

ProLine: Large Format High Speed Cooled CCD Cameras

Outline

ProLine Imaging Systems – setting a new standard in pricing, performance and flexibility. FLI's flagship imaging system features user selectable ultra-fast download speeds, shutters with 1 million MTBF ratings, choice of cooling base configurations, a wide range of supported CCDs and a separate hermetically sealed chamber for the CCD and electronics.

Build Quality

Every component of the ProLine Imaging System is designed to ensure a long life in the most demanding conditions. The ProLine base, shutter housing and front flange are each machined from a single piece of high-grade aluminium. ProLine serial numbers and logos are laser etched. Even the ProLine fan cover is CNC machined! The electrical printed circuit boards use the highest quality components and are protected from harsh environment without the need for conformal coatings. *Our shutters are field serviceable should they ever encounter damage!*

Download Speeds

Breaking new ground in download speeds, the ProLine provides the user with extremely fast user-selectable download speeds. You can download images up to *12 mega-pixels per second!* This means that an unbinned PL09000 image can be downloaded to your PC in as little as 1 second! For imaging, the download time can be slowed to reduce the noise in the final image.

Cooling

The ProLine achieves a sustainable 65°C cooling performance. This means you can operate your camera at -30°C with ambient temperatures of up to 35°C for lowest dark current and its attendant noise. No additional water cooling or cooling sequence staging is required. Simply set the ProLine cooling where you want it and the camera will do the rest – quickly and without worries. Professional grade LC cooling bases are available with extended cooling rates.

Internal Frame Buffer

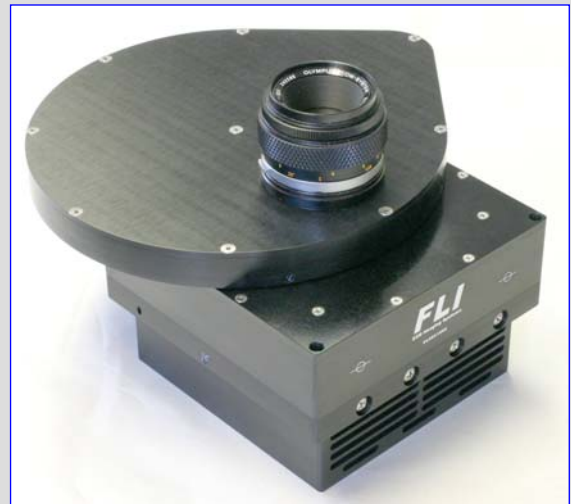
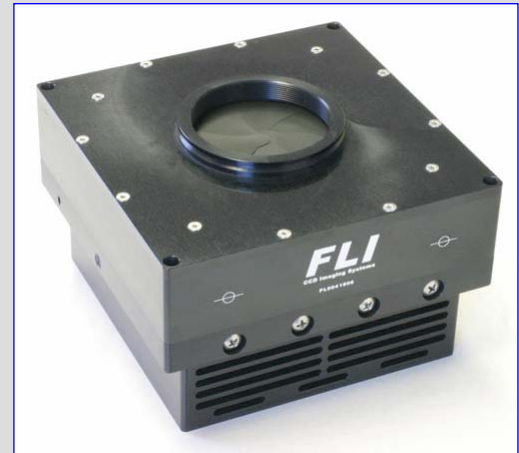
Conventional imaging cameras move the image data directly from the image sensor to the USB port, making them susceptible to added artifacts due to PC processing tasks, processor speed, and other PC-related issues. Each ProLine camera has an internal memory capacity so that the imaging chip can be quickly read out and downloaded to the PC. This allows the PC to take the image at whatever speed it is capable of without introducing any artifacts to the image.

Accurate Sensor Placement

Through sophisticated design and production techniques, the ProLine image sensor is accurately aligned so that the imaging chip is perpendicular to the optical path without shims or other post-assembly adjustments. This is crucially important as chips get larger to insure the entire frame of your image is in focus. Although not required by some applications, we also accurately control the 'X,Y' location of the sensor so that it is square to the camera body.

