SBIG STT-1603ME and STT-3200ME[a]

Available Beginning
September 2012

SBIG
ASTRONOMICAL INSTRUMENTS
a division of Aplegen, Inc.

Dealer Presentation

July 25, 2012

STT-1603ME and STT-3200ME High QE Camera Systems

What makes the STT-1603ME and STT-3200ME so desirable?

They have all the same extraordinary features of the STT-8300:

- Camera, Autoguider, and Filter Wheel fully integrated with guiding CCD in front of the filters! No separate guider required!
- New MicronPrecision 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!

Plus: The Highest Quantum Efficiency of any front illuminated CCDs available to amateurs, 75% and 85% at the important emission line of H-alpha!

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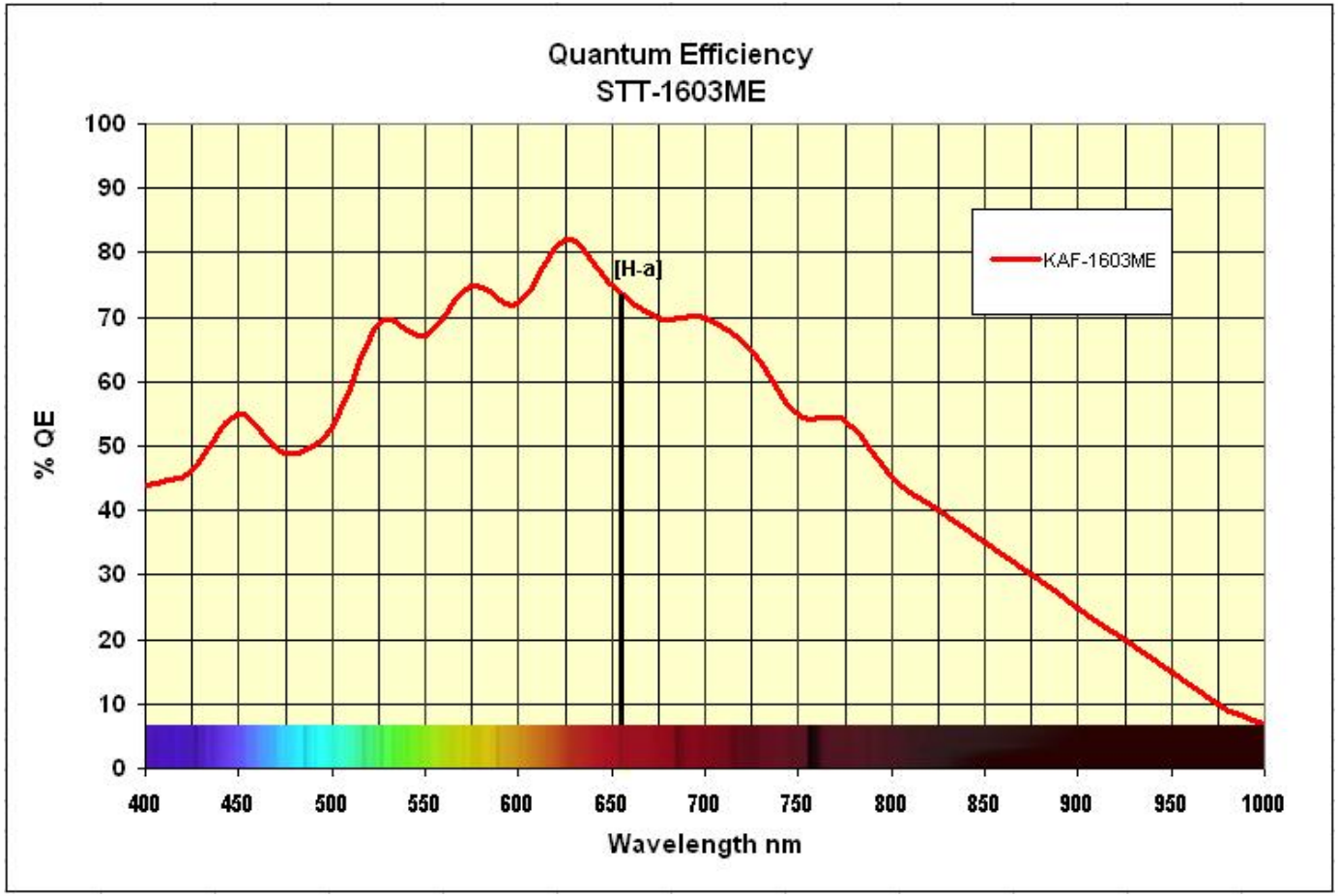
STT-3200ME Available in September, STT-1603ME October / November 2012

