

Flea[®] 3

ULTRA-COMPACT + HIGH FRAME RATES + COST-EFFECTIVE

- Low-cost, high-speed CMOS image sensors
- USB 3.0, 5 Gbit/s interface
- Ultra-compact 29 x 29 x 30 mm metal case, lightweight

The Flea3 line of USB 3.0 cameras offers a variety CMOS image sensors in ultra-compact, low-cost packages. To maximize USB 3.0 reliability, the Flea3 provides a unique set of features including a 32 megabyte frame buffer; on-camera power, temperature, and status monitoring; and in-field updatable firmware. The camera also provides on-camera processing including color interpolation, look up table, gamma correction, and pixel binning functionality.



Model	Version	MP	Imaging Sensor
FL3-U3-13S2C-CS	Color	1.3 MP	<ul style="list-style-type: none"> ■ Sony IMX035 CMOS, 1/3", 3.63 μm ■ Rolling Shutter ■ 120 FPS at 1328 x 1048
FL3-U3-13S2M-CS	Mono		
FL3-U3-13Y3M-C	Mono	1.3 MP	<ul style="list-style-type: none"> ■ On Semi VITA1300 CMOS, 1/2", 4.8 μm ■ Global Shutter ■ 150 FPS at 1280 x 1024
FL3-U3-13E4C-C	Color	1.3 MP	<ul style="list-style-type: none"> ■ e2v EV76C560 CMOS, 1/1.8", 5.3 μm ■ Global Shutter ■ 60 FPS at 1280 x 1024
FL3-U3-13E4M-C	Mono		
FL3-U3-20E4C-C	Color	2.0 MP	<ul style="list-style-type: none"> ■ e2v EV76C5706F, 1/1.8", 4.5 μm ■ Global shutter ■ 60 FPS at 1600 x 1200
FL3-U3-20E4M-C	Mono		
FL3-U3-32S2C-CS	Color	3.2 MP	<ul style="list-style-type: none"> ■ Sony IMX036 CMOS, 1/2.8", 2.5 μm ■ Rolling Shutter with Global Reset ■ 60 FPS at 2080 x 1552
FL3-U3-32S2M-CS	Mono		
FL3-U3-88S2C-C	Color	8.8 MP	<ul style="list-style-type: none"> ■ Sony IMX121 CMOS, 1/2.5", 1.55 μm ■ Rolling Shutter with Global Reset ■ 21 FPS at 4096 x 2160

Imaging Performance (EMVA 1288)	See the Imaging Performance Specification , which includes quantum efficiency, saturation capacity (full well depth), read noise, dynamic range and signal to noise ratio.
A/D Converter	12-bit (FL3-U3-13S2, FL3-U3-32S2, FL3-U3-88S2) / 10-bit (FL3-U3-13Y3, FL3-U3-13E4)
Video Data Output	8, 12, 16 and 24-bit digital data
Image Data Formats	Y8, Y16, Mono8, Mono12, Mono16, Raw8, Raw12, Raw16 (all models); RGB, YUV411, YUV422, YUV 444 (color models)
Partial Image Modes	Pixel binning and region of interest (ROI) modes
Image Processing	Gamma, lookup table, hue, saturation, and sharpness
Shutter	Rolling Shutter (FL3-U3-13S2) / Global Reset (FL3-U3-32S2, FL3-U3-88S2) / Global Shutter (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-U3-32S2) / 0.021 ms to 1 second (FL3-U3-88S2)
Gain	Automatic*/Manual/One-Push* Gain modes (*Free running only) 0 dB to 24 dB (FL3-U3-32S2, FL3-U3-88S2) / 0 dB to 18 dB (FL3-U3-13S2, FL3-U3-13Y3, FL3-U3-13E4)
Gamma	0.50 to 4.00, programmable lookup table
White Balance	Automatic/Manual modes, programmable via software
Color Processing	On-camera in YUV or RGB format, or on-PC in Raw format
Digital Interface	USB 3.0 interface with screw locks for camera control, data, and power
Transfer Rates	5 Gbit/s
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
External Trigger Modes	IIC Trigger Modes 0, 1 (excluding FL3-U3-13E4), and 15
Synchronization	via external trigger or software trigger
Image Buffer	32 MB frame buffer
Memory Channels	2 memory channels for custom camera settings
Flash Memory	1 MB non-volatile memory
Dimensions	29 x 29 x 30 mm excluding lens holder (metal case)
Mass	Without optics: 35 g (FL3-U3-13S2, FL3-U3-32S2) / 41 g (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-88S2)
Power Consumption	5-24 V via GPIO or 5 V via USB 3.0 interface, maximum <3 W
Machine Vision Standard	IIC v1.32
Camera Control	Via FlyCapture SDK, CSRs, or third party software
Camera Updates	In-field firmware updates
Lens Mount	CS-mount (FL3-U3-13S2, FL3-U3-32S2) / C-mount (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-88S2)
Temperature	Operating: 0° to 45°C; Storage: -30° to 60°C
Humidity	Operating: N/A; Storage: N/A
Compliance	CE, FCC, RoHS
Operating System	Windows 7, Linux (32- or 64-bit)
Warranty	Three years

Flea[®]3 Specifications

USB 3.0 Benefits

The USB 3.0 interface used by the Flea3 camera provides guaranteed delivery of critical image data using USB 3.0 (5 Gbit/s) bulk transfers.

