SP-5000M-USB
Technical Datasheet

Lince5M

JAi®
See the possibilities

USB3 VISION®

Apex Series

Spark Series area scan cameras are the perfect choice for machine vision applications demanding high quality images with the highest possible throughput. They feature the latest CMOS imagers delivering high resolution images at speeds as much as 10 times faster than traditional CCD cameras.

For example, 45-megapixel (MP) models can deliver over 50 fps output while some 5-MP models run at 250 fps or more. Using the region-of-interest (ROI) feature, even higher frame rates can be achieved.

Specification Highlights

SENSOR:	Lince5M	**SHUTTER:**	Global Shutter
FORMAT:	1"	**FRAME RATE:**	62 fps
PIXEL SIZE:	5.0 x 5.0 μm	**INTERFACE:**	USB3 Vision (PoUSB)
LENS MOUNT:	C-Mount	**RESOLUTION MP:**	5 MP
SPECTRUM:	Monochrome (Visible + NIR)	**RESOLUTION WxH:**	2560 x 2048 px

Specifications	SP-5000-USB
Sensor	1" CMOS global shutter
System clock	72 MHz (for pulse generator)
Frame rate, full frame	62 frames/sec.
Active area	12.8 mm (h) x 10.2 mm (v), 16.39 mm diagonal
Cell size	5.0 μm (h) x 5.0 μm (v)
Active pixels	2560 (h) x 2048 (v)
Read-out modes Full ROI (mono)	2560 (h) x 2048 (v) up to 62 fps 1 line to full frame height in 1-line steps, with X offset and width in 16-pixel steps 2 lines to full-frame height in 2-line steps, with X offset and width in 16-pixel steps
Binning	1x2, 2x1, 2x2 (monochrome only)
EMVA 1288 Parameters Absolute sensitivity (mono) Absolute sensitivity (color) Maximum SNR (mono) Maximum SNR (color)	10-bit output format 23.50 p (λ = 525 nm) 36.08 p (λ = 525 nm) 41.48 dB 38.00 dB
Traditional SNR* mono color	>55 dB (0 dB gain) >53 dB (0 dB gain, green)
Video signal output mono color	8/10/12-bit monochrome 8/10/12-bit raw Bayer
Auto-iris lens video output	0.7Vp-p, with 0.3V horiz. sync
Gain	Manual/automatic 0 dB to +24 dB
White balance (SP-5000C)	Manual, one-push auto, or continuous (3000K to 9000K)
Gamma	0.45-1.0 (8 steps) or 256-point LUT
Synchronization	Internal
Trigger input	TTL, CXP, Pulse Generators (4), Software, NAND Out (2), GPIO
Trigger modes	EPS, PIV, Trigger Width, Timed RCT (with ALC), Sequence
Electronic shutter Timed exposure Auto shutter	10 μs to 8 sec in 1 μs steps 1/62 to 1/100000 sec.
Auto Level Control (ALC)	Shutter range from 1/62 to 1/100000, gain range from 0 dB to +24 dB, auto iris control. Tracking speeds and max values adjustable.
High Dynamic Range function (monochrome only)	4 built-in HDR slopes. Selectable up to ~84 dB.
Pre-processing functions	Flat field correction, color shading correction (SP-5000C), blemish compensation (512 pixels)
3-axis control	Programmable control of motorized lenses, pan/tilt heads, and other analog accessories
Operating temperature	-45ºC to +70ºC†
Storage temperature	-45ºC to +70ºC
Humidity	20 – 80% non-condensing
Vibration	10 G (20Hz to 200Hz XYZ)
Shock	80 G
Regulations	CE (EN61000-6-2, EN61000-6-3), FCC Part 15 class B, RoHS/WEEE
Power	12V to 24V DC ± 10%. 6.24W typical (full frame @ 12V)
Lens mount	C-mount (fixed or adjustable)
Dimensions (H x W x L)	62 mm x 62 mm x 55.5 mm
Weight	255 g

Ordering Information

SP-5000M-USB	Monochrome camera with two-channel USB3 Vision
SP-5000C-USB	Color camera with two-channel USB3 Vision

