Meet the PowerNewt

This new Boren-Simon astrograph offers 8 inches of aperture, a fast focal ratio, and high-quality optics. **by Phil Harrington**

This Newtonian astrograph boasts 8 inches of aperture and a focal ratio of f/2.8 when the user inserts the included reducer-corrector. Otherwise, the scope's focal ratio is f/4.

The first decade of 21st-century amateur astronomy witnessed an explosion of digital astroimaging gear. At the same time, telescopes designed specifically for those digital cameras — called astrographs — have become increasingly popular, as well.

One of the few Newtonian-based astrographs on the market comes from the Israeli company Boren-Simon. Its PowerNewt 2.8-8 ED is an 8-inch f/2.8 reflector designed for wide-field astrophotography. With a focal ratio of 2.8, this is the fastest commercial Newtonian.

Inside the tube

As with terrestrial photography, astroimaging requires the right exposure to capture a target in proper light and detail. The faster a photographic system — that is, the lower its focal ratio — the shorter the exposure needed to capture a target. For instance, an object that requires an 80-minute exposure through an f/5.6 telescope will require only 20 minutes at f/2.8 through a similar-aperture scope.

The PowerNewt incorporates an f/4 mirror. The secret to the f/2.8 rating lies in a four-element reducer-corrector lens assembly called a Keller corrector. Named for its designer, Philipp Keller, this accessory eliminates coma across the field of view and also reduces the effective focal ratio by 30 percent. Coma is a problem common to fast Newtonians where star images at the edge of the field of view distort into small comet shapes.

Boren-Simon optimized its reducer-corrector for digital single-lens reflex (DSLR) cameras. Swap the camera's lens for a T-ring (available from most camera stores and online), thread the reducer-corrector into the T-ring, and then insert its other end into the focuser as you would an eyepiece. For visual observing, simply replace the corrector with an empty extension tube (supplied) to revert the telescope back to its f/4 focal ratio.