Ultra-compact USB 3.0 Camera

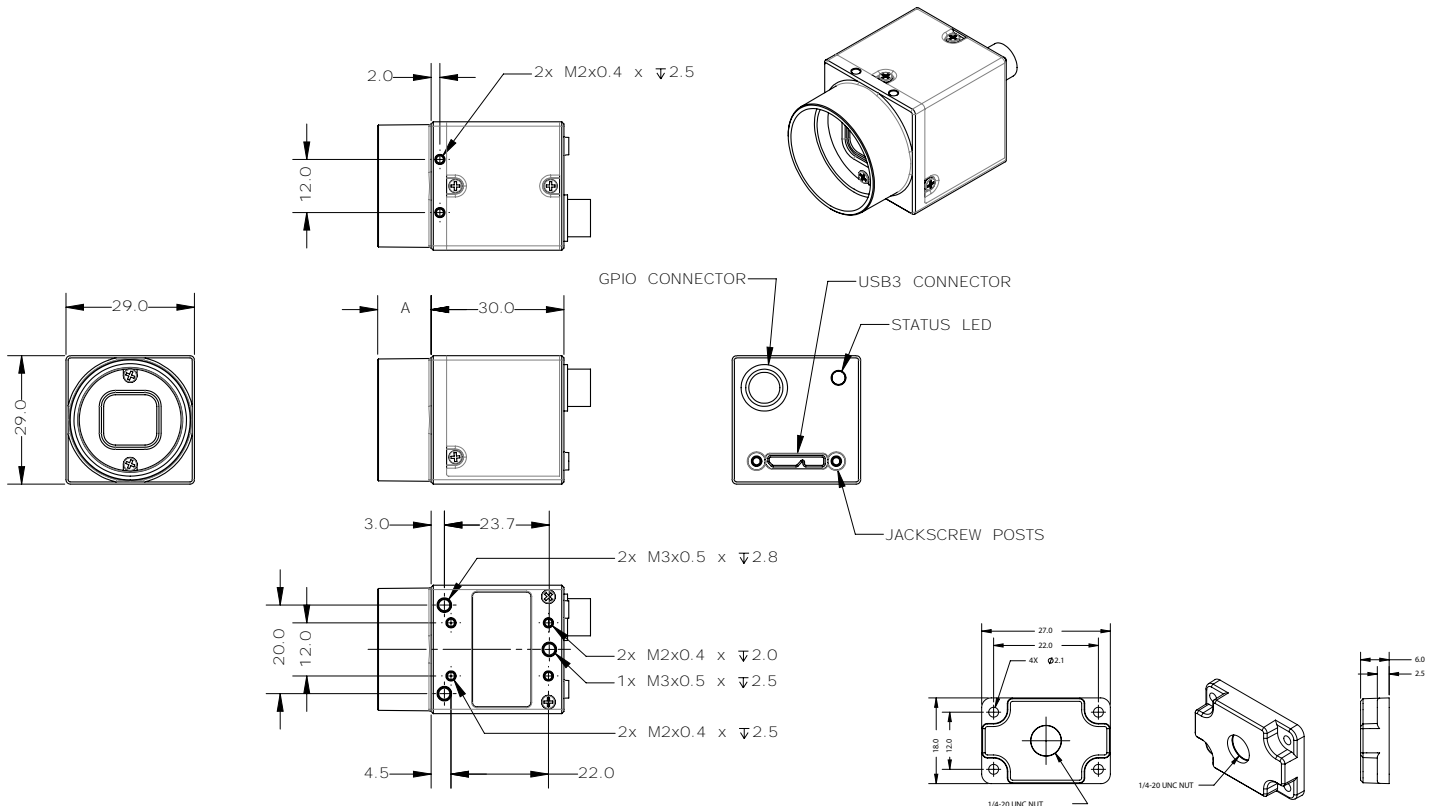
At 29x29x30mm, the Flea3 fits into the small, tight spaces that are common in industrial imaging, making it an ideal camera for OEM applications. The USB 3.0 connector with locking screw holes not only guarantee a reliable connection, but also reduce stress on internal electronics that can be caused by cable movement. The cable also carries both data and power, minimizing the need for additional cables or external power sources.

Triggering and GPIO

The Flea3 camera has an 8-pin GPIO connector located on the back. The opto-isolated pins allows the user to coordinate the camera with external devices such as light sources and GPS units. It can be programmed to accept external trigger signals that initiate the start of exposure, output variable strobe patterns, or send and receive serial data.

Dimensional Drawings (in mm)

CAD models available at www.ptgrey.com/support/downloads.



Color Processing

The color Flea3 features on-camera color processing and auto white balance. Available outputs include YUV411, YUV422, RGB, Y8 and Y16. If a reduction in the bus bandwidth is required, users can access the raw Bayer pattern.

Software

The FlyCapture[®] SDK is included with all imaging products. The SDK is compatible with Microsoft Windows (32bit and 64bit). It includes device drivers, software Application Programming Interface (API), demo programs and C/C++ example source code.

Accessories

Tripod adapter with every camera. All the accessories you need to get up and running, such as interface cards, cables, and power adapters are available from Point Grey.

Industry Standard Mechanics

Every mechanical component of the Flea3 is designed to maximize usability, including the compact cast metal case, CS-mount lens holder and ASA/ISO-compliant tripod mounting bracket, status LED and removable glass/IR filter system.

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