

Video Astronomy: The Atik Infinity

Atik brings video observing fully into the digital age.



Atik Infinity

U.S. price: \$995

Available from dealers worldwide.

ALL PHOTOS BY THE AUTHOR

HOW DO YOU do video observing? It used to be an easy question to answer. You attached an analog video camera to your telescope, and a 15- to 30-second exposure was long enough to capture countless faint objects, while short enough to give the illusion you were observing them in real time. Advanced cameras often included a neat function that stacked each new exposure into the previous one, resulting in a deeper, more detailed image.

These analog cameras showed plenty of objects but came with a lot of caveats. The images they produced were noisy. Using the camera was difficult, too; you needed a dedicated video monitor out at the telescope, or a special adapter to convert the analog signal to a digital format to display them on a laptop computer. Finally,

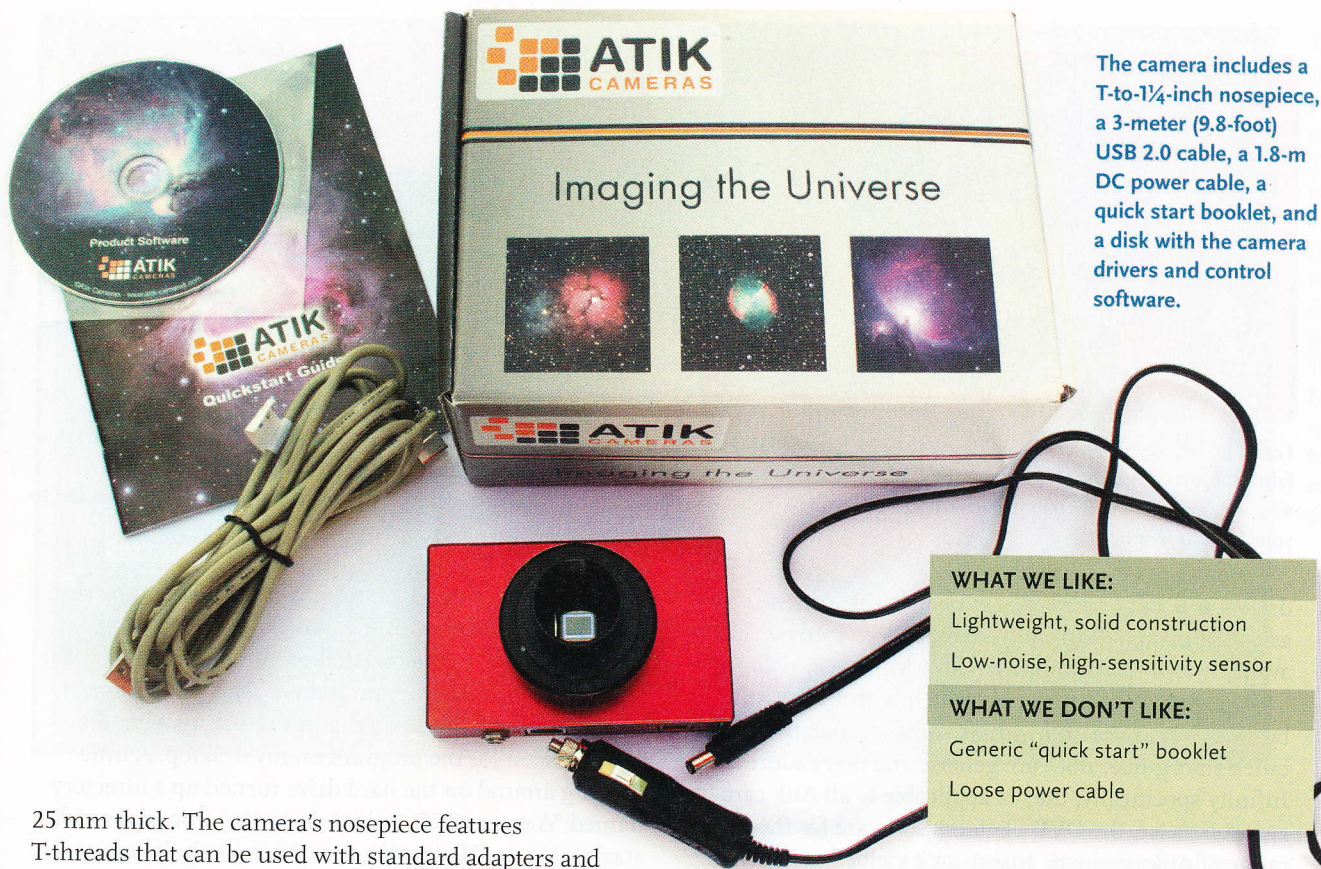
The Atik Infinity is a dedicated video astronomy camera designed to reveal targets through your telescope that are often fainter than you can see with your eye.

