



# 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 FL3-U3 line of the world's smallest and fastest USB 3.0 cameras offers a variety of low-cost, high-speed, CMOS image sensors, ranging from 1.3 to 8.8 megapixel. The Flea3 also offers a host of new features, including enhanced opto-isolated GPIO; an on-camera frame buffer; non-volatile user data storage; new trigger modes; and improved imaging performance.



F13-U3-1352M-CS				
FL3-U3-13Y3M-C	FL3-U3-13S2C-CS		·	
FL3-U3-13Y3M-C	FL3-U3-13S2M-CS		· ·	
F13-U3-13E4M-C  Mono  F13-U3-32S2C-CS  Color  F13-U3-32S2M-CS  Mono  Sompling Shutter with Global Reset  2080:1552 at 60 FPS  F13-U3-32S2M-CS  Mono  REJ-U3-32S2M-CS  Mono  Sompling Shutter with Global Reset  2080:1552 at 60 FPS  Somy IMM212 CMOS, 1/2.5", 1.55 µm  Rolling Shutter with Global Reset  2080:1552 at 60 FPS  Somy IMM212 CMOS, 1/2.5", 1.55 µm  Rolling Shutter with Global Reset  4.096:52160 at 21 FPS  A/D Converter  12-bit (F13-U3-1352, F13-U3-3252, F13-U3-3852) / 10-bit (F13-U3-13Y3, F13-U3-13E4)  Wideo Data Output  Image Data Formats  Rolling Shutter with Global Reset  4.096:52160 at 21 FPS  A/D Converter  12-bit (F13-U3-1352, F13-U3-3252, F13-U3-3852) / 10-bit (F13-U3-13Y3, F13-U3-13E4)  Wideo Data Output  Image Data Formats  Rolling Shutter with Global Reset  4.096:52160 at 21 FPS  A/D Converter  12-bit (F13-U3-1352, F13-U3-3252, F13-U3-3852) / 10-bit (F13-U3-13Y3, F13-U3-13E4)  Rolling Shutter (F13-U3-1352) / 10-bit (F13-U3-13Y3, F13-U3-13E4)  Rolling Shutter (F13-U3-1352) / 10-bit (F13-U3-13Y3, F13-U3-13E4)  Automatic/Manual modes, Programmable via software  Color Processing  On-camera in YUV or RGB format, or-or-Pct in Raw format  Digital Interface  Digital Interface  Solit/S  GPIO  Spin Hirose IREZ 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  IDC Trigger Modes ()	FL3-U3-13Y3M-C	Mono 1.3 MP	■ Global Shutter	
F13-U3-13E4M-C	FL3-U3-13E4C-C			
F13-U3-3252M-CS	FL3-U3-13E4M-C			
F13-U3-3252M-CS	FL3-U3-32S2C-CS			
FL3-U3-8852C-C  Color  8.8 MP  Rolling Shutter with Global Reset  4096x2160 at 21 FPS  A/D Converter  12-bit (FL3-U3-1352, FL3-U3-3252, FL3-U3-8852) / 10-bit (FL3-U3-1373, FL3-U3-13E4)  Video Data Output  8, 12, 16 and 24-bit digital data  Image Data Formats  Y8, Y16, Mono8, Monol2, Monol6, Raw8, Raw12, Raw16 (all models); RGB, YUV411, YUV422, YUV 444 (color models)  Partial Image Modes  Image Processing  Gamma, lookup table, hue, saturation, and sharpness  Automatic*/Manual/One-Push* Gain modes (*Free running only)  0 db to 24 db (FL3-U3-1352), FL3-U3-3252, FL3-U3-3852) / 0 db to 18 db (FL3-U3-13Y3, FL3-U3-13E4)  Samma  0.50 to 4.00  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  S-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  Synchronization  wia external trigger or software trigger  Rolling Shutter (FL3-U3-1352) / Global Reset (FL3-U3-3352, FL3-U3-3852) / Global Shutter (FL3-U3-13Y3, FL3-U3-13E4)  Automatic*/Manual/One-Push*/Extended Shutter* modes (*Tree running only)  0.008 ms to 1 second (FL3-U3-1352) / O.006 ms to 1 second (FL3-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-1352) / 0.021 ms to 1 second (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-18E4) / 0.01 ms to 32 seconds (FL3-U3-13S2) / 0.021 ms to 1 second (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-18E3) / 0.021 ms to 1 second (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-18E3) / 0.01 ms to 32 seconds (FL3-U3-13S2) / 0.021 ms to 1 second (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-18E3) / 0.01 ms to 32 seconds (FL3-U3-13S2) / 0.021 ms to 1 second (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-18E3) / 0.01 ms to 32 seconds (FL3-U3-13S2) / 0.021 ms to 1 second (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-18E3) / 0.01 ms to 1 second (FL3-U3-13Y3, FL3	FL3-U3-32S2M-CS		· ·	
