



# PRODUCT CATALOG AND SENSOR REVIEW



USB  
VISION

GiGE  
VISION



FireWire

CAMERA  
Link



USB 2.0



ptgrey.com

**POINT GREY**  
Innovation in Imaging



# ABOUT POINT GREY

**POINT GREY** is a global leader in the design and manufacturing of innovative, high-performance digital cameras for industrial, scientific, medical, traffic, and security applications. We offer a unique and comprehensive portfolio of USB3 Vision, GigE Vision, FireWire, and USB 2.0 products known for their outstanding quality, ease of use, and unbeatable price-performance.

## QUICK FACTS

- Founded 1997
- ISO 9001:2008 registered company
- 200+ staff worldwide
- 200K+ camera/year capacity
- Designed and manufactured in Canada
- 3 year warranty on most products
- Global offices & distribution network



## INNOVATION

At Point Grey, "innovation" is more than a tagline; it's a way of life. The synergies of a broad range of hardware, software and mechanical engineering skills under one roof allows Point Grey to continually bring innovative and ground-breaking products to market. This drive for innovation has led to many industry firsts, including the world's first and smallest 1394b digital camera, the world's smallest GigE camera, and the world's first USB 3.0 camera.

## PRODUCT EXCELLENCE

All design, prototyping, manufacturing, testing, and packaging is done out of a state-of-the-art facility in Richmond, BC, Canada. These facilities include dedicated



SMT lines, AOI and X-ray machines, industrial clean room, and automated test stations. The "Seal of Quality" label on each camera cannot be printed until the camera has been 100% inspected and tested. This rigorous quality testing, together with hassle-free product warranties, ensures that customers can rely on Point Grey cameras for their demanding applications.

## CUSTOMER CARE

To ensure our customers achieve maximum value from their camera systems, Point Grey offers world-class support on installation, configuration, customization and troubleshooting. Our Customer Support program includes email response within 24 hours, phone support, online



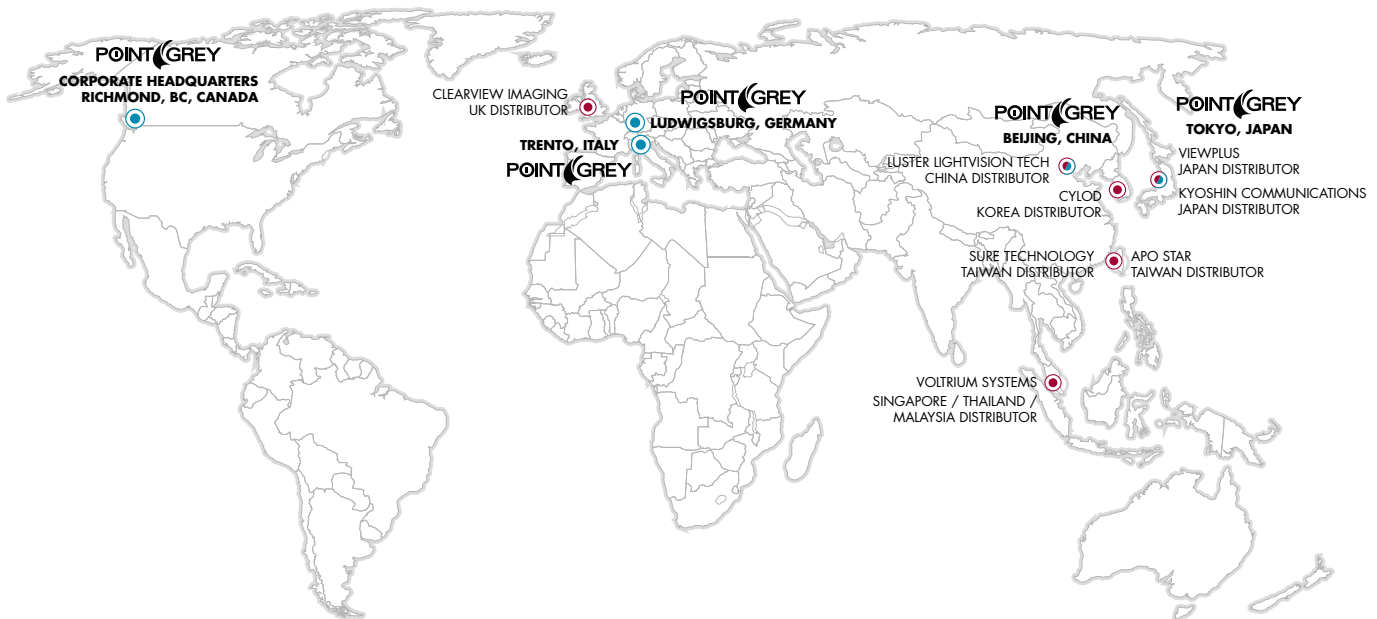
user manuals, online knowledge base articles, and regular firmware updates.

## END-TO-END IMAGING

A critical component of any vision system is the speed and reliability of the imaging pipeline, from light hitting the image sensor to data reaching the host system. Point Grey has taken ownership of the entire pipeline, and over the last 18 years has created a diverse portfolio of digital cameras, peripheral components, and software.







2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
First IEEE 1394 stereo vision camera <i>Digidops</i>	First IEEE 1394 imaging camera <i>Firefly</i>	First spherical vision camera <i>Ladybug</i>	First Flea camera	First IEEE 1394b camera <i>Dragonfly Express</i>	Headquarters expansion  New products <i>Dragonfly2</i> <i>Ladybug2</i>	Office opens in Germany  New products <i>Flea2</i> <i>Firefly MV</i>	New products <i>Grasshopper FirePRO</i>	Headquarters expansion  New product USB 2.0 camera <i>Chameleon</i>  New product <i>Ladybug3</i>	World's first USB 3.0 Camera	New products <i>Flea3</i>  New product GigE camera <i>Grasshopper2</i>	First Camera Link camera <i>Gazelle</i>  First USB 3.0 camera <i>Flea3</i>  World's smallest GigE camera <i>Flea3</i>  New product <i>Grasshopper Express</i>	China office opens  New Product IP camera <i>Zebra2</i>  World's Smallest PoE GigE Camera <i>Blackfly</i>	New USB3 products <i>Ladybug5</i> <i>Grasshopper3</i>	New USB3 products <i>Blackfly USB 3.0</i> <i>Chameleon 3</i>  New GigE products <i>Grasshopper3 GigE</i>



**Point Grey USB 3.0 Camera Features:**

- Largest selection of CCD and CMOS sensors
- FPGA and frame buffer-based architecture for optimal reliability
- Point Grey proprietary USB 3.0 link layer and driver stack
- Industry-standard C- and CS- mount
- Fully tested USB 3.0 accessories: interface cards, hubs, cables, and lenses

# CHAMELEON<sup>3</sup>

FLEXIBLE FORM FACTOR



# BLACKFLY<sup>®</sup>

PERFORMANCE AND VALUE



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
CM3-U3-13S2C/M-CS	1.3MP Sony ICX445 CCD**	1/3" 3.75 µm Global	1288 x 964	30 fps
CM3-U3-13Y3C/M-CS	1.3MP On Semi Python1300 CMOS	1/2" 4.8 µm Global	1280 x 1024	149 fps
CM3-U3-28S4C/M-CS	2.8MP Sony ICX818 CCD**	1/1.8" 3.69 µm Global	1928 x 1448	13 fps

\*\*High sensitivity Sony EXview HAD CCD\*

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
BFLY-U3-03S2C/M-CS	0.3MP Sony ICX424 CCD	1/3" 7.4 µm Global	648 x 488	84 fps
BFLY-U3-05S2C/M-CS	0.5MP Sony ICX693 CCD	1/3" 6.0 µm Global	808 x 608	50 fps
BFLY-U3-13S2C/M-CS	1.3MP Sony ICX445 CCD**	1/3" 3.75 µm Global	1288 x 964	30 fps
BFLY-U3-20S4C/M-CS	2.0MP Sony ICX274 CCD**	1/1.8" 4.4 µm Global	1624 x 1224	15 fps
BFLY-U3-23S6C/M-C	2.3MP Sony IMX249 CMOS	1/1.2" 5.86 µm Global	1920 x 1200	41 fps
BFLY-U3-50H5C/M-C	5.0MP Sharp RJ32S4/S3AAODT	2/3" 3.45 µm Global	2448 x 2048	7.5 fps

\*\*High sensitivity Sony EXview HAD CCD\*

	CHAMELEON <sup>3</sup>	BLACKFLY <sup>®</sup>
<b>INTERFACE</b>	USB 3.0 interface with screw locks for camera control, data, and power	USB 3.0 interface with screw locks for camera control, data, and power
<b>GPIO</b>	9-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power 1 opto-isolated input, 1 opto-isolated output	6-pin Hirose HR10A-7R-6PB GPIO connector for trigger, strobe, and power. 1 opto-isolated input, 1 opto-isolated output
<b>ADC</b>	12-bit	12-bit
<b>IMAGE DATA FORMATS</b>	Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)	Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
<b>PARTIAL IMAGE MODES</b>	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes
<b>GAIN RANGE</b>	Automatic*/manual/one-push* (*Free running only) 0 dB to 24 dB	Automatic*/manual/one-push* (*Free running only) 0 dB to 24 dB
<b>EXPOSURE RANGE</b>	Automatic*/manual/one-push* 0.046 ms to 32 seconds	Automatic*/manual/one-push* 0.015 ms to 32 seconds
<b>GAMMA</b>	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table
<b>TRIGGER MODES</b>	Standard, bulb, multi-shot	Standard, bulb, multi-shot
<b>IMAGE BUFFER</b>	16 MB frame buffer	16 MB frame buffer
<b>USER SETS</b>	2 memory channels for custom camera settings	2 memory channels for custom camera settings
<b>SIZE (WxHxD)</b>	44 x 35 x 19.5 mm excluding lens holder (metal case)	29 x 29 x 30 mm excluding lens holder (metal case)
<b>MASS</b>	55g (Without optics or tripod mounting bracket)	36g (Without optics or tripod mounting bracket)
<b>POWER</b>	5 V, <3 W, via GPIO or USB 3.0 interface	5 V, <3 W, via GPIO or USB 3.0 interface
<b>LENS MOUNT</b>	CS-mount	CS-mount, C-mount
<b>TEMPERATURE</b>	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)
<b>WARRANTY</b>	3 years	3 years



# FLEA<sup>3</sup>

ULTRA-COMPACT, ULTRA-FAST CMOS



# GRASSHOPPER<sup>3</sup>

HIGH PERFORMANCE CCD AND CMOS



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>FL3-U3-1352C/M-CS</b>	1.3MP Sony IMX035 CMOS* 1/3" 3.63µm Rolling	1328 x 1048	120 fps	
<b>FL3-U3-13Y3M-C</b>	1.3MP ON Semi VITA 1300 CMOS 1/2" 4.8 µm Global	1280 x 1024	150 fps	
<b>FL3-U3-13E4C/M-C</b>	1.3MP e2v EV76C560 CMOS 1/1.8" 5.3 µm Global	1280 x 1024	60 fps	
<b>FL3-U3-20E4C/M-C</b>	2.0MP e2v EV76C5706F CMOS 1/1.8" 4.5 µm Global	1600 x 1200	59 fps	
<b>FL3-U3-32S2C/M-CS</b>	3.2MP Sony IMX036 CMOS* 1/2.8" 2.5 µm Rolling	2080 x 1552	60 fps	
<b>FL3-U3-88S2C-C</b>	8.8MP Sony IMX121 CMOS** 1/2.5" 1.55µm Rolling	4096 x 2160	21 fps	

\*\*High performance Sony Exmor R CMOS\*

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>GS3-U3-14S5C/M-C</b>	1.4MP Sony ICX285 CCD 2/3" 6.45 µm Global	1384 x 1036	30 fps	
<b>GS3-U3-15S5C/M-C</b>	1.4MP Sony ICX825 CCD 2/3" 6.45 µm Global	1384 x 1036	45 fps	
<b>GS3-U3-23S6C/M-C</b>	2.3MP Sony IMX174 CMOS* 1/1.2" 5.86 µm Global	1920 x 1200	162 fps	
<b>GS3-U3-28S4C/M-C</b>	2.8MP Sony ICX687 CCD** 1/1.8" 3.69 µm Global	1928 x 1448	26 fps	
<b>GS3-U3-28S5C/M-C</b>	2.8MP Sony ICX674 CCD** 2/3" 4.54 µm Global	1920 x 1440	26 fps	
<b>GS3-U3-32S4C/M-C</b>	3.2MP Sony IMX252 CMOS* 2/3" 3.45 µm Global	2048 x 1536	121 fps	
<b>GS3-U3-41S4C/M-C</b>	4.1MP Sony ICX808 CCD** 1/1.8" 3.1 µm Global	2016 x 2016	18 fps	
<b>GS3-U3-41C6MIR-C</b>	4.1MP CMOSIS CMW4000-3E12 CMOS 1" 5.5 µm Global	2048 x 2048	90 fps	
<b>GS3-U3-41C6C/M-C</b>	4.1MP CMOSIS CMW4000-3E5 CMOS 1" 5.5 µm Global	2048 x 2048	90 fps	
<b>GS3-U3-50S5C/M-C</b>	5.0MP Sony ICX625 CCD 2/3" 3.45 µm Global	2448 x 2048	15 fps	
<b>GS3-U3-51S5C/M-C</b>	5.0MP Sony IMX250 CMOS* 2/3" 3.45 µm Global	2448 x 2048	75 fps	
<b>GS3-U3-60S6C/M-C</b>	6.0MP Sony ICX694 CCD** 1" 4.54 µm Global	2736 x 2192	13 fps	
<b>GS3-U3-60QS6C/M-C</b>	6.0MP Sony ICX694 CCD** 1" 4.54 µm Global	2736 x 2192	25 fps	
<b>GS3-U3-91S6C/M-C</b>	9.1MP Sony ICX814 CCD** 1" 3.69 µm Global	3376 x 2704	9 fps	
<b>GS3-U3-120S6C/M-C</b>	12 MP Sony ICX834 CCD** 1" 3.1 µm Global	4240 x 2824	7 fps	