STT-1603ME Typical Specifications (Preliminary)



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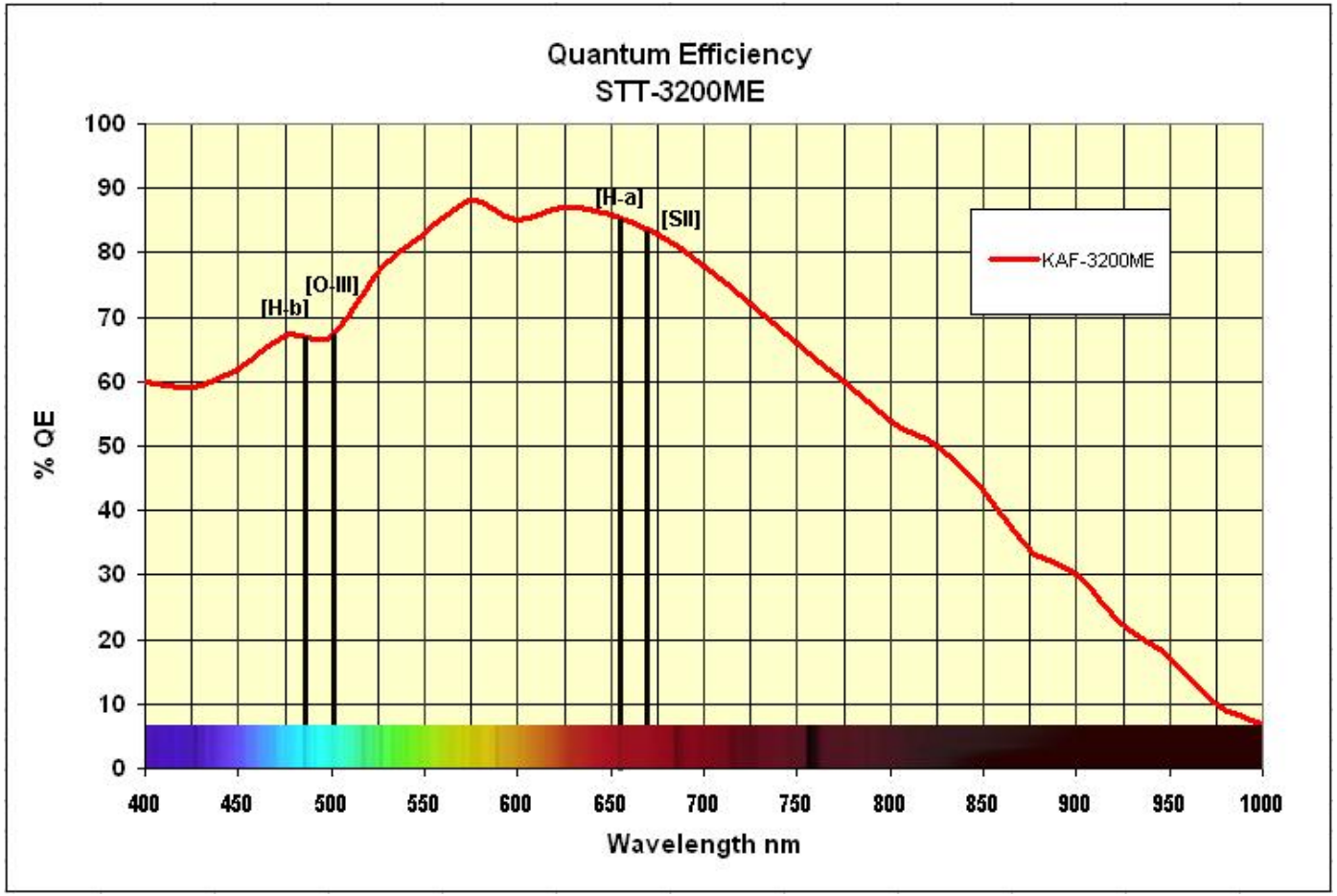
STT-3200ME Typical Specifications (Preliminary)



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Who would benefit from the STT Camera System?

