



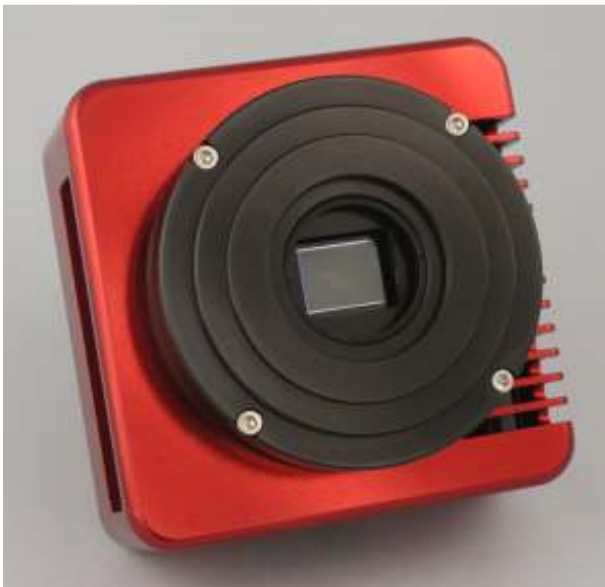
---

## THE ATIK 383L+

THE STANDARD REDEFINED.

The new Atik 383L+ is an 8 Megapixel pixel camera using the Kodak KAF 8300 CCD. Over the last few months a huge amount has been written about this CCD justifying its place in astronomer's hearts. We can sum it up succinctly by saying it's a fabulous CCD with a huge number of good sized pixels that is currently available at an irresistible price. This sensor should redefine mid range astro-imaging making multi-megapixel, cooled, cameras much more accessible.

So what of Atik's implementation? In the past Atik has prided itself on providing cameras with the very highest image quality but at reasonable cost: we see no reason to change. We have built on the success of our very highly regarded Atik 314 platform to support Kodak's KAF 8300. This immediately offers a huge number of advantages including the very low read noise circuits and the reliability from using this established design.



---

## FEATURES

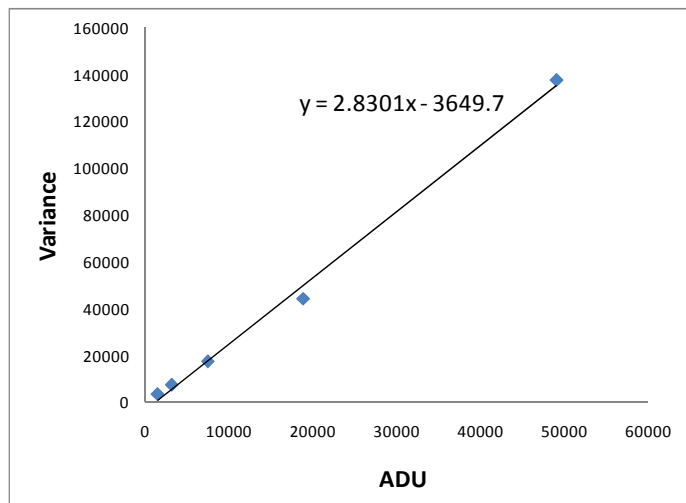
- 8.3 Million 5.4 $\mu$ m square pixels for high resolution imaging.
- Ultra low read noise for great sensitivity.
- Lightweight - no flexure of the telescope focuser tube.
- Highly efficient set point cooling to 40 degrees max below ambient.
- Great software for image acquisition and pre-processing.

## DIGITISATION AND IMAGE QUALITY

The key to any high quality camera is to convert the light collected by the sensor into digital information while ensuring that as little noise is added as possible, and the digital image truly reflects the light collected. This might appear complex to judge but fortunately there are three simple tests which show how well the camera performs against these criteria.