<sup>1</sup>Color models coming soon

\*High performance Sony Pregius\* Global Shutter CMOS \*\*High sensitivity Sony ExView HAD CCD II\*

USB 3.0 interface with screw locks for camera control, data, and power

8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O:  
1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins

12-bit (FL3-U3-13S2, FL3-U3-32S2, FL3-U3-88S2) / 10-bit (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-20E4)

Y8, Y16, Mono8, Mono12, Mono16 (all models)  
RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push\* (\*Free running only) 0 dB to 24 dB (FL3-U3-13S2, FL3-U3-32S2, FL3-U3-88S2)  
0 dB to 18 dB (FL3-U3-13Y3, FL3-U3-13E4)

Automatic/Manual/One-Push\*/Extended Shutter\*\* modes (\*Free running only) (\*\*except FL3-U3-13Y3)  
0.008 ms to 1 second (FL3-U3-13S2) / 0.006 ms to 1 second (FL3-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-20E4, FL3-U3-32S2) / 0.021 ms to 1 second (FL3-U3-88S2)

0.50 to 4.00, programmable lookup table

Standard, bulb, multi-shot

32 MB frame buffer

2 memory channels for custom camera settings

29 x 29 x 30 mm excluding lens holder (metal case)

35g - 41 g (Without optics or tripod mounting bracket)

5 V, <3 W, via GPIO or USB 3.0 interface

CS-mount (FL3-U3-13S2, FL3-U3-32S2), C-mount (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-20E4, FL3-U3-88S2)

-30° to 60°C (storage) • 0° to 45°C (operating)

3 years



USB 3.0 interface with screw locks for camera control, data, and power

8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O: 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins

14-bit • 10/12-bit (GS3-U3-23S6, GS3-U3-32S4, GS3-U3-51S5) • 10-bit (GS3-U3-41C6)

Mono8, Mono12, Mono16 (all models)  
RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push modes 0 dB to 24 dB (GS3-U3-23S6, GS3-U3-28S4, GS3-U3-28S5, GS3-U3-41C6) -6.158 dB to 24 dB (GS3-U3-60S6); -9 dB to 24 dB (GS3-U3-91S6)

Automatic/manual/one-push/extended shutter modes Up to 32 seconds (GS3-U3-28S5, GS3-U3-41S4, GS3-U3-50S5, GS3-U3-60S6, GS3-U3-91S6); up to 30 seconds (GS3-U3-28S4); up to 4 seconds (GS3-U3-14S5, GS3-U3-15S5, GS3-U3-32S4, GS3-U3-41C6, GS3-U3-51S5, GS3-U3-120S6); up to 3.2 seconds (GS3-U3-23S6)

0.50 to 4.00, programmable lookup table

Standard, bulb, multi-shot, overlapped (excludes GS3-U3-23S6)

128 MB frame buffer

2 memory channels for custom camera settings

44 x 29 x 58 mm excluding lens holder (metal case)

90 g (Without optics or tripod mounting bracket)

5-24 V via GPIO or 5 V via USB 3.0 interface, maximum 4.5 W

C-mount

-30° to 60°C (storage) • 0° to 50°C (operating)

3 years



## INTERFACE

### GPIO

### ADC

### IMAGE DATA FORMATS

### PARTIAL IMAGE MODES

### GAIN RANGE

### EXPOSURE RANGE

### GAMMA

### TRIGGER MODES

### IMAGE BUFFER

### USER SETS

### SIZE (WxHxD)

### MASS

### POWER

### LENS MOUNT

### TEMPERATURE

### WARRANTY





Point Grey GigE Camera Features:

- Unique selection of CCD and CMOS sensors
- Supports GigE Vision 1.2
- Industry's most compact sizes
- GigE image filter driver for reduced latency and maximized bandwidth
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED

# BLACKFLY®

WORLD'S SMALLEST POE CAMERA



# FLEA3®

WORLD'S SMALLEST GIGE CAMERA



Model#	Sensor	Specifications	Shutter	Max Res	Max FPS
BFLY-PGE-03S2C/M-CS	0.3MP	Sony ICX424 CCD	1/3" 7.4 µm	Global 648 x 488	84 fps
BFLY-PGE-03S3C/M-CS	0.3MP	Sony ICX414 CCD	1/2" 9.9 µm	Global 648 x 488	90 fps
BFLY-PGE-05S2C/M-CS	0.5MP	Sony ICX693 CCD	1/3" 6.0 µm	Global 808 x 608	50 fps
BFLY-PGE-09S2C/M-CS	0.9MP	Sony ICX692 CCD**	1/3" 4.08 µm	Global 1288 x 728	30 fps
BFLY-PGE-12A2C/M-CS	1.2MP	Aptina AR0134 CMOS	1/3" 3.75 µm	Global 1280 x 960	52 fps
BFLY-PGE-13S2C/M-CS	1.3MP	Sony ICX445 CCD*	1/3" 3.75 µm	Global 1288 x 964	30 fps
BFLY-PGE-13H2C/M-CS	1.3MP	Sharp RJ33J4/RJ33J3 CCD	1/3" 3.75 µm	Global 1288 x 964	30 fps
BFLY-PGE-13E4C/M-CS	1.3MP	e2v EV76C560 CMOS	1/1.8" 5.3 µm	Global 1280 x 1024	60 fps
BFLY-PGE-14S2C-CS	1.4MP	Sony IMX104 CMOS	1/3" 3.75 µm	Rolling 1296 x 1032	60 fps
BFLY-PGE-20E4C/M-CS	2.0MP	e2v EV76C570 CMOS	1/1.8" 4.5 µm	Global 1600 x 1200	47 fps
BFLY-PGE-23S2C-CS	2.3MP	Sony IMX136 CMOS	1/2.8" 2.8 µm	Rolling 1920 x 1200	27 fps
BFLY-PGE-23S6C/M-C	2.3MP	Sony IMX249 CMOS***	1/1.2" 5.86 µm	Global 1920 x 1200	41 fps
BFLY-PGE-50A2C/M-CS	5.0MP	Aptina MT9P006/031 CMOS	1/2.5" 2.2 µm	Rolling 2592 x 1944	13 fps
BFLY-PGE-50H5C/M-C	5.0MP	Sharp RJ32S4/S3AAODT CCD	2/3" 3.45 µm	Global 2448 x 2048	7.5 fps

\*High sensitivity Sony EXview HAD CCD \*\*High sensitivity Sony EXview HAD CCD II \*\*\*High performance Sony Pregius Global Shutter CMOS

Model#	Sensor	Specifications	Shutter	Max Res	Max FPS
FL3-GE-03S1C/M-C	0.3MP	Sony ICX618 CCD*	1/4" 5.6 µm	Global 648 x 488	120 fps
FL3-GE-03S2C/M-C	0.3MP	Sony ICX424 CCD	1/3" 7.4 µm	Global 648 x 488	82 fps
FL3-GE-08S2C/M-C	0.8MP	Sony ICX204 CCD	1/3" 4.65 µm	Global 1032 x 776	31 fps
FL3-GE-13S2C/M-C/CS	1.3MP	Sony ICX445 CCD*	1/3" 3.75 µm	Global 1288 x 964	31 fps
FL3-GE-14S3C/M-C	1.4MP	Sony ICX627 CCD	1/2" 4.65 µm	Global 1384 x 1032	18 fps
FL3-GE-20S4C/M-C	2.0MP	Sony ICX274 CCD	1/1.8" 4.4 µm	Global 1624 x 1224	15 fps
FL3-GE-28S4C/M-C	2.8MP	Sony ICX687 CCD**	1/1.8" 3.69 µm	Global 1928 x 1448	14 fps
FL3-GE-50S5C/M-C	5.0MP	Sony ICX655 CCD	2/3" 3.45 µm	Global 2448 x 2048	8 fps

\*High sensitivity Sony EXview HAD CCD \*\*High sensitivity Sony EXview HAD CCD II\*\*

	BLACKFLY	FLEA3
<b>INTERFACE</b>	Gigabit Ethernet interface with screw locks for camera control and data; Power over Ethernet	Gigabit Ethernet interface with screw locks for camera control and data
<b>GPIO</b>	6-pin Hirose HR10A-7R-6PB GPIO connector for trigger, strobe, and power. 1 opto-isolated input, 1 opto-isolated output	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins
<b>ADC</b>	10-bit (BFLY-PGE-13E4, BFLY-PGE-20E4) • 12-bit	12-bit
<b>IMAGE DATA FORMATS</b>	Mono8, Mono12, Mono16, Raw8, Raw12, Raw16 (all models) RGB, YUV411, YUV422, YUV 444 (color models)	Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV 444, Raw8, Raw12, Raw16 (color models)
<b>PARTIAL IMAGE MODES</b>	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes
<b>GAIN RANGE</b>	Automatic/manual/one-push*/ 0 dB to 18 dB (*free running BFLY-PGE-13E4)	Automatic/manual/one-push/ 0 dB to 24 dB
<b>EXPOSURE RANGE</b>	Automatic/manual/one-push* (*free running BFLY-PGE-13E4) 0.015 ms to 32 seconds	Automatic/manual/one-push/extended shutter modes 0.03 ms to 2 sec (FL3-GE-03S2); 0.03 ms to 4 sec (FL3-GE-08S2, FL3-GE-13S2); 0.03 ms to 6 sec (FL3-GE-50S5); 0.03 ms to 32 sec (FL3-GE-03S1, FL3-GE-14S3, FL3-GE-20S4, FL3-GE-28S2)
<b>GAMMA</b>	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table
<b>TRIGGER MODES</b>	Standard, overlapped, multi-shot	Standard, bulb, skip frames, overlapped, multiple exposure, multi-shot, low smear mode (FL3-GE-13S2, FL3-GE-28S4 models only)
<b>IMAGE BUFFER</b>	16 MB frame buffer	32 MB frame buffer
<b>USER SETS</b>	2 memory channels for custom camera settings	2 memory channels for custom camera settings
<b>SIZE (WxHxD)</b>	29x29x30 mm excluding lens holder, without optics (metal case)	29x29x30 mm excluding lens holder, without optics (metal case)
<b>MASS</b>	36 grams (without optics or tripod mounting bracket)	38 grams (without optics or tripod mounting bracket)
<b>POWER</b>	Standard voltage via Power over Ethernet (PoE) or 5 - 16 V via GPIO interface, < 2.5 W	12-24 V, < 2.5 W, via GPIO
<b>LENS MOUNT</b>	CS-mount (5 mm C-mount adapter sold separately) / C-mount (BFLY-PGE-23S6)	C-mount (FL3-GE-13S2 also available with CS-mount)
<b>TEMPERATURE</b>	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)
<b>WARRANTY</b>	3 years	3 years



# GRASSHOPPER<sup>2</sup>

HIGH-RESOLUTION SONY CCDs



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>GS2-GE-20S4C/M-C</b>	2.0MP Sony ICX274 CCD 1/1.8" 4.4 μm Global	1624 x 1224	29 fps	
<b>GS2-GE-50S5C/M-C</b>	5.0MP Sony ICX625 CCD 2/3" 3.45 μm Global	2448 x 2048	15 fps	

\*High sensitivity Sony Super HAD CCD II™

# GRASSHOPPER<sup>3</sup>

POE, FAST, HIGH-RESOLUTION IMAGING



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>GS3-PGE-23S6C/M-C</b>	2.3MP Sony IMX174 CMOS* 1/1.2" 5.86 μm Global	1920 x 1200	45 fps	
<b>GS3-PGE-50S5C/M-C</b>	5.0MP Sony ICX625 CCD 2/3" 3.45 μm Global	2448 x 2048	15 fps	
<b>GS3-PGE-60S6C/M-C</b>	6.0MP Sony ICX694 CCD** 1" 4.54 μm Global	2736 x 2192	13 fps	
<b>GS3-PGE-91S6C/M-C</b>	9.1MP Sony ICX814 CCD** 1" 3.69 μm Global	3376 x 2704	9 fps	

\*High performance Sony Exmor CMOS\*\* High sensitivity Sony EXview HAD CCD II™

Gigabit Ethernet interface with screw locks for camera control and data

8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O  
1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins

14-bit

Y8, Y16, (all models)  
RGB, YUV411, YUV422, YUV444, Raw8, Raw16, (color models)

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push/ 3.6 dB to 24 dB

Automatic/manual/one-push/extended shutter modes  
0.03 ms to >30 seconds (extended shutter mode)

0.50 to 4.00, programmable lookup table

Standard, bulb, skip frames, overlapped, multi-shot

32 MB frame buffer

2 memory channels for custom camera settings

44x29x58 mm excluding lens holder and connectors (metal case)

86 grams (without optics or tripod mounting bracket)

8-30 V, <4.7 W, via GPIO or interface

C-mount

-30° to 60°C (storage) • 0° to 45°C (operating)

3 years

Gigabit Ethernet interface with screw locks for camera control and data; Power over Ethernet

8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O  
1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins

10/12-bit (GS3-PGE-23S6) • 14-bit

Mono8, Mono12, Mono16 (all models)  
RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push/ 0 dB to 24 dB /-9dB to 24 dB (GS3-PGE-91S6)

