

POINT GREY

Innovation in Imaging

USB[™]
VISION

GIGE[™]
VISION

FireWire

USB 2.0

CAMERA
Link

PRODUCT CATALOG

www.ptgrey.com



ABOUT POINT GREY

POINT GREY is a world-leading designer and manufacturer of innovative, high-performance digital cameras for industrial, life science, and traffic applications. We offer a unique and comprehensive portfolio of USB3 Vision, GigE Vision, FireWire, USB 2.0 and Camera Link products known for their outstanding quality, ease of use, and unbeatable price-performance.

QUICK FACTS

- Founded 1997
- ISO 9001:2008 registered company
- 170+ staff worldwide
- 120 K camera/year capacity
- Designed and manufactured in Canada
- 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 trouble shooting. Our Customer Support program includes quick response email and 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 Research has taken ownership of the entire pipeline, and over the last 16 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
First IEEE 1394 stereo vision camera Digidops	First IEEE 1394 imaging camera Firefly	First spherical vision camera Ladybug	First Flea camera	First IEEE 1394b camera Dragonfly Express	Headquarters expansion New products Dragonfly2 Ladybug2	Office opens in Germany New products Flea2 Firefly MV	New products Grasshopper FirePRO	Headquarters expansion New product USB 2.0 camera Chameleon	World's first USB 3.0 Camera	New products Flea3 New product GigE camera Grasshopper2	First Camera Link camera Gazelle First USB 3.0 camera Flea3 World's smallest GigE camera Flea3 New product Grasshopper Express	China office opens New Product IP camera Zebra2 World's Smallest PoE GigE Camera Blackfly	New USB3 products Ladybug5 Grasshopper3



- Point Grey USB 3.0 Camera Features:
- Unique 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

FLEA³

ULTRA-COMPACT, OPTIMAL VALUE



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

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

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

GPIO 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

A/D	12-bit (FL3-U3-13S2, FL3-U3-32S2, FL3-U3-88S2) • 10-bit (FL3-U3-13Y3, FL3-U3-13E4)
IMAGE DATA FORMATS	Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
PARTIAL IMAGE FORMATS	Pixel binning and region of interest (ROI) modes
GAIN	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)
GAMMA	0.50 to 4.00, programmable lookup table
TRIGGER MODES	Standard, bulb, multi-shot
SHUTTER	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-U3-32S2) / 0.021 ms to 1 second (FL3-U3-88S2)
IMAGE BUFFER	32 MB frame buffer
MEMORY CHANNEL	2 memory channels for custom camera settings

SIZE (WxHxD)	29 x 29 x 30 mm excluding lens holder (metal case)
MASS	35g - 41 g (Without optics or tripod mounting bracket)
POWER	5 V, <3 W, via GPIO or USB 3.0 interface
LENS MOUNT	CS-mount (FL3-U3-13S2, FL3-U3-32S2), C-mount (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-88S2)
TEMPERATURE	-30° to 60°C (storage) • 0° to 45°C (operating)
WARRANTY	3 years



GRASSHOPPER³

HIGH PERFORMANCE, CCD AND CMOS



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GS3-U3-23S6M-C	2.3MP Sony IMX174 CMOS ¹	1" 5.86 µm Global	1920 x 1200	165 fps
GS3-U3-28S4C/M-C	2.8MP Sony ICX687 CCD*	1/1.8" 3.69 µm Global	1928 x 1448	26 fps
GS3-U3-28S5C/M-C	2.8MP Sony ICX674 CCD*	2/3" 4.54 µm Global	1920 x 1440	26 fps
GS3-U3-41C6C/M-C	4.1MP CMOSIS CMV4000 CMOS	1" 5.5 µm Global	2048 x 2048	90 fps
GS3-U3-50S5C/M-C	5.0MP Sony ICX625 CCD*	2/3" 3.45 µm Global	2448 x 2048	15 fps
GS3-U3-60S6C/M-C	6.0MP Sony ICX694 CCD*	1" 4.54 µm Global	2736 x 2192	13 fps
GS3-U3-91S6C/M-C	9.1MP Sony ICX814 CCD*	1" 3.69 µm Global	3376 x 2704	9 fps

