- Attractive price

WHAT WE DON'T LIKE:

- Scratch-prone setscrews can mar accessories
- Vignetting requires more care in processing

per night. Fast optics are always nice to have, but they usually exact a premium price on your bank account.

To address that, Sky-Watcher introduced the Quattro Imaging Newtonian reflectors with 8-, 10-, and 12½-inch apertures. Each is f/4 (hence the Quattro name) and sells for \$610, \$770, and \$1,199, respectively in the United States. However, as I found, to make them usable for imaging you need the optional Quattro Coma Corrector (\$285). But even with that added cost, the Quattros remain bargains for fast astrographic systems.

How well do they work? I tested the 8-inch model, on loan from Pacific Telescopes in Richmond, Canada, and found that it worked very well indeed.

Solid Mechanics

The 8-inch Quattro weighs 9.5 kg (21 lbs). Being a large, solid-tube Newtonian reflector, it's prone to catching the wind and thus needs to be on a sturdy mount for best performance. I tested it on my Astro-Physics Mach-1GTO German equatorial mount, which was somewhat overkill for this scope. In the Sky-Watcher line, I would recommend using the 8-inch Quattro with nothing less than the EQ6 or AZ-EQ6 mounts, and the heavier EQ8 SynScan GPS mount is an even better option.

Since the telescope is designed primarily for photography, key to its performance is the quality of the focuser. The Quattros use a Crayford-style focuser with a friction drive and 10:1 fine-speed motion. I found the focuser precise and rock solid. It locked down well and never slipped with the DSLR camera I used, nor with any of the heavy eyepieces I tried when observing through the instrument.

However, the camera and coma corrector are held in the focuser with two small setscrews that press directly on the barrel of the coma corrector. There is no compression ring, nor are the setscrews Nylon tipped, so they scratched the coma corrector's tube. I also found the small setscrews tough to get at and adjust. I was also concerned that they might not be sufficient to hold a heavy CCD camera if the focuser were angled down to the ground (a common orientation when imaging with Newtonians). But the Quattro focuser is ideal for DSLRs and most lightweight CCD cameras.

The Quattro's steel tube has an attractive black-sparkle finish common to many Sky-Watcher telescopes. On cool autumn nights, I never noticed any appreciable focus shift during the one to two hours I needed to capture a set of images of an object. Even so, it's a good idea to refocus periodically when imaging through any telescope, particularly when the temperature changes markedly throughout the night.

The 8-inch Quattro comes with a Vixen-style dovetail mounting bar. Its tube rings also include threaded holes for attaching an additional plate to the top of the scope. I had no problem bolting on my own, larger dovetail plate



The tube rings included with the Quattro are tapped with a single ¼-20 thread on both top and bottom, and one ring includes a ¼-20 threaded stud, suitable for attaching a ball head for piggyback photography.



The Quattro line includes an excellent 9x50 finderscope attached with a standard dovetail shoe, which can be replaced with a 50-mm guidescope for autoguiding. The Crayford-style focuser comes with adapters for 1¼- and 2-inch eyepieces. The 2-inch adapter is shown here.



The tube interior is well blackened and contains nine baffles, but does not extend farther than a standard Newtonian. Nevertheless, shooting from a dark site, the author didn't notice any stray light illuminating the field. The coma corrector does not protrude into the light path, and the only diffraction spikes in images were due to the four-vane spider.



The primary mirror cell is well ventilated and includes knurled collimation knobs that are easy to turn by hand and lock down securely. Note that they protrude beyond the end of the cell, requiring care in transport to ensure they do not get damaged.

needed for my mount, and another plate to the top for mounting my SBIG SG-4 autoguider.

You can loosen the tube rings to allow the telescope to rotate for placing the camera or eyepiece at a convenient angle. But this proved difficult to do without either shifting the mount or having the tube slide down the rings, compromising the balance. Instead, I settled on an orientation that worked well for all the imaging I did in the eastern and southern sky.

Imaging Performance

Without the optional coma corrector, the 8-inch Quattro presented a sharp field of view over a central 12-mm circle of the camera's frame, typical for an f/4 Newtonian. Outside of this small area, stars appear as progressively larger teardrop shapes radiating from the center. While this is sufficient for lunar photography with the

small detectors typically found in high-speed video cameras used for lunar imaging, the optional Quattro Coma Corrector is an essential accessory for deep-sky imaging with any DSLR camera or today's CCD cameras with mid-sized detectors.