Video Data Output Image Data Formats V8, Y16, Monos, Mono12, Mono16, Raw8, Raw12, Raw16 (all models); RGB, YUV411, YUV422, YUV 444 (color models) Partial Image Modes Image Modes Image Processing Gamma, lookup table, hue, saturation, and sharpness  Galin  Obsolve 4 db (FL3-U3-1352, FL3-U3-3252), FL3-U3-8852) / 0 db to 18 db (FL3-U3-13Y3, FL3-U3-13E4)  Gamma  O.50 to 4.00  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 2 b-i-directional I/O pins  External Trigger Modes Synchronization Via external trigger or software trigger Rolling Shutter (FL3-U3-1352) / Global Reset (FL3-U3-3252, FL3-U3-8852) / Global Shutter (FL3-U3-13Y3, FL3-U3-13E4) Automatic*/Manual/none-Push*/Extended Shutter** modes ("Free running only) (**except FL3-U3-13Y3)  O.008 ms to 1 second (FL3-U3-13S2) / O.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-U3-13Y3) / 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-U3-13Y3, FL3-U3-8852)  Mass Without optics: 35 g (FL3-U3-32S2) / I.3-U3-32S2) / 41 g (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-8852)  Power Consumption  Camera Specification  IDC V1.32  Camera Optate  Without optics: 35 g (FL3-U3-13S2) / C-mount (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-8852)  Demover Consumption  Camera Specification  Camera Specification  Camera Updates  Left SW	FL3-U3-88S2C-C	Color 8.8 MP	<ul> <li>Rolling Shutter with Global Reset</li> </ul>	
Video Data Output Image Data Formats V8, Y16, Monos, Mono12, Mono16, Raw8, Raw12, Raw16 (all models); RGB, YUV411, YUV422, YUV 444 (color models) Partial Image Modes Image Modes Image Processing Gamma, lookup table, hue, saturation, and sharpness  Galin  Obsolve 4 db (FL3-U3-1352, FL3-U3-3252), FL3-U3-8852) / 0 db to 18 db (FL3-U3-13Y3, FL3-U3-13E4)  Gamma  O.50 to 4.00  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 2 b-i-directional I/O pins  External Trigger Modes Synchronization Via external trigger or software trigger Rolling Shutter (FL3-U3-1352) / Global Reset (FL3-U3-3252, FL3-U3-8852) / Global Shutter (FL3-U3-13Y3, FL3-U3-13E4) Automatic*/Manual/none-Push*/Extended Shutter** modes ("Free running only) (**except FL3-U3-13Y3)  O.008 ms to 1 second (FL3-U3-13S2) / O.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-U3-13Y3) / 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-U3-13Y3, FL3-U3-8852)  Mass Without optics: 35 g (FL3-U3-32S2) / I.3-U3-32S2) / 41 g (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-8852)  Power Consumption  Camera Specification  IDC V1.32  Camera Optate  Without optics: 35 g (FL3-U3-13S2) / C-mount (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-8852)  Demover Consumption  Camera Specification  Camera Specification  Camera Updates  Left SW	A/D Converter	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, Raw8, Raw12, Raw16 (all models); RGB, YUV411, YUV422, YUV 444 (color models)  Partial Image Modes  Radial Image Processing  Gamma, lookup table, hue, a saturation, and sharpness  Automatic*/Manual/One-Push* Gain modes (*Free running only)  Od to 24 dB (FL3-U3-1352, FL3-U3-3252, FL3-U3-8852) / O db to 18 db (FL3-U3-13Y3, FL3-U3-13E4)  Obytice 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  2 bi-directional I/O pins  External Trigger Modes  IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization  via external trigger or software trigger  Rolling Shutter (FL3-U3-3252) / Global Reset (FL3-U3-3252, FL3-U3-8852) / Global Shutter (FL3-U3-13Y3, FL3-U3-13E4)  Automatic*/Manual/One-Push*/Extended Shutter** modes (*Free running only) (**except FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-3252) / 0.021 ms to 1 second (FL3-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-3252) / 0.021 ms to 1 second (FL3-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-13F4) / 0.01 ms to 1 second (FL3-U3-13F4, FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-13F4) / 0.01 ms to 1 second (FL3-U3-13F4, FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-13F4) / 0.01 ms to 1 second (FL3-U3-13F4, FL3-U3-13F4, FL3-U3-13F4) / 0.01 ms to 32 seconds (FL3-U3-13F4, FL3-U3-13F4,	•			