the small size of the cameras' sensors meant they only covered narrow fields of view.

Fortunately, today there's an easier way to observe with video that preserves the immediacy and produces higher-resolution images. Enter the Atik Infinity from the United Kingdom. This multi-purpose CCD camera promises to make video observing easy and fun while reducing the amount of equipment needed at the telescope.

A Compact Package

The Atik Infinity is a beautifully finished "box" with red anodizing and a black nosepiece. With the exception of its lack of controls or an LCD screen, the Infinity looks more like a point-and-shoot digital camera than a video camera. The unit has just three ports: a type-B female USB connector, an RJ-12 autoguiding port, and a connector for the 12-volt DC power supply. It's rectangular in shape and thin, measuring 113 mm by 70 mm high and



The camera includes a T-to-1¼-inch nosepiece, a 3-meter (9.8-foot) USB 2.0 cable, a 1.8-m DC power cable, a quick start booklet, and a disk with the camera drivers and control software.

WHAT WE LIKE:

- Lightweight, solid construction
- Low-noise, high-sensitivity sensor

WHAT WE DON'T LIKE:

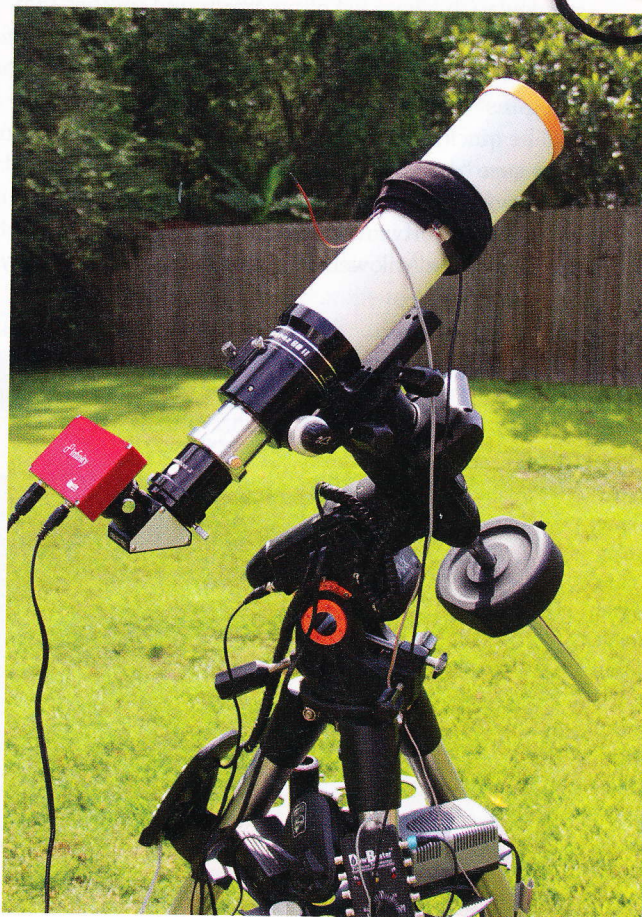
- Generic "quick start" booklet
- Loose power cable