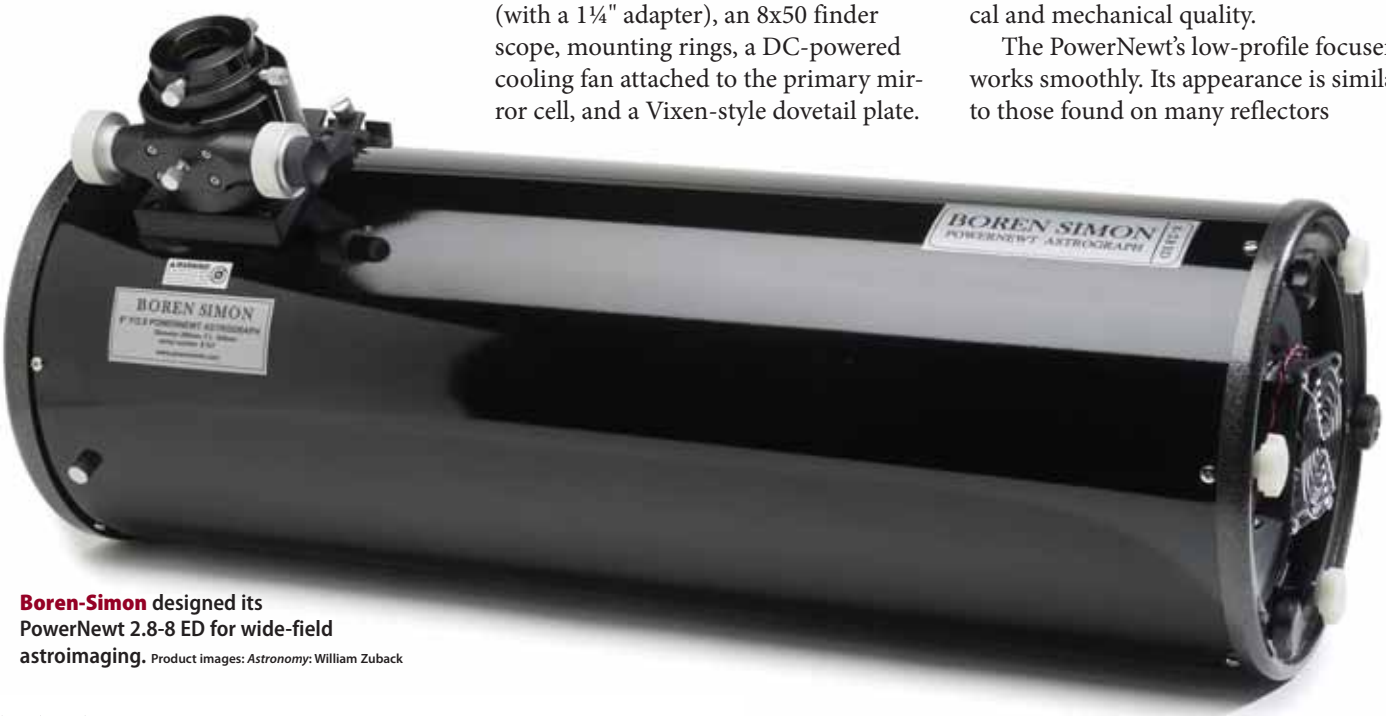
Accessories and enhancements

In addition to the reducer-corrector and extension tube, the PowerNewt comes outfitted with a dual-speed 2" focuser (with a 1¼" adapter), an 8x50 finder scope, mounting rings, a DC-powered cooling fan attached to the primary mirror cell, and a Vixen-style dovetail plate.

Weighing 13.6 pounds (6.2 kilograms) and measuring 27.55 inches (70 centimeters) long, the PowerNewt can ride on a wide variety of popular equatorial mounts; of course, the sturdier the mount, the better when it comes to long-exposure guided imaging.

The primary and secondary mirrors have enhanced coatings to reflect 93 percent of the light striking their surfaces. Furthermore, the company field-tests each telescope to ensure the highest optical and mechanical quality.

The PowerNewt's low-profile focuser works smoothly. Its appearance is similar to those found on many reflectors



Boren-Simon designed its PowerNewt 2.8-8 ED for wide-field astroimaging. Product images: *Astronomy*: William Zuback

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Product specifications

PowerNewt 2.8-8 ED
Type: Newtonian astrograph
Aperture: 8 inches
Focal length: 568mm
Focal ratio: f/2.8
Corrector: Four-element, multicoated
Optical tube: Rolled steel with enamel finish
Weight: 13.6 pounds (6.2 kilograms)
Length: 27.55 inches (70 centimeters)
Included: Hinged, felt-lined tube rings, 8x50 finder scope, 1¼" adapter
Price: $2,199

The Baby Nebula (IC 1848) in Cassiopeia was a test image taken from Israel's Negev Desert by one of PowerNewt's founders to demonstrate the telescope's performance. He captured and stacked eighteen 5-minute exposures using an Orion Starshoot Pro 2 color CCD camera. Kfir Simon

imported from Asia, except that its barrel carries a linear scale to make repeat focusing easier to accomplish. Once you find the sharpest focus, simply record the scale reading so you can return to that same setting time and again.

When I attached a Canon DSLR to the focuser, I found the camera's weight did not adversely affect the PowerNewt's focus. As long as I tightened the focuser's locking thumbscrew, the image remained sharp during extended sessions.

Viewing through an imaging scope

As Boren-Simon states, buyers can use the PowerNewt visually as an f/4 instrument, but the company really designed it for astrophotography. One result is that the PowerNewt carries a larger secondary mirror than usual to illuminate the wide photographic field evenly.

The secondary mirror in a conventional 8-inch f/4 Newtonian typically measures 2.5 inches (6.4cm) across, but the PowerNewt's is 3 inches (7.6cm) wide. This larger central obstruction lowers image contrast.

The enhanced optical coatings partially offset the loss, but experienced visual observers may still notice an impact. Imagers can enhance the contrast during processing, which is why astrophotographers are more concerned with sharpness than contrast.

Even with that proviso, the PowerNewt's optics proved to be of high quality. After collimating the scope, I began to visually inspect some of the deep-sky jewels scattered across the winter sky. My first stop was the Orion Nebula (M42). The view at 90x was striking, and the six Trapezium stars embedded in the nebula all appeared clearly.

The blue-white gems that make up the Pleiades (M45) also sparkled through the PowerNewt, with tack-sharp images nearly to the edge of the field. Likewise, I resolved many other Messier and bright NGC clusters through the telescope.