Partial Image Modes Image Processing Gamma, lookup table, hue, saturation, and sharpness Gain Automatic*/Manual/One-Push* Gain modes (*Free running only) O db to 24 dB (FL3-U3-1352, FL3-U3-3252, FL3-U3-8852) / 0 db to 18 db (FL3-U3-13Y3, FL3-U3-13E4)  Gamma O.50 to 4.00 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 S 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 IIDC Trigger Modes o, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15 Synchronization via external trigger or software trigger Rolling Shutter (FL3-U3-1352) / Global Reset (FL3-U3-3252, FL3-U3-8852) / Global Shutter (FL3-U3-13Y3, FL3-U3-13E4) Automatic*/Manual/One-Push*/Extended Shutter** modes (*Free running only) (**except FL3-U3-13Y3, FL3-U3-13E4) O.08 ms to 1 second (FL3-U3-13S2) / O.006 ms to 1 second (FL3-U3-393) / O.016 ms to 1 second (FL3-U3-13S2) / O.006 ms to 1 second (FL3-U3-393) / O.016 ms to 1 second (FL3-U3-393) Image Buffer 32 MB frame buffer Wemory Channels Flash Memory 1 MB Dimensions 29 x 29 x 30 mm excluding lens holder (metal case) Mass Without optics: 35 g (FL3-U3-1352, FL3-U3-3252) / 41 g (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-8852) Power Consumption Camera Specification IDC v1.32 Camera Optrol via FlyCapture SDK, CSRs, or third party software Camera Optrol via FlyCapture SDK, CSRs, or third party software Camera Optrol via FlyCapture SDK, CSRs, or third party software Camera Optrol via FlyCapture SDK, CSRs, or third party software Camera Optrol via FlyCapture SDK, CSRs, or third party software Camera Optrol via FlyCapture SDK, CSRs, or third party software Camera Updates Lens Mount CS-mount (FL3-U3-13S2, FL3-U3-32S2) / C-mount (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-88S2) Operating System Windows 7 32	<u> </u>	, ,		
Image Processing   Gamma, lookup table, hue, saturation, and sharpness				
Automatic*/Manual/One-Push* Gain modes (*Free running only) OdB 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  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, 6bit/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 IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization via external trigger or software trigger 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)  Image Buffer Memory Channels 2 memory channels for custom camera settings Flash Memory 1 MB 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 V, <3 W, via GPIO or USB 3.0 interface Camera Specification IIDC V1.32  Camera Control via FlyCapture SDK, CSRs, or third party software  In-field firmware 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)  Operating System Windows 7 32- or 64-bit				
Gain  O dB to 24 dB (FL3-U3-1352, FL3-U3-3252, FL3-U3-8852) / 0 db to 18 db (FL3-U3-13Y3, FL3-U3-13E4)  Gamma  0.50 to 4.00  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  IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization  via external trigger or software trigger  Rolling Shutter (FL3-U3-1352) / Global Reset (FL3-U3-3252, FL3-U3-8852) / 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-U3-13Y3) / 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-U3-13Y3) / 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-U3-13Y3) / 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-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-13S2) / 0.021 ms to 1 second (FL3-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-13E4) / 0.01 ms to 1 second (FL3-U3-13E4) /		·		
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 IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15 Synchronization via external trigger or software trigger 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) One ms to 1 second (FL3-U3-13S2) / 0.006 ms to 1 second (FL3-U3-13Y3) / 0.016 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 Channels 2 memory channels for custom camera settings Flash Memory 1 MB 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 V, <3 W, via GPIO or USB 3.0 interface Camera Specification IIDC 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 Emissions Compliance CE, FCC, RoHS Operating System Windows 7 32- or 64-bit	Gain			
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 UDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15 Synchronization via external trigger or software trigger Rolling Shutter (FL3-U3-1352) / 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-U3-13Y3) / 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-U3-13Y3) / 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-U3-13Y3) / 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-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-13E4) / 0.01 ms to 1 second (FL3-U3-13E4, FL3-U3-13E4, FL3-U3-8S2) Pomeration  Dimensions  2 macro (PL3-U3-13E4, FL3-U3-13E4, FL3-	Gamma	0.50 to 4.00		