Automatic/manual/one-push/extended shutter modes

Up to 32 seconds (GS3-PGE-60S6, 50S5) / up to 3.2 seconds (GS3-PGE-23S6)

0.50 to 4.00, programmable lookup table

Standard, bulb, skip frames, overlapped, multi-shot

128 MB frame buffer

2 memory channels for custom camera settings

44x29x58 mm excluding lens holder and connectors (metal case)

86 grams (without optics or tripod mounting bracket)

8-30 V, <4.7 W, via GPIO or interface

C-mount

-30° to 60°C (storage) • 0° to 50°C (operating)

3 years

**INTERFACE**

**GPIO**

**ADC**

**IMAGE DATA FORMATS**

**PARTIAL IMAGE MODES**

**GAIN RANGE**

**EXPOSURE RANGE**

**GAMMA**

**TRIGGER MODES**

**IMAGE BUFFER**

**USER SETS**

**SIZE (WxHxD)**

**MASS**

**POWER**

**LENS MOUNT**

**TEMPERATURE**

**WARRANTY**



# ZEBRA<sup>2</sup>

HYBRID IP AND MACHINE VISION CAMERA



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
ZBR2-PGEHD-20S4C-CS	2.0MP Sony ICX274 CCD 1/1.8" 4.4µm Global	1624 x 1224	30 fps (HD-SDI 25 FPS)	
ZBR2-PGEHD-28S4C-CS	2.8MP Sony ICX687 CCD* 1/1.8" 3.69µm Global	1928 x 1448	26 fps (HD-SDI 25 FPS)	
ZBR2-PGEHD-50S5C-CS	5.0MP Sony ICX625 CCD 2/3" 3.45µm Global	2448 x 2048	15 fps (HD-SDI 25 FPS)	
ZBR2-PGEHD-51S5C-CS	5.0MP Sony ICX655 CCD 2/3" 3.45µm Global	2448 x 2048	10 fps (HD-SDI 25 FPS)	

HD-SDI up to 2.97 Gbit/s for video. Gigabit Ethernet interface with screw locks for camera control and data; Power over Ethernet.

#### INTERFACE

6-pin GPIO connector for trigger, strobe, and serial I/O  
1 opto-isolated input, 1 opto-isolated output, RS-485 interface

#### GPIO

12-bit (ZBR2-PGEHD-51S5) • 14-bit

#### ADC

Raw8, Raw12, Raw16, RGB, YUV411, YUV422, MJPEG Image Compression

#### IMAGE DATA FORMATS

HD-SDI supports standard SMPTE formats, RTSP/GVSP supports binned

#### PARTIAL IMAGE MODES

Automatic/manual/one-push/ 0 dB to 24 dB

#### GAIN RANGE

Automatic/manual/one-push/extended shutter modes  
0.03 ms to 2 seconds (extended shutter mode)

#### EXPOSURE RANGE

0.50 to 4.00, programmable lookup table

#### GAMMA

Standard, bulb, skip frames, multi exposure preset, multi exposure pulse width, low smear, overlapped, and multi shot

#### TRIGGER MODES

32 MB frame buffer

#### IMAGE BUFFER

2 memory channels for custom camera settings

#### USER SETS

44x44x87.5 mm excluding lens holder and connectors (metal case)

#### SIZE (WxHxD)

150 grams (without optics or tripod mounting bracket)

#### MASS

8-30 V, <6 W, via 4-pin power connector or GigE interface

#### POWER

CS-mount with hand-adjustable back focal distance • DC auto iris

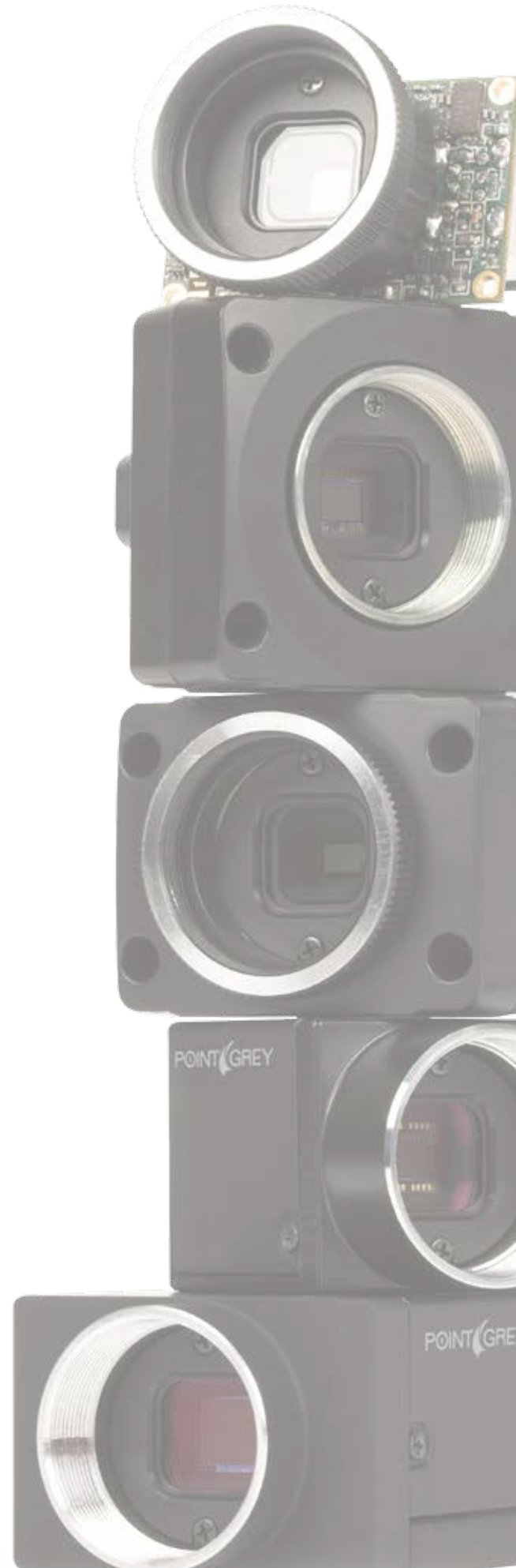
#### LENS MOUNT

-30° to 60°C (storage) • 0° to 45°C (operating)

#### TEMPERATURE

3 years

#### WARRANTY







Point Grey USB 2.0 Camera Features:

- Cost effective
- Industry-standard CS- mount
- Includes CS-C 5 mm adapter
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED
- Board-level and custom options available for OEMs

# CHAMELEON®

COMPACT, COST EFFECTIVE, CCD QUALITY



# FIREFLY® MV

SMALL, AFFORDABLE, VERSATILE CMOS



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>CMLN-13S2C/M-CS</b>	1.3MP Sony ICX445 CCD* 1/3" 3.75 µm Global		1296 x 964	18 fps

\*High sensitivity Sony EXview HAD CCD™

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>FMVU-03MTC/M-CS</b>	0.3MP Micron MT9V022 CMOS 1/3" 6.0 µm Global		752 x 480	60 fps
<b>FMVU-13S2C-CS</b>	1.3MP Sony IMX035 CMOS* 1/3" 3.63 µm Rolling		1328 x 1048	23 fps

\*High speed Sony Exmor™ CMOS

Mini-B USB2.0 for camera control, video data, and power

7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power

12-bit  
Y8, Y16 (mono)  
8-bit and 16-bit Raw Bayer data (color)  
Pixel binning and region of interest (ROI) modes  
Automatic/manual/one-push/ 0 dB to 24 dB  
Automatic/manual/one-push/extended shutter modes  
0.01 ms to >10 seconds (extended shutter mode)  
0.50 to 4.00, programmable lookup table  
Standard, bulb, skip frames, overlapped  
N/A  
2 memory channels for custom camera settings

Mini-B USB2.0 for camera control, video data, and power

7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power

10-bit (FMVU-03MT) • 10/12-bit (FMVU-13S2)  
Y8, Y16 (mono)  
8-bit and 16-bit raw Bayer data (color)  
Pixel binning and region of interest (ROI) modes  
Automatic/manual/ 0 dB to 12 dB (03MT) / 0 dB to 24 dB (13S2)  
Automatic/manual modes  
0.12 ms to 512 ms (FMVU-03MT) / 0.03 ms to 8 seconds (FMVU-13S2)  
0 to 1 (FMVU-03MT)/0.50 to 4.00 (FMVU-13S2)  
Standard, skip frames  
N/A  
2 memory channels for custom camera settings

39x31mm (board level) / 25.5x44x41 mm excluding lens holder, without optics (plastic case)  
22 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)  
2 W, 4.745 to 5.25 V via USB 2.0 interface or JST 7-pin GPIO connector  
CS-mount (5 mm C-mount adapter included)  
-30° to 60°C (storage) • 0° to 45°C (operating)  
1 year

39x24 mm (board level) / 24.4x44x34 mm excluding lens holder, without optics (plastic case)  
14 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)  
8-30 V, 1 W at 12 V via 1394a interface  
CS-mount  
-30° to 60°C (storage) • 0° to 45°C (operating)  
1 year

**INTERFACE**

**GPIO**

**ADC**

**IMAGE DATA FORMATS**

**PARTIAL IMAGE MODES**

**GAIN RANGE**

**EXPOSURE RANGE**

**GAMMA**

**TRIGGER MODES**

**IMAGE BUFFER**

**USER SETS**

**SIZE (WxHxD)**

**MASS**

**POWER**

**LENS MOUNT**

**TEMPERATURE**

**WARRANTY**





Point Grey IEEE 1394 Camera Features:

- Compact sizes including board level options
- Supports IIDC v1.32
- Industry-standard C-mount
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED
- Automatic synchronization

# FLEA<sup>3</sup>

ULTRA-COMPACT, CCD FAMILY



# GRASSHOPPER EXPRESS<sup>®</sup>

HIGH RESOLUTION AND SENSITIVITY



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>FL3-FW-0351C/M-C</b>	0.3MP Sony ICX618 CCD* 1/4" 5.6 µm	Global	648 x 488	120 fps
<b>FL3-FW-0353C/M-C</b>	0.3MP Sony ICX414 CCD 1/2" 9.9 µm	Global	648 x 488	76 fps
<b>FL3-FW-1453C/M-C</b>	1.4MP Sony ICX267 CCD 1/2" 4.65 µm	Global	1384 x 1032	16 fps
<b>FL3-FW-2054C/M-C</b>	2.0MP Sony ICX274 CCD 1/1.8" 4.4 µm	Global	1624 x 1224	15 fps

\*High sensitivity Sony EXview HAD CCD \*

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>GX-FW-10K3M-C</b>	1.0MP Kodak KAI-01050 CCD 1/2" 5.5 µm	Global	1024 x 1024	70 fps
<b>GX-FW-2855C/M-C</b>	2.8MP Sony ICX674 CCD* 2/3" 4.54 µm	Global	1932 x 1452	26 fps
<b>GX-FW-60S6C/M-C</b>	6.0MP Sony ICX694 CCD* 1" 4.54 µm	Global	2736 x 2192	11 fps

\*High sensitivity Sony EXview HAD CCD II \*

<b>INTERFACE</b>	IEEE 1394b interface with screw locks for camera control, data, and power	Two IEEE 1394b interface with screw locks for camera control, data, power, and daisy chaining
<b>GPIO</b>	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins
<b>ADC</b>	12-bit	14-bit
<b>IMAGE DATA FORMATS</b>	Y8, Y16 (all models) RGB, YUV411, YUV422, Raw8, Raw16 (color models)	Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
<b>PARTIAL IMAGE MODES</b>	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes
<b>GAIN RANGE</b>	Automatic/manual/one-push/ 0 dB to 24 dB	Automatic/manual/one-push/ 0 dB to 24 dB
<b>EXPOSURE RANGE</b>	Automatic/manual/one-push/extended shutter modes 0.03 ms to >25 seconds (extended shutter mode)	Automatic/manual/one-push/extended shutter modes 0.04 ms to >30 seconds (extended shutter mode)
<b>GAMMA</b>	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table
<b>TRIGGER MODES</b>	Standard, bulb, skip frames, overlapped, multiple exposure, multi-shot	Standard, bulb, skip frames, overlapped, multi-shot
<b>IMAGE BUFFER</b>	32 MB frame buffer	32 MB frame buffer
<b>USER SETS</b>	2 memory channels for custom camera settings	2 memory channels for custom camera settings
<b>SIZE (WxHxD)</b>	29x29x30 mm excluding lens holder, without optics (metal case)	44x29x58 mm excluding lens holder, without optics (metal case)
<b>MASS</b>	58 g (without optics or tripod mounting bracket)	86 grams (without optics or tripod mounting bracket)
<b>POWER</b>	8-30 V, <2.5 W via GPIO or 1394b interface	8-30 V, ~5 W, via GPIO or 1394b interface
<b>LENS MOUNT</b>	C-mount	C-mount
<b>TEMPERATURE</b>	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)
<b>WARRANTY</b>	3 years	3 years





# GRASSHOPPER<sup>2</sup>

HIGH SENSITIVITY AND LOW NOISE



# FLEA<sup>2</sup>

UP TO 5 MP, ULTRA-COMPACT, CCD



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>GS2-FW-1455C/M-C</b>	1.4MP Sony ICX285 CCD* 2/3" 6.45 µm Global	1384 x 1036	30 fps	

