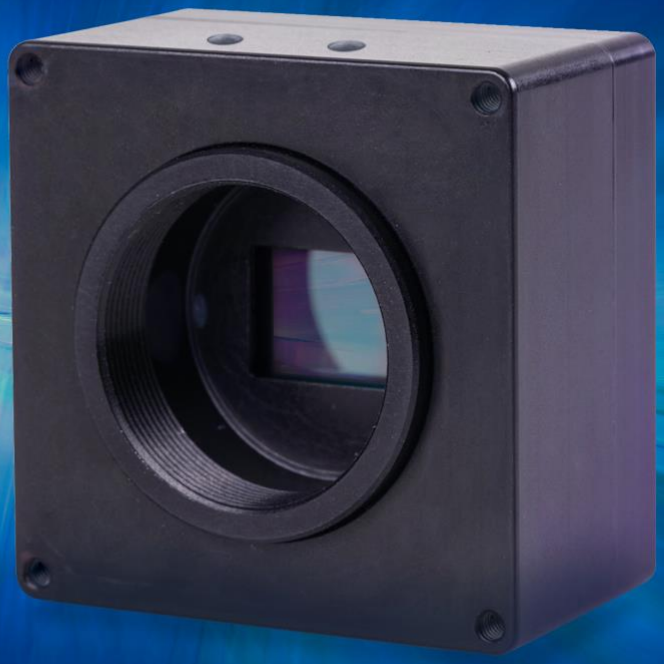
KAYA INSTRUMENTS



Iron 2020BSI

Iron CoaXPress
Small Form Factor, Ruggedized Camera

Innovative Approach

The ***Iron 2020BSI*** is a high speed, low-cost, low-power rolling shutter CMOS camera with up to 12.5 Gbps CoaXPress 2.0 interface (Micro-BNC connector) which supports 4 MP high quality video at rates of up to 74fps.

Intelligent Design

The GSENSE2020BSI is a rolling shutter sensor with a 6.5µm pixel size. With a compact outline the camera can be fitted into tight spaces. Superior sensor performance allows very low light vision capabilities.

Applications:

- Perimeter vision
- Low light surveillance
- Special Effects
- Virtual Reality

Key Features:

- 4 Megapixel up to 74 fps
- Monochrome and Color models
- Up to 4W power at full rate
- Full image processing feature set
- Optional Pan/Tilt alignment of the sensor
- Up to 12.5 Gbps CoaXPress interface
- C / CS / EF or DC Auto Iris mounts available
- Full EMVA1288 report
- Full built-in self-test (BIT)
- Full built-in voltage testing
- Customization as per user requirements

Technical Data

Feature	Description
Pixel size	6.5 µm x 6.5 µm
Resolution	2048 (H) x 2048 (V)
Sensor size	13.3 mm x 13.3 mm | 1.2”
Sensor	Gpixel GSENSE2020BSI
Video output	CoaXPress 2.0 up to 12.5 Gbps (CXP3, CXP6, CXP12)
Interface connector	Micro-BNC
Digitization	Dual 11 bit, Dual 12 bit
Electronic shutter	Rolling shutter with global reset
Shutter speed	4.62 µs @11-bit resolution in 6.6 µs steps (up to 16 sec) 8.04 µs @12-bit resolution in 11.2 µs steps (up to 16 sec)
Exposure control	Off / Internal / Auto
Image acquisition	Continuous / Triggered
Trigger input [1]	Pulse generator / Software (12 µs latency, 8 ns jitter)
Triger mode	Free run / Internal
Trigger options	Edge
Output resolution	16bits HDR in API or 24bit RAW (2x 11 or 12 bit ADC)
Frame rate	74 fps @ 11 bit 43 fps @ 12 bit
Subsampling	1 x 2 / 2 x 1 / 2 x 2 (user configurable)
Monochrome/ color	Monochrome
Full well charge	54 ke$^-$
Dynamic range	88dB
Dark Current	42 e$^-$ pxl/sec @ 21 °C
Signal-to-Noise Ratio (SNR max)	46 dB
Quantum Efficiency (QE) X FF	<95% @550 nm
Temporal Noise	1.9 e$^-$ or 1.4 e$^-$ with reduced dynamic range
Latency	< 100 µs (on top of exposure time)
Communication latency	Gen<i>Cam – ~5 ms Direct camera access – ~0.5 ms
Regulation	FCC Part 15 Class A, CE, RoHs2 (official certification optional)
On camera processing	▪ Defect pixel correction ▪ Auto/Manual White balance ▪ ROI [2] ▪ Image flip ▪ Frame counter ▪ Flat field / Fixed patter noise correction ▪ LUT ▪ Gain (Analog / Digital) – manual / auto ▪ Auto/Manual black level ▪ Digital binning (2 x 2) ▪ Auto Exposure/Gain ▪ Operational Time Counter
Pulse generator	Yes, Programmable at 8 ns increments
Additional features	▪ Over/under voltage protection ▪ Correlated double sampling support ▪ Per frame ROI change ▪ Global reset ▪ Reverse voltage polarity protection ▪ Frame-by-frame shutter speed change ▪ Three points of temperature sensing ▪ Per-pixel FPN (optional) ▪ Multi ROI Support (vertical only. Horizontal at full resolution)
GPIO connection	Two inputs, two outputs, external trigger & strobe controller

