SBIG
ASTRONOMICAL
INSTRUMENTS

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Dear SBIG Dealer:

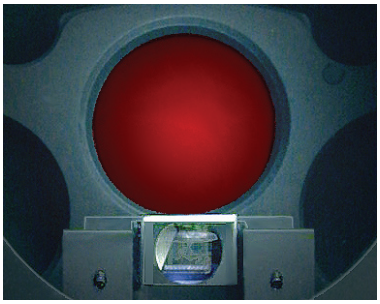
SBIG is proud to announce the first of several new products for 2012 that continue the tradition of innovation for amateur astronomy by the company that helped start the imaging revolution in this field over 20 years ago. Our latest products mark another step forward along this path: The STT and STXL Series of cameras and two new filter wheel / guiders that go along with them. This letter will give you a brief overview of the STT systems, the first of which will be the STT-8300 scheduled to begin production in June. The STT-1603 and STT-3200 will be release in coming months and prices will be available for the 1603 and 3200 versions by June 1st. Information regarding the STXL will follow shortly. For more details, please see the product launch materials that accompany this letter, including a power point presentation, flyer, product images and a copy of the latest two-page ad in Sky & Telescope.

The New STT-1603 / 3200 / 8300 Series Cameras

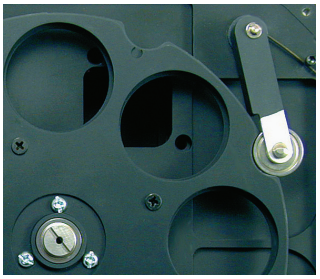
No compromises. The new mid-sized STT Series cameras offer features and specifications found in no other astro-camera - of any size. Drawing on all of our previous experience and the best of each of our previous designs over the years, the STT represents the culmination of everything that the amateur has asked for in an imaging system, packed into a 4.9 x 4.9 x 2.9 inch body. Standard features include: Two-stage cooling with a temperature delta of -55C with air only; water cooling ready; USB 2.0 and Ethernet on every camera; full frame buffer; fast low-noise readout of an 8.3Mp CCD in less than one second; MAR coated sapphire chamber window; internal user selectable automatic image processing; self-guiding in front of filters; remote guide head support; optional adaptive optics; and more. Compare these STT features with any other camera:

- Ethernet and USB 2.0
- Built-in Web Server
- Full Frame Image Buffer
- 2-Stage Cooling -55C delta T with air
- Liquid Cooling Capability Standard for greater cooling
- Twin Variable Speed Fans
- High Accuracy Temperature Control
- Built-in Frost Detection
- Built-in RBI Pre-flash
- External Triggers In / Out
- Power Management System
- 12VDC Operation
- Lowest Noise 10Mhz Readout (<1 sec download)
- High Precision 8-position Filter Wheel Option
- Accepts 1.25", 31mm and 3mm filters
- Even-illumination (photometric) shutter
- MAR Coated Sapphire Chamber Window
- Optional Self-Guiding in Front of filters
- Optional Remote Guide Head
- Optional Adaptive Optics (AO-8)
- User Rechargeable Desiccant Plug
- User Selectable Internal Image Processing
- Status, Power and Relay Indicators
- Windows and Mac Control Software, 32 and 64 bit

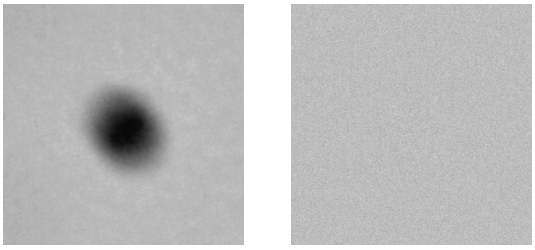
The FW8-STT High Precision Filter Wheel / Guider



A new filter wheel design for the STT series sets it apart from other designs. The carousel holds eight 36mm filters and inserts are available for 1.25" and 31mm filters. Two new unique features make this an imager's delight: First, the design incorporates a self-guiding CCD in the filter wheel cover so that light from the guide star is captured before passing through the filters. An optional filter wheel cover is available for wide angle imaging with Nikon or Canon 35mm camera lenses, or for anyone who does not need or want the built-in self-guiding feature.



