



# SBIG's New STT-8300 Camera

**SBIG STT-8300  
CCD Camera**

U.S. price: starting at \$3,695.00  
[sbig.com](http://sbig.com)

*A redesign brings state-of-the-art features to SBIG's new STT line of astronomical cameras.*

**NO NAME IS BETTER KNOWN** in the world of amateur CCD imaging than SBIG, short for Santa Barbara Instrument Group. Founded by amateur astronomers in the late 1980s, the company built its reputation on a succession of pioneering CCD autoguiders and astronomical cameras tailor-made for amateurs. A quarter century later SBIG's core market still remains the amateur community, helping explain why there's been lots of reader interest surrounding the launch of SBIG's newest line of CCD cameras. Dubbed the STT Series, the completely redesigned cameras include a host of features

requested by astrophotographers. Among them are USB 2.0 and Ethernet computer connectivity, an internal image buffer, fast image downloads, advanced thermo-electric cooling, and modular integration with SBIG's new filter wheels and autoguiding systems.

For this review I borrowed an early production model of the STT-8300 from the manufacturer. It features

**The STT-8300's 5.4-micron pixels are well matched to short-focus instruments. This view of the Orion Nebula was shot with an 8-inch f/3 scope having a focal length of only 600 mm.**

ALL PHOTOGRAPHS BY THE AUTHOR; IMAGE PROCESSING BY S&T: SEAN WALKER

Kodak's KAF-8300 CCD, which is one of most popular chips used by today's amateurs. Much of the chip's allure comes from its large array of 8.3 million 5.4-micron-square pixels. The relatively small pixels are well matched to short-focus telescopes, and they even work well with conventional camera lenses. SBIG offers a variety of package deals for the STT-8300. The one I tested includes the self-guiding FW8G-STT filter wheel, a set of eight 36-mm Baader filters (for LRGB and narrowband imaging), and a super-strong Pelican-Storm storage case. Priced at \$5,985, this package costs about \$1,000 less than if the pieces were purchase individually.

The camera and filter wheel weigh about 5½ pounds (2.4 kg). Although this is a lot heavier than, say, a DSLR camera, it is well within the limits of most focusers supplied on modern telescopes made for imaging. I did most of my sky shooting with the STT-8300 attached to the Officina Stellare Veloce RH200 astrograph that I reviewed in last April's issue, page 60 (you'll find additional images made with the STT-8300 there). I also tested the camera with several medium-format camera lenses fitted to the STT-8300 with a lens adapter that I made myself. SBIG sells a lens adapter for Canon EOS lenses, but it only works with the STT-8300 camera body alone or with the *standard* FW8-STT filter wheel. The Canon lenses do not have sufficient back focus to work with the added thickness of the self-guiding filter wheel I tested.

The self-guiding filter wheel is a new addition to SBIG's line of products. Shown in the accompanying photos, it has a small CCD camera mounted on an adjustable pick-off assembly placed ahead of the filters. As such, light from guide stars is not attenuated by the filters before reaching the guiding CCD. The pick-off mirror can be moved perpendicular to the telescope's optical axis to avoid vignetting the STT-8300's main imaging chip depending on the focal ratio of the telescope's converging light beam. I tested the system with camera lenses as fast as f/2, and it worked very nicely with the f/3 RH200



**With the 8-inch f/3 scope, the STT-8300 has an image scale of 1.85 arcseconds per pixel and a field covering 1.7° x 1.3°, ideal for imaging the galaxy pair M81 (bottom) and M82 in Ursa Major.**

astrograph. Setting the pick-off mirror's position and focusing the guiding camera take a few minutes under a dark sky, and any extra time needed to get everything carefully adjusted is time well spent, since the only reason to change the guider's position or focus is if you use different telescopes or have filters of different thicknesses.