Note: Add -CX to model number for adjustable C-mount

Dimensions
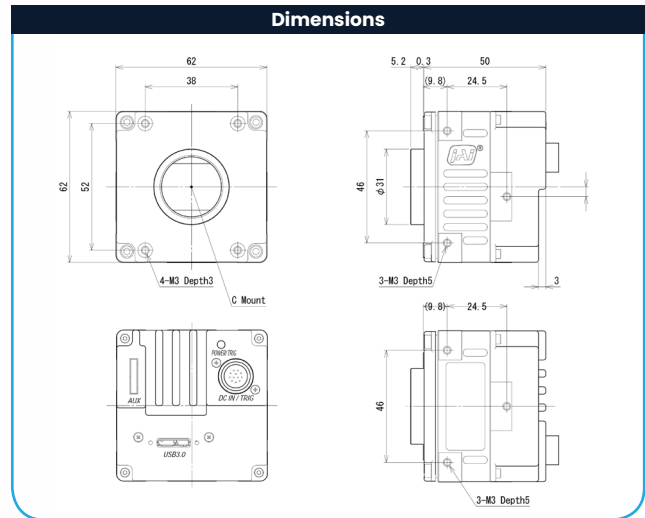
Connector pin-out

DC In / Trigger

HIROSE HR10A-10R-12PB-01

Connector Pin-out

Pin	Signal
1	GND
2	+12V to +24V DC input
3	GND
4	NC
5	Opto In-
6	Opto In+
7	Opto Out-
8	Opto Out+
9	TTL out 1
10	TTL in 1
11	+12V to +24V DC input
12	GND

USB 3.0 Interface

Micro B type - ZX3600-B-10P or equiv.

Pin	I/O	Signal	Note
1	I	VBUS IN	Power (VBUS)[1]
2	I/O	DM	USB2.0 Differential pair (-)[2]
3	I/O	DP	USB2.0 Differential pair (+)
4	-	OTG ID	USB OTG ID for identifying lines
5	-	GND	GND
6	O	FX3 SSTXM	USB3.0 Signal Transmission line (-)
7	O	FX3 SSTXP	USB3.0 Signal Transmission line (+)
8	-	GND	GND
9	I	FX3 SSRXP	USB3.0 Signal Receiving line (-)
10	I	FX3 SSRXM	USB3.0 Signal Receiving line (+)

[1] SP-5000-USB does not accept power over USB
[2] Does not work with USB 2.0

Spectral response

Note: Color response includes IR-cut filter.
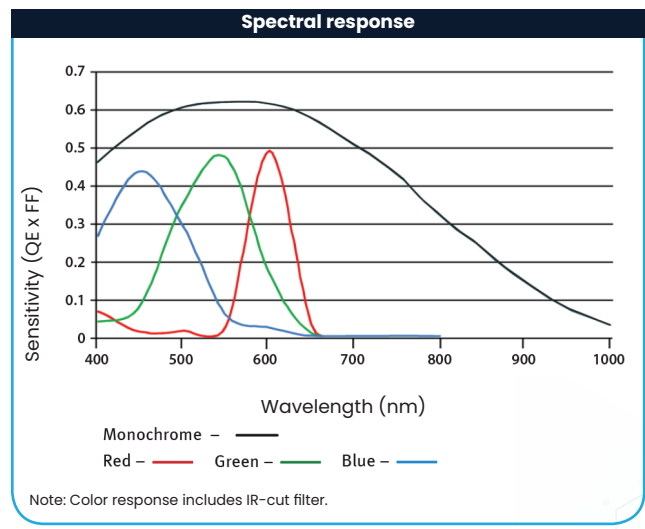
*Traditional SNR is based on random noise in a single frame, where EMVA SNR measurements consider more comprehensive noise sources and variance over time. For a more complete description, see the manual.

†Reduced performance may occur when operating outside the standard range of -5ºC to +45ºC

Product Highlights

- Large format 5 MP CMOS imager (global shutter)
- Up to 62 fps at full resolution
- 5.0 μm square pixels in a 5:4 aspect ratio
- Monochrome or Bayer color models
- 60 dB linear dynamic range with up to 84 dB piecewise HDR modes (monochrome only)
- Analog front-end gain control for reduced noise in low light images
- On-chip analog gain for individual R, G, + B control (color models)
- Exposure control from 10 μs (1/100,000) to 8 seconds in 1 μs steps
- ROI modes for flexible readout, windowing, or increasing frame rate
- Vertical and horizontal binning on monochrome model
- 8/10-bit digital output over USB3 Vision interface
- C-mount lens mount
- Automatic Level Control (ALC) for dynamic lighting conditions
- Programmable P-iris lens control or 3-axis control for operation of motorized lenses, pan/tilt heads, or other analog accessories

Additional Product Images