

ASTRONOMY

TECHNOLOGY TODAY

Your Complete Guide to Astronomical Equipment

A REPORT FROM THE PARLOR OF THE GLOBE • THE SKY-WATCHER QUATTRO 12-INCH IMAGING NEWT
CELESTRON AVX MOUNT • LIGHTWEIGHT MIRRORS • THE IOPTRON CUBE PRO 8300
THE DAYSTAR QUARK CHROMOSPHERE • LOOKING BACK SERIES: CELESTRON'S FIRST 50 YEARS

The Sky-Watcher Quattro 12-inch Imaging Newt

A Quest for Glorious
Diffraction Spikes



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Cover Story: Pages 29-41

Our cover features Sky-Watcher USA's 12-inch, f/4 Quattro Imaging Newton, which Richard W. Wright Jr. used to capture the background image of M45, the Pleiades. The image was shot with an unmodified Canon 5D at ISO 800. Competent treatments of M45 are always stunning, but Richard's version is especially so thanks to the dramatic diffraction spikes characteristic of the classic four-vane secondary spider of the Quattro Newtonian.



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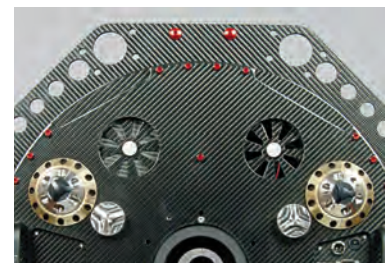
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At the Forefront of Research and Innovation





Ray Bureau is a retired computer support specialist living in Bossier City, Louisiana, and is a member of the Shreveport-Bossier Astronomical Society. As a long-time avid monochrome landscape photographer and computer user, DSLR astrophotography and infrared landscape photography – both using IR-modified cameras – were natural fits. He is also an Extra-Class Ham Radio operator, AD5ZT.

Dr. James Dire has an M.S. degree in physics from the University of Central Florida and M.A. and Ph.D. degrees from The Johns Hopkins University, both in planetary science. He has been a professor of physics astronomy at several colleges and universities. Currently he is the Vice Chancellor for Academic Affairs at Kauai Community College in Hawaii. He has played a key role in several observatory projects including the Powell Observatory in Louisburg, KS, which houses a 30-inch (0.75-m) Newtonian; the Naval Academy observatory with an 8-inch (0.20-m) Alvin Clark refractor; and he built the Coast Guard Academy Astronomical Observatory in Stonington, CT, which houses a 20 inch (0.51-m) Ritchey-Chrétien Cassegrain telescope.



Gary Parkerson discovered early in his amateur-astronomy career that he was as fascinated by the tools of astronomy as by the amazing celestial objects they reveal – perhaps more so. When not writing about astro-tech, he covers industrial technology for a variety of online resources.

Richard S. Wright Jr. has been an avid amateur astronomer for more than 25 years, and is the lead author of a best-selling book on graphics programming. For over 9 years he has worked as a software engineer for Software Bisque and has contributed to TheSkyX and Seeker Theater Suites, and on Bisque's mobile products for iOS. Richard likes to take credit for bringing Software Bisque back to the Mac, and refuses to run Windows at the scope, or as part of his imaging work flow. He loves to go camping... anywhere with dark skies.