### READ NOISE

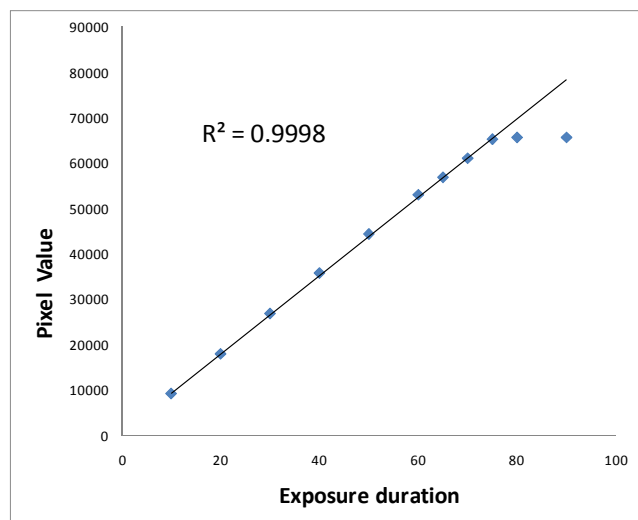
Every camera will add some noise to its images. The challenge is to add as little as possible. To determine read noise we simply look at the standard deviation of pixel values in a bias frame. This gives read noise in ADU units. Converting to electrons allows comparison with other cameras. The conversion factor for the Atik383L+ is shown opposite to be 2.83 ADU per electron. Using this, the read noise of the Aik383L+ is 7.0 electrons. We are unaware of any KAF 8300 based camera giving a lower read noise.



### LINEARITY

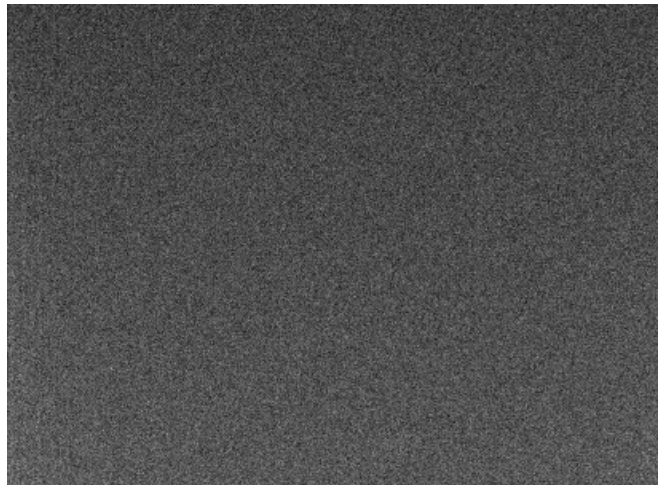
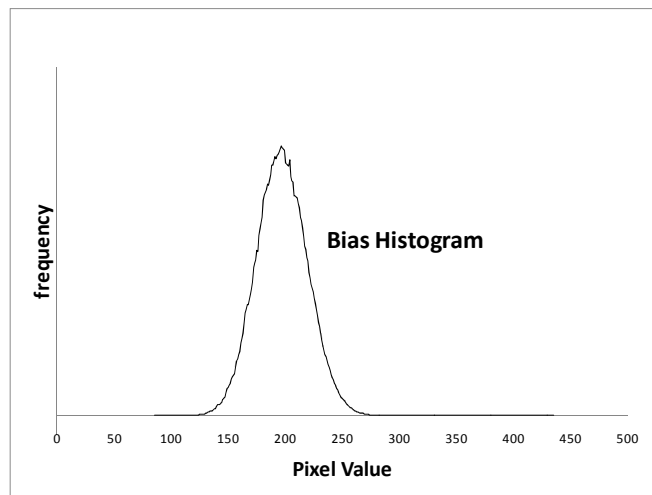
OK we can see the Atik 383L+ adds very little noise to its images. The next test is to ensure that the pixel values fairly represent the light that fell on the CCD. These values should respond linearly to increasing light.

The graph to the right shows this with the camera having an extremely linear response right up to the saturation value of 65535.



## BIAS FRAME.

A camera can have low read noise and good linearity but still show annoying artifacts in its bias frames that can appear in an image. The histogram from the Atik 383L+ has the ideal shape of a normal distribution. This allows faint detail to be pulled out of the Atik's 383L+ images during processing and background noise treated efficiently with filtering.