¹High sensitivity Sony EXview HAD CCD II" ²Coming Soon

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

GPIO 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

A/D	14-bit • 10-bit (GS3-U3-23S6, GS3-U3-41C6)
IMAGE DATA FORMATS	Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
PARTIAL IMAGE FORMATS	Pixel binning and region of interest (ROI) modes
GAIN	Automatic/manual/one-push modes 0 dB to 24 dB (GS3-U3-41C6, GS3-U3-28S4, GS3-U3-28S5) -6.158 dB to 24 dB (GS3-U3-60S6); -9 dB to 24 dB (GS3-U3-91S6)
GAMMA	0.50 to 4.00, programmable lookup table
TRIGGER MODES	Standard, bulb, multi-shot, overlapped
SHUTTER	Automatic/manual/one-push/extended shutter modes 0.04 ms to 30 seconds (extended shutter mode)
IMAGE BUFFER	128 MB frame buffer
MEMORY CHANNEL	2 memory channels for custom camera settings

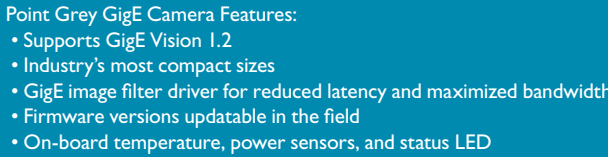
SIZE (WxHxD)	44 x 29 x 58 mm excluding lens holder (metal case)
MASS	90 g (Without optics or tripod mounting bracket)
POWER	5-24 V via GPIO or 5 V via USB 3.0 interface, maximum 4.5 W

LENS MOUNT C-mount

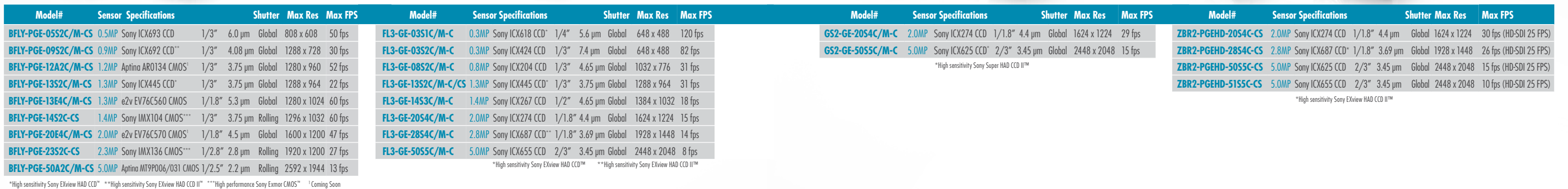
TEMPERATURE -30° to 60°C (storage) • 0° to 45°C (operating)

WARRANTY 3 years





WORLD'S SMALLEST POE CAMERA





- 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

FLEA³

ULTRA-COMPACT, CCD FAMILY



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
FL3-FW-03S1C/M-C	0.3MP Sony ICX618 CCD* 1/4" 5.6 µm	Global	648 x 488	120 fps
FL3-FW-03S3C/M-C	0.3MP Sony ICX414 CCD 1/2" 9.9 µm	Global	648 x 488	76 fps
FL3-FW-14S3C/M-C	1.4MP Sony ICX267 CCD 1/2" 4.65 µm	Global	1384 x 1032	16 fps
FL3-FW-20S4C/M-C	2.0MP Sony ICX274 CCD 1/1.8" 4.4 µm	Global	1624 x 1224	15 fps

*High sensitivity Sony EXview HAD CCD *

GRASSHOPPER EXPRESS[®]

HIGH RESOLUTION AND SENSITIVITY



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GX-FW-10K3M-C	1.0MP Kodak KAI-01050 CCD 1/2" 5.5 µm	Global	1024 x 1024	70 fps
GX-FW-28S5C/M-C	2.8MP Sony ICX674 CCD* 2/3" 4.54 µm	Global	1932 x 1452	26 fps
GX-FW-60S6C/M-C	6.0MP Sony ICX694 CCD* 1" 4.54 µm	Global	2736 x 2192	11 fps

*High sensitivity Sony EXview HAD CCD II *

GRASSHOPPER²

HIGH SENSITIVITY AND LOW NOISE



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GS2-FW-14S5C/M-C	1.4MP Sony ICX285 CCD* 2/3" 6.45 µm	Global	1384 x 1036	30 fps

