FLI’s new ProLine 16803 CC

Nik Szymanek captures images of deep sky objects with a new high-end CCD camera from US company Finger Lakes Instrumentation.

These are exciting times for the amateur CCD imager. Keen to stay ahead of the competition, manufacturers continue to deliver instrumentation that blurs the distinction between amateur and professional imaging and for very reasonable costs too. Before reviewing Finger Lake Instrumentation’s (FLI) ProLine 16803 CCD camera I knew that this would be a camera of distinction and I wasn’t disappointed. I’d reviewed another FLI CCD camera some years ago (see *Astronomy Now*, September 2006) and found that to be of the highest calibre so I had high hopes for the 16803 model.

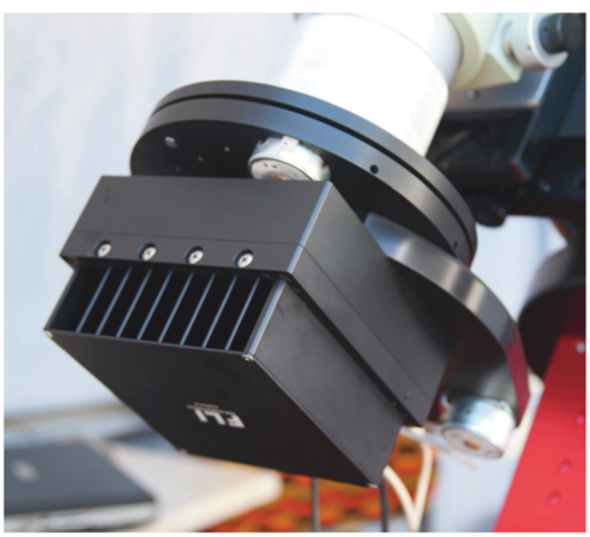
The camera is based around a Kodak KAF-16803 sensor that features a 4096 × 4096 array of nine-micron pixels. This is a seriously large CCD with dimensions of 36.9mm × 36.9mm so requires a telescope that will both illuminate the sensor evenly and has a flat field with no aberrations. The camera was loaned to me by The Widescreen Centre in London along with a Takahashi 106 FSQ refractor that admirably fulfilled the above criteria. This is one of the most popular imaging telescopes available and proved to be a good match for the camera. Also supplied by FLI were a large five-position filterwheel and an electronic focuser. The focuser wasn’t part of the review but it was needed to allow the camera to reach focus. There’s no doubt that this is a seriously high-end camera. The build quality and engineering are of the highest standard. Needless to say, with all three items securely bolted together this is a hefty package best suited to large telescopes with rugged focusers.

Software

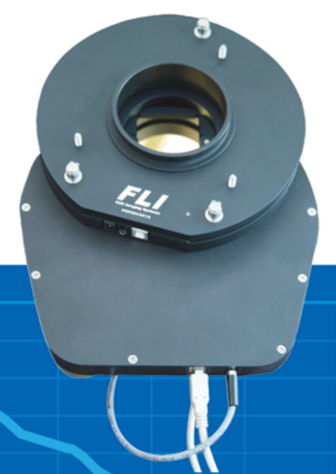
FLI supplied a set of 50mm-square LRGB, hydrogen-alpha and O III filters. It’s possible to install them by rotating the filter carousel into the clear aperture but I found it easier to remove the faceplate to gain access. The filters are held in place by a pair of circular discs (designed to work with differing thickness filters) secured by small cross-headed screws. This seemed a bit tricky at first, especially handling the expensive 50mm filters, but became easier with practice. Next I had to install the FLI operating software that is downloadable from their website. The camera and filterwheel both have their own operating programs but for some reason they didn’t work because of a reported missing DLL file (although on inspection the errant file did seem to be installed in the right location). It wasn’t a problem as I’d planned to use *Maxim DL v5* to operate the CCD and filterwheel. This involved copying an FLI file into the *Maxim* directory, after which I had to choose the camera, filterwheel and filter allocation in the *Maxim* set-up. All of this worked flawlessly.

