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STT-8300M

The newest SBIG STT camera system



- Camera, Autoguider, and Filter Wheel now fully integrated with tracking sensor in front of filters. No separate guider required!
- New Micron-Precision filter wheel provides unmatched flat field accuracy for high end imaging and high precision photometry
- Lightning fast downloads < 1 second full-frame
- Superior two-stage cooling to -55 deg C ambient with air only
- Built-in frost detection
- User Selectable Internal Image Processing
- USB 2.0 and Ethernet connectivity for remote observatories

STT Camera System – The Next Generation

No compromises. To meet the demands of the next generation astroimaging, SBIG introduces the next generation STT Camera System with self-guiding integrated into a Micron-Precision Filter Wheel.

At last, a worthy successor to SBIG's classic round, dual-sensor ST and STL series self-guiding cameras!

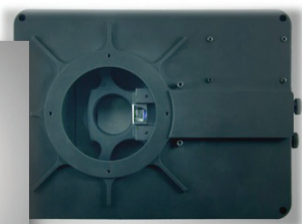
The new mid-sized STT Series cameras offer features and specifications found in no other astrocamera – of any size. Drawing on all of our previous experience and the best of each of our previous designs over the years, the STT represents the culmination of everything that the astroimager has asked for in an imaging system, packed into a 4.9 x 4.9 x 2.9 inch camera body.

STT Camera Series Highlights

- Self-Guiding in Front of filters
- Lowest Noise 10MHz Readout < 1 sec
- High Precision 8-position Filter Wheel
- User Selectable Internal Image Processing
- Built-in Frost Detection
- 2-Stage TE Cooling -55C delta T with air
- Built-in Web Server
- Full Frame Image Buffer
- Even-illumination (photometric) shutter
- Ethernet and USB 2.0
- Built-in RBI Pre-flash
- Liquid Cooling Capability Standard
- Twin Variable Speed Fans
- Multi-coated Sapphire Chamber Window
- Accepts 1.25", 31mm and 36mm filters
- User Rechargeable Desiccant Plug

- High Accuracy Temperature Control
- External Triggers In / Out
- Status, Power and Relay Indicators
- Windows 32-bit and 64-bit (and Mac) Software
- Optional Remote Guide Head
- Optional Adaptive Optics (AO-8)
- Power Management System
- 12VDC Operation

STT Series Camera System



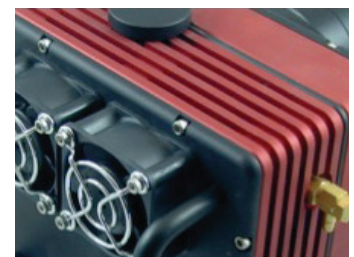
Micron-Precision Filter Wheel with Built-in Self-Guiding CCD

The Camera

No Compromises

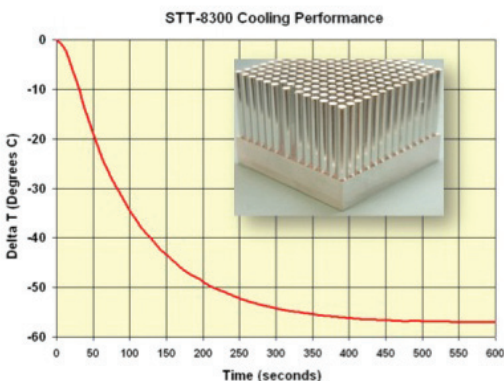
The STT Series is a new design with everything the astroimager could want in a camera:

- Fast, low noise digitization and a full frame image buffer. At 10MHz the STT downloads a full frame, low-noise 8300 frame in less than a second.



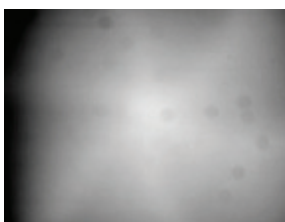
- Superior two-stage cooling to -55C below ambient with air only. Its also water cooling-ready for additional cooling without having to buy a replacement back plate or other additional accessory. Its ready to go out of the box.
- A multitude of advanced features such as built-in frost detection, RBI pre-flash, power management system, ethernet and USB 2.0, high accuracy temperature control, sapphire window, and user selectable internal image processing put this camera in a league of its own. No other astro camera has these features, at any price.

The STT uses the same efficient pin fin heat sink design as the STX series cameras to achieve the most efficient use of space and weight while maximizing the cooling capability of the camera. This type of heat sink is more expensive than typical parallel fin heat sinks, but the results speak for themselves. The STT prototypes achieved an average temperature delta greater than -50C in 5 minutes and a max of -57C in less than ten.



Even-Illumination Shutter

- Since its founding, SBIG's mechanical shutters have been designed for highly reliable, even-illumination, of the sensor even at short exposures.
- Even-illumination is especially critical when taking flatfields with exposures of less than a second or even several seconds.
- Very common when taking sky flats.



Twilight Flat from Iris / Leaf shutter



Twilight Flat from SBIG Even-Illumination Shutter

Internal Image Processing

SBIG's new STT-8300, the first high speed 8300 camera with user-selectable automatic image processing! These 30 second dark frames 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.