*High sensitivity Sony EXview HAD CCD *

FLEA²

UP TO 5 MP, ULTRA-COMPACT, CCD



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

High sensitivity Sony EXview HAD CCD

INTERFACE	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	Two IEEE 1394b interface with screw locks for camera control, data, power, and daisy chaining	IEEE 1394b interface with screw locks for camera control, data, and power	INTERFACE
GPIO	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	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	8-pin Hirose HR25 GPIO connector opto-isolated pins for trigger and strobe (FL2G only), bi-directional pins for trigger, strobe or serial port	GPIO
A/D	12-bit	14-bit	14-bit	12-bit	A/D
IMAGE DATA FORMATS	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)	Y8, Y16, (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw16, (color models)	Y8, Y16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw16 (color models)	IMAGE DATA FORMATS
PARTIAL IMAGE FORMATS	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes	PARTIAL IMAGE FORMATS
GAIN	Automatic/manual/one-push/ 0 dB to 24 dB	Automatic/manual/one-push/ 0 dB to 24 dB	Automatic/manual/one-push/ 0dB to 24dB	Automatic/manual/one-push/ 0 dB to 24 dB	GAIN
GAMMA	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table	GAMMA
TRIGGER MODES	Standard, bulb, skip frames, overlapped, multiple exposure, multi-shot	Standard, bulb, skip frames, overlapped, multi-shot	Standard, bulb, skip frames, overlapped, multi-shot	Standard, bulb, skip frames, overlapped, multiple exposure, multi-shot	TRIGGER MODES
SHUTTER	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)	Automatic/manual/one-push/extended shutter modes 0.03 ms to >330 seconds (extended shutter mode with amp glow disable option)	Automatic/manual/one-push/extended shutter modes 0.02 ms to > 10 s (extended shutter mode)	SHUTTER
IMAGE BUFFER	32 MB frame buffer	32 MB frame buffer	32 MB frame buffer	32 MB frame buffer (FL2G only)	IMAGE BUFFER
MEMORY CHANNEL	2 memory channels for custom camera settings	2 memory channels for custom camera settings	2 memory channels for custom camera settings	2 memory channels for custom camera settings	MEMORY CHANNEL
SIZE (WxHxD)	29x29x30 mm excluding lens holder, without optics (metal case)	44x29x58 mm excluding lens holder, without optics (metal case)	44x29x58 mm excluding lens holder and connectors (metal case)	29x29x30 mm excluding lens holder, without optics (metal case)	SIZE (WxHxD)
MASS	58 g (without optics or tripod mounting bracket)	86 grams (without optics or tripod mounting bracket)	104 g (without optics or tripod mounting bracket)	58 g (without optics or tripod mounting bracket)	MASS
POWER	8-30 V, <2.5 W via GPIO or 1394b interface	8-30 V, ~5 W, via GPIO or 1394b interface	8-30 V, <2.5 W, via GPIO or 1394b interface	8-30V, <2.5W, via GPIO or 1394b interface	POWER
LENS MOUNT	C-mount	C-mount	C-mount	C-mount	LENS MOUNT
TEMPERATURE	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)	TEMPERATURE
WARRANTY	3 years	3 years	3 years	3 years	WARRANTY





GRASSHOPPER®

HIGH PERFORMANCE, CCD FAMILY



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

High sensitivity Sony EXview HAD CCD

FIREFLY® MV

SMALL, AFFORDABLE, VERSATILE



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

DRAGONFLY® 2

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

GAZELLE®

HIGH RESOLUTION AND 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 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

INTERFACE

GPIO

10-bit

Mono8, Mono10

A/D

IMAGE DATA FORMATS

Single or multiple region of interest modes

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

PARTIAL IMAGE FORMATS

N/A

Single-shot, bulb, software trigger

GAIN

GAMMA

Full 8-tap mode

0.07 ms to 54 seconds

TRIGGER MODES

N/A

SHUTTER

2 memory channels for custom camera settings

IMAGE BUFFER

MEMORY CHANNEL

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

SIZE (WxHxD)

MASS

POWER

C-mount

LENS MOUNT

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

TEMPERATURE

3 years

WARRANTY





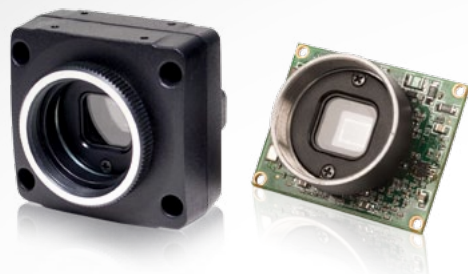
- Point Grey USB 2.0 Camera Features:
- Cost effective
 - Industry-standard CS-mount
 - Includes CS-C 5 mm adapter
 - Firmware versions updatable in the field
 - On-board temperature, power sensors, and status LED
 - Board-level and custom options available for OEMs