- Intermediate and advanced imagers who want the highest performance, most cost effective imaging system for small to mid-size sensors
  - Imagers with reflectors or SCTs from 6” to 14” aperture
- Imagers who do narrow band imaging through any type of scope or camera lens
- Imagers who want to use, AO (adaptive optics)
- Imagers who need to guide on very faint where the complete spectrum is required for guide exposures < 2 seconds
- Imagers who want high precision flat fields with maximum removal of artifacts
- Astronomers performing high precision photometry where high precision flat fielding is critical

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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

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The Products

STT Series Camera System

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

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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.

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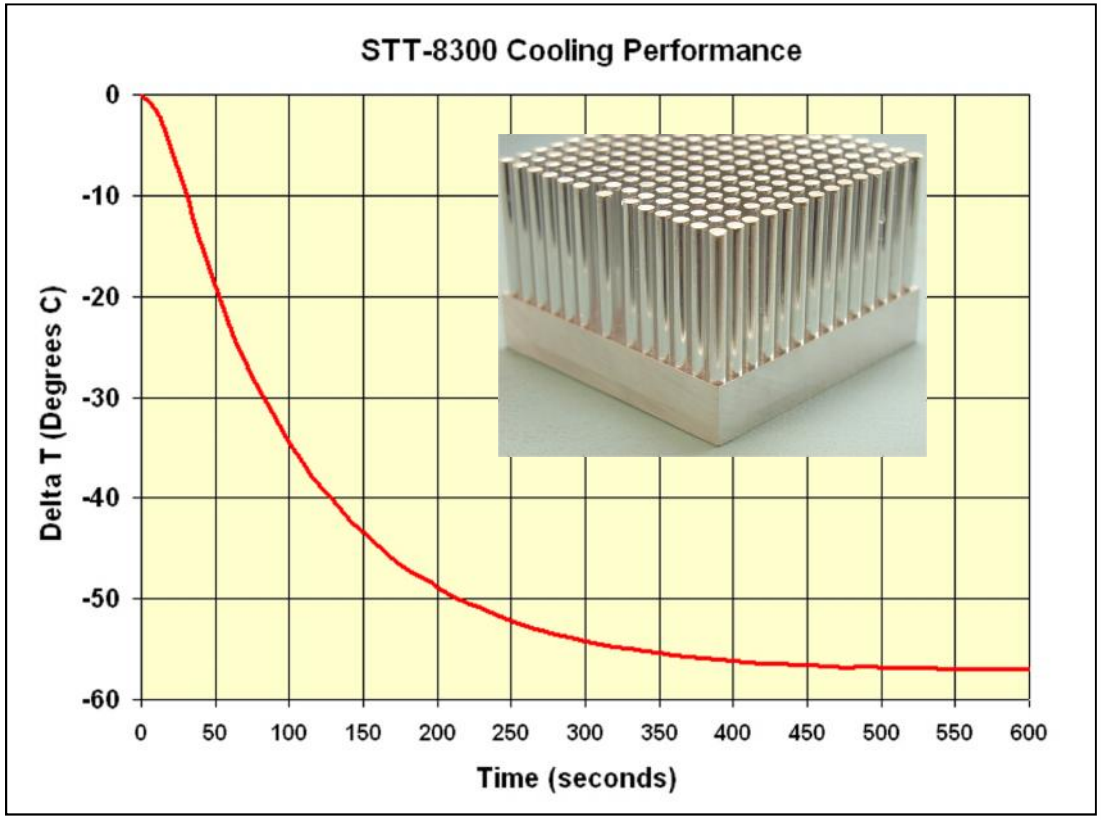
The Camera: No Compromises



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.