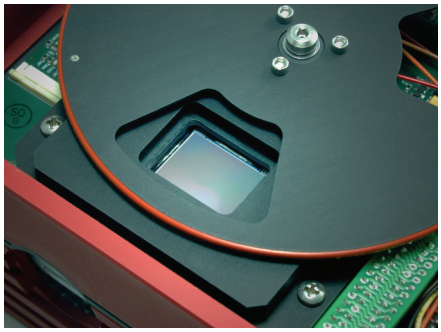
The second unique feature of the STT filter wheel is a positive centering mechanism that precisely re-positions and firmly holds filters in the same position over the CCD no matter how many times the carousel is moved. In our tests of the new design, the re-positioning of filters was accurate to better than one pixel (5.4 microns) using an STT-8300 after several complete rotations of the filter carousel. This degree of precision means that flat fields taken after the filter has moved and returned are accurate virtually to the level of a single pixel. An example of the improvement in flat fields with this kind of precision is demonstrated in the comparison images below.



The image at left, above, shows a large opaque spot on a filter in STT filter wheel. The filter carousel was rotated several times before the filter was moved back into the optical path and a flat field was taken. The image at right shows the resulting flat field image.

Other STT Features:

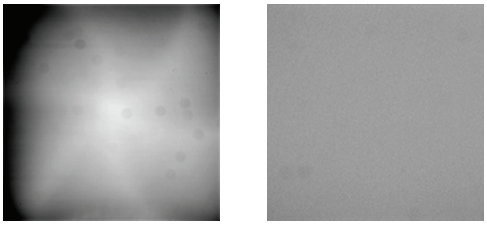
Even-Illumination Shutter



A mechanical shutter is included to facilitate dark frames. This is a necessity for anyone operating remotely; even if remotely means a few feet away from the telescope. Since the early days of the original ST-7 camera, SBIG has been providing even-illumination shutters in our cameras, something not found in the majority of other cameras made for astrophotography. "Even-illumination" means that the shutter mechanism is designed to open and close in such a manner that it does not change the proportion of light falling on the sensor due to the shape or motion of the shutter itself. This is what one finds for instance with an iris type of shutter that opens-up starting at the center and closes over the center last. In the STT-

8300 we use a simple and very robust shutter wheel with a fan-shaped aperture of the same design that we have employed in the ST series cameras for the past 15 years. The STT-8300 shutter sweeps over the CCD without leaving any area of the sensor exposed for a different period of time than any other area. Another benefit of the rotating disk type of shutter is that it has only one moving part - the motor. These motors are extremely reliable and can operate for millions of exposures without failure. In 15 years with thousands of cameras in the field taking millions of exposures, this shutter design has proven itself better than we can describe. Our design is accurate, proven and reliable.

Even-illumination shutters are also referred to as photometric shutters because they produce flat frames of photometric quality. This is extremely important when taking twilight flats or any flat field image using short exposure times. The effect is demonstrated in the twilight flat field images shown below:



The left image shows a twilight flat field image taken with a camera using an iris type shutter. The right image is a flat field image taken under the same conditions using our even-illumination type shutter.

User Selectable Internal Image Processing

The STF-8300 and STT-8300 are the first astro-cameras available with the ability to automatically clean up raw images with user-selectable automatic image processing! By selecting the level of hot pixel removal or even column repair, the user can obtain exceptionally clean images without any other image processing required. To illustrate, the 30 second dark frames at right were taken at room temperature to accentuate the number of warm pixels. The first frame is unprocessed; the second frame has a medium filter, and the third frame the most aggressive filter. Each shows fewer bright pixels and each has corresponding lower noise in the image. The user can select from eight levels of filter strength to suit his needs.