CHAMELEON®

COMPACT, COST EFFECTIVE, CCD QUALITY

FIREFLY® MV

SMALL, AFFORDABLE, VERSATILE



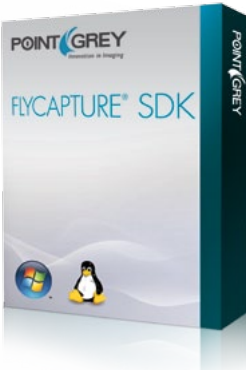
Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Model#	Sensor Specifications	Shutter	Max Res	Max FPS
CMLN-13S2C/M-CS	1.3MP Sony ICX445 CCD	1/3"	3.75 µm Global	1296 x 964 18 fps	FMVU-03MTC/M-CS	0.3MP Micron MT9V022 CMOS	1/3"	6.0 µm Global	752 x 480 60 fps
					FMVU-13S2C-CS	1.3MP Sony IMX035 CMOS	1/3"	3.63 µm Rolling	1328 x 1048 23 fps

*High sensitivity Sony EXview HAD CCD™

*High speed Sony Exmor™ CMOS

FLYCAPTURE SDK

THE FLYCAPTURE SOFTWARE DEVELOPMENT KIT (SDK) THAT comes free with every camera provides a common software interface to acquire images from an control all Point Grey FireWire, USB 3.0, USB 2.0 and GigE 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, Vista, 7, 8
- **LINUX®**
Ubuntu® 32/64-bit
ARMv7

MULTIPLE INTERFACES

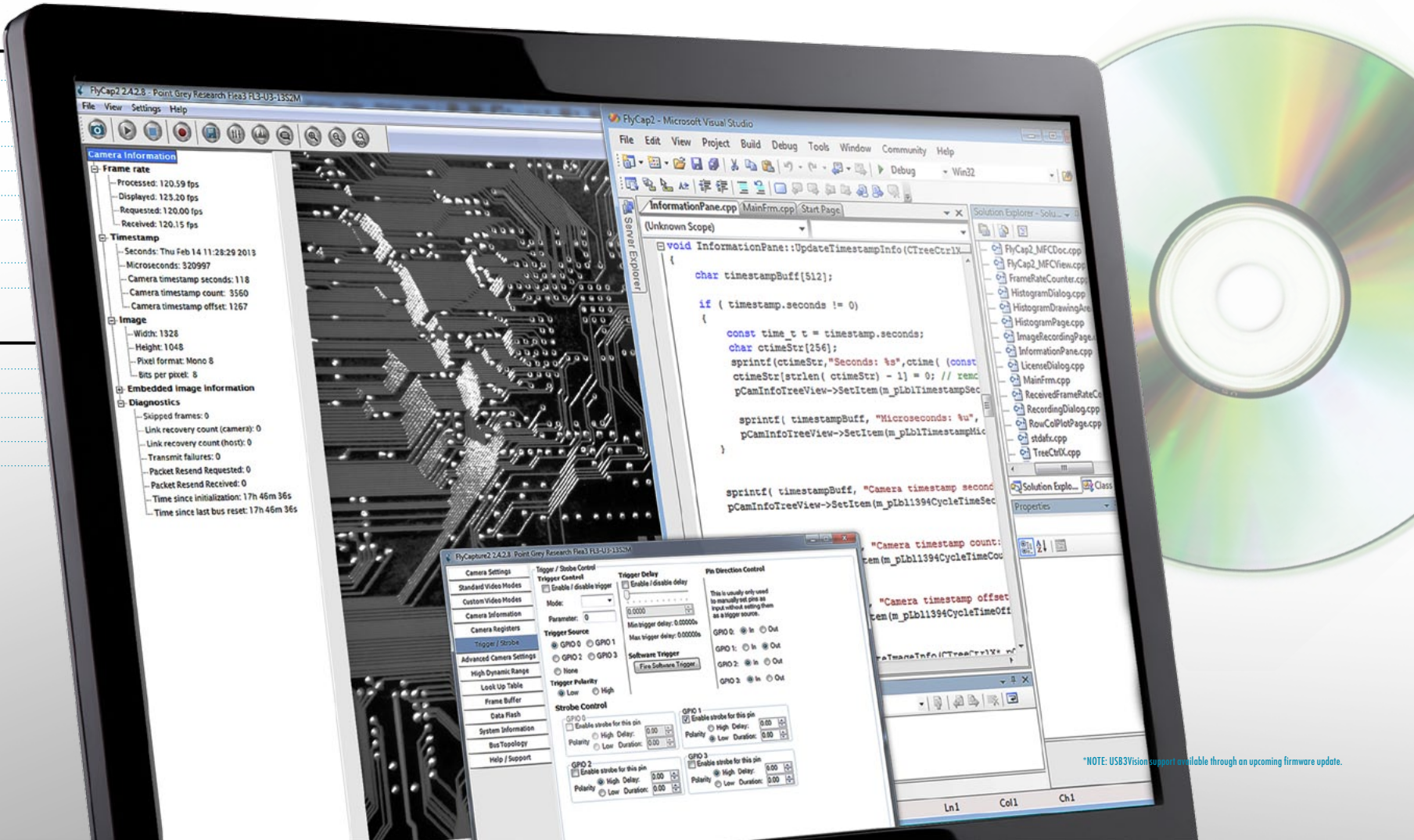
US3 VISION The SDK provides the same programming interface across USB 3.0*, USB 2.0, GigE and FireWire products.