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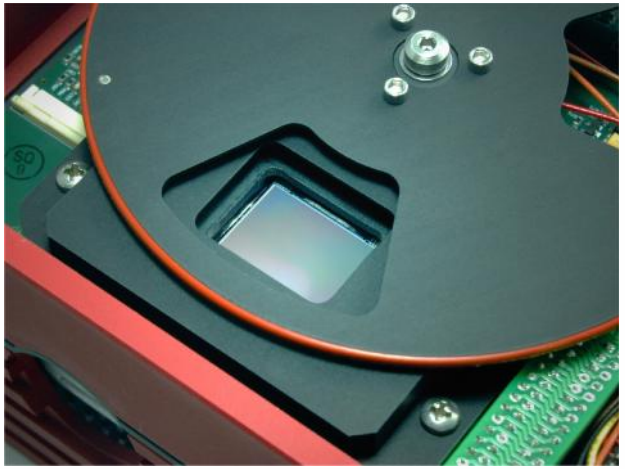
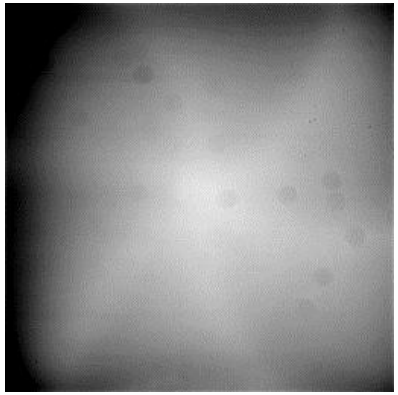
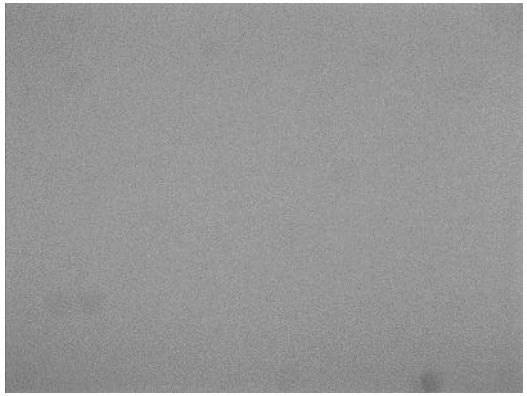
The Camera: Even-Illumination Shutter

- 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 flat fields with exposures of less than a second or even several seconds
- Very common when taking sky flats