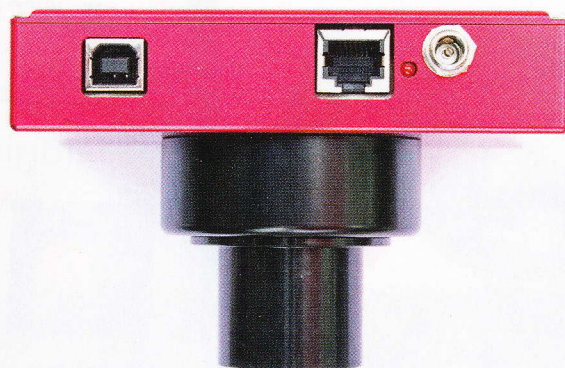
25 mm thick. The camera's nosepiece features T-threads that can be used with standard adapters and accepts most T- to 1¼-inch adapters. The camera is available with either color or monochrome CCD sensors, though I requested a color camera for this review.

In addition to its digital nature, a big attraction of the Atik Infinity is its relatively large CCD chip. It's a 16-bit, 2/3-inch Sony ICX825 with a 1,392 × 1,040 pixel array, which promises much wider fields of view than analog video cameras, particularly when it's used with focal lengths of 1,000 mm or less. The sensor's mid-sized 6.45-micron-square pixels, combined with its high quantum efficiency, should allow it to rival and even surpass the sensitivity of its analog predecessors.

The Infinity's compact body is possibly due to its bare-bones design; there's no Peltier unit or fan to cool the CCD chip. Normally, a CCD detector requires electronic cooling to reduce thermal noise, which appears as many bright pixels in the images it produces. The manufacturer claims the inherent low-noise characteristics of the camera's Sony EXview HAD CCD II sensor eliminates the need for cooling that keeps thermal noise at bay. According to Atik's literature, dark frames are not required to remove warm pixels generated by heat. I was skeptical. My DSLRs do fine without cooling, but they require dark frames to be subtracted from images to remove the many false stars of thermal noise.

Included with the camera is a 3-meter (9.8-foot) USB cable, a 1.8-m, 12-volt power cable equipped with a "cigarette lighter"-style plug, a 1¼-inch screw-on adapter, a brief quick-start guide, and a DVD containing the camera





Left: The Infinity's $\frac{1}{3}$ -inch format Sony ICX825 EXview HAD CCD II detector boasts high quantum efficiency, meaning you'll record faint objects with fairly short exposures. **Right:** Three ports on the bottom of the Infinity are a B-type USB 2.0, an RJ-12 port that allows the camera to be used as an autoguider, and a DC power input. The red LED is activated only when the camera is connected to your telescope mount.

drivers and software needed to operate the camera, as well as a PDF manual. Currently, the Infinity's software is only available for PCs running Windows Vista, 7, 8, or 10.

I was impressed with the build quality of the Infinity, but was less impressed with its software installer and quick-start guide. Both are generic and don't address the Infinity specifically; they're applicable to all Atik cameras. Likewise, the DVD contains software for the entire range of Atik products. Inserting it yielded an install window with a long list of programs and utilities that could be installed. It was obvious I needed to load "Infinity," but did I also need ASCOM drivers? What were the "plug-ins" the app was offering to install?

The quick-start guide helped some by cautioning me to be sure "drivers" (not ASCOM drivers) was checked in the window. Otherwise, it instructed me to select any optional software I need. But what did I need? With the help of the Atik website, I finally figured out I only

needed to install the *Infinity* application in addition to the camera drivers.

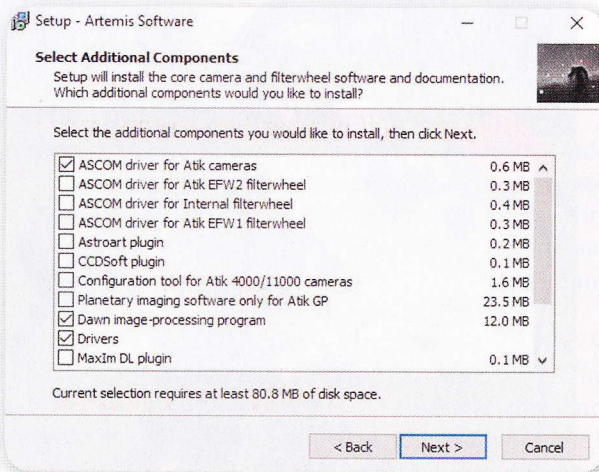
Once I got past the installation, I thought I'd have a look at the *Infinity* program indoors. But it wasn't clear how I was supposed to do that, since the installer didn't place an icon for the program on my desktop. A little digging around on the hard drive turned up a directory named "ArtemisCCD," which I recalled from the quick-start guide. Inside that directory was a sub-directory called "Infinity," and in it was the software application of the same name.

