

# Grasshopper<sup>®</sup> 3



## HIGH PERFORMANCE CCD + USB 3.0

- **USB 3.0 for bandwidth, ease of use, and cost effectiveness**
- **Variety of high-resolution large format CCDs**
- **FPGA and frame buffer-based architecture for optimal reliability**



The high performance Grasshopper3 camera line combines the benefits of CCD with the affordability and data throughput of USB 3.0. Its FPGA and frame buffer-based architecture provides optimal reliability, a rich set of features, and a full image processing pipeline including color interpolation, gamma, and lookup table functionality. The Grasshopper3 offers a powerful, easy-to-use, and cost-effective alternative to Camera Link and dual GigE LAG solutions.



MODEL	VERSION	MP	IMAGING SENSOR
GS3-U3-28S4C-C	Color	2.8 MP	<ul style="list-style-type: none"> <li>■ Sony ICX687 CCD, 1/1.8", 3.69 <math>\mu</math>m</li> <li>■ Global shutter</li> <li>■ 1928 x 1448 at 26 FPS</li> </ul>
GS3-U3-28S4M-C	Mono		
GS3-U3-28S5C-C*	Color	2.8 MP	<ul style="list-style-type: none"> <li>■ Sony ICX674 CCD, 2/3", 4.54 <math>\mu</math>m</li> <li>■ Global shutter</li> <li>■ 1920 x 1440 at 26 FPS</li> </ul>
GS3-U3-28S5M-C*	Mono		
GS3-U3-60S6C-C*	Color	6.0 MP	<ul style="list-style-type: none"> <li>■ Sony ICX694 CCD, 1", 4.54 <math>\mu</math>m</li> <li>■ Global shutter</li> <li>■ 2736 x 2192 at 13 FPS</li> </ul>
GS3-U3-60S6M-C*	Mono		
GS3-U3-91S6C-C*	Color	9.1 MP	<ul style="list-style-type: none"> <li>■ Sony ICX814 CCD, 1", 3.69 <math>\mu</math>m</li> <li>■ Global shutter</li> <li>■ 3376 x 2704 at 9 FPS</li> </ul>
GS3-U3-91S6M-C*	Mono		

\* Available Q2 2013

<b>A/D Converter</b>	14-bit
<b>Video Data Output</b>	8, 12, 16 and 24-bit digital data
<b>Image Data Formats</b>	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
<b>Image Processing</b>	Gamma, lookup table, hue, saturation, and sharpness
<b>Shutter</b>	Global shutter; Automatic/manual/one-push/extended shutter modes 0.03 ms to 30 seconds (extended shutter mode)
<b>Gain</b>	Automatic/manual/one-push modes 0 dB to 24 dB GS3-U3-28S4/GS3-U3-28S5; -6.158 to 24 dB GS3-U3-60S6; -9 to 24 dB GS3-U3-91S6
<b>Gamma</b>	0.50 to 4.00, programmable lookup table
<b>White Balance</b>	Automatic/manual/one-push modes
<b>High Dynamic Range</b>	Cycle 4 gain and exposure presets
<b>Color Processing</b>	On-camera in YUV or RGB format, or on-PC in Raw format
<b>Digital Interface</b>	USB 3.0 interface with screw locks for camera control, data, and power
<b>Transfer Rates</b>	5 Gbit/s
<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
<b>External Trigger Modes</b>	Standard, bulb, overlapped, and multi shot trigger modes
<b>Synchronization</b>	Via external trigger or software trigger
<b>Image Buffer</b>	128 MB frame buffer
<b>Memory Channels</b>	2 user configuration sets for custom camera settings
<b>Flash Memory</b>	2 MB non-volatile memory
<b>Dimensions</b>	44 mm x 29 mm x 58 mm excluding lens holder, without optics (metal case)
<b>Mass</b>	90 grams (without optics or tripod mounting bracket)
<b>Power Consumption</b>	5-24 V via GPIO or 5 V via USB 3.0 interface, maximum 4.5 W
<b>Camera Control</b>	Via FlyCapture SDK or third party software
<b>Camera Updates</b>	In-field firmware updates
<b>Lens Mount</b>	C-mount
<b>Temperature</b>	Operating: 0° to 50°C; Storage: -30° to 60°C
<b>Compliance</b>	CE, FCC, RoHS
<b>Operating System</b>	Windows, Linux (32- or 64-bit)
<b>Warranty</b>	3 years