Complete Imaging System from A to Z

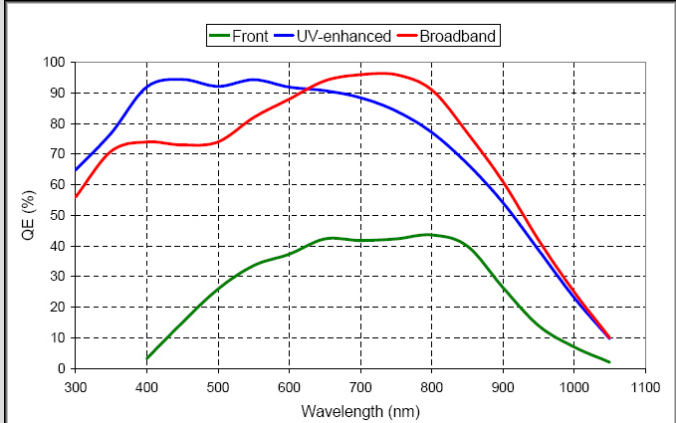
ProLine is part of a complete and integrated imaging system! The ProLine camera rigidly couples to the new Precision CFW-4-5S filter wheel (five positions, 50mm square filters) and Precision Digital Focuser (PDF). Add our ME2 auto-guider for a complete imaging solution. Available filters include the new 50mm square H-alpha, LRGB, UBVRI, Sulfur II and Oxygen III filters. We also offer a wide range of available adapters.



Product Details	
Selectable download speeds up to 12 mega-pixels/sec	High tolerance sensor alignment and orthogonality
On-board frame buffer standard	100% CNC Machined Sub-Assemblies
CCD over scan capability	High Transmission camera windows (97%)
Field upgradeable firmware	Custom window available with transmission below 200nm
USB 2.0 High speed serial Interfaces	Wide range of supported CCD Imaging Sensors
<u>Fast Reliable Shutters</u> <ul style="list-style-type: none"> 82 mm FLI designed stainless-steel shutter 65 mm Uniblitz shutter 	<ul style="list-style-type: none"> Kodak Full Frame Color, Monochrome and Interline Fairchild Imaging Full Frame Back-Illuminated E2V Technologies Full Frame Back-Illuminated (UVAR)
Triple TEC Cooling Standard	Professional Grade LC Cooling Back is available
<u>Separate hermetically sealed chambers</u> <ul style="list-style-type: none"> Electronics: back filled with Ultra Pure Argon Sensor: back filled with Ultra Pure Argon or Xenon 	<u>Compatible with CFW-4-5, CFW-5-7 and PDF Focuser</u> <ul style="list-style-type: none"> Five and Seven positions filter wheels available LRGB, H alpha, UVRI, SII and OIII available 50mm square and 65mm diameter filters available
Low noise, 16-bit operation	

Specifications	
CCD readout noise	As low as 5e~
Dark Current @ -30 deg C. (typical)	0.1 to 1 e-/pixel/sec (Sensor Dependent)
Anti-blooming	Available
Spectral sensitivity	200 - 1050 nanometers
Available number of pixels	Up to 40 mega pixels
Pixel size range	6.8 to 24 micron
Camera cooling	As low as 65 deg C (fan-assisted air) or 75 deg C (LC base)
Power requirements	12V
Storage temperature range	-50°C to +100°C
Operation temperature range	-40°C to +50°C
Relative humidity operating range	95%
Standard Camera Weight	5.5 pounds
Standard Camera Dimensions	6.2" x 6.2" x 4" (Width x Depth x Height)

ProLine Models with Kodak Interline Sensors				
Model	Sensor	Peak QE	Pixel	Resolution
PL11000M	KAI-11000M	51%	9 µm	4008 x 2672
PL4021	KAI-4021M	55%	7.4 µm	2048 x 2048
ProLine Models with Kodak Full Frame Sensors				
PL4301E	KAF-4301E	65%	24 µm	2084 x 2084
PL39000	KAF-39000	TBD	6.8 µm	7216 x 5412
PL09000	KAF-09000	69%	12 µm	3056 x 3056
PL16803	KAF-16803	60%	9 µm	4096 x 4096
PL1001E	KAF-1001E	72%	24 µm	1024 x 1024
ProLine Models with E2V Sensors				
PL4240-1-B	CCD42-40-1-368	85%	13.5µm	2048 x 2048
PL4710-1-BB	CCD47-10-1-371	93%	13 µm	1056 x 1027
PL4710-1-UV	CCD47-10-1-373	73%	13 µm	1056 x 1027
PL77-1-MB	CCD77-00-1-358	93%	24 µm	512 x 512
<u>Direct link to ProLine Web Page</u> http://www.fli-cam.com/proline.htm				

ProLine with Fairchild Sensors				
Model	Sensor	Peak QE	Pixel	Resolution
PL3041-1	CCD3041	96%	15 µm	2048 x 2048
Typical QE Curve for CCD3041 sensor 				
A Wider Range of Sensors are Available Please Contact FLI Regarding Unlisted Sensors				