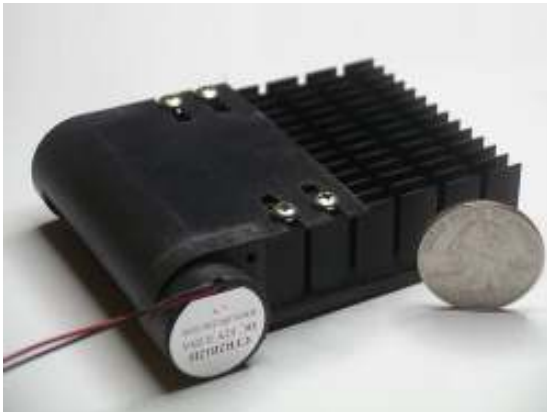
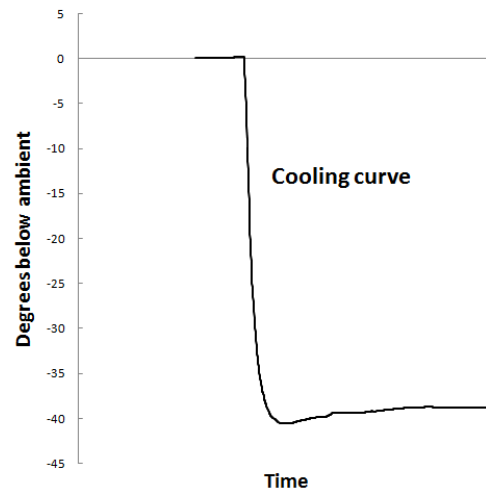
## SHUTTER



Shutters present a particular challenge in camera design. Being moving mechanical parts they can be subject to some reliability issues. Up to this point all the Atik cameras have used interline CCDs that have electronic shutters. The Atik 383L+ uses a full frame CCD and requires the use of a mechanical shutter. Rather than design this in-house, which would require an extended period of testing to determine reliability, we have sourced a shutter from a established company specialising in exactly this kind of device. This will help to ensure the long term reliability of the Atik 383L+

## COOLING

The Atik 383L+ features our most advanced cooling system to date. We are using the latest, high-efficiency Peltier modules, tiny temperature sensors located under the CCD and a centrifugal fan and heatsink. The fan is especially important as it allows us to move a lot of air over the heatsink while running the fan slowly so causing no vibration to the camera that might blur an image. As can be seen opposite cooling is a maximum of 40 degrees below ambient rising slightly to 38 degrees below as the system stabilises. The temperature of the CCD can be set to 0.1 degree precision for reproducible dark frames.



Cross flow heatsink above and *in situ* right



## OTHER FEATURES.

.... are too numerous to list but let's give it a try! The camera is powered by a single 12V supply negating the need for bulky power packs in the field. The CCD chamber is kept moisture free by using extremely efficient molecular sieves as desiccant. These will last years in normal use, and when they need replacement it's a simple job not requiring the camera to be opened.



Picture showing desiccant plug (black)

The camera has a standard T thread connection on its front and can be used with our new Filterwheel and Off Axis Guider unit. For focal ratios of F5 and above standard 1.25 inch filters can be used without vignetting. Faster focal ratios will need flat field correction or larger filters (36mm or 2inch). The camera body and shutter will work down to F2 without vignetting.

The Atik 383L+ comes with our renowned Capture image acquisition software and Dawn our innovative image processing application. So if you choose you do not need any 3<sup>rd</sup> party software to take and process images from the camera. Should you wish to use Maxim, Astro Art or CCD Soft then plug in are supplied.

---

## SUMMARY

We have taken our most popular camera, the Atik 314L+, and extended it to support the Kodak KAF-8300 CCD. It's a dream combination of low noise electronics and scientific grade sensor. Furthermore we are able offer the camera at a fantastic price. Whether you are an established imager or just starting up, the Atik383L+ is a great choice.

---

## SPECIFICATIONS

<b>Sensor Type</b>	CCD – Kodak KAF 8300 17.6mm x 13.52mm
<b>Horizontal Resolution</b>	3362 pixels
<b>Vertical Resolution</b>	2504 pixels
<b>Pixel Size</b>	5.40 $\mu\text{M}$ x 5.40 $\mu\text{M}$
<b>ADC</b>	16 bit
<b>Readout Noise</b>	Typical 7 e <sup>-</sup>
<b>Interface</b>	USB 2.0 High Speed
<b>Power</b>	12v DC
<b>Maximum Exposure Length</b>	Unlimited
<b>Cooling</b>	Thermoelectric with $\Delta T = -40^{\circ}\text{C}$ max, set point controller
<b>Weight</b>	500 gram

---

## IMAGE DOWNLOAD TIMES.

<b>Binning</b>	<b>Resolution</b>	<b>Pixel Size (<math>\mu\text{m}</math>)</b>	<b>Normal (Sec)</b>	<b>Preview (Sec)</b>
1x1	3326x2504	5.4	10.5	6
2x2	1663x1252	10.8	4.1	2.5
3x3	1108x834	16.2	2.6	1.6
4x4	831x626	21.6	1.9	1.1
<b>Subframe</b>				
1x1	100x100	5.4	0.69	0.32