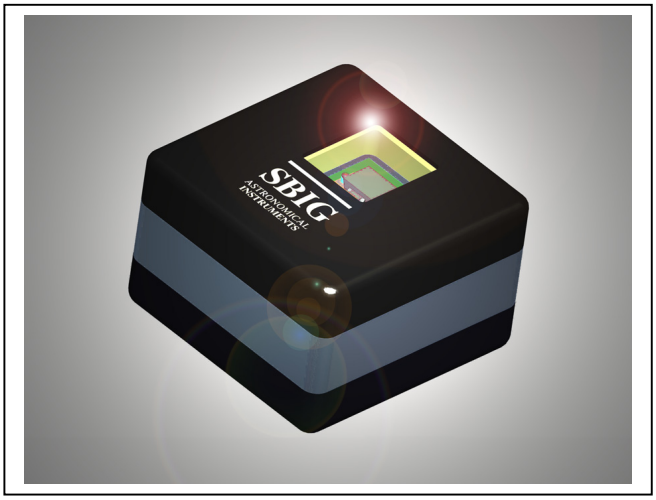
New STX Series Cameras

The new STX Series Cameras from SBIG leave nothing to be desired: Greater cooling, faster download rates, better guiding, new imaging CCDs, larger tracking CCD, dual interface and more:

- USB 2.0 and Ethernet Connections
- 12VDC Operation
- Full Frame Image Buffer
- Air Cooling to –50C from ambient
- Water Cooling Ready
- Internal and External Self-Guiding
- Simultaneous Dual CCD Guiding
- Differential Guiding (patent pending)
- Continuous Guiding During Download
- Adaptive Optics Control
- Even-illumination Mechanical Shutter
- Gas Purge Option CCD Chamber
- 40% Larger Tracking CCD
- Focus Mechanism for Tracking CCD



NEW CCDs	Pixels	Array	Pixel	Mono / Color	Notes
KAF-8300	8.3 Megapixels	3326 x 2504	5.4u	Mono or color	Full Frame Microlens ABG
KAI-10100	10.1 Megapixels	3648 x 2760	4.75u	Color	2x2 Color Binning
KAI-16000	16 Megapixels	4872 x 3248	7.4u	Mono or color	35mm format
KAF-9000	9 Megapixels	3056 x 3056	12u	Mono	Full Frame Microlens ABG
KAF-16803	16 Megapixels	4096 x 4096	9u	Mono	Full Frame Microlens ABG
CCD42-40	4 Megapixels	2048 x 2048	13.5u	Mono	Back illuminated High QE
CCD47-10	1 Megapixels	1056 x 1027	13u	Mono	Back illuminated High QE
CCD42-00	262,144 Pixels	512 x 512	24u	Mono	Back illuminated High QE

Internal and external guiders can be operated simultaneously for both fast and slow corrections to handle differential deflection. Guiding will continue during downloads and autograb sequences. The new 10100 color CCD can be binned 2x2 without losing color information, giving the camera 2.5 megapixels at 9.5 microns, or 10.1 megapixels at 4.75 microns. More new STX features, details inside.

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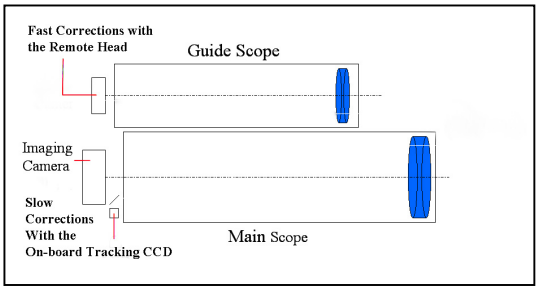
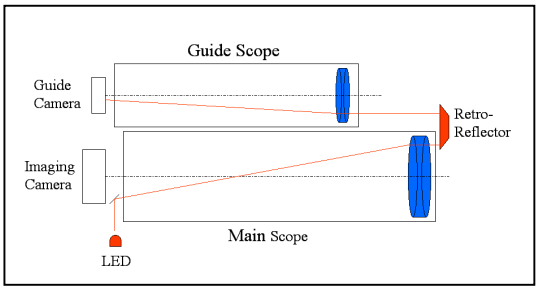
New Guiding Techniques for the STX