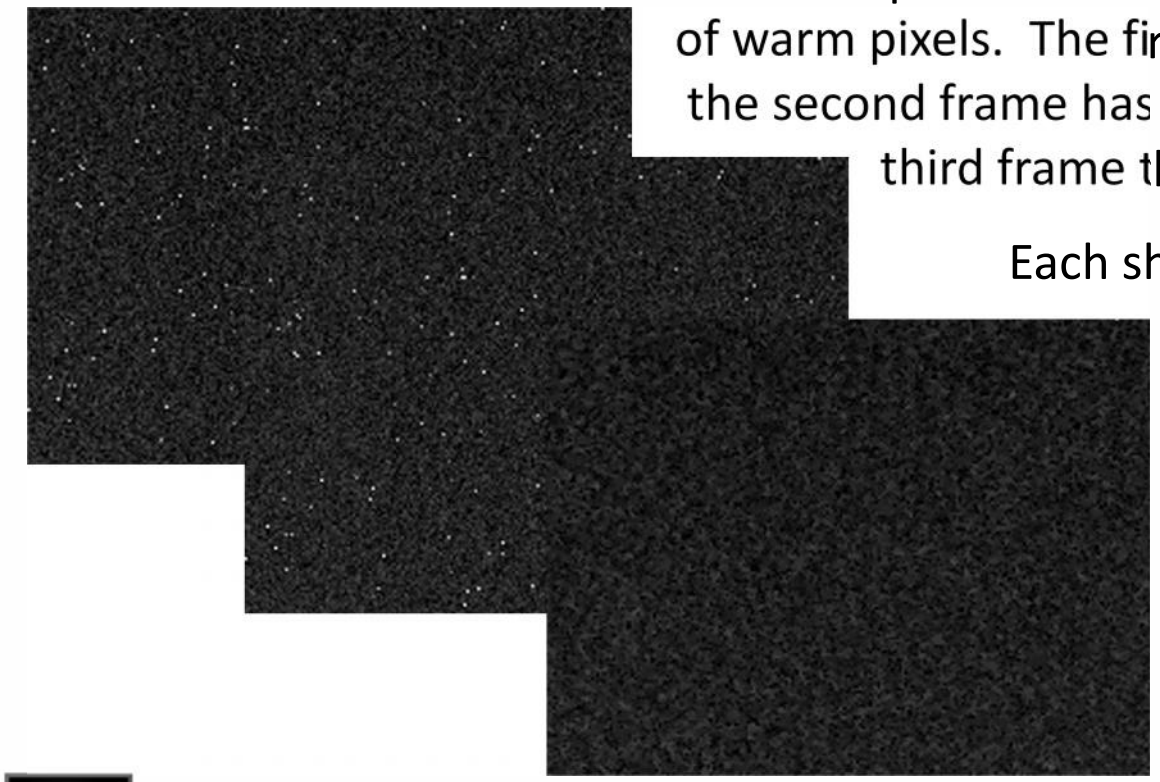
Twilight Flat from
Iris / Leaf shutter



Twilight Flat from SBIG
Even-Illumination Shutter

The Camera: 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.

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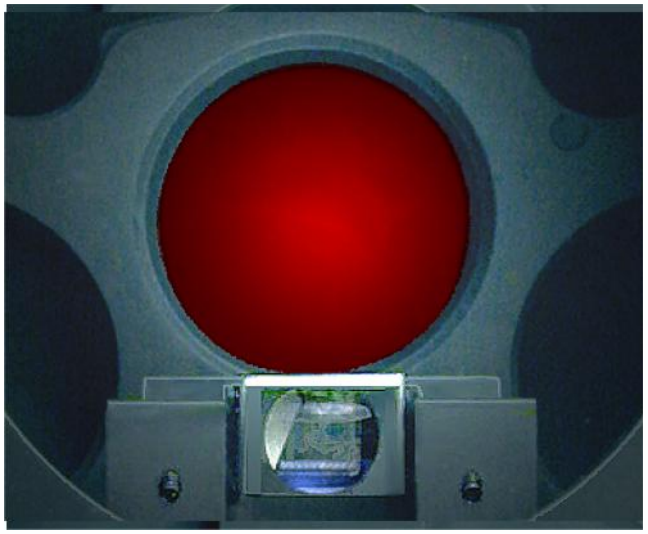
The Filter Wheel: Self-Guiding Up Front

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.



The Filter Wheel: 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 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. ***Note:*** *The STT-3200ME and STT-1603ME require only 1.25" filters to fully illuminate the sensor. Inserts are available for the STT Filter Wheels allowing the use of 1.25" LRGB, Narrowband and Photometric filters.*

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STT-1603ME Typical Specifications (Preliminary)

CCD	Kodak KAF-1603ME
Pixel Array	1536 x 1024 pixels @ 9u
CCD Size	13.8 x 9.2 mm
Total Pixels	1.6 million
Full Well Capacity	100,000 e-
Dark Current	0.1e-/pixel/sec @ -20C.
Antiblooming	NABG only
Shutter	Mechanical, Even-illumination
Exposure	0.12 to 3600 seconds, 10ms
Correlated Double Sampling	Yes
A/D Converter	16 bits
Gain	2.3e-/ADU
Read Noise	< 15e- rms

Quantum Efficiency	~85% Peak, ~75% at H-a
Binning Modes	1x1, 2x2, 3x3, 9x9, x n
Digitization Rate	10 Megapixels / sec
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 74mm
Mounting	T-Thread, 2" nosepiece
Weight	2.7 pounds / 1.2kg
Backfocus	0.69 inches / 17.5 mm

Mechanical back focus of the STT with FW8S-STT Standard Filter Wheel is 36.2 mm, and with FW8G-STT Self-Guiding Filter Wheel it is 54 mm. Optical back focus will be a few mm less depending on the thickness of the filter used.