I used the freeware *CCD Calculator* to work out the field-of-view and sampling rate of this camera and was astounded to see that it would deliver a huge 238-arcminute square field with a 3.5 arcsecond per pixel sampling scale. This made the set up suitable for imaging the largest deep sky objects. Before dark, I fired up the camera and took a few test exposures. It was a pleasant surprise to see that the image files downloaded to my aging XP-based laptop in a staggeringly quick eight seconds (especially considering that this is a 17 megapixel CCD and that each image downloaded as a 32MB file). Modern high-speed computers should download the 16-bit images in four seconds and there is a user-option to select a slower download to help maintain the best image quality. Images binned into a 4 × 4 configuration downloaded at lightning speed as did a ‘windowed’ section of the sensor used for focusing on a star. The review period coincided with an unusually mild September and I was interested to see how well the Peltier cooler worked. Camera specifications on the FLI website show that it was capable of a 55 degree Celsius cooling capability, so I set the camera to cool from about 18 degrees Celsius to zero to see how fast the cooling worked but discovered that once the camera had

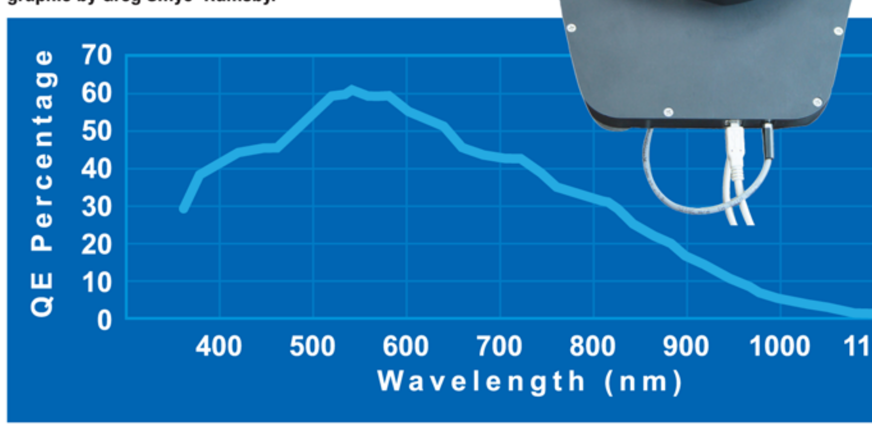
▼ The FLI ProLine 16803 CCD camera is a large item and needs to be firmly attached to a sturdy telescope focuser. This view shows the camera’s cooling ducts (beneath the four screws). Also shown are the five-position motorised filterwheel and the FLI electronic focuser. Image: Nik Szymanek



▶ Finger Lake Instrumentation’s ProLine 16803 CCD.



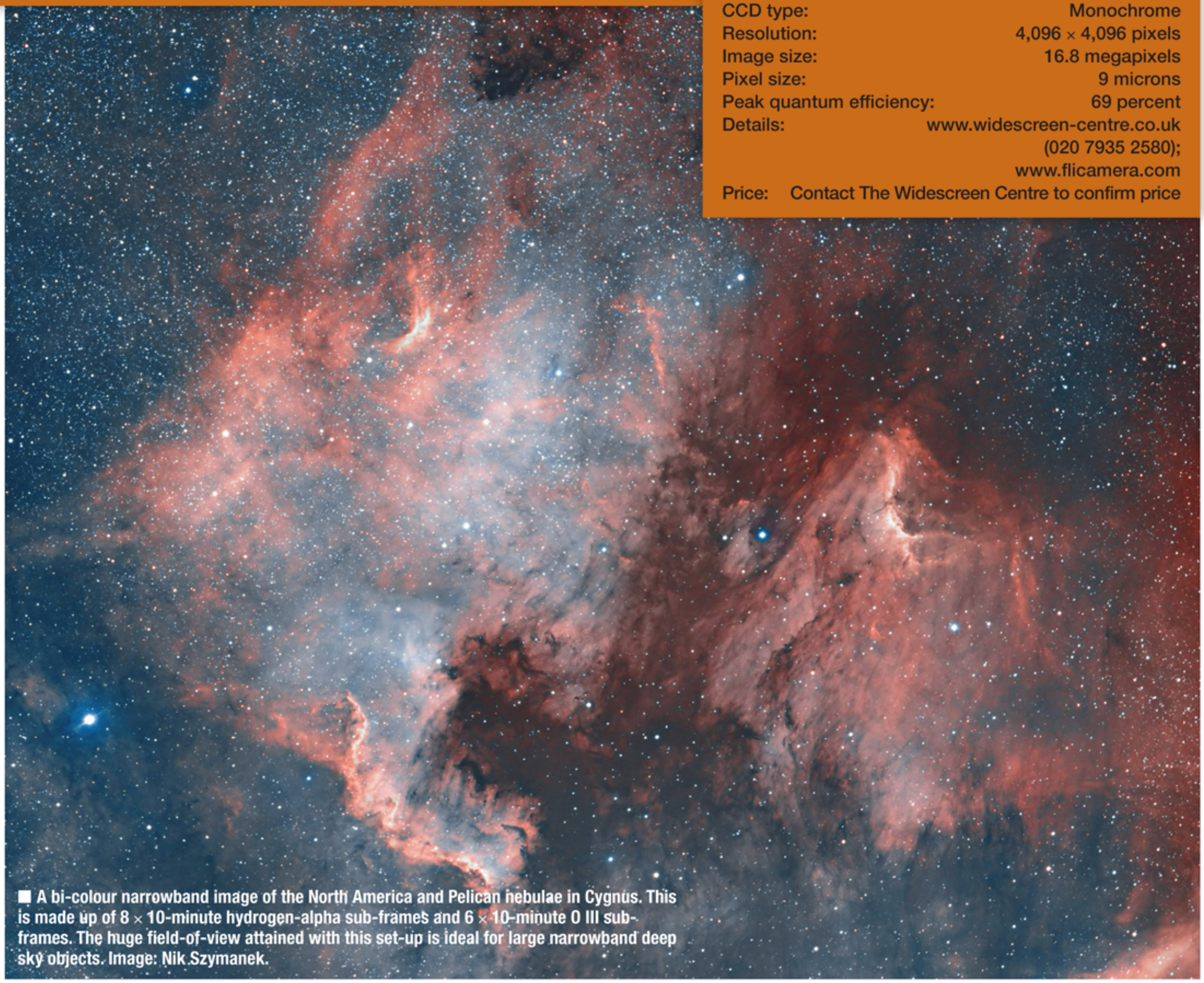
▼ This graph shows the quantum efficiency of the Kodak KAF-16803 sensor. The peak quantum efficiency (QE) of around 59 percent at 550 nanometres makes the sensor ideal for narrowband imaging with hydrogen-alpha, O III and S II filters. AN graphic by Greg Smye–Rumsby.