Mechanical & Electrical

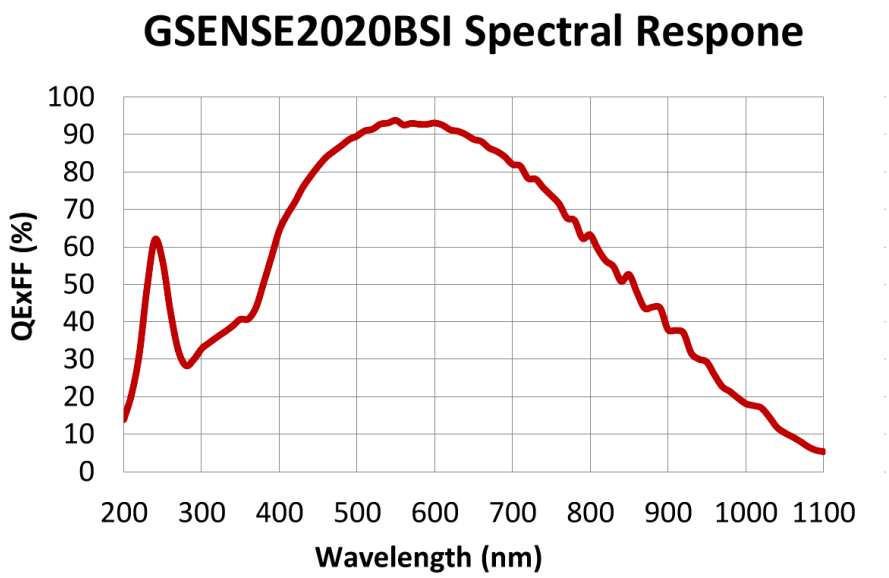
Feature	Description
Dimensions	44 mm x 44 mm x 51.8 mm (Height x Width x Depth)
Lens mount	C-mount, CS-mount, EF-mount or DC Auto Iris lenses
Weight (without lens)	<100g
Typical current	170mA @ 24V
Power consumption	<4W @ 24V DC
Mount	Front mount
Heat dissipation	Front heat dissipation
Sensor Mechanical Positioning	≤ 0.15°
Operating temperature	-40°C to 80°C, 10-90% humidity (non-condensing)
Storage temperature	-40°C to 85°C, 10-90% humidity (non-condensing)
Shock/Vibration	MIL 810F

1. The output is synchronized to the trigger on a frame by frame basis
2. ROI position can change on a frame by frame basis

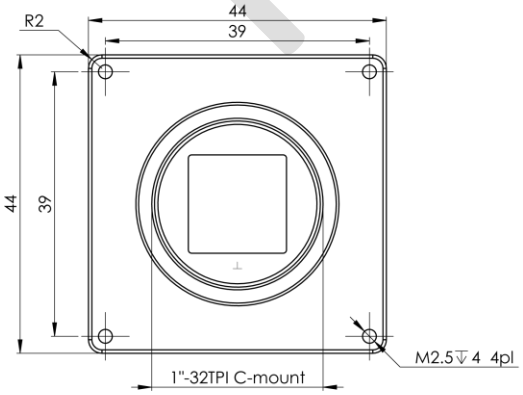
* Performance is measured at full resolution, maximum bitness and the maximum frame rate for that bitness

** KAYA Instruments reserves the right to update the data sheet from time to time without prior notice.

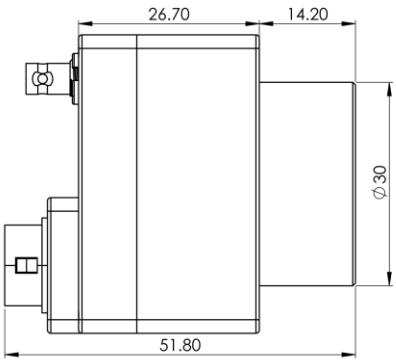
Absolute Quantum Efficiency



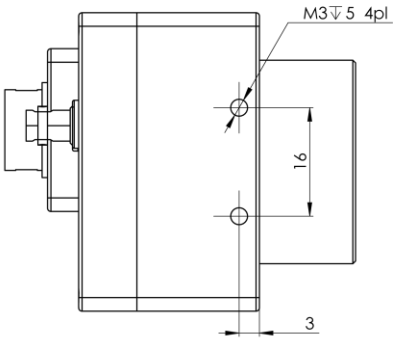
Mechanical Drawings



Front View



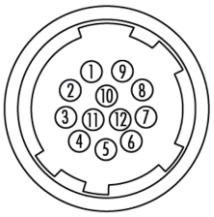
Side View



Top View

General Purpose Input Output

GPIO Pinout – 12 Pin Hirose Connector



1. DC Power return
2. DC Power
3. RS232 RX
4. RS232 TX
5. OUT2 Return (OPTO)
6. RS232 Return
7. OUT1 (TTL)
8. IN1 (TTL)
9. IN2 (LVTTL)
10. IN1/OUT1 Return
11. IN2 Return (LVTTL)
12. OUT2 (OPTO)

Compatibility

KAYA Instruments creates and maintains compatibility and interfaces for the most common and advanced vision image processing libraries and applications.

Major support is available for **MVTec Halcon, National Instruments' LabVIEW** and **MathWorks' MATLAB**.

- Supported vision standards:

CoaXPress®

- Supported vision libraries:

HALCON a product of MVTec, OpenCV, NATIONAL INSTRUMENTS LabVIEW, COGNEX

- Supported operating systems:

Windows, Linux

Please check our website for an up-to-date list of other supported libraries and software package

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