Digital Interface 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 IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization via external trigger or software trigger 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)  Image Buffer 32 MB frame buffer Memory Channels 2 memory channels for custom camera settings Flash Memory 1 MB 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 V, <3 W, via GPIO or USB 3.0 interface Camera Specification IIDC 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 Emissions Compliance  Operating: 5Vstem Windows 7 32- or 64-bit	White Balance	Automatic/Manual modes, programmable via software		
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 IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization via external trigger or software trigger  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-U3-13Y4) / 0.01 ms to 32 seconds (FL3-U3-32S2) / 0.021 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-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-13S2) / 0.021 ms to 1 second (FL3-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-13E4) / 0.01 ms to 3	Color Processing	On-camera in YUV or RGB format, or on-PC in Raw format		
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 IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization via external trigger or software trigger  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-U3-13Y3) / 0.016 ms to 1 second (FL3-U3-13E4) / 0.01 ms to 32 seconds (FL3-U3-3SS2) / 0.021 ms to 1 second (FL3-U3-88S2)  Image Buffer 32 MB frame buffer  Memory Channels 2 memory channels for custom camera settings  Flash Memory 1 MB  Dimensions 29 x 29 x 30 mm excluding lens holder (metal case)  Mass Without optics: 35 g (FL3-U3-13S2, FL3-U3-3S2S2) / 41 g (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-88S2)  Power Consumption 5 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification IIDC v1.32  Camera Ontrol 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  Emissions Compliance CE, FCC, RoHS  Windows 7 32- or 64-bit	Digital Interface	USB 3.0 interface with screw locks for camera control, data, and power		
External Trigger Modes  IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15  Synchronization  via external trigger or software trigger  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-U3-13Y3) / 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-U3-13Y3) / 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 Channels  2 memory channels for custom camera settings  Flash Memory  1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification  IIDC 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  Emissions Compliance  CE, FCC, ROHS  Windows 7 32- or 64-bit	Transfer Rates	5 Gbit/s		
Synchronization via external trigger or software trigger  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-U3-13Y3) / 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  Memory Channels  2 memory channels for custom camera settings Flash Memory  1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification  IIDC v1.32  Camera Control  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  Emissions Compliance  Operating System  Windows 7 32- or 64-bit	GPIO			
Rolling Shutter (FL3-U3-13S2) / Global Reset (FL3-U3-3S2S2, FL3-U3-8SS2) / 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-U3-3SS2) / 0.021 ms to 1 second (FL3-U3-88S2)  Image Buffer  32 MB frame buffer  Memory Channels  1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification  IIDC 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  Emissions Compliance  OE, FCC, RoHS  Windows 7 32- or 64-bit	External Trigger Modes	IIDC Trigger Modes 0, 1 (excluding FL3-U3-13E4), 14 (FL3-U3-13E4 only), and 15		