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STT-3200ME Typical Specifications (Preliminary)

CCD	Kodak KAF-3200ME
Pixel Array	2184 x 1510 pixels @ 6.8u
CCD Size	14.85 x 10.26 mm
Total Pixels	3.2 million
Full Well Capacity	55,000 e-
Dark Current	0.06e-/pixel/sec at -20C.
Antiblooming	NABG Only
Shutter	Mechanical, Even-illumination
Exposure	0.12 to 3600 seconds, 10ms
Correlated Double Sampling	Yes
A/D Converter	16 bits
Gain	0.8e-/ADU (1.2e- binned)
Read Noise	~10e- rms

Quantum Efficiency	~90% Peak, ~85% at H-a
Binning Modes	1x1, 2x2, 3x3, 9x9, x n
Digitization Rate	8.33 Megapixels / 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 74mm
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Complete STT-1603ME Packages

Production begins October / November 2012

		Introductory Price	List Price	SBIG Part #
I.	**Basic Camera** STT-3200ME Camera with KAF-3200-C2 CCD, Universal Power Supply, USB Cable, Tracking Cable, 2” t-thread nosepiece and Software	**$3995**	$4495	STT-1603ME
II.	**Standard Filter Wheel Package** STT-3200ME Camera + FW8S-STT, Standard 8-Position Micron-Precision Filter Wheel	**$4995**	$5690	80-12250-00
III.	**Self-Guiding Filter Wheel Package** STT-3200ME Camera + FW8GS-STT, Self-Guiding 8-Position Micron-Precision Filter Wheel	**$5995**	$6690	80-12251-00
	Add Baader Planetarium 1.25” filters in cells with 36 mm inserts or 36mm unmounted filters without inserts to filter wheel package II or III:			
	1.25” LRGB	**$ 295**	$ 395	FL-LRGB 1.25
	1.25” LRGB + Ha	**$ 439**	$ 590	FL-LRGB 1.25 PLUS
	1.25” LRGBC + Ha, OIII, SII	**$ 695**	$ 890	FL-LRGB 1.25 PRO

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Complete STT-3200ME Packages

Production begins September 2012

		Introductory Price	List Price	SBIG Part #
I.	**Basic Camera** STT-3200ME Camera with KAF-3200-C2 CCD, Universal Power Supply, USB Cable, Tracking Cable, 2” t-thread nosepiece and Software	**$6495**	$6995	STT-3200ME
II.	**Standard Filter Wheel Package** STT-3200ME Camera + FW8S-STT, Standard 8-Position Micron-Precision Filter Wheel	**$7495**	$8190	80-12240-00
III.	**Self-Guiding Filter Wheel Package** STT-3200ME Camera + FW8GS-STT, Self-Guiding 8-Position Micron-Precision Filter Wheel	**$8495**	$9190	80-12241-00
	Add Baader Planetarium 1.25” filters in cells with 36 mm inserts or 36mm unmounted filters without inserts to filter wheel package II or III:			
	1.25” LRGB	**$ 295**	$ 395	FL-LRGB 1.25
	1.25” LRGB + Ha	**$ 439**	$ 590	FL-LRGB 1.25 PLUS
	1.25” LRGBC + Ha, OIII, SII	**$ 695**	$ 890	FL-LRGB 1.25 PRO

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Product Components

STT-3200ME and STT-1603ME cameras include:

Rugged, aluminum body with Ethernet and USB 2.0 electronics, Even-illumination shutter, two-stage TE cooling, water cooling ready, USB and Tracking Cables, Power supply, CCDOPS, CCDSoftV5, TheSky v.5, carrying case.

Standard filter wheel package adds FW8S-STT Micron-Precision filter wheel (without self-guiding).

Self-Guiding Filter Wheel Package adds the Self-Guiding FW8G-STT Micron-Precision filter wheel.