## Software and Connectivity

SBIG ships its cameras with printed manuals and the latest version of its venerable camera-control and image-processing program *CCDOps*. Versions of the software are available for Windows 2000 and above (including 32- and 64-bit systems) and Mac OS X 10.5 and above. There's even a rudimentary version for LINUX, which the company states is "for the adventurous." SBIG also provides a nice program for installing and updating camera drivers on your computer. The documentation for these programs

**The STT-8300 and its self-guiding, eight-position filter wheel are operated by a single computer connection (either USB 2.0 or Ethernet). The "scope" port is for a conventional autoguiding cable.**



### WHAT WE LIKE:

Updated STT design, including mechanical, electronic, and software improvements

Modular integration with new filter wheels and autoguiding systems

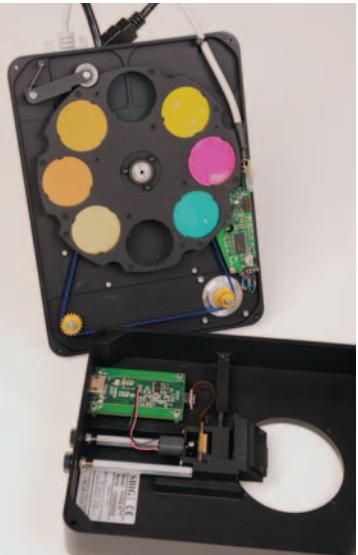
### WHAT WE DON'T LIKE:

Special care needed to ensure reliable connection of the power supply to the camera (see text for details)





**The filter wheel** attaches to the STT-8300 after removing the camera's front cover. A new design ensures that filters precisely return to the same position each time they are moved, which is critical for flat-fielding images when dust is on the filters. The self-guiding mechanism visible at lower right is described in the text.



is very clearly written, making it easy for those timid about computers to get everything working properly.

Although the user interface for *CCDOps* is starting to show its age, the program is full-featured and very robust. I've used various versions of it over the years with remarkable success, having never lost a single image to a software glitch. While I used the latest version for some of my STT-8300 tests, I did most of my image acquisition and processing with Diffraction Limited's *MaxIm DL*, but only after I updated that software to the latest version (5.23) to make it compatible with the new SBIG camera. And for the record, I also had to update Software Bisque's *TheSkyX Professional Edition* to version 10.2.0 (build 6409) so its camera functions would work with the STT-8300.

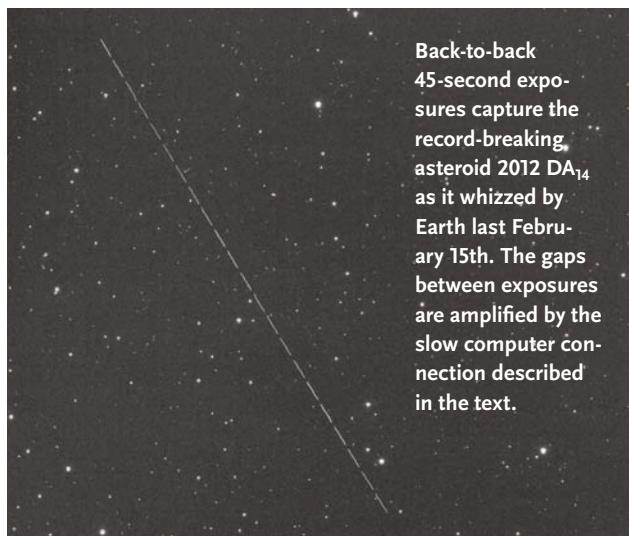
I tested the STT-8300 with a variety of computer connections. At the telescope, I had a USB 2.0 cable run directly between the camera and my laptop computer. Most of my imaging, however, was done from a remote desktop computer in my house several hundred feet away from the telescope. I did this with a network USB hub — a now-discontinued Belkin product that plugs into any Ethernet port on my home network. Located next to the

telescope, this hub provides USB ports without exceeding the distance limitations of standard USB cables. Except for being slower than a direct USB 2.0 connection, the Belkin hub worked fine with the STT-8300.

I also tried the camera's Ethernet connection by plugging the camera directly into my home network with the same type of cable used to connect computers to the network. Initially I had some trouble with this arrangement, which I thought was due to my network firewalls. But it turned out that, unlike computers, the camera's Ethernet connection has to be made *before* the camera is powered up in order for the system to be properly assigned a network IP address.