MULTIPLE LANGUAGES

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

INTERFACE	Mini-B USB2.0 for camera control, video data, and power	Mini-B USB2.0 for camera control, video data, and power
GPIO	7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power	7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power
A/D	12-bit	10-bit (FMVU-03MT) 10 / 12-bit (FMVU-13S2)
IMAGE DATA FORMATS	Y8, Y16 (mono) 8-bit and 16-bit Raw Bayer data (color)	Y8, Y16 (mono) 8-bit and 16-bit raw Bayer data (color)
PARTIAL IMAGE FORMATS	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes
GAIN	Automatic/manual/one-push/ 0 dB to 24 dB	Automatic/manual/ 0 dB to 12 dB (03MT) / 0 dB to 24 dB (13S2)
GAMMA	0.50 to 4.00, programmable lookup table	0 to 1 (FMVU-03MT)/0.50 to 4.00 (FMVU-13S2)
TRIGGER MODES	Standard, bulb, skip frames, overlapped	Standard, skip frames
SHUTTER	Automatic/manual/one-push/extended shutter modes 0.01 ms to >10 seconds (extended shutter mode)	Automatic/manual modes 0.12 ms to 512 ms (FMVU-03MT) / 0.03 ms to 8 seconds (FMVU-13S2)
IMAGE BUFFER	N/A	N/A
MEMORY CHANNEL	2 memory channels for custom camera settings	2 memory channels for custom camera settings
SIZE (WxHxD)	39x31mm (board level) / 25.5x44x41 mm excluding lens holder, without optics (plastic case)	39x24 mm (board level) / 24.4x44x34 mm excluding lens holder, without optics (plastic case)
MASS	22 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)	14 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)
POWER	2 W, 4.745 to 5.25 V via USB 2.0 interface or JST 7-pin GPIO connector	8-30 V, 1 W at 12 V via 1394a interface
LENS MOUNT	CS-mount (5 mm C-mount adapter included)	CS-mount
TEMPERATURE	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)
WARRANTY	1 year	1 year



*NOTE: USB3Vision support available through an upcoming firmware update.

