![KAYA INSTRUMENTS]

Iron CoaXPress 2020BSI-UV

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 and non-standard UV sensitivity allow excellent low-light vision capabilities.

Applications:

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

Key Features:

- 4 Megapixel up to 74 fps
- Up to 4W power at full rate
- UV light sensitivity
- Full image processing feature set
- Up to 12.5 Gbps CoaXPress interface
- C / CS / EF lens 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	55 ke$^-$
Dynamic range	90.5dB
Dark Current	42 e$^-$ pxl/sec @ 21 °C
Signal-to-Noise Ratio (SNR max)	46 dB
Quantum Efficiency (QE) X FF	<85% @550 nm
Temporal Noise	1.6 e$^-$ or 1.2 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)
	▪ Defect pixel correction ▪ Digital binning (2 x 2) ▪ ROI ▪ Auto Exposure/Gain ▪ Gain (Analog / Digital) – manual / auto ▪ Auto/Manual black level ▪ LUT
Pulse generator	Yes, Programmable at 8 ns increments
Additional features	▪ Over/under voltage protection ▪ Three points of temperature sensing ▪ Reverse voltage polarity protection ▪ Frame-by-frame shutter speed change
GPIO connection	Two inputs, two outputs, external trigger & strobe controller

Mechanical & Electrical

Feature	Description
Dimensions	44 mm x 44 mm x 53 mm (Height x Width x Depth)
Lens mount	C-mount, CS-mount, EF-mount
Weight (without lens)	<100g
Typical current	170mA @ 24V
Power consumption	<4W @ 24V DC
Mount	Front mount
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

* 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.

Ordering Information

KAYA's Part Numbers are intuitive and derived directly from the product's properties. Each index represents a different property of the camera, according to the following diagram:

GPIO options:
G – GPIO
N – No GPIO

Environmental grade:
CG – Commercial Grade
RG – Industrial\Rugged

Iron2020BSI – UV – CXP – M – NF – X – Y – NPT – Z

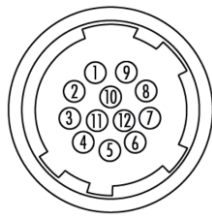Lens mount:
C – C-mount
CS – CS-mount
E – EF-mount
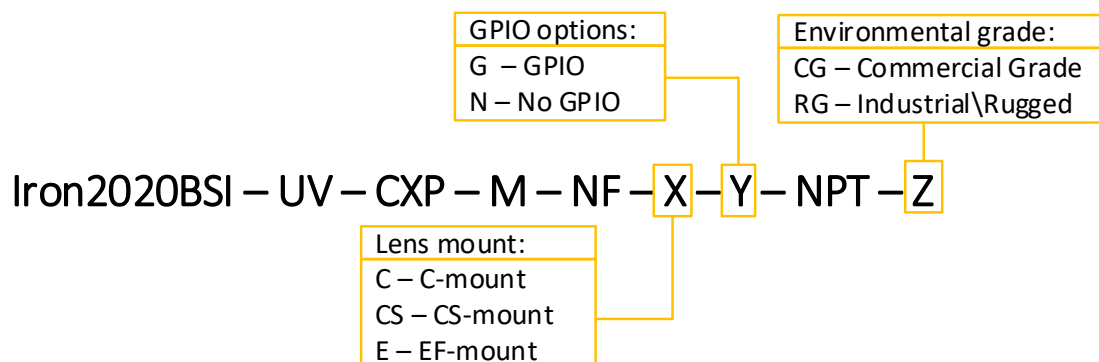
For example: an Iron 2020BSI-UV with a C-mount and GPIO that is rated for industrial use would go by Iron2020BSI-UV-CXP-M-NF-C-G-NPT-RG. It is also possible to buy peripheral equipment in addition to the camera as listed in the following table:

Product Name	Product Part Number
Cable, 12P Hirose connector (f)	KY-CBL-006

Please contact a sales representative over at info@kayainstruments.com for a full list of peripherals including cables and frame grabbers.

