

Ladybug[®] 5

30 MEGAPIXEL 360° SPHERICAL CAMERA SYSTEM

KEY FEATURES

- 30 megapixels covering up to 90% of a full sphere
- High-quality CCDs pre-calibrated for optimal stitching
- Up to 10 frames per second over SuperSpeed USB 3.0
- Automatic or manually configurable MJPEG compression
- Weather-resistant housing
- General purpose I/O for external device synchronization



PRELIMINARY

MODEL	VERSION	MP	IMAGING SENSOR
LD5-U3-51S5C-44R*	Red	6 x 5.0 MP	<ul style="list-style-type: none"> ■ Sony ICX655 CCD x6, 2/3", 3.45 μm ■ Global Shutter ■ 2048x2448 at 10 FPS
LD5-U3-51S5C-44B*	Black		

*Upcoming models

A/D Converter	12-bit
Video Data Output	8-, 12-, or 16-bit, Raw or JPEG compressed
Image Data Formats	Raw8, Raw12, Raw16 in uncompressed and JPEG
Partial Image Modes	Pixel binning and region of interest (ROI) modes
Image Processing	Shutter, gain, white balance, gamma and JPEG compression, are programmable via software
Gain	Automatic/Manual/One-Push Gain modes 0 - 18 dB
High Dynamic Range	Cycle 4 gain and exposure presets
Digital Interface	USB 3.0 with locking screws for secure connection
Transfer Rates	5 Gbit/s
GPIO	12-pin GPIO connector for external trigger input, strobe output, and camera power
External Trigger Modes	IIDC Trigger Modes 0, 1, 3, 14, 15
Shutter	Global Shutter Automatic/Manual/One-Push/Extended Shutter modes 0.02 ms to 2 seconds (extended shutter)
Memory Channels	2 memory channels for custom camera settings
Case	Machined aluminum housing, anodized red or black; single unit, water resistant, IP66 compliant
Dimensions	160 mm x 139.5 mm (without lens hoods)
Mass	~2900 g
Power Consumption	12-24 V, 13 W via GPIO
Camera Specification	IIDC v1.32
Camera Control	via Ladybug SDK, CSRs, or third party software
Camera Updates	In-field firmware updates
Optics	Six high quality 4.4 mm focal length lenses
Field of View	90% of full sphere
Spherical Distance	Calibrated from 2 m to infinity
Focus Distance	~200 cm. Objects have an acceptable sharpness from ~60 cm to infinity
Environmental Sensors	Temperature, Barometer, Humidity, Accelerometer, Compass, Gyroscope
Temperature	Operating: 0° to 45°C; Storage: -30° to 60°C
Humidity	Operating: 20 to 80% (no condensation); Storage: 20 to 95% (no condensation)
Emissions Compliance	CE, FCC, RoHS
Operating System	Windows 7
Warranty	Two Years

Ladybug® SDK

COMPLETE SPHERICAL IMAGE ACQUISITION SOFTWARE

SDK INCLUDES

- Full software API for custom application development
- C, C++, and C# example source code
- LadybugCapPro program for easy access to system functionality
- Camera and low-level xHCI USB 3.0 drivers



CAPTURE

- Control camera settings such as auto exposure, resolution, and frame rate
- Automatically or manually adjust JPEG compression quality
- Enable camera settings information to be embedded in images
- Configure high dynamic range imaging
- Save raw images and GPS data to a proprietary stream file

PROCESS

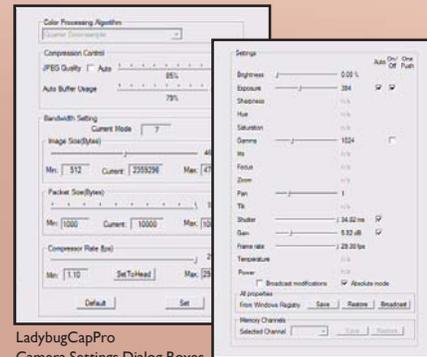
- Fast rectification and stitching can be performed on the GPU
- Render output using spherical, panoramic or dome projections
- Color process and apply image correction
- Minimize parallax by adjusting the sphere size used for stitching
- Dynamically select different stitching distances for different areas of the scene

OUTPUT

- Save processed images to a variety of still image and video file formats
- Generate Google Map or Google Earth files
- Publish Flash Video files to the web



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



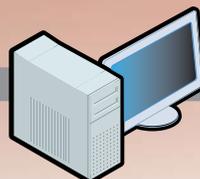
LadybugCapPro Camera Settings Dialog Boxes

LADYBUG



- Camera Calibration
- CCD Timing Core
- JPEG Core
- Water Resistant Design

HOST SYSTEM



- USB 3.0 Interface Card
- Low-Level USB 3.0 Driver

LADYBUG SOFTWARE



- Full Software API
- Color Interpolation Core
- Rectification and Stitching on GPU
- iPad Application