		MODEL NUMBER	INTERFACE	SENSOR TYPE	OPTICAL FORMAT	PIXEL SIZE	MAX RES	MAX FPS		SHUTTER	LENS MOUNT	A/D CONVERTER	VIDEO DATA OUTPUT	ON-BOARD MEMORY	SIZE	OPERATING TEMP	WARRANTY
	FLEA3 Page 2	FL3-U3-13S2C/M-CS	USB 3.0	Sony IMX035 CMOS	1/3"	3.63µm	1328x1048	120 fps		Rolling	CS	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	29 x 29 x 30 mm	0° to 45° C	3 years
		FL3-U3-13Y3M-C	USB 3.0	ON Semi VITA1300 CMOS	1/2"	4.8µm	1280x1024	150 fps		Global	C	10-bit ADC		1 MB flash memory			
		FL3-U3-13E4C/M-C	USB 3.0	e2v EV76C560 CMOS	1/1.8"	5.3µm	1280x1024	60 fps		Global	C	10-bit ADC					
		FL3-U3-32S2C/M-CS	USB 3.0	Sony IMX036 CMOS	1/2.8"	2.5µm	2080x1552	60 fps		Rolling/Global Reset	CS	12-bit ADC					
		FL3-U3-88S2C-C	USB 3.0	Sony IMX121 CMOS	1/2.5"	1.55µm	4096x2160	21 fps		Rolling/Global Reset	C	12-bit ADC					
	GRASSHOPPER3 Page 2	GS3-U3-23S6C/M-C	USB 3.0	Sony IMX174 CMOS	1"	5.86µm	1920x1200	165 fps		Global	C	10-bit ADC	8, 12, 16, 24-bit	128 MB frame buffer	44 x 29 x 58 mm	0° to 45° C	3 years
		GS3-U3-28S4C/M-C	USB 3.0	Sony ICX687 CCD	1/1.8"	3.69µm	1928x1448	26 fps		Global	C	14-bit ADC		512 KB flash memory			
		GS3-U3-28S5C/M-C	USB 3.0	Sony ICX674 CCD	2/3"	4.54µm	1920x1440	26 fps		Global	C	14-bit ADC					
		GS3-U3-41C6C/M-C	USB 3.0	CMOSIS CMV4000 CMOS	1"	5.5µm	2048x2048	90 fps		Global	C	10-bit ADC					
		GS3-U3-50S5C/M-C	USB 3.0	Sony ICX625 CCD	2/3"	3.45µm	2448x2048	15 fps		Global	C	14-bit ADC					
		GS3-U3-60S6C/M-C	USB 3.0	Sony ICX694 CCD	1"	4.54µm	2736x2192	13 fps		Global	C	14-bit ADC					
		GS3-U3-91S6C/M-C	USB 3.0	Sony ICX814 CCD	1"	3.69µm	3376x2704	6 fps		Global	C	14-bit ADC					
	BLACKFLY Page 3	BFLY-PGE-05S2C/M-CS	GiGE	Sony ICX693 CCD	1/3"	6.0µm	808x608	50 fps		Global	CS	12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer	29 x 29 x 30 mm	0° to 45° C	3 years
		BFLY-PGE-09S2C/M-CS	GiGE	Sony ICX692 CCD	1/3"	4.08µm	1288x728	30 fps		Global	CS	12-bit ADC		512 KB flash memory			
		BFLY-PGE-12A2C/M-CS	GiGE	Aptina AR0134 CMOS	1/3"	3.75µm	1280x960	52 fps		Global	CS	12-bit ADC					
		BFLY-PGE-13S2C/M-CS	GiGE	Sony ICX445 CCD	1/3"	3.75µm	1288x964	22 fps		Global	CS	12-bit ADC					
		BFLY-PGE-13E4C/M-CS	GiGE	e2v EV76C560 CMOS	1/1.8"	5.3µm	1280x1024	60 fps		Global	CS	10-bit ADC					
		BFLY-PGE-14S2C-CS	GiGE	Sony IMX104 CMOS	1/3"	3.75µm	1296x1032	60 fps		Rolling	CS	12-bit ADC					
		BFLY-PGE-20E4C/M-CS	GiGE	e2v EV76C570 CMOS	1/1.8"	4.5µm	1600x1200	47 fps		Global	CS	10-bit ADC					
		BFLY-PGE-23S2C-CS	GiGE	Sony IMX136 CMOS	1/2.8"	2.8µm	1920x1200	27 fps		Rolling	CS	12-bit ADC					
		BFLY-PGE-50A2C/M-CS	GiGE	Aptina MT9P006/031 CMOS	1/2.5"	2.2µm	2592x1944	13 fps		Rolling	CS	12-bit ADC					
			FLEA3 Page 3	FL3-GE-03S1C/M-C	GiGE	Sony ICX618 CCD	1/4"	5.6µm	648x488	120 fps		Global	C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	29 x 29 x 30 mm
FL3-GE-03S2C/M-C	GiGE			Sony ICX424 CCD	1/3"	7.4µm	648x488	82 fps		Global	C			1 MB flash memory			