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)

The GPIO connector used on the camera is a 12 pin male Hirose connector. It is recommended to use a cable with a matching Hirose 12 pin female connector. Hirose's manufacturer's part number is listed below:
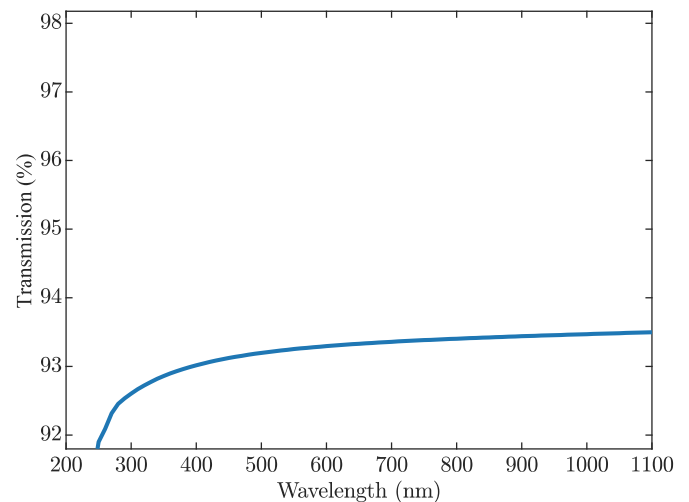
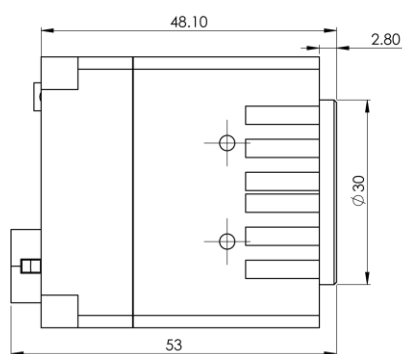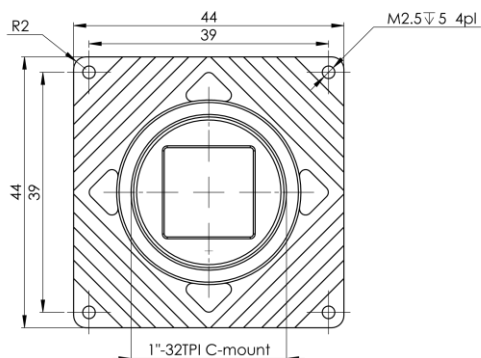| Product Name	Product Part Number
Hirose 12P connector, male	HR10A-10R-12PB
Hirose 12P connector, female	HR10A-10P-12S

Absolute Quantum Efficiency

GSENSE2020BSI Sensor
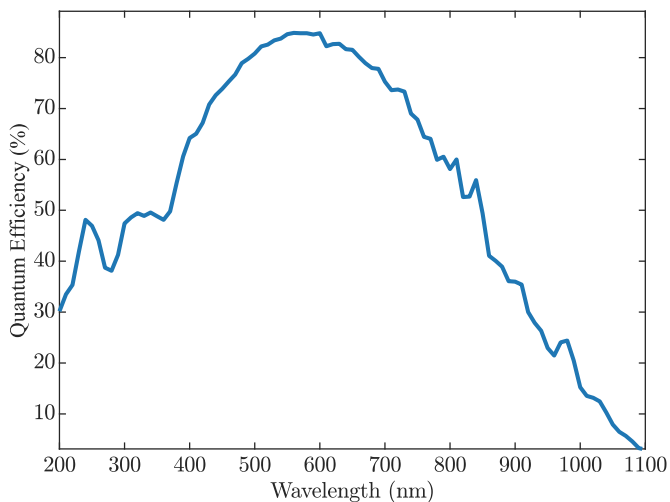
Iron 2020BSI Input Window

Mechanical Drawings
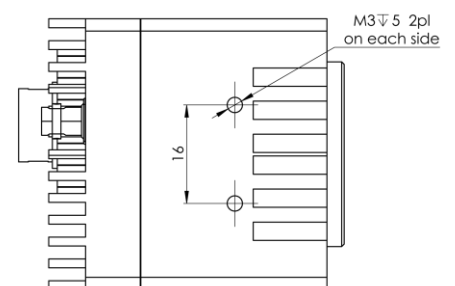
Compatibility

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:

❖ Supported vision libraries:

❖ Supported operating systems:

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

Contact Us

Please feel free to contact our team with any question or further inquiry at **info@kayainstruments.com** – we will be happy to provide assistance and consultation.

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