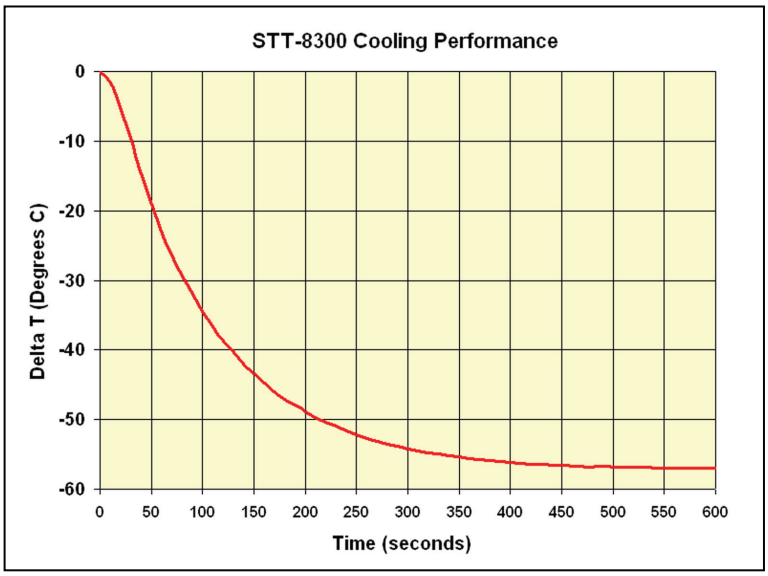
Efficient Two-Stage TE Cooling

The STT uses two-stage TE cooling, twin variable-speed fans and a highly efficient pin fin array heat sink that has proven itself in the STX design. Pin fin heat sinks are more expensive than typical parallel fin type heat sinks, but offer more efficient heat dissipation in a given space. In our tests of prototype models, the camera reached a delta of -55 degrees C below ambient in approximately five minutes using air cooling only. And, while is should not be necessary to use water cooling in most circumstances, if it should be desired, the STT series cameras include water cooling capability as standard

equipment. It is not necessary to buy an expensive add-on or separate back. Simply supply water to the adjustable fixtures on the side of the camera body to obtain further cooling or to run the TE cooler without the fans.

Exceptionally Low Dark Current

The KAF-8300 CCD has very low dark current, even at room temperature. Cooling the CCD reduces the dark current by 50% for every drop of 5.8 degrees C of cooling that is applied. Kodak specifies a dark current of less than 200 electrons per pixel per second at +60 degrees C. Extrapolating we calculate that at -15C the dark current is approximately 0.02e-. Our tests of the 8300 CCD in production cameras confirm this extraordinarily low dark current at typical operating temperatures.



High Quantum Efficiency

Another desirable characteristic of the KAF-8300 CCD is its relatively high Quantum Efficiency (QE). Microlens technology is used to focus more light on the sensitive area of each pixel, increasing the effective QE of the 8300. Many nebulas emit a great portion of their light in the red portion of the spectrum, particularly at 656nm, the wavelength of H-alpha light. Other objects such as stars and galaxies emit a great deal of energy in the near IR. According to the KAF-8300 spectral characteristics, this CCD's sensitivity is spread well across the visible portion of the spectrum and into the near IR with a peak of nearly 60% at 550nm and still 50% at 656nm. It is as sensitive at 850nm as it is at 350nm. This is quite a broad range and explains the CCDs popularity (and success) in astro-imaging.

12VDC Operation

The STT-8300 comes with its own universal AC power supply. This supply will operate from 100-240VAC and provides 12VDC at 3.5A to the camera. The STT-8300 also has a built-in voltage regulator and can therefore be powered directly from any unregulated 12V (10 - 14 volts) source such as a battery for operation in the field.

Adaptive Optics

The STT camera is compatible with our existing AO-8 adaptive Optics accessory. With this accessory, control of the mount during guiding can become a thing of the past. In many cases, mount control is not necessary when using the AO-8 to stabilize the image.

Remote Guide Head

A new remote guide head is available for the STT camera. This external guiding CCD looks similar to the ST-i camera with a KAI-0340 CCD, but as a remote guide head it can plug directly into the STT body with no other connection to the computer required.