FL3-GE-08S2C/M-C	GiGE			Sony ICX204 CCD	1/3"	4.65µm	1032x776	31 fps		Global	C						
FL3-GE-13S2C/M-C/CS	GiGE			Sony ICX445 CCD	1/3"	3.75µm	1288x964	31 fps		Global	C / CS						
FL3-GE-14S3C/M-C	GiGE			Sony ICX267 CCD	1/2"	4.65µm	1384x1032	18 fps		Global	C						
FL3-GE-20S4C/M-C	GiGE			Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	15 fps		Global	C						
FL3-GE-28S4C/M-C	GiGE			Sony ICX687 CCD	1/1.8"	3.69µm	1928x1448	15 fps		Global	C						
FL3-GE-50S5C/M-C	GiGE			Sony ICX655 CCD	2/3"	3.45µm	2448x2048	8 fps		Global	C						
	GRASSHOPPER2 Page 4	GS2-GE-20S4C/M-C	GiGE	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	29 fps		Global	C	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	44 x 29 x 58 mm	0° to 45° C	3 years
		GS2-GE-50S5C/M-C	GiGE	Sony ICX625 CCD	2/3"	3.45µm	2448x2048	15 fps		Global	C			512 KB flash memory			
	ZEBRA2 Page 4	ZBR2-PGEHD-20S4C-CS	GiGE/ HD-SDI	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	30 fps (HD-SDI 25 FPS)		Global	CS	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	44 x 44 x 87.5 mm	0° to 45° C	3 years
		ZBR2-PGEHD-28S4C-CS	GiGE/ HD-SDI	Sony ICX687 CCD	1/1.8"	3.69µm	1928x1448	26 fps (HD-SDI 25 FPS)		Global	CS			1 MB flash memory			
		ZBR2-PGEHD-50S5C-CS	GiGE/ HD-SDI	Sony ICX625 CCD	2/3"	3.45µm	2448x2048	15 fps (HD-SDI 25 FPS)		Global	CS						
		ZBR2-PGEHD-50S5C-CS	GiGE/ HD-SDI	Sony ICX655 CCD	2/3"	3.45µm	2448x2048	10 fps (HD-SDI 25 FPS)		Global	CS						
	FLEA2 Page 6	FL2-03S2C/M-C	IEEE 1394b	Sony ICX424 CCD	1/3"	7.4µm	648x488	80 fps		Global	C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	29 x 29 x 30 mm	0° to 45° C	3 years
		FL2-08S2C/M-C	IEEE 1394b	Sony ICX204 CCD	1/3"	4.65µm	1032x776	30 fps		Global	C			512 KB flash memory			
		FL2G-13S2C/M-C	IEEE 1394b	Sony ICX445 CCD	1/3"	3.75µm	1288x964	30 fps		Global	C						
		FL2-14S3C/M-C	IEEE 1394b	Sony ICX267 CCD	1/2"	4.65µm	1392x1032	15 fps		Global	C						
		FL2-20S4C/M-C	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	15 fps		Global	C						
		FL2G-50S5C/M-C	IEEE 1394b	Sony ICX655 CCD	2/3"	3.45µm	2448x2048	7.5 fps		Global	C						
	FLEA3 Page 5	FL3-FW-03S1C/M-C	IEEE 1394b	Sony ICX618 CCD	1/4"	5.6µm	648x488	120 fps		Global	C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	29 x 29 x 30 mm	0° to 45° C	3 years
		FL3-FW-03S3C/M-C	IEEE 1394b	Sony ICX414 CCD	1/2"	9.9µm	648x488	76 fps		Global	C			1 MB flash memory			
		FL3-FW-14S3C/M-C	IEEE 1394b	Sony ICX267 CCD	1/2"	4.65µm	1384x1032	16 fps		Global	C						
		FL3-FW-20S4C/M-C	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	15 fps		Global	C						
	GRASSHOPPER EXPRESS Page 5	GX-FW-10K3M-C	IEEE 1394b	Kodak KAI-01050 CCD	1/2"	5.5µm	1024x1024	70 fps		Global	C	14-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer	44 x 29 x 58 mm	0° to 45° C	3 years
		GX-FW-28S5C/M-C	IEEE 1394b	Sony ICX674 CCD	2/3"	4.54µm	1932x1452	26 fps		Global	C			1 MB flash memory			
		GX-FW-60S6C/M-C	IEEE 1394b3														