\*High sensitivity Sony EXview HAD CCD™

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
<b>FL2-03S2C/M-C</b>	0.3MP Sony ICX424 CCD 1/3" 7.4 µm Global	648 x 488	80 fps	
<b>FL2-08S2C/M-C</b>	0.8MP Sony ICX204 CCD 1/3" 4.65 µm Global	1032 x 776	30 fps	
<b>FL2G-13S2C/M-C</b>	1.3MP Sony ICX445 CCD* 1/3" 3.75 µm Global	1288 x 964	30 fps	
<b>FL2-14S3C/M-C</b>	1.4MP Sony ICX267 CCD 1/2" 4.65 µm Global	1392 x 1032	15 fps	
<b>FL2-20S4C/M-C</b>	2.0MP Sony ICX274 CCD 1/1.8" 4.4 µm Global	1624 x 1224	15 fps	
<b>FL2G-50S5C/M-C</b>	5.0MP Sony ICX655 CCD 2/3" 3.45 µm Global	2448 x 2048	7.5 fps	

\*High sensitivity Sony EXview HAD CCD™

Two IEEE 1394b interface with screw locks for camera control, data, power, and daisy chaining

8-pin Hirose HR25 GPIO connector  
1 opto-isolated trigger pin, 1 opto-isolated strobe pin  
2 bi-directional pins for trigger, strobe, pwm or serial port

14-bit  
Y8, Y16, (all models)  
RGB, YUV411, YUV422, YUV444, Raw8, Raw16, (color models)  
Pixel binning and region of interest (ROI) modes  
Automatic/manual/one-push/ 0dB to 24dB  
Automatic/manual/one-push/extended shutter modes  
0.03 ms to >330 seconds (extended shutter mode with amp glow disable option)  
0.50 to 4.00, programmable lookup table  
Standard, bulb, skip frames, overlapped, multi-shot  
32 MB frame buffer  
2 memory channels for custom camera settings

44x29x58 mm excluding lens holder and connectors (metal case)  
104 g (without optics or tripod mounting bracket)  
8-30 V, <2.5 W, via GPIO or 1394b interface  
C-mount  
-30° to 60°C (storage) • 0° to 45°C (operating)  
3 years

IEEE 1394b interface with screw locks for camera control, data, and power

8-pin Hirose HR25 GPIO connector opto-isolated pins for trigger and strobe (FL2G only),  
bi-directional pins for trigger, strobe or serial port

12-bit  
Y8, Y16 (all models)  
RGB, YUV411, YUV422, YUV444, Raw8, Raw16 (color models)  
Pixel binning and region of interest (ROI) modes  
Automatic/manual/one-push/ 0 dB to 24 dB  
Automatic/manual/one-push/extended shutter modes  
0.02 ms to > 10 s (extended shutter mode)  
0.50 to 4.00, programmable lookup table  
Standard, bulb, skip frames, overlapped, multiple exposure, multi-shot  
32 MB frame buffer (FL2G only)  
2 memory channels for custom camera settings

29x29x30 mm excluding lens holder, without optics (metal case)  
58 g (without optics or tripod mounting bracket)  
8-30V, <2.5W, via GPIO or 1394b interface  
C-mount  
-30° to 60°C (storage) • 0° to 45°C (operating)  
3 years

**INTERFACE**  
**GPIO**

**ADC**  
**IMAGE DATA FORMATS**

**PARTIAL IMAGE MODES**  
**GAIN RANGE**  
**EXPOSURE RANGE**

**GAMMA**  
**TRIGGER MODES**  
**IMAGE BUFFER**  
**USER SETS**

**SIZE (WxHxD)**  
**MASS**  
**POWER**  
**LENS MOUNT**  
**TEMPERATURE**  
**WARRANTY**



# GRASSHOPPER®

HIGH PERFORMANCE, CCD FAMILY



# FIREFLY® MV

SMALL, AFFORDABLE, VERSATILE CMOS



Model#	Sensor Specifications			Shutter	Max Res	Max FPS
<b>GRAS-03K2C/M-C</b>	0.3MP	Kodak O340D CCD	1/3"	7.4 µm	Global 648 x 480	200 fps
<b>GRAS-03S3M-C</b>	0.3MP	Sony ICX414 CCD	1/2"	9.9 µm	Global 648 x 488	74 fps
<b>GRAS-14S3C/M-C</b>	1.4MP	Sony ICX267 CCD	1/2"	4.65 µm	Global 1384 x 1032	21 fps
<b>GRAS-14S5C/M-C</b>	1.4MP	Sony ICX285 CCD*	2/3"	6.45 µm	Global 1384 x 1036	15 fps
<b>GRAS-20S4C/M-C</b>	2.0MP	Sony ICX274 CCD	1/1.8"	4.4 µm	Global 1624 x 1224	30 fps
<b>GRAS-50S5C/M-C</b>	5.0MP	Sony ICX625 CCD	2/3"	3.45 µm	Global 2448 x 2048	15 fps

\*High sensitivity Sony EXview HAD CCD™

Model#	Sensor Specifications			Shutter	Max Res	Max FPS
<b>FMV-03M2C/M-CS</b>	0.3MP	Aptina MT9V022 CMOS	1/3"	6.0 µm	Global 752 x 480	60 fps

**INTERFACE** Two IEEE 1394b interface with screw locks for camera control, data, power, and daisy chaining  
**GPIO** 8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and RS232

IEEE-1394a interface for camera control, data, and power (mini connector option available)  
 7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power

**ADC** 14-bit

10-bit

**IMAGE DATA FORMATS** Y8, Y16 (all models)  
 RGB, YUV411, YUV422, YUV 444, 8-bit and 16-bit raw Bayer data (color models)

Y8, Y16 (mono)  
 8-bit and 16-bit raw Bayer data (color)

**PARTIAL IMAGE MODES** Pixel binning and region of interest (ROI) modes

Pixel binning and region of interest (ROI) modes

**GAIN RANGE** Automatic/manual/one-push/ 0 dB to 24 dB

Automatic/manual/ 0 dB to 12 dB

**EXPOSURE RANGE** Automatic/manual/one-push/extended shutter modes  
 0.08 ms to >10 seconds (extended shutter mode)

Automatic/manual/extended shutter modes  
 0.03 ms to 512 ms (extended shutter mode)

**GAMMA** 0.50 to 4.00, programmable lookup table

0 to 1

**TRIGGER MODES** Standard, bulb, skip frames, overlapped, multi-shot

Standard, skip frames

**IMAGE BUFFER** 32 MB frame buffer

N/A

**USER SETS** 2 memory channels for custom camera settings

2 memory channels for custom camera settings

**SIZE (WxHxD)** 44x29x58 mm excluding lens holder, without optics (metal case)

39x24 (board level) / 44x34x24.4 mm (plastic case) excluding lens holder, without optics

**MASS** 104 g (without optics or tripod mounting bracket)

15 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)

**POWER** 8-30 V, <2.5 W via GPIO or 1394b interface

8-30 V, 1 W at 12 V via 1394a interface

**LENS MOUNT** C-mount

CS-mount or M12 microlens mount

**TEMPERATURE** -30° to 60°C (storage) • 0° to 40°C (operating)

-30° to 60°C (storage) • 0° to 40°C (operating)

**WARRANTY** 3 years

1 year







# DRAGONFLY<sup>2</sup>

FLEXIBLE AND FULL-FEATURED



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
DR2-COL/BW-C	0.3MP Sony ICX424 CCD 1/3" 7.4 μm Global 648 x 488	60 fps		
DR2-HICOL/BW-C	0.8MP Sony ICX204 CCD 1/3" 4.65 μm Global 1032 x 776	30 fps		
DR2-13S2C/M-C	1.3MP Sony ICX445 CCD* 1/3" 3.75 μm Global 1296 x 964	20 fps		

\*High sensitivity Sony EXview HAD CCD\*

IEEE-1394a interface for camera control, data, and power

8-pin Phoenix connector for power, trigger, strobe, PWM, and I/O

12-bit

Y8, Y16, Mono8, Mono12, Mono16, Raw8, Raw12, Raw16 (all models)  
RGB, YUV411, YUV422, YUV 444 (color models)

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push/ 0 dB to 24 dB

Automatic/manual/one-push/extended shutter modes  
0.031 ms to 66.63 ms at 15 FPS, >5 seconds in extended shutter mode

0.50 to 4.00, programmable lookup table

Standard, bulb, overlapped, multiple exposure, multi-shot

N/A

2 memory channels for custom camera settings

64x51 mm (board level) / 44x34x24.4 mm (metal case)

37 g (board level) / 187 g (metal case) (without optics or tripod mounting bracket)

8-30 V, 2.5 W at 12 V via 1394a or GPIO connector

C-mount / M12 microlens (DR2-03S2 & DR2-08S2)

-30° to 60°C (storage) • 0° to 45°C (operating)

1 year



Point Grey Camera Link Camera Features:

- 2 SDR connectors with screw locks
- Industry-standard C-mount
- 8- and 10-bit image modes
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED

# GAZELLE<sup>®</sup>

HIGH RESOLUTION, FAST FRAME RATES



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GZL-CL-22C5M-C	2.2MP CMOSIS CMV2000 CMOS 2/3" 5.5 μm Global 2048 x 1088	280 fps		
GZL-CL-41C6M-C	4.1MP CMOSIS CMV4000-2E5 CMOS 1" 5.5 μm Global 2048 x 2048	150 fps		

Camera Link LVDS for camera control and video data transmission.

Base (2-tap) and Full (8-tap) configurations

8-pin Hirose HR25 GPIO connector; opto-isolated pins for trigger and strobe

10-bit

Mono8, Mono10

Single or multiple region of interest modes

Analog and digital programmable via software. Range: 32 - 64 (analog), 1 - 63 (digital)

Full 8-tap mode  
0.07 ms to 54 seconds

N/A

Single-shot, bulb, software trigger

N/A

2 memory channels for custom camera settings

44x29x59.5 mm excluding lens holder, without optics (metal case)

90 g (without optics or tripod mounting bracket)

12 V, 6 W at 12 V

C-mount

-30° to 60°C (storage) • -10° to 50°C (operating)

3 years

INTERFACE

GPIO

ADC

IMAGE DATA FORMATS

PARTIAL IMAGE MODES

GAIN RANGE

EXPOSURE RANGE

GAMMA

TRIGGER MODES

IMAGE BUFFER

USER SETS

SIZE (WxHxD)

MASS

POWER

LENS MOUNT

TEMPERATURE

WARRANTY



# FLYCAPTURE SDK

THE FLYCAPTURE SOFTWARE DEVELOPMENT KIT (SDK) THAT comes free with every Point Grey camera provides a common software interface to control and acquire images from Point Grey USB 3.0, GigE, FireWire, and USB 2.0 cameras using the same API under 32- or 64-bit Windows or Linux. FlyCapture supports ActiveX and DirectShow interfaces, and includes the FirePRO low-level 1394b interface driver, enhanced USB 3.0 interface driver, and the GigE image filter driver. A complete software API library, ready-to-use demo programs, and comprehensive source code examples enable users to easily build custom imaging applications.



## KEY FEATURES

- Proprietary USB 3.0 and FireWire driver stacks for robust diagnostics and, with complete end-to-end control, faster issue resolution
- GigE image filter driver for reduced latency and dropped frames, and maximized bandwidth
- Support for IIDC 1.32 features such as frame buffering and lookup table functionality
- OpenGL and Direct 2D support for better display performance and CPU usage
- Managed interface to decrease development time
- Simple (API) - only 3 function calls required to grab an image
- Example programs and source code