D camera

At a glance:
FLI ProLine 16803

CCD chip:	Kodak KAF-16803
CCD type:	Monochrome
Resolution:	4,096 × 4,096 pixels
Image size:	16.8 megapixels
Pixel size:	9 microns
Peak quantum efficiency:	69 percent
Details:	www.widescreen-centre.co.uk (020 7935 2580); www.flicamera.com
Price:	Contact The Widescreen Centre to confirm price



■ A bi-colour narrowband image of the North America and Pelican nebulae in Cygnus. This is made up of 8 × 10-minute hydrogen-alpha sub-frames and 6 × 10-minute O III sub-frames. The huge field-of-view attained with this set-up is ideal for large narrowband deep sky objects. Image: Nik Szymanek.

reached the preset level a layer of condensation had formed above the sensor. This isn't too uncommon and has happened to just about every other camera that I've owned but it surprised me nonetheless. The only solution was to power down the CCD and start again with a less aggressive cycle of cooling (a stepped procedure of five degree increments), which worked fine and the problem didn't re-occur. I believe this scenario happens when a high-humidity pocket of air is trapped in the cavity above the glass slip protecting the sensor and cooling allows the moisture to condense out of the air. In any case the cooling set point remained ultra stable during further imaging runs. FLI offer an anti-dew option called ADT that can be purchased for $200, and which can also be retrofitted and doesn't affect the normal cooling operation of the sensor in any way.

High-level imaging

My first target was the North America and Pelican nebulae in Cygnus. I set the camera to record 8 × 10-minute hydrogen-alpha exposures and was pleasantly surprised to see how deep the stacked images had reached. The wide field had easily captured both nebulae with room to spare. The next night I took images using the O III filter and although the imaging run was curtailed by mist I was able to acquire 6 × 10-minute exposures. Most of my imaging these days is made up of bi-colour pictures using the above filters and I was really pleased with the final processed image. The quantum efficiency of the CCD is a very respectable 59 percent making it suitable for narrowband imaging. The next night I took images of the Andromeda Galaxy using the supplied LRGB filters. As expected, the camera performed well and was only limited by the high level of light pollution from my observing site that caused annoying gradients across the large field-of-view (and by the innumerable aircraft trails!). I would have loved to place this camera on my 254mm (ten-inch) GSO Ritchey-Chrétien telescope for some higher-resolution imaging but sadly didn't have the appropriate adaptors.

This is a product with an outstanding pedigree. The build quality and performance of the electronics are exemplary and the price is competitive for a product of this calibre. If you're looking for a high-end camera for quality deep sky imaging then the FLI ProLine 16803 model should be high on your list.

Nik Szymanek is a keen astrophotographer based in Essex and is the author of Infinity Rising.