When I launched the program, I became a lot happier. The software doesn't have an overwhelming number of features, but that's in keeping with the nature of video astronomy as a simpler way to take images. There are no menus to navigate to set up the camera; just connect the power, plug in the USB cable, and run the program.

From there it's a matter of learning a few buttons, controls, and indicators. Exposures are limited to a maximum of 120 seconds, but for the dimmest objects, you can select a binning mode, a process combining the sensor's pixels into groups of 2×2 , 4×4 , or 8×8 . The result is considerably more sensitivity but at the expense of resolution. Also, due to the way the Infinity produces color images, binned exposures appear in black and white.

One of the software's most important features is "Image Stacking." When stacking is enabled, the program automatically aligns and combines incoming images into a single, smoother-looking frame. While stacking doesn't add details not present in the individual sub-frames, it makes everything clearer by reducing the noise in the image, which made a big difference in what I was able to achieve with the Infinity.

The remaining controls that will get the most use concern the histogram at the bottom of the screen. The program also permits users to select automatic histogram settings — high, medium, low — to set image brightness and contrast, but manual adjustment of the



Included with the Infinity is an install disk with the camera drivers and software necessary to operate the camera. It also includes many other drivers and plug-ins for third-party software, as well as drivers for many other Atik products.



Once installed, the *Infinity* program was easy to master. The software has only a few controls, which makes operating the camera easy and relatively intuitive. The image of M42 is mirror-reversed due to the author using a star diagonal.

black, white, and gray sliders along the bottom of the screen usually yielded better results. Unlike with some imaging programs, these settings don't just affect the displayed image; they're saved with the picture, so before clicking "save," be sure the image looks good onscreen.

After just a little use, I grew to appreciate the *Infinity* program — with one exception. It's not a true Windows application. Not only does it lack standard Windows menus, it can't be minimized. Clicking the program's top bar will downsize it, but you can't completely minimize the program. That was slightly annoying when I wanted to access other running software, like the planetarium program I use to control my telescope mount.

In the Field

Preliminaries done, I was ready to hit the backyard. My back-forty is hardly perfect, with a zenith limiting magnitude of about 5.0 on a good night, but it's sufficient to allow video cameras to pull in amazingly dim targets with my 5- and 8-inch telescopes. Since my 5-inch f/7 refractor was already set up on its Go To equatorial mount, I thought I'd try the *Infinity* with it first.

While the chip of the *Infinity* is larger than those of my analog cameras, calculations showed I would still need a focal reducer to allow the camera to frame larger targets. Unfortunately, all I had for the refractor was an inexpensive 0.5× reducer. I decided to use it, and if I couldn't bring the scope to focus, or if I had other problems, I'd use a shorter focal length telescope the following night.

Once I had the mount Go To aligned, I inserted the camera and reducer into the scope's focuser via the

Infinity's 1¼-inch nosepiece and almost immediately ran into a problem. When I'd plugged the power supply into the camera experimentally in the house, I'd noted the connection felt loose. The same was true of the cigarette lighter cord. In the backyard the power connector wasn't just loose, it fell out the moment I moved the telescope.

The solution was simple. I mounted the *Infinity* upside down in the focuser with the power and other connectors facing up. That didn't cause any operational problems, but was a little annoying. Atik needs to provide a more secure connector, perhaps one with a threaded collar.