## MULTIPLE PLATFORM

• **WINDOWS**® 32/64-bit  
XP, 7, 8



• **LINUX**®  
Ubuntu® 32/64-bit  
ARMv7



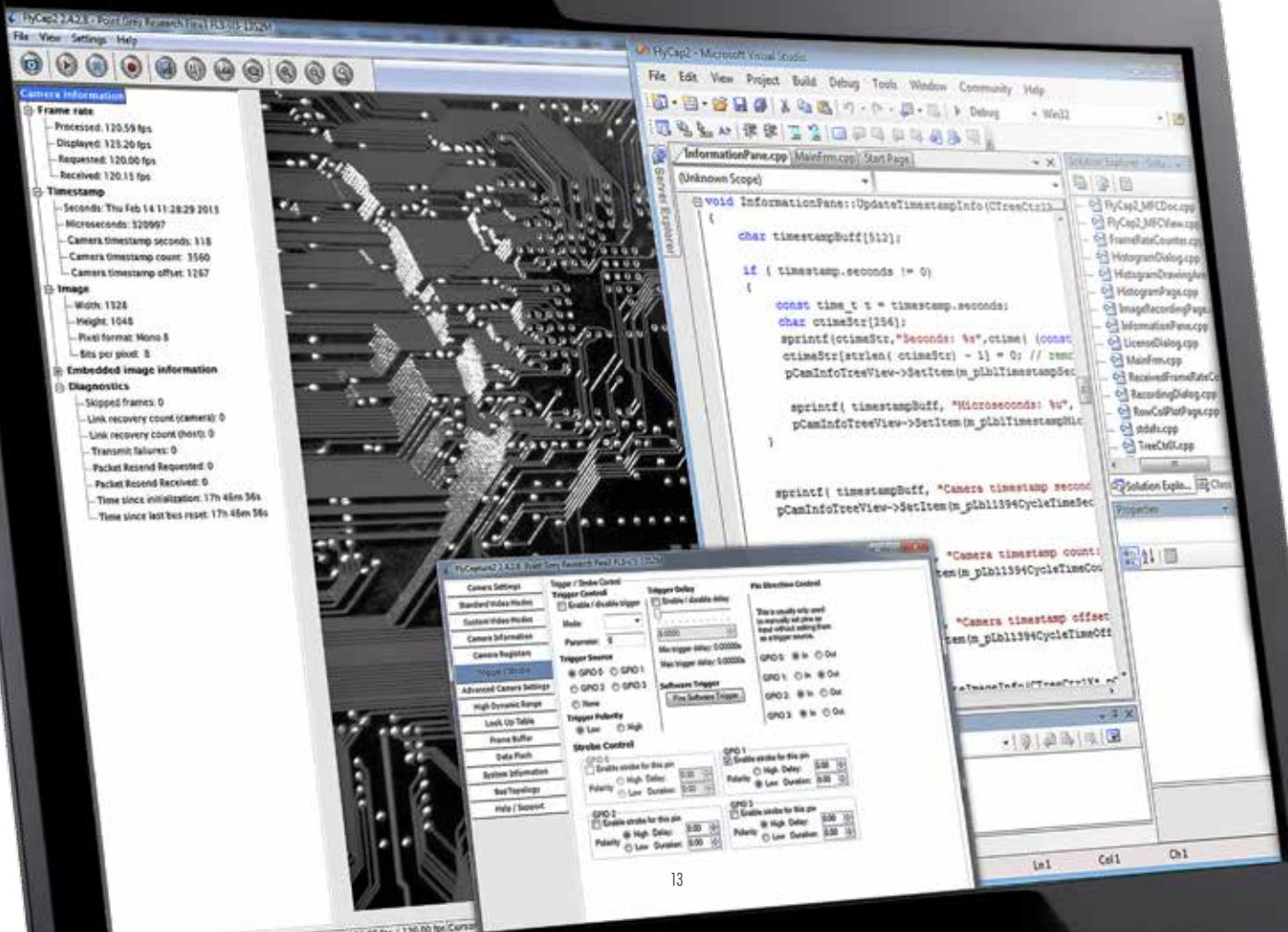
## MULTIPLE INTERFACES

**USB** VISION The SDK provides the same programming interface across USB 3.0\*, USB 2.0, GigE and FireWire products.



## MULTIPLE LANGUAGES

- C, C++, C#
- Visual Basic .NET
- ActiveX
- DirectShow





The compact, cost-effective Cricket IP camera uses high resolution Sony CMOS Exmor sensors for exceptional sensitivity and excellent dynamic range. Cricket offers a 720p model featuring a 1.3 MP sensor at 60 fps, and two 1080p models featuring a 2.0 MP sensor at 60 fps running over PoE. Designed and manufactured in Canada.

# CRICKET® IP CAMERA

HD WDR, 60 FPS, IP SECURITY CAMERA\*



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
CR-POE-13S2C-CS	1.3MP Sony IMX139 CMOS 1/3"	Rolling	1280 x 1024	60 fps
CR-POE-20S2C-CS	2.0MP Sony IMX140 CMOS 1/2.8"	Rolling	1920 x 1080	60 fps
CR-POE-20S3C-CS	2.0MP Sony IMX185 CMOS 1/2"	Rolling	1920 x 1080	60 fps

**INTERFACE** RJ45 100Base-TX for data and power (PoE), 4-pin DC auto-iris connector

**LIGHT SENSITIVITY/ MINIMUM ILLUMINATION** 0.1 lux, F1.2 at 30 FPS, 1/30 second shutter

**DYNAMIC RANGE** 120 dB (CR-POE-13S2), 90 dB (CR-POE-20S2) in 4 image WDR mode

**GAIN RANGE** 0 dB to 24 dB

**EXPOSURE RANGE** 1/10,000 second to 1 second

**LENS TYPE** CS-mount, DC Auto Iris (optional)

**COMPRESSION FORMAT** MJPEG; H.264 Base/Main/High Profile

**STREAM RESOLUTIONS** CR-POE-13S2: ranging from 1280 x 1024 to 160 x 120, including SXGA, 720p, XGA, VGA  
CR-POE-20S2: ranging from 1920 x 1080 to 160 x 120, including 1080p, SXGA, 720p, XGA, VGA  
CR-POE-20S3: ranging from 1920 x 1080 to 160 x 120, including 1080p, SXGA, 720p, XGA, VGA

**MULTI-STREAMING** 2 streams, individually configurable frame rate, resolution and compression (H.264 or MJPEG)

**PAN/TILT/ZOOM** Digital

**IMAGE SETTINGS** Auto exposure, auto white balance, gain, shutter, contrast, sharpness, gamma

**IMAGE ENHANCEMENTS** WDR, 2D noise reduction, 3D noise reduction, image flip

**SECURITY** Password protection, HTTPS encryption

**SUPPORTED PROTOCOLS** ONVIF Profile S, RTSP, RTP, IPv4, TCP, UDP, HTTP, HTTPS, DHCP, NTP

**MULTICASTING** Yes

**CASING** Plastic and aluminum, white or black, integrated tripod mount (1/4-20 thread)

**POWER CONSUMPTION** ~4 W, via PoE 802.3af, at full frame rate and resolution with a single stream

**TEMPERATURE** 0°-45°C, 20-80% relative humidity (operating) • -30° to 60°C, 20-95% relative humidity (storage)

**APPROVALS** CE, FCC, RoHS, TUV

**SIZE (WxHxD)** 88.1 mm x 44 mm x 32 mm

**MASS** ~75 grams (without lens)

**WARRANTY** 1 year



## Wide Dynamic Range for challenging lighting conditions



## Excellent sensitivity with Sony Exmor CMOS sensors



Images taken at less than 0.1 lux

## Ultra-compact and lightweight



## Available in a black enclosure



\*Note: Cricket is recommended for customers familiar with the use of standard security IP cameras. Key differences between the Cricket IP security camera and other Point Grey cameras include:

- Cricket produces compressed images only;
- Cricket requires a 3rd party Video Management Software (VMS) and does not support FlyCapture SDK;
- Cricket does not support external triggering or strobe capabilities.

# 360° SPHERICAL IMAGING CAMERAS

POINT GREY MAKES SPHERICAL video a reality by providing affordable hardware and software packages that deliver high-resolution 360° visual coverage. All three Ladybug systems perform the image acquisition, processing, stitching and correction necessary to integrate multiple camera images into full-resolution digital spherical and panoramic videos in real time. The quality and flexibility of spherical video data make the medium ideal for applications requiring synchronization of video images. This revolutionary technology is now used for a wide variety of applications and solutions. Examples include large scale GIS for street-level viewing, geographical mapping and other location-based visualizations (NMEA GPS and EXIF output compatible); high end security and surveillance applications; city planning applications; simulation and measurement analysis; and entertainment solutions for lighting models, full dome projection content, and other immersive experiences.

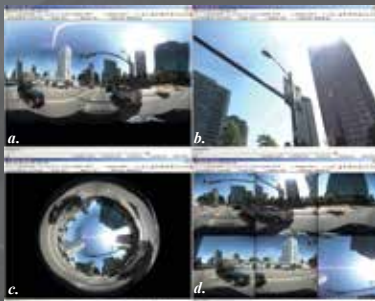
## LADYBUG FAMILY KEY FEATURES

- 360° degree video streaming
- Covers 90% of visual sphere; 6 sensors each camera
- Independent imaging control CCD settings controlled individually or in unison
- Pre-calibrated for ease of use
- High dynamic range mode continuously cycles through a series of camera shutter and gain settings
- Image stabilization for smoother sequences
- Dynamic Stitching
- Complete Development Accessory Kit with each model (Ladybug5 Dev Kit shown below)



## LADYBUG SDK

Every Ladybug system includes feature-rich software to manage image acquisition, spherical and panoramic image production, and camera settings. The Ladybug SDK includes the LadybugCapPro program, source code for a quick start in the C/C++ programming environment, a camera device driver, and Application Programming Interface (API) software library.



Spherical View Styles:  
a. Panoramic b. Spherical c. Dome d. Multi-camera view

## LADYBUG API FUNCTIONALITY

- Acquire and process images using a variety of different color processing algorithms
- Stream images off the camera for viewing
- Control JPEG compression level
- Access stored image stream files
- Store and link data from NMEA GPS devices
- Image stabilization for smoother sequences
- Dynamic Stitching - Stitch to variable distances
- Independent Exposure and HDR Imaging
- Anti-aliasing
- Environment Mapping - Uses OpenGL's cube map texture to create reflections from far away scenes.
- Control other settings including:
  - Auto exposure, gain, shutter, white balance, color correction, falloff correction, frame rate, independent sensor control
- Unique post processing workflow
  - **Exclusive only to the Ladybug5.** Edit 12-bit Camera RAW files for maximum flexibility and dynamic range



# LADYBUG® 5

30 MP AND 12-BIT CAMERA RAW



Model#	Sensor Specifications	Shutter	Max Res Per Sensor	Max FPS
LDS-U3-5155C-44	30MP Sony ICX655 CCD	2/3" 3.45 µm Global	2048 x 2448	10 FPS Compressed, 5 FPS Uncompressed

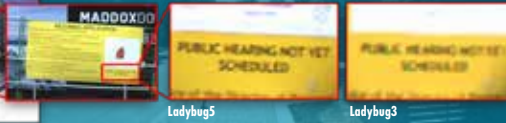
<b>INTERFACE</b>	USB 3.0 interface with screw locks for camera control and data
<b>GPIO</b>	12-pin GPIO connector for external trigger input, strobe output, and camera power
<b>OPTICS</b>	Six high quality 4.4 mm focal length lenses
<b>SPHERICAL DISTANCE</b>	Calibrated from 2 m to infinity
<b>FOCUS DISTANCE</b>	-200 cm. Objects have an acceptable sharpness from -60 cm to infinity

<b>ADC</b>	12-bit
<b>IMAGE DATA FORMATS</b>	Raw8, Raw12, Raw16 in uncompressed and JPEG
<b>IMAGE DATA OUTPUT</b>	8-, 12-, or 16-bit, Raw or JPEG compressed
<b>PARTIAL IMAGE MODES</b>	Pixel binning and region of interest (ROI) modes
<b>GAIN RANGE</b>	Automatic/manual/one-push/ 0dB to 18dB
<b>GAMMA</b>	0.50 to 4.00
<b>TRIGGER MODES</b>	Standard, bulb, skip frames, overlapped, multi-shot
<b>HIGH DYNAMIC RANGE</b>	Cycle 4 gain and exposure presets
<b>EXPOSURE RANGE</b>	Global shutter; Automatic/manual/one-push/extended shutter modes 0.02 ms to 2 seconds (extended shutter)
<b>IMAGE PROCESSING</b>	Shutter, gain, white balance, gamma & JPEG compression, programmable via software
<b>CASE TYPE</b>	Single unit, water resistant
<b>CASE MATERIAL</b>	Machined aluminum housing, anodized red or black
<b>ENVIRONMENTAL SENSORS</b>	Temperature, Barometer, Humidity, Accelerometer, Compass
<b>SIZE (WXHXD)</b>	197 mm diameter, 160 mm height (with lens hoods)
<b>MASS</b>	3000 g
<b>POWER</b>	12-24 V, 13 W via GPIO
<b>TEMPERATURE</b>	-30° to 60°C (storage) • 0° to 45°C (operating)
<b>WARRANTY</b>	2 years





Comparison Image 300% magnification



## LADYBUG<sup>®</sup> 3

HIGH RESOLUTION, WATER RESISTANT



## LADYBUG<sup>®</sup> 2

30 FPS SPHERICAL VIDEO



Model#	Sensor Specifications	Shutter	Max Res Per Sensor	Max FPS	Model#	Sensor Specifications	Shutter	Max Res Per Sensor	Max FPS
<b>LD3-20S4C-33</b>	12MP Sony ICX274 CCD 1/1.8" 4.4 μm Global	1600 x 1200	16 FPS Compressed, 6.5 FPS Uncompressed		<b>LD2-HICOL-KIT</b>	4.8MP Sony ICX204 CCD 1/3" 4.65 μm Global	1024 x 768	30 FPS Compressed, 15 FPS Uncompressed	

IEEE 1394b interface with screw locks for camera control, data, and power

8-pin GPIO connector for external trigger, strobe, serial port, or external power

Six high quality 3.3 mm focal length lenses

Calibrated at 20 m

~200 cm. Objects have an acceptable sharpness from ~60 cm to infinity

12-bit

Raw8, Mono8

8-bit raw Bayer (color) digital data

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push/ 0dB to 24dB

0.50 to 4.00

Standard, bulb, skip frames, overlapped, multi-shot

Cycle 4 gain and exposure presets

Global shutter; Automatic/manual/one-push/extended shutter modes 0.01 ms to 4.2 s (extended shutter mode)

Shutter, gain, white balance, gamma & JPEG compression, programmable via software

Single unit, water resistant

Machined aluminum housing, anodized red or black

N/A

122 x 141 x 133 mm

2414 g

8-30 V, 7.2 W at 12 V via IEEE 1394b

-30° to 60°C (storage) • 0° to 45°C (operating)

1 year

IEEE 1394b interface with screw locks for camera control, data, and power fiber optic link between head and compressor

N/A

Six high quality 2.5 mm focal length lenses

Calibrated at 20 m

~200 cm. Objects have an acceptable sharpness from ~60 cm to infinity

12-bit

Raw8, Mono8

8-bit raw Bayer (color) digital data

Pixel binning and region of interest (ROI) modes

Automatic/manual/one-push/ 0dB to 26dB

0.50 to 4.00

Software only

N/A

Global shutter; Automatic/manual/one-push/extended shutter modes 0.01 ms to 4.2 s (extended shutter mode)

Shutter, gain, white balance, gamma & JPEG compression, programmable via software

Two units (head and compressor)

Machined aluminum housing, anodized red

N/A

110 x 100 x 141 mm

1190 g

8-30 V, 11.2 W at 12 V via IEEE 1394b

-30° to 60°C (storage) • 0° to 45°C (operating)

1 year

### INTERFACE

### GPIO

### OPTICS

### SPHERICAL DISTANCE

### FOCUS DISTANCE

### ADC

### IMAGE DATA FORMATS

### IMAGE DATA OUTPUT

### PARTIAL IMAGE MODES

### GAIN RANGE

### GAMMA

### TRIGGER MODES

### HIGH DYNAMIC RANGE

### EXPOSURE RANGE

### IMAGE PROCESSING

### CASE TYPE

### CASE MATERIAL

### ENVIRONMENTAL SENSORS

### SIZE (WxHxD)

### MASS

### POWER

### TEMPERATURE

### WARRANTY

# STEREO VISION CAMERAS

## POINT GREY MAKES STEREO VISION PRACTICAL

for a variety of research areas by providing hardware and software packages that include complete stereo processing support – from image correction and alignment to dense correlation-based stereo mapping. Stereo vision works in a similar way to 3D sensing in human vision. It begins with identifying image pixels that correspond to the same point in a physical scene observed by multiple cameras. The 3D position of a point can then be established by triangulation using a ray from each camera. The more corresponding pixels identified, the more 3D points that can be determined with a single set of images. Correlation stereo methods attempt to obtain correspondences for every pixel in the stereo image, resulting in tens of thousands of 3D values generated with every stereo image.