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The iOptron Cube Pro 8300

By Dr. James R. Dire

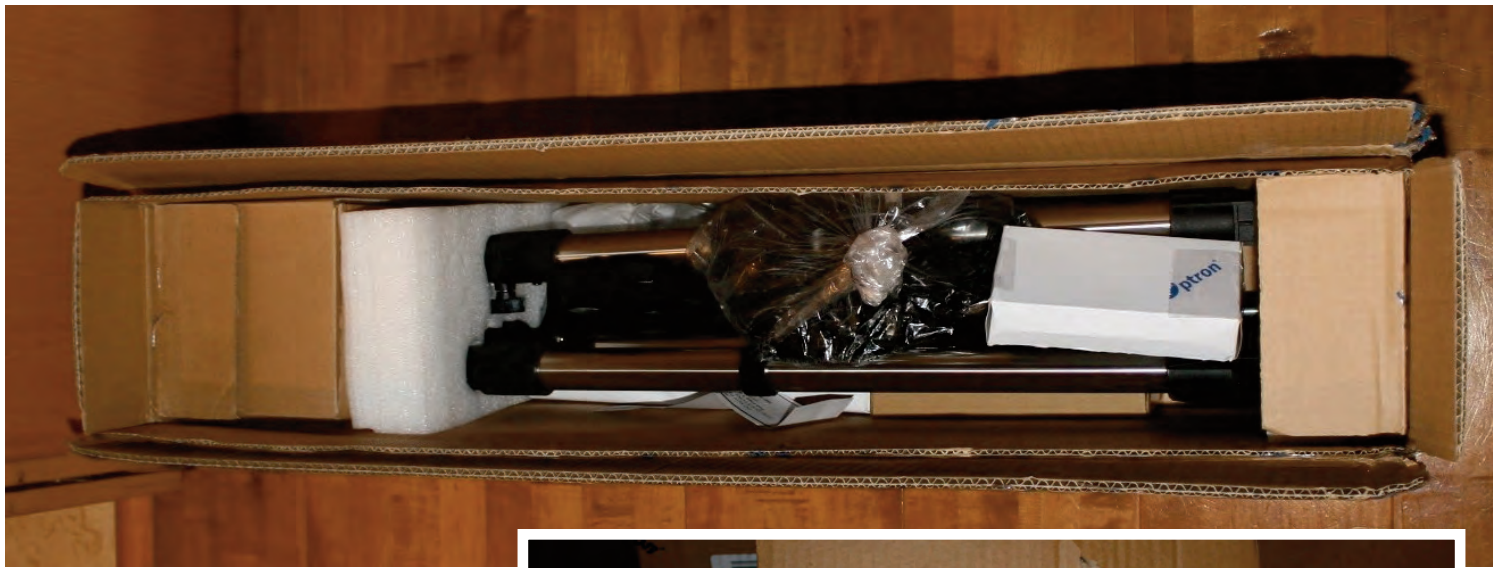


Image 1 - The iOptron Cube comes securely packed in a double cardboard box with foam holding the tripod in place.

The iOptron Cube line of alt-azimuth mounts are small, extremely portable go-to mounts for use with small, lightweight telescopes. These mounts are best suited for short-focal length 60-80 mm refractors, 3- to 6-inch Matsutov- or Schmidt-Cassegrain reflectors, or short-focal length Newtonians up to 144 mm (4.5 inches).

Over the past decade, I have read several reviews of various iOptron Cube models. Many of the reviews spoke negatively about the mounts plastic gears, go-to accuracy, flimsy tripod, and documentation. I am happy to say that iOptron has listened and made great improvements to the Cube mounts.

I won't compare the features of the



Image 2 - The actual Cube mount is inside an interior box, also secured with plenty of foam insulation.

various models of the Cube mounts. However, I will note that I decided on the Cube Pro 8300 because of its built-in GPS, 130,000-object database, and its compatibility with *Voyager* (Carina Soft-

ware) and *The Sky X* (Software Bisque) astronomical software. Plus the mount and tripod only weigh 12 pounds and are rated for up to an eight-pound telescope.

Image 1 shows how the mount was



Image 3 - The completely assembled iOptron Cube mount with a William Optics Star 71 apochromatic refractor.



Image 4 - The small black box on the top of the Cube housed the GPS receiver.

packed for shipping. It came in a double-layered cardboard box. The tripod was held in place by foam on both ends. Accessories like the spreader/eyepiece tray, hand controller, counterweight and counterweight shaft were in separate boxes inside with bubblewrap. The actual Cube Pro mount was in the small box at the end of the larger box, also protected by foam (**Image 2**). I was quite impressed by the packing.