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  Memory Channels 2 memory channels for custom camera settings Flash Memory 1 MB 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 V, <3 W, via GPIO or USB 3.0 interface Camera Specification IIDC 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  Emissions Compliance Operating System Windows 7 32- or 64-bit	Synchronization	via external trigger or software trigger		
0.008 ms to 1 second (FL3-U3-1352) / 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 Channels  2 memory channels for custom camera settings  Flash Memory  1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification  IIDC 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  Emissions Compliance  Operating System  Windows 7 32- or 64-bit	Shutter			
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 Channels  2 memory channels for custom camera settings  Flash Memory  1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification  IDC 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  Emissions Compliance  Operating System  Windows 7 32- or 64-bit		Automatic*/Manual/One-Push*/Extended Shutter** modes (*Free running only) (**except FL3-U3-13Y3)		
Memory Channels 2 memory channels for custom camera settings  Flash Memory 1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification IIDC 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  Emissions Compliance CE, FCC, RoHS  Operating System Windows 7 32- or 64-bit				
Flash Memory 1 MB  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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification IIDC 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-U3-13F4, FL3-U3-88S2)  Temperature Operating: 0° to 45°C; Storage: -30° to 60°C  Emissions Compliance CE, FCC, RoHS  Operating System Windows 7 32- or 64-bit	Image Buffer	32 MB frame buffer		
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 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification IIDC 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  Emissions Compliance CE, FCC, RoHS  Operating System Windows 7 32- or 64-bit	Memory Channels			
Mass Without optics: 35 g (FL3-U3-1352, FL3-U3-3252) / 41 g (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-8852)  Power Consumption 5 V, <3 W, via GPIO or USB 3.0 interface  Camera Specification IIDC 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  Emissions Compliance CE, FCC, RoHS  Operating System Windows 7 32- or 64-bit	Flash Memory			
Power Consumption5 V, <3 W, via GPIO or USB 3.0 interfaceCamera SpecificationIIDC v1.32Camera Controlvia FlyCapture SDK, CSRs, or third party softwareCamera UpdatesIn-field firmware updatesLens MountCS-mount (FL3-U3-13S2, FL3-U3-32S2) / C-mount (FL3-U3-13Y3, FL3-U3-13F4, FL3-U3-88S2)TemperatureOperating: 0° to 45°C; Storage: -30° to 60°CEmissions ComplianceCE, FCC, RoHSOperating SystemWindows 7 32- or 64-bit	Dimensions			
Camera SpecificationIIDC v1.32Camera Controlvia FlyCapture SDK, CSRs, or third party softwareCamera UpdatesIn-field firmware updatesLens MountCS-mount (FL3-U3-13S2, FL3-U3-32S2) / C-mount (FL3-U3-13Y3, FL3-U3-13F4, FL3-U3-88S2)TemperatureOperating: 0° to 45°C; Storage: -30° to 60°CEmissions ComplianceCE, FCC, ROHSOperating SystemWindows 7 32- or 64-bit		, , , , , , , , , , , , , , , , , , , ,		
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-U3-13F4, FL3-U3-88S2)  Temperature Operating: 0° to 45°C; Storage: -30° to 60°C  Emissions Compliance CE, FCC, ROHS  Operating System Windows 7 32- or 64-bit		, ,		
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  Emissions Compliance CE, FCC, RoHS  Operating System Windows 7 32- or 64-bit	<u> </u>			
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  Emissions Compliance CE, FCC, RoHS  Operating System Windows 7 32- or 64-bit				
TemperatureOperating: 0° to 45°C; Storage: -30° to 60°CEmissions ComplianceCE, FCC, RoHSOperating SystemWindows 7 32- or 64-bit	<u> </u>	·		
Emissions Compliance CE, FCC, RoHS Operating System Windows 7 32- or 64-bit				
Operating System Windows 7 32- or 64-bit	•			
Warranty Two years				
	Warranty	i wo 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.