### BUMBLEBEE CAMERA FAMILY KEY FEATURES

- Full field-of-view depth measurements from a single image set
- Real time transformation of images to 3D data. Cameras can easily generate one million 3D points per second
- Easy integration with other machine vision techniques. The images and 3D data are perfectly registered
- Passive 3D sensing – no lasers or projectors required
- Pre-calibration for lens distortion and camera misalignments. Epipolar lines are aligned to within 0.05\* pixels RMS error
- No manual adjustments or in-field calibration required
- High quality Sony CCD sensors
- Flexible software environment that provides access to all levels of the stereo processing pipeline

\* This figure is based on a stereo resolution of 320x240 and is valid for all camera models. Calibration accuracy will vary from camera to camera.

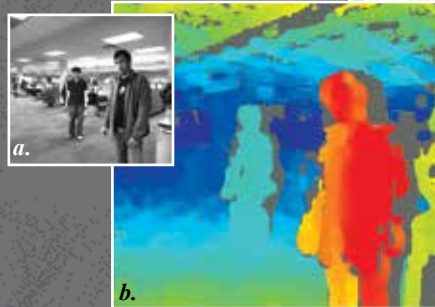
## TRICLOPS™ STEREO SDK

The Triclops SDK provides flexible access to all image stages in the stereo processing pipeline, making it ideal for custom stereo processing approaches. For example, users can track features in the distorted images, rectify feature locations only, use rectified locations to perform epipolar validation on the features, and then determine their locations in 3D. Or users can rectify images and implement a user-supplied stereo algorithm, or perform correlation stereo only in regions of interest in the image, to speed up stereo processing. This flexibility enables innovation in a wide range of stereo vision research and application.

### TRICLOPS SDK FEATURES INCLUDE:

- Distance Measurement for every pixel in view
- Over 1,000,000 measurements per second
- Removes lens distortions and misalignments
- Extensive example programs and source code

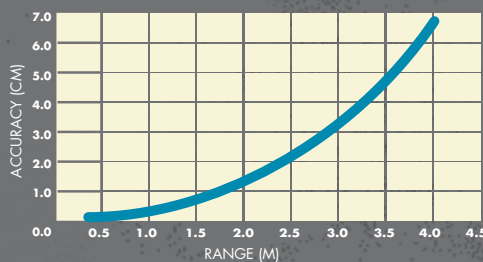
### IMAGE RECTIFICATION



a. Original Image b. Depth Image

### RANGE VS ACCURACY

This chart shows the accuracy of 3D point calculations versus the range to the point. Results are dependent on image resolution, lens focal length and calibration accuracy.



a. Original Image b. Depth Image



## BUMBLEBEE® XB3

3-SENSOR AND MULTI-BASELINE



## BUMBLEBEE® 2

COMPACT SIZE AND QUALITY



Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Focal Length	Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Focal Length
<b>BBX3-13S2C/M-38</b>	1.3MP Sony ICX445 CCD	1/3" 3.75 μm Global	1280 x 960	16 fps	3.8 mm	<b>BB2-03S2C/M-25</b>	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	48 fps	2.5 mm
<b>BBX3-13S2C/M-60</b>	1.3MP Sony ICX445 CCD	1/3" 3.75 μm Global	1280 x 960	16 fps	6 mm	<b>BB2-03S2C/M-38</b>	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	48 fps	3.8 mm
						<b>BB2-03S2C/M-60</b>	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	48 fps	6 mm
						<b>BB2-08S2C/M-25</b>	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	20 fps	2.5 mm
						<b>BB2-08S2C/M-38</b>	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	20 fps	3.8 mm
						<b>BB2-08S2C/M-60</b>	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	20 fps	6 mm

Two IEEE-1394b interfaces for camera control, data, and power  
4 general-purpose digital input/output pins

IEEE-1394a interfaces for camera control, data, and power  
4 general-purpose digital input/output pins

**INTERFACE**  
**GPIO**

12-bit  
YUV411, YUV422, and RGB formats  
8, 12, 16 and 24-bit digital data  
Automatic/Manual/One-Push Gain modes, 0 dB to 24 dB  
12 cm and 24 cm  
3.8 mm with 66° HFOV, 6 mm with 43° HFOV  
f/2.0 (2.5 mm and 3.8 mm focal length), f/2.5 (6.0 mm focal length)  
54 dB  
Standard, bulb, skip frames, overlapped  
Automatic/Manual 0.03 ms to 66.63 ms at 15 FPS

12-bit  
YUV411, YUV422, and RGB formats  
8, 12, 16 and 24-bit digital data  
Automatic/Manual/One-Push Gain modes, 0 dB to 24 dB  
12 cm  
2.5 mm with 97° HFOV, 3.8 mm with 66° HFOV, 6 mm with 43° HFOV  
f/2.0 (2.5 mm and 3.8 mm focal length), f/2.5 (6.0 mm focal length)  
60 dB  
Standard, bulb, skip frames, overlapped  
Automatic/Manual 0.03 ms to 66.63 ms at 15 FPS

**ADC**  
**IMAGE DATA FORMATS**  
**IMAGE DATA OUTPUT**  
**GAIN**  
**BASELINE**  
**FIELD OF VIEW**  
**APERTURE**  
**SIGNAL TO NOISE RATIO**  
**TRIGGER MODES**  
**EXPOSURE RANGE**

277 x 37 x 41.8 mm  
505 g  
4 W at 12 V via IEEE-1394 interface or GPIO connector  
3 x M12 microlens mount  
-30° to 60°C (storage) • 0° to 45°C (operating)  
2 years

157 x 36 x 47.4 mm  
342 g  
2.5 W at 12 V via IEEE-1394 interface or GPIO connector  
2 x M12 microlens mount  
-30° to 60°C (storage) • 0° to 45°C (operating)  
2 years

**SIZE (WXHxD)**  
**MASS**  
**POWER**  
**LENS MOUNT**  
**TEMPERATURE**  
**WARRANTY**







	MODEL NUMBER	INTERFACE	SENSOR TYPE	OPTICAL FORMAT	PIXEL SIZE	MAX RES	MAX FPS
<b>CHAMELEON3</b> Page 3	CM3-U3-13S2C/M-CS	USB 3.0	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	30 fps
	CM3-U3-13Y3M-C	USB 3.0	On Semi Python 1300 CMOS	1/2"	4.8µm	1280 x 1024	150 fps
	CM3-U3-28S4C/M-CS	USB 3.0	Sony ICX818 CCD	1/1.8"	3.69µm	1928 x 1448	13 fps
<b>BLACKFLY</b> Page 3	BFLY-U3-03S2C/M-CS	USB 3.0	Sony ICX424 CCD	1/3"	7.4µm	648 x 488	84 fps
	BFLY-U3-05S2C/M-CS	USB 3.0	Sony ICX693 CCD	1/3"	6.0µm	808 x 608	50 fps
	BFLY-U3-13S2C/M-CS	USB 3.0	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	30 fps
	BFLY-U3-20S4C/M-CS	USB 3.0	Sony ICX274 CCD	1/1.8"	4.4µm	1624 x 1224	15 fps
	BFLY-U3-23S6C/M-C	USB 3.0	Sony IMX249 CMOS	1/1.2"	5.86µm	1920 x 1200	41 fps
	BFLY-U3-50H5C/M-C	USB 3.0	Sharp RJ32S3AAODT CCD	2/3"	3.45µm	2448 x 2048	7.5 fps
<b>FLEA3</b> Page 4	FL3-U3-13S2C/M-CS	USB 3.0	Sony IMX035 CMOS	1/3"	3.63µm	1328 x 1048	120 fps
	FL3-U3-13Y3M-C	USB 3.0	ON Semi VITA1300 CMOS	1/2"	4.8µm	1280 x 1024	149 fps
	FL3-U3-13E4C/M-C	USB 3.0	e2v EV76C560 CMOS	1/1.8"	5.3µm	1280 x 1024	60 fps
	FL3-U3-20E4C/M-C	USB 3.0	e2v EV76C5706F CMOS	1/1.8"	4.5µm	1600 x 1200	59 fps
	FL3-U3-32S2C/M-CS	USB 3.0	Sony IMX036 CMOS	1/2.8"	2.5µm	2080 x 1552	60 fps
	FL3-U3-88S2C-C	USB 3.0	Sony IMX121 CMOS	1/2.5"	1.55µm	4096 x 2160	21 fps
<b>GRASSHOPPER3</b> Page 4	GS3-U3-14S5C/M-C	USB 3.0	Sony ICX285 CCD	2/3"	6.45µm	1384 x 1036	30 fps
	GS3-U3-15S5C/M-C	USB 3.0	Sony ICX825 CCD	2/3"	6.45µm	1384 x 1032	45 fps
	GS3-U3-23S6C/M-C	USB 3.0	Sony IMX174 CMOS	1/1.2"	5.86µm	1920 x 1200	162 fps
	GS3-U3-28S4C/M-C	USB 3.0	Sony ICX687 CCD	1/1.8"	3.69µm	1928 x 1448	26 fps
	GS3-U3-28S5C/M-C	USB 3.0	Sony ICX674 CCD	2/3"	4.54µm	1920 x 1440	26 fps
	GS3-U3-32S4C/M-C	USB 3.0	Sony IMX252 CMOS	1/1.8"	3.45µm	2048 x 1536	121 fps
	GS3-U3-41S4C/M-C	USB 3.0	Sony ICX808 CCD	1/1.8"	3.1µm	2016 x 2016	18 fps
	GS3-U3-41C6NIR-C	USB 3.0	CMOSIS CMV4000-3E12 CMOS	1"	5.5µm	2048 x 2048	90 fps
	GS3-U3-41C6C/M-C	USB 3.0	CMOSIS CMV4000-3E5 CMOS	1"	5.5µm	2048 x 2048	90 fps
	GS3-U3-50S5C/M-C	USB 3.0	Sony ICX625 CCD	2/3"	3.45µm	2448 x 2048	15 fps
	GS3-U3-51S5C/M-C	USB 3.0	Sony IMX250 CMOS	2/3"	3.45µm	2448 x 2048	75 fps
	GS3-U3-60S6C/M-C	USB 3.0	Sony ICX694 CCD	1"	4.54µm	2736 x 2192	13 fps
	GS3-U3-60Q56C/M-C	USB 3.0	Sony ICX694 CCD	1"	4.54µm	2736 x 2192	25 fps
	GS3-U3-91S6C/M-C	USB 3.0	Sony ICX814 CCD	1"	3.69µm	3376 x 2704	9 fps
	GS3-U3-120S6C/M-C	USB 3.0	Sony ICX834 CCD	1"	3.1µm	4240 x 2824	7 fps