Beside the above accessories, the mount comes with an AC power cord, DC power cord, and a USB cable for computer control. Eight AA batteries inserted into a battery compartment inside the Cube Pro can also power the mount.

The mount came with a quick setup guide. Before I used it, I downloaded the complete 42-page Cube Pro 8300 manual from iOptron's website and read it. The manual contains detailed setup procedures and operating instructions for the hand controller, all nicely illustrated.

Image 3 shows the mount completely assembled on my patio. Setting up the mount involved extending the tripod legs, spreading them and attaching the accessory tray, and using the hand-turned bolt, that extends from below the Cube's base, to firmly attached the Cube to the tripod. Then, I plugged in the hand controller and the power cable. As can be seen in **Image 3**, I am powering the telescope with a 12-volt DC power pack.

I purchased the mount to use with my William Optics Star 71 (71-mm f/4.9 APO, see *ATT* July/August 2014 issue), also shown in **Image 3**. The telescope, rings, and dovetail plate, combined, weigh less than six pounds. The manual recommends using the 1.5-kilogram counterweight for payloads exceeding seven pounds, so it is not necessary with my telescope. I have used it with and without the counterweight and shaft attached with identical results.

Based on my use of the mount, I

would say some telescopes up to 10-12 pound (total payload weight with eyepiece) might work well with this mount, even though iOptron lists the payload capacity at eight pounds. It all depends on the tube dimensions and field of view. My 114-mm Newtonian was light enough, but with a 900-mm focal length, the legs of the tripod got in the way. Shorter focal length Newtonians should not be a problem.

The lightweight tripod is fully extended and the spreader/accessory tray provides a very stable platform. The tripod is not tall enough for standing while viewing, but this keeps it smaller and lightweight. It also easily fits in my large suitcase for airline travel! I prefer to sit when observing, so a small observing stool is standard equipment. The height of the eyepiece is perfect for children to view while standing.

Image 4 shows a closer view of the Cube. As you can see, the Cube is not actually cubic. But who cares? In the image, you can see that the counterweight has a large handle for clamping it in place on the counterweight shaft, and the position of the weight can be adjusted depending on the mass of the payload. The small black box on top of the Cube is the GPS receiver. There is a bubble level on the base plate below the Cube. **Image 5** shows this in more detail (not yet leveled).

A close up of the other side of the Cube appears in **Image 6**. On the left side, you will see the edge of the door to the battery compartment. **Image 7** shows the side of the cube under the counterweight. This side has the on-off switch. The jack for an external power source is on the left side of the switch, and the hand controller plugs into one of the HBX ports to the right. The other HBX port can be used for an autoguider, electronic focuser or another accessory.

The Go2Nova hand controller is pictured in **Image 8**. This is the same hand controller that comes with other

iOptron mounts and can be used to control alt-azimuth or equatorial iOptron mounts. The base of the hand controller has two jacks; one for connecting the controller cable to the HBX port on the Cube and another for connecting the USB cable to a computer for use with ASCOM or planetarium software.

The hand controller's keys and screen are backlight with red lights (**Image 9**) for ease of use. Unlike some other brand mounts, the iOptron hand controller screen has eight lines! Image 9 displays the home screen. When the mount's time zone is configured and the GPS syncs, the local date and time are displayed at the bottom of this screen. Information about the current pointing locations is also displayed.

To operate the mount, before turning on the power it is important to level the tripod and point the side of the base with an "S" as close to true south as possible. The telescope must start out pointed straight up (towards the zenith). When powered up, the GPS quickly determines the location and time. For alt-azimuth operation, the telescope will select two alignment stars and drive to each in turn. Each star must be centered in the eyepiece before going on.