To test the company's claim of ⅛-wave optics, I aimed the scope at a 2nd-magnitude star. Although this star test only produces qualitative results, I can say that images slightly inside of focus mirrored those slightly outside of focus. This test provided another strong indication of excellent optics.

An 8-inch f/4 Newtonian is certainly not intended to be a planetary telescope, yet the PowerNewt surprised me there, as well. With Jupiter low in the west, I swung the PowerNewt its way. At 203x, the scope revealed some nice details in Jupiter's atmosphere, including the slowly returning South Equatorial Belt.

A cooling fan helps the primary mirror reach ambient temperature more quickly than it otherwise would.

Use this scope to image

Photographically, the PowerNewt produces crisp, clear images of nebulae, star clusters, and galaxies. True to promise, the reducer-corrector does its job admirably. Not only are exposure times cut dramatically, but stars also remain pinpoints out to the edge of the field.

When coupled with a Canon DSLR, the PowerNewt captures a field measuring approximately 135' by 90' — 16 times the area covered by the Full Moon. This makes it ideal for large-scale objects, such as emission and dark nebulae, broad star clusters, and nearby galaxies.

Because I love wide-field imaging, I came away impressed with the precision and clarity of the PowerNewt's optics. Stars are sharp from edge to edge, while images all showed a clarity that other optical designs simply cannot duplicate.

If you are also into this sort of photography, then consider the PowerNewt 2.8-8 ED. It's a great scope.

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Phil Harrington *is a contributing editor of* Astronomy. *His new book,* Cosmic Challenge *(Cambridge 2011), is on sale now.*

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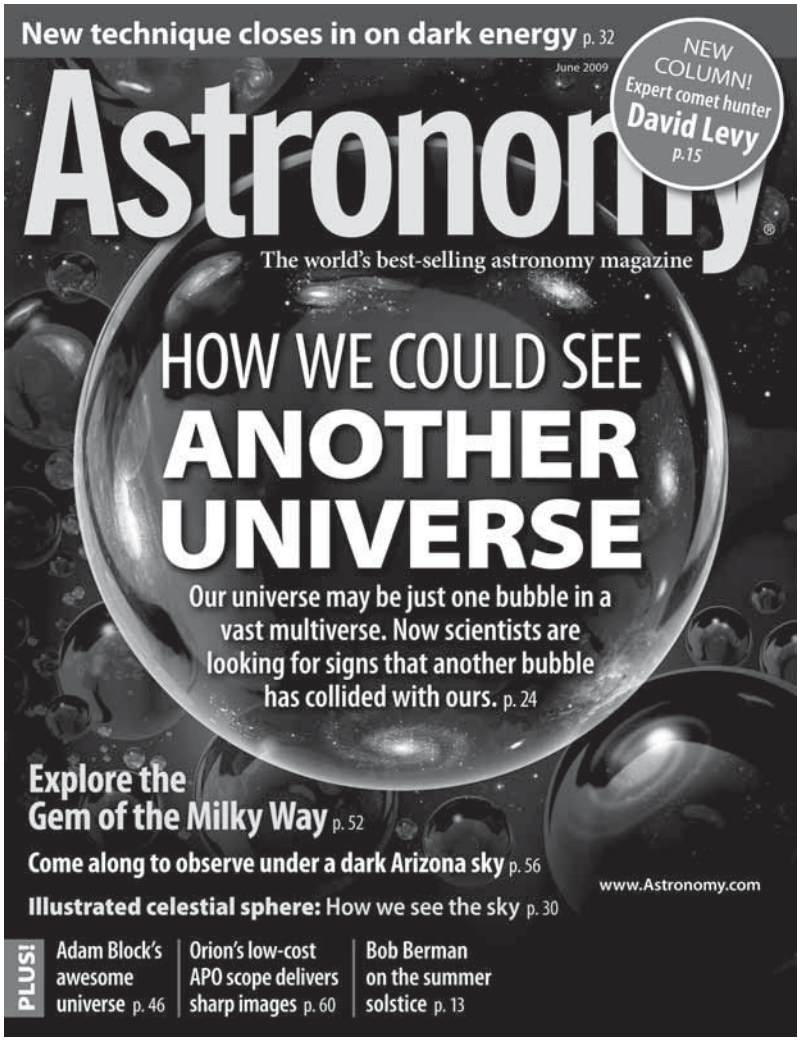

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