Filter Packages purchased with either filter wheel include:

Color Package:	36mm LRGB
Color Plus Package	36mm LRGB+H-alpha
Pro Packages:	36mm LRGBC+H-alpha, O-III, SII

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STT-1603ME / 3200ME Camera Components

Every STT-1603ME and STT-3200ME, whether sold separately or as part of a kit, includes:

- Class 2 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 6A Power supply
- SBIG’s CCDOPS version 5 camera control software
- Software Bisque’s CCDSoftV5 camera control and image processing software
- 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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STT Autoguiding Filter Wheel Components

Every STT Standard Filter Wheel Package includes:

- FW8S-STT Precise Positioning Filter Wheel with standard cover plate
- 8-Position, 36mm carousel (31mm and 1.25” inserts are optional)
- Two Year Warranty Parts and Labor

Every STT Self-Guiding Filter Wheel Package includes:

- FW8G-STT Precise Positioning Filter Wheel with Self-Guiding cover plate
- Built-in KAI-0340 Guiding CCD with adjustable pick-off mirror and focus
- 8-Position, 36mm carousel (31mm and 1.25” inserts are optional)
- Two Year Warranty Parts and Labor

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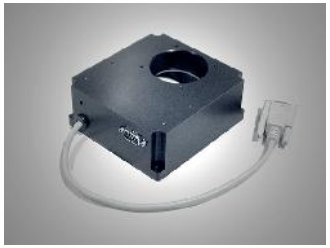
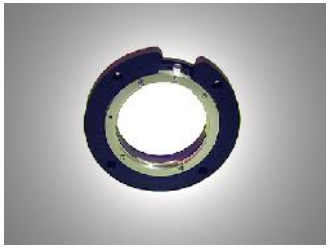
Optional Accessories for STT-1603ME and STT-3200ME





- STT Remote Guide Head
- AO-8T Adaptive Optics
- LRGB Filters
- Narrowband filters
- Photometric filters
- 31mm and 1.25” filter inserts
- Nikon lens adapter
- Canon EOS lens adapter

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How the STT-1603ME Compares to the Competition

	SBIG STT-1603ME	QSI 616	APOGEE U2	FLI ML-1603
Imaging CCD	**KAF-1603ME-C2**	**KAF-1603ME-C2**	**KAF-1603ME-C2**	**KAF-1603ME-C2**
Lowest Noise 16-bit Digitization Rate	**10 MHz**	8 MHz	1 MHz	8 MHz
Maximum cooling delta with air	**-55 C**	-45 C	-50 to -55 C	-50 to -55 C
RBI Pre-flash	**YES**	NO	NO	YES
Water cooling included	**YES**	NO ($169 Option)	NO ($900 Option)	NO ($295 Option)
Carrying Case included	**YES**	YES	NO	NO ($125 Option)
Dew Prevention included	**YES**	NO	NO	NO ($200 Option)
Ethernet included	**YES**	NO	NO	NO
Self-Guiding Option Available	**YES**	NO	NO	NO
Adaptive Optics Option Available	**YES**	NO	NO	NO
User-rechargeable desiccant	**YES**	NO	NO	NO
Sapphire window standard	**YES**	NO	NO	NO
Automatic image processing	**YES**	NO	NO	NO
3rd Party Software Included	**CCDSoftV5, The Sky v5 Equinox for Mac**	NONE	NONE	NONE
PRICE	**$3995**	$4295	$5295	$5995

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How the STT-3200ME Compares to the Competition

	SBIG STT-3200ME	QSI 632	APOGEE U32	FLI ML-3200
Imaging CCD	**KAF-3200ME-C2**	**KAF-3200ME-C2**	**KAF-3200ME-C2**	**KAF-3200ME-C2**
Lowest Noise 16-bit Digitization	**10 MHz**	8 MHz	1 MHz	8 MHz
Maximum cooling delta with air	**-55 C**	-45 C	-50 to -55 C	-50 to -55 C
RBI Pre-flash	**YES**	NO	NO	YES
Water cooling included	**YES**	NO ($169 Option)	NO ($900 Option)	NO ($295 Option)
Carrying Case included	**YES**	YES	NO	NO ($125 Option)
Dew Prevention included	**YES**	NO	NO	NO ($200 Option)
Ethernet included	**YES**	NO	NO	NO
Self-Guiding Option Available	**YES**	NO	NO	NO
Adaptive Optics Option Available	**YES**	NO	NO	NO
User-rechargeable desiccant	**YES**	NO	NO	NO
Sapphire window standard	**YES**	NO	NO	NO
Automatic image processing	**YES**	NO	NO	NO
3rd Party Software Included	**CCDSoftV5, The Sky v5 Equinox for Mac**	NONE	NONE	NONE
PRICE	**$6495**	$6995	$7995	$7995

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