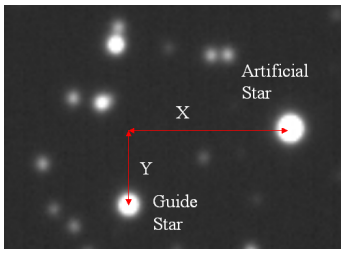
It is well known that the advantage of easier guiding through a separate guide scopes is often limited by differential deflection of the guide scope relative to the main optical axis due to mechanical flexure or shifting of the mirror in the main OTA. This difficulty is addressed with two new guiding techniques developed by SBIG and implemented in the STX series cameras: *Simultaneous Guiding* and *Differential Guiding*.

Simultaneous Guiding: The external guide head will not only continue to guide while the imaging CCD is downloading an image, but it can be operated simultaneously with the on-board guiding CCD. This allows a unique type of guiding through a separate guide scope that will correct for differential deflection by using the external guider to make fast corrections while the on-board guider makes slow corrections. Differential deflection tends to occur over a longer period of time than drive errors, typically minutes vs. seconds. A long exposure taken with the built-in guider is capable of reaching dim stars without searching, even though dark filters, and a long exposure with slow corrections by the on-board guider will correct for slow differential deflection typically experienced with separate guide scopes. In the mean time, the external guider will continue to make fast corrections using the brighter stars easily found with a short refractor mounted externally. With the new STX series cameras this technique will only require a Remote Guide Head.

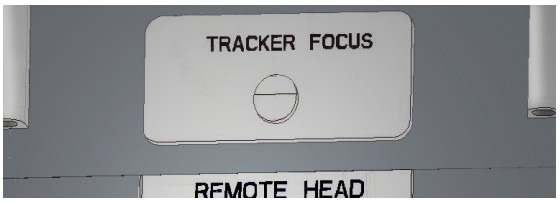


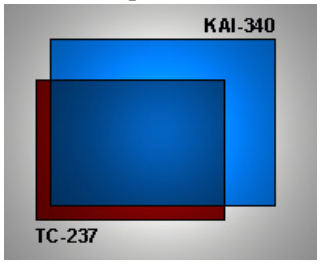
Differential Guiding: SBIG has a patent pending on a new guiding technique using an artificial guide star. Although artificial stars are used in a variety of techniques on professional telescopes, the SBIG technique is somewhat different and easy to implement on amateur scopes. An artificial star is created near the focal plane of the imaging CCD and an image of this star is retro-reflected into a separate guide scope. By using one real star in the FOV of the guide scope and the artificial star image reflected from the main scope, the difference in separation caused by telescope drift is used to make the corrections to the telescope drive. There is no problem with differential deflection and a single CCD external guider can be used to monitor both the real and artificial guide stars. The artificial star image is not seen by the imaging CCD.





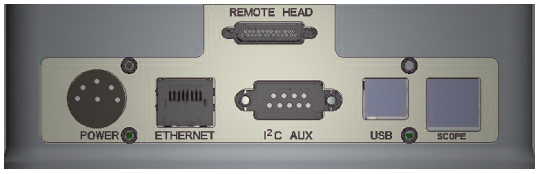
Larger Guiding CCD with Adjustable Focus: The guiding CCD in the STX cameras will be a new KAI-340 CCD with 640 x 480 pixels at 9u. This CCD is approximately 40% larger than the TC-237 currently used in ST and STL series cameras. The KAI-340 CCD will also be used in a new Remote Guide Head made for the STX series cameras. As the imaging and guiding CCDs get larger, the guiding CCD gets pushed farther away from the center of the optical axis. Depending on the nature of the optical system, this can cause the image on the guiding CCD to be slightly out of focus when the image on the main CCD is in focus. To address this, the new STX cameras will have a user accessible adjustment for changing the focal point of the on-board guiding CCD.