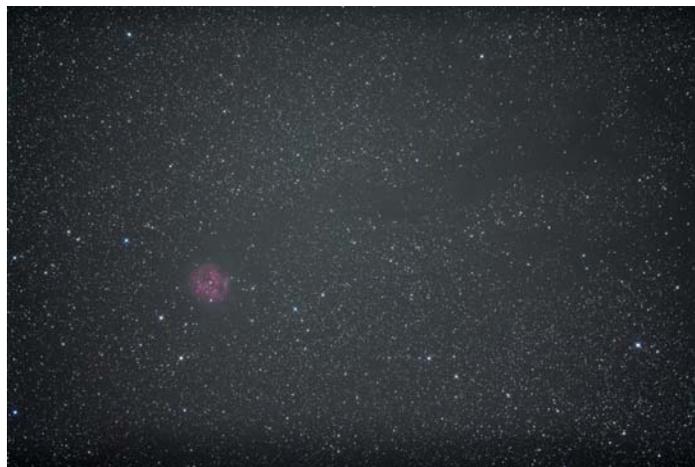
The Quattro Coma Corrector flattened the field almost completely, leaving star images ever so slightly elongated only at the extreme corners of a full-frame ($24 \times 36\text{mm}$) DSLR sensor — performance that I consider more than acceptable. While this telescope has a large, 3-inch secondary mirror, there is still a significant amount of vignetting in the outer third of the field of a full-frame DSLR camera. Also apparent is a darkening along the bottom edge of the frame, and along the top to a lesser extent, caused by shadowing from the camera's rectangular mirror box. This isn't any fault of the Quattro — it's an effect that shows up in all full-frame DSLR cameras paired with fast astrograph systems. The faster the optics, the worse the shadowing effect, which can vary depending on the camera model. It is less of an issue for photographers using cameras with smaller, APS-size sensors.

Nevertheless, imagers should be prepared to record and apply flat-field calibration frames that eliminate most, if not all, of the vignetting. Just be warned, this is the price to pay for using fast focal-ratio astrograph systems with DSLRs, especially full-frame cameras.

Visual Use

Although the Quattro series is marketed primarily for imaging, an f/4 Newtonian makes an attractive "rich-field" visual telescope. I spent some nights observing with the scope to evaluate its visual performance.

Despite its small coma-free field, I never found the coma at the edge of the field to be objectionable even



Left: Without the optional coma corrector, the Quattro exhibits strong coma on full-frame cameras, with sharp stars in only the central 12-mm of the frame. **Right:** While using the telescope with the Quattro Coma Corrector, some light falloff toward the corners is inevitable in such a fast system. In addition, the mirror box of a full-frame DSLR camera added shadowing along the top and bottom edges of the frame. This image is processed with increased contrast to better display the vignetting.



This image of IC 5146, the Cocoon Nebula, was shot with the Quattro Coma Corrector and a modified full-frame Canon 5D MarkII camera. It shows nearly perfect star images at each corner.

with wide-field eyepieces. Views with many premium eyepieces, including Tele Vue's 41-mm Panoptic, 31-mm Nagler, and 17-mm Ethos eyepieces, looked stunning. Crisp, round stars were visible across all but the outer 25% or so of the field. (Note that the Sky-Watcher Quattro Coma Corrector cannot be used visually.)

At low magnifications the field of view was particularly impressive. The brighter eastern and western sections of the Veil Nebula (NGC 6992 and NGC 6960) just fit into the field of the Tele Vue 31-mm Nagler eyepiece. After slight tweaks to the telescope's collimation, the optics yielded classic Airy disk diffraction patterns around stars at high powers, and double stars such as Epsilon Lyrae were well resolved. There was no sign of astigmatism or spherical aberration.

But the large secondary mirror robs planetary views of contrast, so I wouldn't recommend the Quattro (or any f/4 Newtonian reflector) as a great planetary scope. For visual use, the Quattro excels at providing low-power, wide-field views.

For me, the benchmark of a fine telescope is how soon I stop fussing with the testing and just start enjoying it. After one or two moonlit nights of testing, I found myself shooting with the Quattro and using it to go after some remaining objects on my personal target list. It just worked! Being able to shoot at the low-noise setting of ISO 800 while keeping my exposures no longer than 8 minutes let me capture excellent detail in multiple targets each night with the scope's 800-mm focal length. It is a wonderful thing!

Even with the additional cost of the coma corrector and the need for accurate flat-field calibration images, the telescope performed admirably. I can recommend the 8-inch Quattro as a superb imaging system for under \$1,000. Just be sure to match it to a substantial mount to do the telescope justice. ♦

Contributing Editor Alan Dyer is author of the ebook How to Photograph & Process Nightscapes and Time-Lapses, available at amazingsky.com/nightscapesbook.html.