<b>BLACKFLY</b> Page 5	BFLY-PGE-03S2C/M-CS	GigE PoE	Sony ICX424 CCD	1/3"	7.4µm	648 x 488	84 fps	
	BFLY-PGE-03S3C/M-CS	GigE PoE	Sony ICX414 CCD	1/2"	9.9µm	648 x 488	90 fps	
	BFLY-PGE-05S2C/M-CS	GigE PoE	Sony ICX693 CCD	1/3"	6.0µm	808 x 608	50 fps	
	BFLY-PGE-09S2C/M-CS	GigE PoE	Sony ICX692 CCD	1/3"	4.08µm	1288 x 728	30 fps	
	BFLY-PGE-12A2C/M-CS	GigE PoE	Aptina ARO134 CMOS	1/3"	3.75µm	1280 x 960	52 fps	
	BFLY-PGE-13S2C/M-CS	GigE PoE	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	30 fps	
	BFLY-PGE-13H2C/M-CS	GigE PoE	Sharp RJ33J4/RJ33J3 CCD	1/3"	3.75µm	1288 x 964	30 fps	
	BFLY-PGE-13E4C/M-CS	GigE PoE	e2v EV76C560 CMOS	1/1.8"	5.3µm	1280 x 1024	60 fps	
	BFLY-PGE-14S2C-CS	GigE PoE	Sony IMX104 CMOS	1/3"	3.75µm	1296 x 1032	60 fps	
	BFLY-PGE-20E4C/M-CS	GigE PoE	e2v EV76C570 CMOS	1/1.8"	4.5µm	1600 x 1200	47 fps	
	BFLY-PGE-23S2C-CS	GigE PoE	Sony IMX136 CMOS	1/2.8"	2.8µm	1920 x 1200	27 fps	
	BFLY-PGE-23S6C/M-C	GigE PoE	Sony IMX249 CMOS	1/1.2"	5.86µm	1920 x 1200	41 fps	
	BFLY-PGE-50A2C/M-CS	GigE PoE	Aptina MT9P006/031 CMOS	1/2.5"	2.2µm	2592 x 1944	13 fps	
	BFLY-PGE-50H5C/M-C	GigE PoE	Sharp RJ32S4/S3AAODT CCD	2/3"	3.45µm	2448 x 2048	7.5 fps	
	<b>FLEA3</b> Page 5	FL3-GE-03S1C/M-C	GigE	Sony ICX618 CCD	1/4"	5.6µm	648 x 488	120 fps
		FL3-GE-03S2C/M-C	GigE	Sony ICX424 CCD	1/3"	7.4µm	648 x 488	82 fps
		FL3-GE-08S2C/M-C	GigE	Sony ICX204 CCD	1/3"	4.65µm	1032 x 776	31 fps
FL3-GE-13S2C/M-C/CS		GigE	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	31 fps	
FL3-GE-14S3C/M-C		GigE	Sony ICX267 CCD	1/2"	4.65µm	1384 x 1032	18 fps	
FL3-GE-20S4C/M-C		GigE	Sony ICX274 CCD	1/1.8"	4.4µm	1624 x 1224	15 fps	
FL3-GE-28S4C/M-C		GigE	Sony ICX687 CCD	1/1.8"	3.69µm	1928 x 1448	15 fps	
FL3-GE-50S5C/M-C	GigE	Sony ICX655 CCD	2/3"	3.45µm	2448 x 2048	8 fps		
<b>GRASSHOPPER3</b> Page 6	GS3-PGE-23S6C/M-C	GigE-PoE	Sony IMX174 CMOS	1/1.2"	5.86µm	1920 x 1200	45 fps	
	GS3-PGE-50S5C/M-C	GigE-PoE	Sony ICX625 CCD	2/3"	3.45µm	2448 x 2048	15 fps	
	GS3-PGE-60S6C/M-C	GigE-PoE	Sony ICX694 CCD	1"	4.54µm	2736 x 2192	13 fps	
	GS3-PGE-91S6C/M-C	GigE-PoE	Sony ICX814 CCD	1"	3.69µm	3376 x 2704	9 fps	
<b>GRASSHOPPER2</b> Page 6	GS2-GE-20S4C/M-C	GigE	Sony ICX274 CCD	1/1.8"	4.4µm	1624 x 1224	29 fps	
	GS2-GE-50S5C/M-C	GigE	Sony ICX625 CCD	2/3"	3.45µm	2448 x 2048	15 fps	
<b>ZEBRA2</b> Page 7	ZBR2-PGEHD-20S4C-CS	GigE-PoE / HD-SDI	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	30 fps (HD-SDI 25 FPS)	
	ZBR2-PGEHD-28S4C-CS	GigE-PoE / HD-SDI	Sony ICX687 CCD	1/1.8"	3.69µm	1928x1448	26 fps (HD-SDI 25 FPS)	
	ZBR2-PGEHD-50S5C-CS	GigE-PoE / HD-SDI	Sony ICX625 CCD	2/3"	3.45µm	2448x2048	15 fps (HD-SDI 25 FPS)	
	ZBR2-PGEHD-51S5C-CS	GigE-PoE / HD-SDI	Sony ICX655 CCD	2/3"	3.45µm	2448x2048	10 fps (HD-SDI 25 FPS)	



<b>FLEA2</b> Page 10	FL2-03S2C/M-C	IEEE 1394b	Sony ICX424 CCD	1/3"	7.4µm	648x488	80 fps
	FL2-08S2C/M-C	IEEE 1394b	Sony ICX204 CCD	1/3"	4.65µm	1032x776	30 fps
	FL2G-13S2C/M-C	IEEE 1394b	Sony ICX445 CCD	1/3"	3.75µm	1288x964	30 fps
	FL2-14S3C/M-C	IEEE 1394b	Sony ICX267 CCD	1/2"	4.65µm	1392x1032	15 fps
	FL2-20S4C/M-C	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	15 fps
FL2G-50S5C/M-C	IEEE 1394b	Sony ICX655 CCD	2/3"	3.45µm	2448x2048	7.5 fps	
<b>FLEA3</b> Page 9	FL3-FW-03S1C/M-C	IEEE 1394b	Sony ICX618 CCD	1/4"	5.6µm	648x488	120 fps
	FL3-FW-03S3C/M-C	IEEE 1394b	Sony ICX414 CCD	1/2"	9.9µm	648x488	76 fps
	FL3-FW-14S3C/M-C	IEEE 1394b	Sony ICX267 CCD	1/2"	4.65µm	1384x1032	16 fps
	FL3-FW-20S4C/M-C	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	15 fps
<b>GRASSHOPPER EXPRESS</b> Page 9	GX-FW-10K3M-C	IEEE 1394b	Kodak KAI-01050 CCD	1/2"	5.5µm	1024x1024	70 fps
	GX-FW-28S5C/M-C	IEEE 1394b	Sony ICX674 CCD	2/3"	4.54µm	1932x1452	26 fps
	GX-FW-60S6C/M-C	IEEE 1394b	Sony ICX694 CCD	1"	4.54µm	2736x2192	11 fps

SHUTTER	GPIO	LENS MOUNT	A/D CONVERTER	IMAGE DATA OUTPUT	ON-BOARD MEMORY	SIZE	OPERATING TEMP	WARRANTY
Global Global Global	9-pin JST	CS CS CS	12-bit ADC 12-bit ADC 12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer 1 MB flash memory	44 x 35 x 19.5 mm	0° to 45° C	3 years
Global Global Global Global Global	6-pin Hirose HR10A-7R-6PB	CS CS CS C C	12-bit ADC 12-bit ADC 12-bit ADC 10/12-bit ADC 12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Rolling Global Global Global	8-pin Hirose HR25	CS C C C	12-bit ADC 10-bit ADC 10-bit ADC 10-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Rolling/Global Reset Rolling/Global Reset		CS C	12-bit ADC 12-bit ADC					
Global Global Global Global Global Global Global Global Global Global Global Global Global Global	8-pin Hirose HR25	C C C C C C C C C C C C C C	14-bit ADC 14-bit ADC 10/12-bit ADC 14-bit ADC 14-bit ADC 10/12-bit ADC 14-bit ADC 10-bit ADC 10-bit ADC 14-bit ADC 10/12-bit ADC 14-bit ADC 14-bit ADC 14-bit ADC	8, 12, 16, 24-bit	128 MB frame buffer 2 MB flash memory	44 x 29 x 58 mm	0° to 50° C	3 years
Global Global Global Global Global Global Global Global Global Rolling Global Rolling Global Rolling Global	6-pin Hirose HR10A-7R-6PB	CS CS CS CS CS CS CS CS CS CS C CS C	12-bit ADC 12-bit ADC 12-bit ADC 12-bit ADC 12-bit ADC 12-bit ADC 10-bit ADC 12-bit ADC 10-bit ADC 12-bit ADC 10/12-bit ADC 12-bit ADC 12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer 512 KB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global Global Global Global Global Global Global	8-pin Hirose HR25	C C C C/CS C C C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global Global Global	8-pin Hirose HR25	C C C	10/12-bit ADC 14-bit ADC 14-bit ADC	8, 12, 16, 24-bit	128 MB frame buffer 2 MB flash memory	44 x 29 x 58 mm	0° to 50° C	3 years
Global Global	8-pin Hirose HR25	C C	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 512 KB flash memory	44 x 29 x 58 mm	0° to 45° C	3 years
Global Global Global Global	6-pin Pheonix	CS CS CS CS	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	44 x 44 x 87.5 mm	0° to 45° C	3 years
Global Global Global Global Global	8-pin Hirose HR25	C C C C C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 512 KB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global Global Global Global	8-pin Hirose HR25	C C C C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global Global Global	8-pin Hirose HR25	C C C	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	44 x 29 x 58 mm	0° to 45° C	3 years

**GRASSHOPPER**  
Page 11

MODEL NUMBER	INTERFACE	SENSOR TYPE	OPTICAL FORMAT	PIXEL SIZE	MAX RES	MAX FPS
GRAS-03K2C/M-C	IEEE 1394b	Kodak KAI-0340D CCD	1/3"	7.4µm	648x480	200 fps
GRAS-03S3M-C	IEEE 1394b	Sony ICX414 CCD	1/2"	9.9µm	648x488	74 fps
GRAS-14S3C/M-C	IEEE 1394b	Sony ICX267 CCD	1/2"	4.65µm	1384x1032	21 fps
GRAS-14S5C/M-C	IEEE 1394b	Sony ICX285 CCD	2/3"	6.45µm	1384x1036	15 fps
GRAS-20S4C/M-C	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	30 fps
GRAS-50S5C/M-C	IEEE 1394b	Sony ICX625 CCD	2/3"	3.45µm	2448x2048	15 fps

**GRASSHOPPER2**  
Page 10

GS2-FW-14S5C/M-C	IEEE 1394b	Sony ICX285 CCD	2/3"	6.45µm	1384x1036	30 fps
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Page 8 **CHAMELEON**

CMLN-13S2C/M-CS	USB 2.0	Sony ICX445 CCD	1/3"	3.75µm	1296x964	18 fps
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**FIREFLY MV**  
Page 8

FMVU-03MTC/M-CS	USB 2.0	Micron MT9V022 CMOS	1/3"	6.0µm	752x480	60 fps
FMVU-13S2C-CS	USB 2.0	Sony IMX035 CMOS	1/3"	3.63µm	1328x1048	23 fps

**GAZELLE**  
Page 12

GZL-CL-22C5-C	Camera Link Base/Full	CMOSIS CMV2000 CMOS	2/3"	5.5µm	2048x1088	280 fps
GZL-CL-41C6-C	Camera Link Base/Full	CMOSIS CMV4000-2E5 CMOS	1"	5.5µm	2048x2048	150 fps

**CRICKET IP CAMERA**  
Page 14

CR-POE-13S2C-CS	100Mbit PoE	Sony IMX139 CMOS	1/3"	3.75µm	1280x1024	60 fps
CR-POE-20S2C-CS	100Mbit PoE	Sony IMX140 CMOS	1/2.8"	2.8µm	1920x1080	60 fps
CR-POE-20S3C-CS	100Mbit PoE	Sony IMX185 CMOS	1/2"	3.75µm	1920x1080	60 fps

**BUMBLEBEE2 & XB3**  
Page 18

BB2-03S2C/M (25/38/60)	IEEE 1394a	Sony ICX424 CCD	1/3"	7.4µm	648x488	48 fps
BB2-08S2C/M (25/38/60)	IEEE 1394a	Sony ICX204 CCD	1/3"	4.65µm	1032x776	20 fps
BBX3-13S2C/M (38/60)	IEEE 1394b	Sony ICX445 CCD	1/3"	3.75µm	1280x960	16 fps

Page 15 & 16 **LADYBUG2  
LADYBUG3  
LADYBUG5**

LD2-HICOL-KIT	IEEE 1394b	Sony ICX204 CCD	1/3"	4.65µm	1024x768 (x6)	30 fps
LD3-20S4C-33	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1600x1200 (x6)	16 fps
LD5-U3-51S5C-44	USB 3.0	Sony ICX655 CCD	2/3"	3.45µm	2048x2448 (x6)	10 fps



## Sony EXview HAD CCD II

### Increased Camera Sensitivity for Sony's Global Shutter CCDs

Sony EXview HAD CCD technology increases sensitivity compared to other CCD's, including into the near infrared. Sony engineers achieve this by optimizing the photodiode's surface area and depth on the sensor as well as placing their proprietary micro lenses on each diode to better capture and focus the light.



## Sony Exmor

### Increased Imaging Performance for Sony's CMOS Sensors

Exmor CMOS technology features very low temporal dark noise (read noise) and excellent high saturation capacity (well depth). The results are excellent imaging performance at the high frame rates of CMOS. Sony engineers achieve this by replacing aluminum transistors with copper transistors to reduce wiring thickness and its interference to incoming light. In addition, Sony engineers increased heat shielding and improved silicon purity.



SHUTTER	GPIO	LENS MOUNT	A/D CONVERTER	IMAGE DATA OUTPUT	ON-BOARD MEMORY	SIZE	OPERATING TEMP	WARRANTY
Global Global Global Global Global	8-pin Hirose HR25	C C C C C	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 512 KB flash memory	44 x 29 x 58 mm	0° to 40° C	3 years
Global	8-pin Hirose HR25	C	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 512 KB flash memory	44 x 29 x 58 mm	0° to 45° C	3 years
Global	7-pin JST	CS	12-bit ADC	8, 16-bit	256 KB flash memory	44 x 41 x 25.5 mm	0° to 45° C	1 year
Global Rolling	7-pin JST	CS CS	10-bit ADC 12-bit ADC	8, 16-bit	N/A	44 x 34 x 24.4 mm	0° to 45° C	1 year
Global Global	8-pin Hirose HR25	C C	10-bit ADC	8, 10-bit	4 MB flash memory	44 x 29 x 59.5 mm	-10° to 50° C	3 years
Rolling Rolling Rolling	N/A	CS CS CS	N/A	N/A	N/A	88.1 x 44 x 32 mm	0° to 45° C	1 year
Global Global Global	4-pin GPIO	2 x M12 2 x M12 3 x M12	12-bit ADC	8, 16-bit	N/A	157x 36 x 47.4 mm 157 x 36 x 47.4 mm 277 x 37 x 41.8 mm	0° to 45° C	2 years
Global Global Global	N/A 8-pin GPIO 12-pin GPIO	N/A N/A N/A	12-bit ADC	8-bit 8-bit 8, 12, 16-bit	N/A	110 x 100 x 141 mm 122 x 141 mm 139.5 x 160 mm	0° to 45° C	1 year 1 year 2 years



## Sony Exmor R

### Back Illuminated Technology for High Sensitivity and Lower Noise

Sony Exmor R back-illuminated CMOS architecture increases quantum efficiency and reduces read noise for small sensors with high resolutions. Sony engineers flipped the wiring layer with the photodiode so the photodiode is completely free from any wiring obstruction, allowing more light to be collected within the smaller photo diode. This gives the sensors high imaging performance even though the pixels sizes are small.