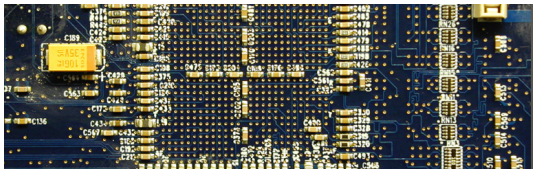


Design Features for the STX

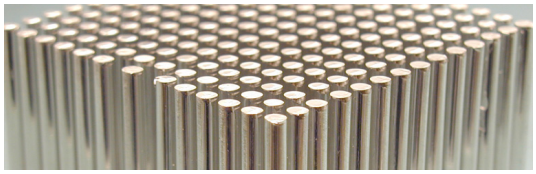
USB 2.0 and Ethernet: Both USB 2.0 ***and*** Ethernet will be available on each STX camera. The user will not have to choose the interface at the time of purchase. The STX cameras will have the same convenient I2C AUX port that we use on the ST and STL cameras for power and control of accessories such as filter wheels and Adaptive Optics, and will operate from any unregulated 12VDC source.



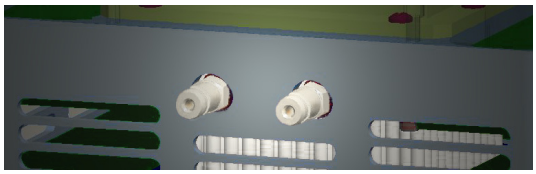
Full Frame Image Buffer: The STX series cameras will have a full frame image buffer for storing image date during download. We are exploring the possibility of using this buffer for pre-processing pixel defects based on a defect map provided by the CCD manufacturer, at the user's direction.



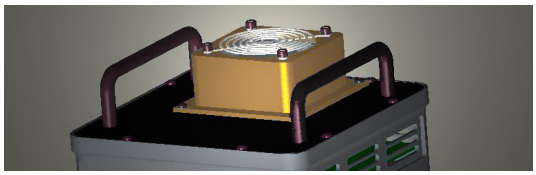
Improved Cooling: Our engineers have modeled an optimum cooling design for this camera using a large custom pin grid array heat sink mated directly to the hot side of the 2 stage TE cooler to achieve maximum heat dissipation with a single large fan. The STX is designed to achieve a minimum delta of -50 degrees C with air only, and a similar delta with water only.



Water Circulation Ready: While the design is aimed at sufficient cooling without water assist, it is possible to use water instead of air or in addition to air for optimum cooling. Using water instead of air will not require the use of a fan. Chilled water may also be used alone or with the fan for even greater cooling.

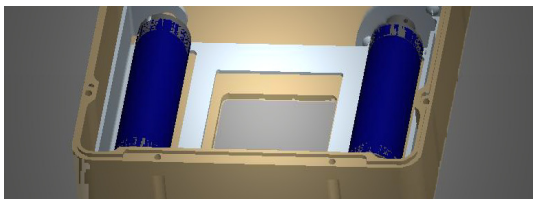


Variable Speed Fan Control: If the user desires air cooling only, the fan speed is controllable through software. Variable speed control allows the user to "tune" to fan to eliminate any resonance with the user's telescope thus suppressing harmonic vibrations.



Desiccant + Gas Purge Ports: In order to allow the user the greatest flexibility in the field, and to avoid having to return the camera to the factory in order to purge the CCD chamber with inert gas, we have designed the chamber to accept both a rechargeable desiccant plug similar to our current ST and STL cameras, and an optional quick disconnect gas purge port for purging the chamber with Argon or other inert gas .

Even-illumination Shutter: From the first ST-7 camera, SBIG has incorporated an even illumination shutter for taking short exposure flat field frames on all self-guiding cameras. However, the rotating disk design becomes rather large with ever increasing CCD sizes. Therefore, a new shutter design will be introduced with the STX series that reduces the overall size and weight of the camera body, while maintaining even illumination on short exposures with large CCDs.