The Ethernet connection offers some interesting possibilities. First, any computer on the network can make a connection to the camera, regardless of distance between them, and you can operate the camera with appropriate software installed on the computer (*CCDOps* or *MaxIm DL*, for example), and this goes for computers using a wireless connection to the network. But the Ethernet connection also allows the camera to be controlled through its own built-in web server that you access by simply typing the camera's IP address into the search field of any web browser — even a browser on a smartphone! This eliminates the need for camera-control software on your computer or smartphone; you just need a web browser.

Although you can operate the STT-8300's cooler, filter wheel, and exposure settings via the camera's webpage, the setup is not optimized for advanced imaging. For example, you can't run an automated sequence of filtered exposures. Nevertheless, the web access proved more useful than I initially anticipated. As mentioned earlier, I did most of my imaging with the camera run remotely from a computer in my house. But there were times I needed to shoot exposures at the telescope when focusing or trying to center a target on the CCD. It was super easy to do this using the web browser on my smartphone. As with any



**Back-to-back** 45-second exposures capture the record-breaking asteroid 2012 DA<sub>14</sub> as it whizzed by Earth last February 15th. The gaps between exposures are amplified by the slow computer connection described in the text.



The STT-8300 proved highly versatile for the author's imaging projects, including a conventional color view (made with red, green, and blue filters) of the galaxy M101 (*upper left*), and a narrowband image (using H-alpha, O III, and S II filters) of the Crab Nebula (*lower left*). The narrowband image at *right*, totaling 25 hours of exposure with the 8-inch f/3 scope, captured the exceedingly faint filamentary structure of PKS 0646+06 in Monoceros. Listed as a supernova remnant, the virtually unknown object is 4½° east-northeast of the Rosette Nebula.

new tool, once you have it you'll likely think of interesting ways to use it.

### Notes from the Field

I've only mentioned some of the STT-8300's specifications, since they are all available on SBIG's website ([www.sbig.com](http://www.sbig.com)). You can also download all the user manuals for free from the website. After several months of testing the camera, I can comfortably say that it lived up to my expectations based on the company's literature. One aspect of the camera, however, was difficult for me to test — the cooling. SBIG states that the STT-8300's two-stage thermoelectric cooler can drop the CCD's temperature as much as 55°C below the ambient air temperature (and the camera is ready-made for water-assisted cooling if you need more). I chose to run the CCD at -25°C as a good balance between the KAF-8300's imaging performance and a temperature I could reach even on warm nights. Nevertheless, there weren't any warm nights during our recent New England winter. Indeed, on most nights the STT-8300 maintained its -25°C setting with the cooler running at less than 15% of its capacity.

As with other SBIG gear I've used in the past, the STT-8300 proved to be very robust and reliable. Occasionally I would get a "filter wheel error" when initially connecting to the camera using *MaxIm DL* on my remote computer.

I never isolated the problem, but it was likely due to the unusual way I set up my long-distance USB connection (described earlier). Regardless, simply making a second attempt to connect to the camera always worked.

In the grand scheme of things, the only quibble I have with the STT-8300 sounds rather minor, but it's worth mentioning. SBIG uses a power connector with a locking collar that prevents the power cable from being accidentally pulled out of the camera. That's a very good thing. But if you don't tighten the locking collar down snugly (something that's hard to do in the cold, especially if you have fat fingers like me), it's possible to wiggle the power cable and break the connection, causing an electronic reset of the camera. That's a bad thing. Once aware of this, I used needle-nose pliers to make sure the locking collar was tightened, and this eliminated the problem for good.

In many respects, the STT-8300 is the best SBIG camera I have ever used. Coupled with its self-guiding filter wheel, it's a powerful platform ideally suited for imaging with typical setups used by today's astrophotographers. The company is clearly continuing its well-deserved reputation of serving the amateur community. ♦

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*Senior editor Dennis di Cicco still covets his SBIG ST-4 autoguider/camera that he reviewed in the September 1990 issue, page 250.*