## Sony Pregius Global Shutter CMOS

### High-Speed CMOS Sensor with Global Shutter Technology

Sony's Pregius Global Shutter CMOS technology truly fulfills the promise of global shutter CMOS: crisp, clear, distortion-free images at high speeds. Sony engineers designed a special “analog memory” that perfectly stores the light collected in the photodiode. This memory is shielded from all sources of noise and allows for a clean conversion during the analog to digital process. This technology results in very high QE and dynamic range with ultra low read noise.

# ACCESSORY LIST

MAXIMIZE THE EFFECTIVENESS OF YOUR IMAGING PIPELINE  
For the most up to date list, please visit [ptgrey.com/products/accessories](http://ptgrey.com/products/accessories)

Model#	TRIPOD MOUNT / ENCLOSURES	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-0003	Tripod Mount Adapter-3																								
ACC-01-0005	Tripod Mount Adapter-5																								
ACC-01-0011	Tripod Mount Adapter-11																								
ACC-01-0010	Metal Camera Enclosure for CS-Mount FFMV only																								
ACC-01-0012	Ladybug3 Desktop Mount																								
ACC-01-0013	Ladybug3 Tripod Mount Adapter and Plugs																								
ACC-01-0014	Zebra2 Tripod Mount Adapter																								
ACC-01-0015	Ladybug5 Tripod Mount Adapter																								

Model#	HOST ADAPTER CARDS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-1000	IEEE 1394a OHCI PCI Host Adapter 3 Port																								
ACC-01-1001	IEEE 1394b OHCI PCI Host Adapter 2 Port																								
ACC-01-1100	Intel PRO 1000 CT Gigabit Ethernet PCIe																								
GIGE-PCIE2-2P02	Gigabit Ethernet PCIe PoE, 2 Port, Intel																								
ACC-01-1201	Generic USB 3.0 PCIe 2.0 x1 2 Port Card																								
ACC-01-1202	Generic USB 3.0 PCIe 2.0 x1 4 Port Card																								
U3-PCIE2-2P01X	PGR USB 3.0 PCIe 2.0 x1 Card, Fresco, 2-port																								

Model#	CABLES	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-2000	4.5 m, 6-pin to 6-pin, 1394a																								
ACC-01-2004	0.3-m, 6-pin to 6-pin, Ultra Thin 1394a (10moq)																								
ACC-01-2003	1.0 m, 6-pin to 6-pin, Ultra Thin 1394a (10moq)																								
ACC-01-2002	2.0 m, 6-pin to 6-pin, Ultra Thin 1394a (10moq)																								
ACC-01-2013	4.5 m, 4-pin to 9-pin, 1394a to 1394b																								
ACC-01-2007	4.5 m, 6-pin to 9-pin, Locking 1394a to 1394b																								
ACC-01-2016	0.3 m, 9-pin to 9-pin, Locking 1394b																								
ACC-01-2015	1.0 m, 9-pin to 9-pin, Locking 1394b																								
ACC-01-2005	4.5 m, 9-pin to 9-pin, 1394b																								
ACC-01-2006	4.5 m, 9-pin to 9-pin, Locking 1394b																								
ACC-01-2012	4.5 m, 9-pin to 9-pin, Locking 1394b High Flex OKI																								
ACC-01-2017	FirePRO 10-m 9-pin to 9-pin, Locking 1394b																								
ACC-01-2008	10 m Ladybug2 Data																								
ACC-01-2010	10 m Ladybug2 Power																								
ACC-01-2011	50 m Ladybug2 Power																								
ACC-01-2100	5 m CAT 5e Ethernet Locking Cable, High Flex																								
ACC-01-2101	4.5 meter CAT 5e Ethernet Cable																								
ACC-01-2200	3 m 85 MHz Camera Link, 1x MDR, 1x SDR mini																								
ACC-01-2300	3 m USB 3.0 Cable, Type-A to Micro-B (Locking)																								
ACC-01-2301	5 m USB 3.0 Cable, Type-A to Micro-B (Locking)																								
ACC-01-2302	5 m USB 3.0 Cable, Type-A to Micro-B (Locking) Industrial, 80°C																								

Model#	GPIO CONNECTORS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-3000	1.0 m, Circular 8-pin Prewired GPIO Hirose Conn.																								
ACC-01-3005	4.5 m, Circular 8-pin Prewired GPIO Hirose Conn.																								
ACC-01-3001	Circular 12PIN Prewired GPIO Hirose Connector																								
ACC-01-3002	7-pin Prewired GPIO JST Connector																								
ACC-01-3013	9-pin Prewired GPIO JST Connector																								
ACC-01-3004	8-pin Phoenix Contact GPIO Connector																								
ACC-01-3006	8-pin Circular Hirose HR25 GPIO Connector																								
ACC-01-3007	4-pin Phoenix Contact Power Connector																								
ACC-01-3008	6-pin Phoenix Contact GPIO Connector																								
ACC-01-3009	1.0m, Circular 6-pin Prewired GPIO Hirose Conn.																								
ACC-01-3010	4.5m, Circular 6-pin Prewired GPIO Hirose Conn.																								
ACC-01-3011	6-pin Circular Hirose HR10 GPIO Connector																								
ACC-01-3012	12-pin Circular Hirose GPIO Cable with Power Jack																								

Model#	GENERIC OPTICS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-4000	M12 Microlens 4MM (Boowon BW38BLF)																								
ACC-01-4001	M12 Microlens 6MM (Boowon BW60BLF)																								
ACC-01-4002	M12 Microlens 8MM (Boowon BW80H-1000)																								
ACC-01-4003	Auto Iris CS-Mount Lens 1/3" 3.5-8MM																								

Model#	OPTIC MOUNTS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-5004	C-to CS-Mount Mount 5mm Spacer Adapter																								
ACC-01-5005	CS-to M12 Microlens Adapter																								
ACC-01-5006	Cast Metal M12 Microlens Holder																								
ACC-01-5007	Cast Metal M12 Microlens Holder with IR Filter																								

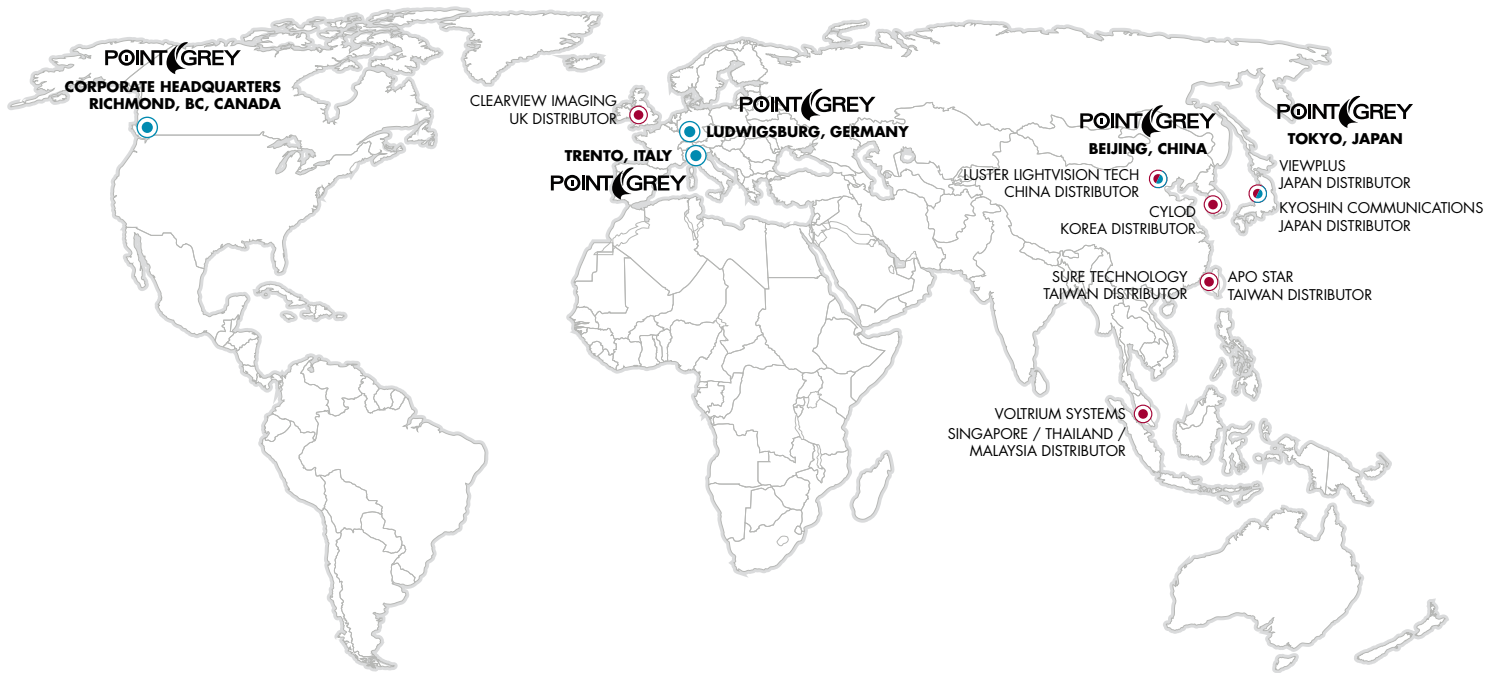
Model#	HUBS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-6000	4-Port USB 3.0 Hub, Screw Locks, Ext Power Adap.																								
ACC-01-6001	USB 3.0 Hub, VIA VL812, Micro B to Standard A, 1-port with screw locks																								
FWB-HUB-2PORT	FirePRO 1394b 2-Port Repeater																								
FWB-HUB-3PORT	FirePRO 1394b 3-Port Hub																								
FWB-HUB-5PORT	FirePRO 1394b 5-Port Repeater																								
FWB-LDR-CAT5	FirePRO LDR IEEE 1394b 100 m Cat5e repeater																								

Model#	POWER SUPPLY (PS) / MISC	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-9001	24V 2.5A 60W PS, Standard DC Barrel Connector																								
ACC-01-9007	20V 2A 40W PS, Standard DC Barrel Connector																								
ACC-01-9008	12V 1.5A (18W) Wall Mount PS, 4-Pin Phoenix Contact																								
ACC-01-9009	12V 1.5A Wall-Mount PS, Plug Adapters, HR25 GPIO Harness																								
ACC-01-9010	12V 2.0A Wall Mount PS for FWB-EC2PORT																								
ACC-01-9011	12V 1.5A Wall-Mount PS, Plug Adapters, HR10 GPIO Harness																								
ACC-01-9012	19.6W Single Port PoE Injector with NA power cord																								

Model#	REGULAR LENS
LENS-V130F3C	Fujinon 3.8-13mm Varifocal C-mount lens, for 1/2" sensors (DV3.4x3.8SA-1)
LENS-V130F3C-DC	Fujinon 3.8-13mm Varifocal C-mount lens, for 1/2" sensors, DC Iris (DV3.4x3.8SA-SA1)
LENS-15F5-125C	Fujinon fixed focal length 12.5mm C-mount lens for 2/3" sensors (HF12.5HA-1B)
LENS-15F5-250C	Fujinon fixed focal length 25mm C-mount lens for 2/3" sensors (HF25HA-1B)
LENS-15F3-60C	Fujinon fixed focal length 6mm C-mount lens for 1/2" sensors (DF6HA-1B)
LENS-30F2-V80C	Fujinon vari-focal 2.8-8mm CS-mount lens, for 1/3" sensors (YV2.8x2.8SA-2)
LENS-V500F2CS	Fujinon vari-focal 15-50mm CS-mount lens, for 1/3" sensors (YV3.3x15SA-2)
LENS-V80F2CS-DC	Fujinon vari-focal 2.8-8mm CS-mount DC iris lens, for 1/3" sensors (YV2.8x2.8SA-SA2)
LENS-V500F2CS-DC	Fujinon vari-focal 15-50mm CS-mount DC iris lens, for 1/3" sensors (YV3.3x15SA-SA2)

Model#	HIGH RESOLUTION LENS
LENS-50F5-125C	Fujinon fixed focal length 12.5mm C-mount lens for 2/3" sensors (HF12.5SA-1)
LENS-160T5C	Tamron fixed focal length 16mm C-mount lens for 2/3" sensors (23FM16SP)
LENS-250T5C	Tamron fixed focal length 25mm C-mount lens for 2/3" sensors (23FM25SP)
LENS-80T4C	Tamron fixed focal length 8mm C-mount lens for 1/1.8" sensors (MF118FM08)
LENS-160T4C	Tamron fixed focal length 16mm C-mount lens for 1/1.8" sensors (MF118FM16)
LENS-30S6-250C	Spacecom fixed focal length 25mm C-mount lens for 1" sensors (VF25095M)
LENS-125F6C	Fujinon fixed focal length 12.5mm C-mount lens for 1" sensors (CF12.5HA-1)
LENS-250F6C	Fujinon fixed focal length 25mm C-mount lens for 1" sensors (CF25HA-1)





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