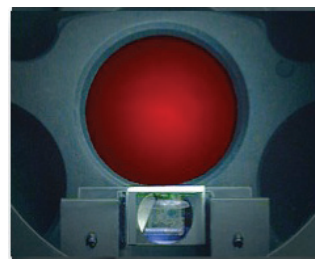
Each shows fewer bright pixels and each has correspondingly lower noise in the image. The user can select from eight levels of filter strength to suit his needs.



The Filter Wheel

Self-Guiding Up Front: Self-Guiding in Front of the Filters

Self-guiding has long been acknowledged as the best, most accurate way to guide long exposure astrophotos, particularly with commercial SCTs. The single most common complaint however is finding bright stars when guiding through dark or narrowband filters. The STT filter wheel incorporates the self-guiding CCD inside the front cover of the filter wheel so that the guider picks off light from the guide stars before passing through the filters. There are two adjustment knobs on the filter wheel base: one for focus and one for moving the pick-off mirror. Problem solved!



Precise Flats Solved: Micron-Precision Filter Positioning

When taking flat field frames of filtered images, the flat field frame must show exactly the same optical characteristics to be the most effective. If there is dust on the filter, or uneven illumination caused by the filter, this must be represented precisely as seen in the light



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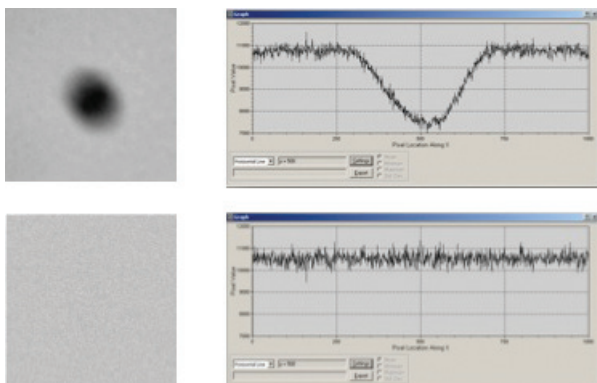
image to be corrected by the flat field frame. The STT filter wheel is designed to provide a new level of accuracy when taking flats through filters by repositioning filters to within a few microns every time. This allows the imager to take extremely accurate flat field frames even after rotating the filter wheel several times, or even after a loss of power.



The light frame at top left, taken with an STT and the new filter wheel, shows a large opaque spot caused by debris intentionally stuck on a clear filter.

The filter wheel was rotated several times, then the clear filter was re-positioned, and a flat field image was taken through the same dirty filter.

The image at bottom left shows the result after applying the flat field image to the original light frame. We measured this positional accuracy to be better than 5.4 microns, or better than a single pixel using the STT-8300.



STT-8300 Typical Specifications

CCD	Kodak KAF-8300
Pixel Array	3326 x 2504 pixels
CCD Size	17.96 x 13.52 mm
Total Pixels	8.3 million
Full Well Capacity	25,500 e-
Dark Current	0.02e-/pixel/sec at -15C
Antiblooming	1000X
Shutter	Mechanical, Even-illumination
Exposure	0.12 to 3600 seconds, 10ms
Correlated Double Sampling	Yes
A/D Converter	16 bits
Gain	0.37e-/ADU
Read Noise	~9.3e- rms
Binning Modes	1x1, 2x2, 3x3, 9x9, x n
Digitization Rate	10 Megapixels per second

Full Frame Download	< 1 second
Max Cooling Delta	-55C with air only
Temp. Regulation	±0.1°C
Power	12VDC at 3.5 amps
Interface	USB 2.0 and Ethernet
Computer Compatibility	• Windows 32 / 64 bit • Mac OSX • 3rd party Linux
Camera Body Size	4.9 x 4.9 x 2.9 in. / 124 x 124 x 74 mm
Mounting	T-Thread, 2" nosepiece
Weight	2.7 pounds / 1.2 kg
Backfocus	0.69 inches / 17.5 mm

Product Components

All STT-8300 cameras include: Rugged, aluminum body with Ethernet and USB 2.0 electronics, Even-illumination shutter, -50 degree TE cooling delta, water cooling ready, USB and Tracking Cables, Power supply, CCDOPS, CCDSoftV5, TheSky v.5, Pelican Storm Case



Standard filter wheel package adds FW8-STT filter wheel without self-guiding.

Self-Guiding Filter Wheel Package adds the Self-guiding FW8-STT precise positioning filter wheel.

Pro package includes STT camera, FW8-STT Self-Guiding precise positioning filter wheel and a set of Baader LRGB and H-alpha filters.

Pro+ package includes the Pro package and adds O-III and SII filters

Every STT-8300, whether sold separately or as part of a kit, includes:

- Class I KAF-8300 CCD
- Rugged machined camera body with rack handles and 2" nosepiece
- Internal, even-illumination, mechanical shutter
- 15 foot USB cable (third party USB extenders available)
- Telescope interface cable (for guiding)
- Universal 100-240VAC Power supply
- SBIG's CCDOPS version 5 camera control software
- Software Bisque's CCDSoftV5 camera control and image processing software



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- Software Bisque's TheSky v5, Level II, Planetarium and Telescope Control Software
- Custom Pelican Storm case with pre-cut foam for camera and small accessories
- Two Year Warranty Parts and Labor on the camera other than the CCD
- One Year Warranty Parts and Labor on the CCD
- Demo CD-ROM with sample images and software

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