Current SBIG Camera Models and Accessories

Model	CCD	# Pixels	Array	Pixel	Type	Notes	Price
Remote Head	TC-237H	325,215	657 x 495	7.4u	Mono	External Guider	$695
Seeing Monitor	KAF-0402ME	390,150 Pixels	765 x 510	9u	Mono	Measures Seeing	$1995
Meteor Camera	KAF-0402ME	390,150 Pixels	765 x 510	9u	Mono	Wide Angle	$1995
ST-402ME	KAF-0402ME	390,150 Pixels	765 x 510	9u	Mono	Single CCD High QE	$1395
ST-402ME RGB	KAF-0402ME	390,150 Pixels	765 x 510	9u	Mono	Internal RGB Filters	$1595
ST-402ME BVI	KAF-0402ME	390,150 Pixels	765 x 510	9u	Mono	Internal BVI Filters	$1774
ST-1603ME	KAF-1603ME	1.5 Megapixels	1530 x 1020	9u	Mono	Single CCD High QE	$3495
ST-3200ME	KAF-3200ME	3.2 Megapixels	2184 x 1472	6.8u	Mono	Single CCD High QE	$5895
ST-7XME Std	KAF-0402ME	390,150 Pixels	765 x 510	9u	Mono	Self-Guiding High QE	$2195
ST-8XME	KAF-1603ME	1.5 Megapixels	1530 x 1020	9u	Mono	Self-Guiding High QE	$4495
ST-9XE	KAF-0261E	262,144 Pixels	512 x 512	20u	Mono	Self-Guiding High QE	$2795
ST-10XME	KAF-3200ME	3.2 Megapixels	2184 x 1472	6.8u	Mono	Self-Guiding High QE	$5995
ST-2000XM	KAI-2020M	2 Megapixels	1600 x 1200	7.4u	Mono	Self-Guiding ABG	$3395
ST-2000XCM	KAI-2020CM	2 Megapixels	1600 x 1200	7.4u	Color	Self-Guiding Color	$2695
ST-4000XM	KAI-4021M	4.2 Megapixels	2048 x 2048	7.4u	Mono	Self-Guiding ABG	TBA
ST-4000XCM	KAI-4020CM	4.2 Megapixels	2048 x 2048	7.4u	Color	Self-Guiding Color	$3395
STL-1001E	KAF-1001E	1 Megapixel	1024 x 1024	24u	Mono	Self-Guiding High QE	$6995
STL-4020XM	KAI-4021M	4.2 Megapixels	2048 x 2048	7.4u	Mono	Self-Guiding ABG	$5995
STL-4020XCM	KAI-4021CM	4.2 Megapixels	2048 x 2048	7.4u	Color	Self-Guiding Color	$5995
STL-6303E	KAF-6303E	6.3 Megapixels	3060x 2040	9u	Mono	Self-Guiding High QE	$8995
STL-11000M	KAI-11002M	11 Megapixels	4008 x 2675	9u	Mono	Self-Guiding ABG	$6995
STL-11000CM	KAI-11002CM	11 Megapixels	4008 x 2675	9u	Color	Self-Guiding Color	$6995

Model	Item	Description	Price
CFW-9	Filter Wheel	5 Position 1.25" filter wheel for ST-7/8/9/10/2000 cameras (see notes below)	$595
CFW-10	Filter Wheel	10 Position 1.25" filter wheel for ST-7/8/9/10/2000 cameras	$995
CFW-10 SA	Filter Wheel	Same as CFW-10 but "stand alone" for use with any brand of CCD camera	$995
FW8-STL	Filter wheel	8 Position 2" filter wheel for STL series cameras (replaces 5 position wheel)	$700
FW8-STL	Filter wheel	8 Position 2" filter wheel for STL series cameras (add to 5 position wheel)	$1195
AO-8	Adaptive Optics	Adaptive Optics for ST-7/8/9/10/2000/4000 cameras	$699
AO-L	Adaptive Optics	Adaptive Optics for STL series cameras	$1795
DSS-7	Spectrograph	Spectrograph designed for ST-402 (will work with any ST series camera)	$1595
SGS	Spectrograph	Self-Guiding Spectrograph for ST-7/8/9/10/2000/4000 cameras	$4995
SGS High Res	Spectrograph	Same as SGS but with higher resolution grating	$6150

Please Note: The CFW-9 filter wheel is currently free with ST-8/9/10/2000 monochrome cameras. Offer is good through12/31/07. All STL cameras come with a built-in 5 position filter wheel, the 8 position filter wheel may be added for $700 at time of purchase The ST-4000XCM at $3395 is limited to a supply of CCDs on hand and the offer will expire when the supply is exhausted. The regular price for the ST-4000XCM after the special sale will be the same as the ST-4000XM monochrome camera. The rest of the prices above include any special offers in effect at the time of this writing and are good through 12/31/07. For information onclasses of CCDs available, industrial (single sensor) models of the ST series cameras, filters and accessories, with pricing, please see our official price list at http://www.sbig.com/sbwhtmls/Pricelist_u.htm