ACCESSORY LIST

MAXIMIZE THE EFFECTIVENESS OF YOUR IMAGING PIPELINE

For the most up to date list, please visit ptgrey.com/products/accessories

Model#	TRIPOD MOUNT / ENCLOSURES	BFLY-PGE	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	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	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	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-PCI-E2-2P02	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																					
FWB-EC-2PORT	IEEE 1394b 2 Port 800Mbps Express Card																					
U3-PCI-E2-2P01X	PGR USB 3.0 PCIe 2.0 x1 Card, Fresco, 2-port																					

Model#	CABLES	BFLY-PGE	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	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 MDX, 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	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	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-01-3004	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	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-4000	M12 Microlens 4MM																					
ACC-01-4001	M12 Microlens 6MM																					
ACC-01-4002	M12 Microlens 8MM																					
ACC-01-4003	Auto Iris CS-Mount Lens 1/3" 3.5-8MM																					

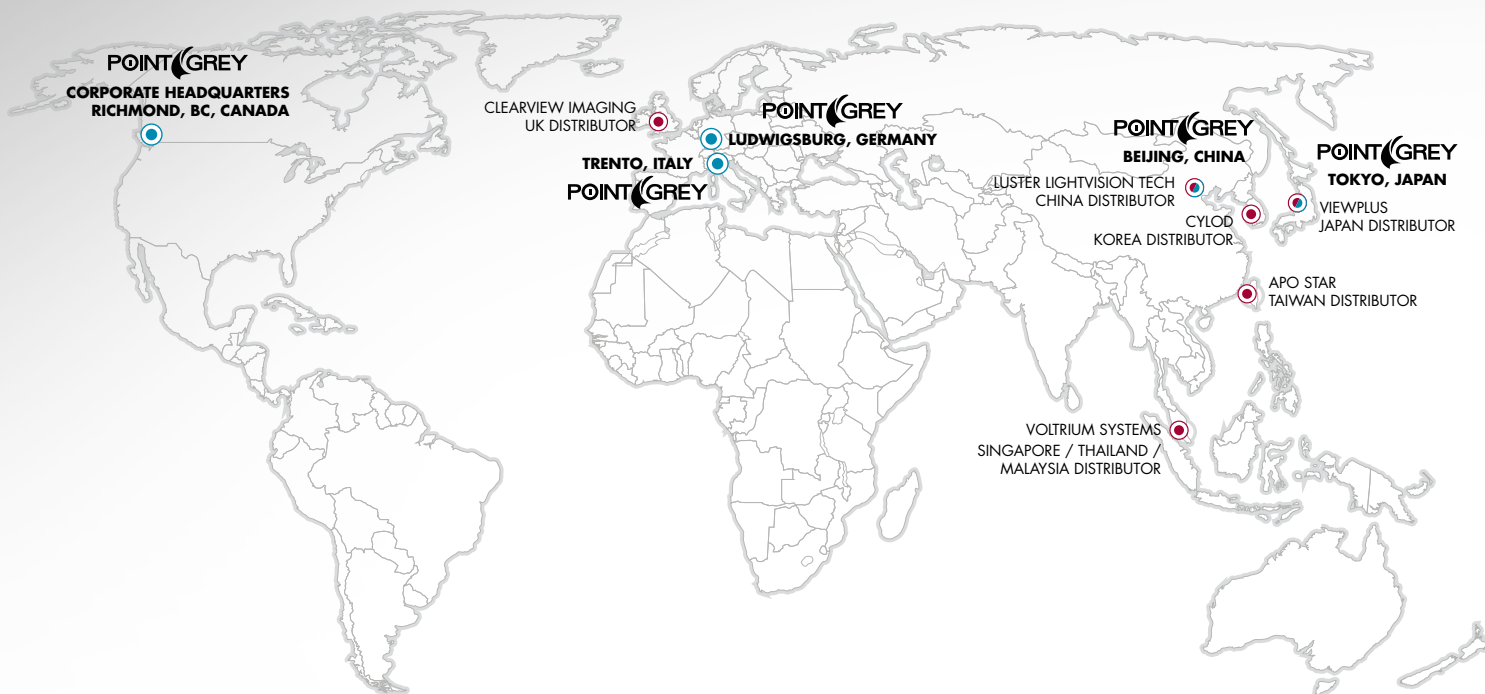
Model#	OPTIC MOUNTS	BFLY-PGE	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-5004	C-to CS-Mount Mount 5mm Spacer Adapter																					
ACC-01-5005	CS-to M12 Microlens Adapter																					
ACC-01-5006	Cast Metal M12 Microlens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

Model#	HUBS	BFLY-PGE	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	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.																					
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	BB2	BBX3	CMLN	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	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-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-2)
LENS-V500F2CS-DC	Fujinon vari-focal 15-50mm CS-mount DC iris lens, for 1/3" sensors (YV3.3x15SA-2)

Model#	HIGH RESOLUTION LENS
LENS-50F5-125C	Fujinon fixed focal length 12.5mm C-mount lens for 2/3" sensors (HF12.5SA-1)
LENS-30S6-250C	Spacecom fixed focal length 25mm C-mount lens for 1" sensors (VF25095M)
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)



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