Two alignment stars may not seem sufficient for perfect go-to operation ... and they are not. However, with a low-power eyepiece, the go-to operation always placed my target somewhere in the field of view. I use the slewing buttons on the hand controller to center a target before proceeding to high-power eyepieces. I have also used an 8x50 finderscope attached to the telescope for centering targets without having to swap out a high-power eye-



Image 5 - A close up of the bubble level built into the top of the Cube's base.



Image 6 - This view shows the large hand knob used to secure the telescopes dovetail plate to the mount.



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Image 7 - This side of the Cube has the on/off switched, a red lamp that is illuminated when the power is on, a 12-volt jack for connecting a power cable (if not using batteries in the internal battery compartment), and two HBX outlets.

piece in the WO Star 71 refractor.

One thing I noted in using the mount is that, sometimes in doing the two-star alignment and proceeding to my first target, the telescope would rotate more than 360 degrees in azimuth, wrapping the power cord around the mount. The supplied power cords are generously long and can easily be unwrapped. Once the mount is aligned and operational, it seems to know which direction to rotate to not wrap the cord around anymore.

To control the mount with a computer planetarium or ASCOM compliant program, the supplied USB cable must be attached to the Go2Nova hand controller and to a USB port on a computer. For Window operating systems, the USB2COM driver must be downloaded from the iOptron website and installed on the computer. The Cube Pro 8300 manual has an appendix with detailed instructions on how to do this.

Neither the manual nor the iOptron website had instructions on how to operate the Cube using a Macintosh com-

puter. However, I contacted iOptron and they provided me a link to download the driver for Macintosh OSX. I have successfully operated the mount using both Windows and Macintosh versions of *The Sky X* and *Voyager 4.5*.

The Cube Pro can be operated in alt-azimuth or equatorial mode. I have a tripod and wedge that came with an old Schmidt-Cassegrain telescope. My next project will be to drill a hole in the center of wedge plate, so I can bolt the Cube Pro on the wedge and polar align it. Then I will test the equatorial tracking of the Cube Pro with my DSLR camera for ultra-wide field, unguided, low-power imaging with a 50-mm or 100-mm focal length camera lens. I suspect it will provide images as good as placing my DSLR camera piggyback on one of my larger German equatorial mounts.


I think the Cube Pro is a keeper! I now have a go-to mount that I can take abroad that easily packs into my suitcase along with a great compact telescope. The telescope and mount are a perfect match! 



Image 8 - The Go2Nova hand controller.

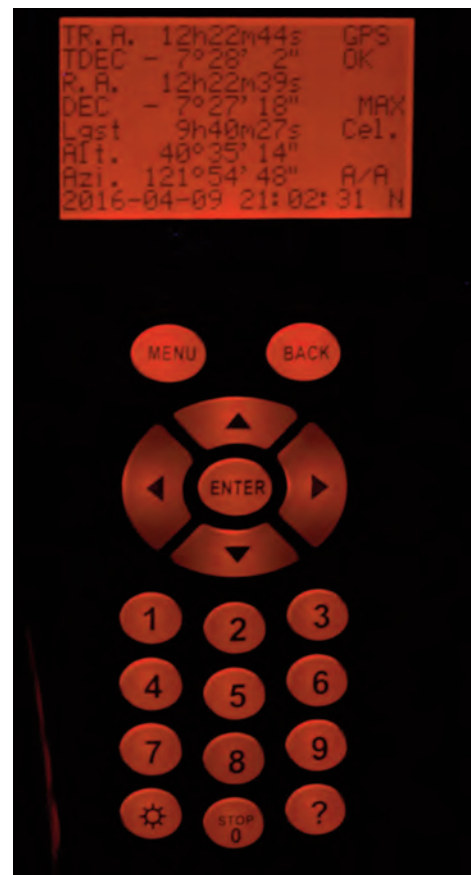


Image 9 - The hand controller display and keys are back illuminated with red lights for ease of use at night.