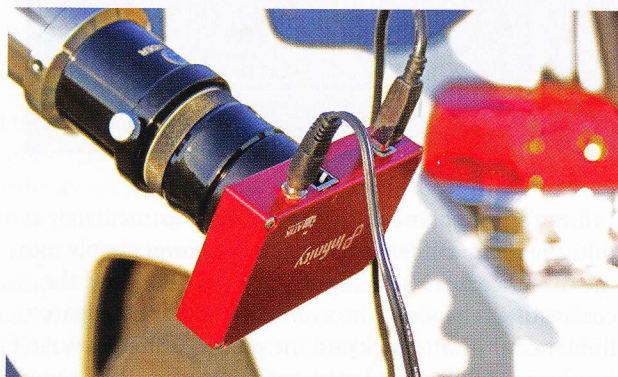
Power restored, I sent the telescope to a bright star and focused. I tried the *Infinity*'s finder mode first but soon switched to normal video. Exposures in video mode were smoother and sharper looking, and I found it easier to focus by eye than in finder mode. One-second shots



Low surface brightness galaxies such as M33 were easy targets using the *Infinity* and the author's 80-mm refractor. This image was the result of stacking twelve 30-second exposures at f/6 combined automatically in the *Infinity* program.



Images taken with the Infinity and the author's 80-mm refractor were extremely noise-free, with only a handful of hot pixels visible when using the camera on warm summer nights. Hot pixels appear as red, green, and blue dots, and appear in clusters in these images because they combine multiple exposures. The better your tracking is, the less these will detract from your view.



The camera's power cable port was very loose, often allowing the cable to fall out when slewing the telescope. A simple fix was to mount the Infinity upside down in the focuser.

allowed me to get Aldebaran as small as possible, and bumping up the exposure to 2 seconds showed plenty of dimmer stars. By watching those dimmer stars and observing the Full Width Half Minimum readout in the program, I was able to achieve good focus.

I wasn't going to go easy on the Infinity. My first target would be a challenging one. The Flaming Star Nebula in Auriga, IC 405, has bedeviled me over the years. I'm not sure I've ever been convinced I've seen it visually, even in large telescopes. I'd never tried my analog cameras on it, because it's just too large for their small chips to properly frame. Frankly, I didn't expect it to show up on my monitor on this night given the state of my backyard sky, which wasn't close to its magnitude-5.0 best.

Surprise! There it was in a 45-second exposure. Carefully adjusting the histogram showed impressive detail and multiple loops of nebulosity. In addition to my surprise and pleasure at turning up such a dim target with ease, I was happy to see how noise-free the picture looked. If there was thermal noise present, it wasn't obvious.

One issue I ran into using the Infinity on my refractors when attaching the camera at prime focus was limited focus travel. The Infinity's chip is close to the front of the camera, only 13 mm back, so I couldn't reach focus unless I had my star diagonal in place, or an extension tube. If your telescope doesn't have a lot of back-focus range, be prepared for this problem.

The second evening's first subject was Messier 33, the Pinwheel Galaxy. Once on target with my 80-mm refractor, I was relieved to see the 1°-wide object just fit in the field. Since it was getting low in the west, I didn't expect my image of the galaxy to look good, and, indeed, the 30-second exposure looked grainy and washed out.

Before moving on, however, I thought I'd try the program's automatic image-stacking feature. Not only did it work, it made all the difference in the world. By the time 4 or 5 frames had accumulated, the galaxy was looking smooth and pretty. I was seeing plenty of spiral detail and was able to pick out multiple pinkish H II regions, nebulae in the big galaxy.

Later, my first look at Orion's dim Horsehead Nebula allayed any remaining concerns about the Infinity's sensitivity. A single 40-second exposure was enough to show the dark Horsehead, B33, and the dim red emission nebula, IC 434, that forms its background. After five 40-second frames had accumulated, I wasn't just seeing the Horsehead, I was detecting fine details!

So it went for the remainder of the evening, dim object after dim object falling to the Infinity and eliciting plenty of oohs and aahs from my fellow observers. Despite a few annoyances at the start, I was quite impressed with the camera. The Atik Infinity has me ready to put my much-loved analog cameras on the shelf. ♦

Contributing Editor **Rod Mollise** can often be found observing at many of the summer star parties held throughout the southern United States.