

# Product Brief: QIS16 Camera

## 16.7 Megapixel Quanta Image Sensor Camera Reliable Photon Counting at Room Temperature at Full Speed



The Gigajot QIS16 Camera is a complete camera platform ready for integration into systems that operate in extreme low-light conditions and require photon counting and photon number resolving. The camera is equipped with Gigajot's 16.7 Megapixel (GJ01611) Quanta Image Sensor (QIS) and utilizes the convenient USB 3.0 SuperSpeed interface. Gigajot's user friendly software enables control of the camera settings, image/video capture, real-time processing, and analysis. Alternatively, Gigajot's software development kit (SDK) allows control of the camera and customization for integration into your own application platform.

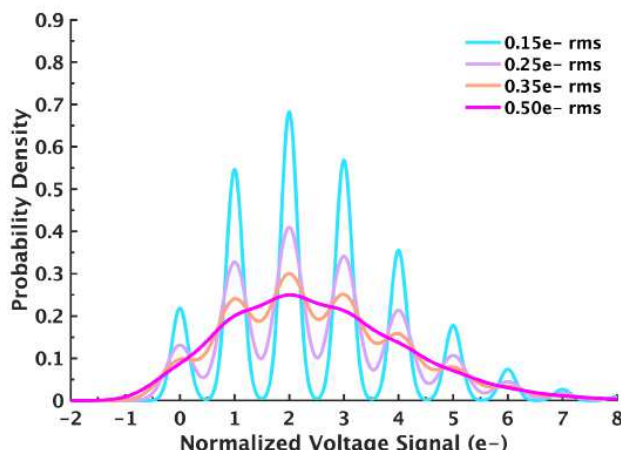
### Key Features

- 16.7 Megapixel QIS
- Photon counting at room temperature & full speed
- Accurate photon number resolving
- Market leading low read noise
- Market leading low dark current
- Sensor with advanced stacked CMOS BSI process
- Equipped with TE temperature stabilization
- USB 3.0 interface
- Software for camera control and image acquisition
- SDK & 3rd party software support for system integration

### Applications

- Bio-luminescence
- Fluorescence
- Microscopy
- Live cell imaging
- Spectroscopy
- Astronomy
- Quantum physics

### Photon Counting Capability



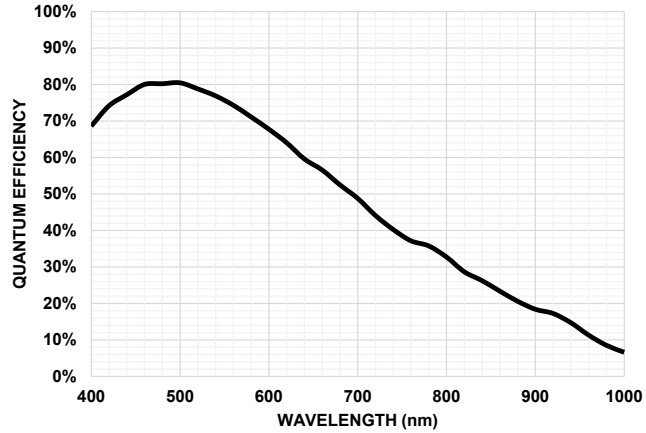
Read Noise	Is Photon Counting Possible?
0.5 e-	✗
0.3 e-	✓
<0.2 e-	✓ (<1% error rate)

## Specification

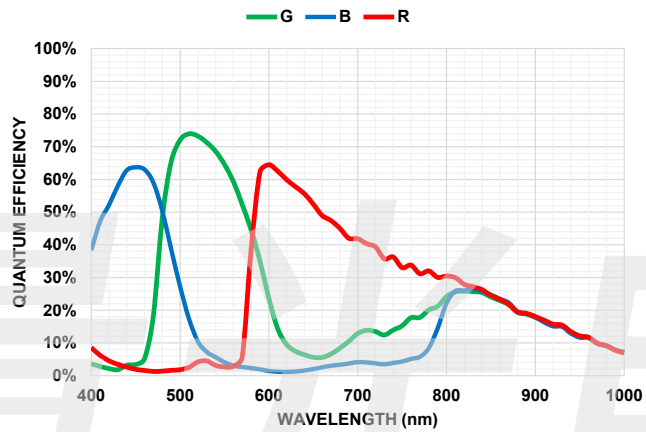
	QIS16TS Temperature Stabilized	QIS16C Compact Camera
Sensor Temperature	10°C	25-35°C at ambient 25°C
QIS Sensor	GJ01611	
Resolution	4096 x 4096 (16.7 MP)	
Pixel Size	1.1 μm x 1.1 μm	
Optical Format	1/2.8" (6.37 mm diagonal)	
Active Area	4.5 mm x 4.5 mm	
Read Noise @ full speed (RMS)	0.19 e- peak	
	0.21 e- median	
	0.31 e- rms	
Dark Current	0.002 e-/s/pix (10°C)	0.03 e-/s/pix (25°C)
Full Well Capacity	2,000 e-	
Non-linearity	<0.5%	
Dynamic Range	80 dB	
Peak QE (mono)	81%	
Chroma	Mono/Color	
Shutter Type	Rolling Shutter	
Exposure Time at Full Resolution	97 μs to 1800 s	
Sensor Modes	Normal	
	Ultra Low Light	
	Photon Number Resolving	
Digital Binning	2 x 2	
Windowing	User selectable ROI (see table below)	
Interface	USB 3.0 SuperSpeed	
Digital Output	12 bits	
Frame Rate	10 frames/s at full resolution	
	15,974 frames/s at 4 rows & 1024 columns	
Input Trigger	Start image capture	
Output Trigger	Global exposure start and stop	
Lens Mount	C-mount	
Recommended Operating Environment	0 to 40°C, 30 to 80% humidity (no condensation)	
Recommended Storage Environment	-10 to 50°C, 90% max. humidity (no condensation)	
External Power Supply	100 V to 240 V AC, 50 Hz/60 Hz	
Power Input	5.9 VDC @ 7 A	
Dimensions	110mm x 112mm x 131mm	77mm x 111mm x 79mm
Weight	4.7 lbs. (2.1 kg)	1.3 lbs. (0.6 kg)



## Monochrome QE



## Color QE

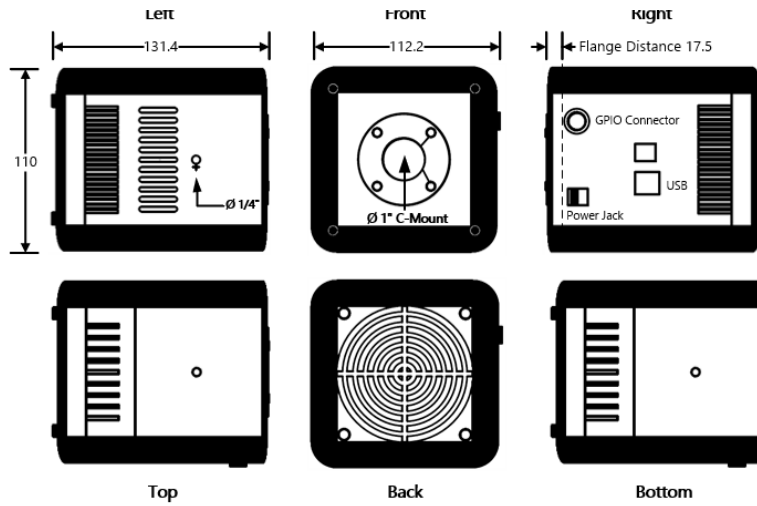


## ROI

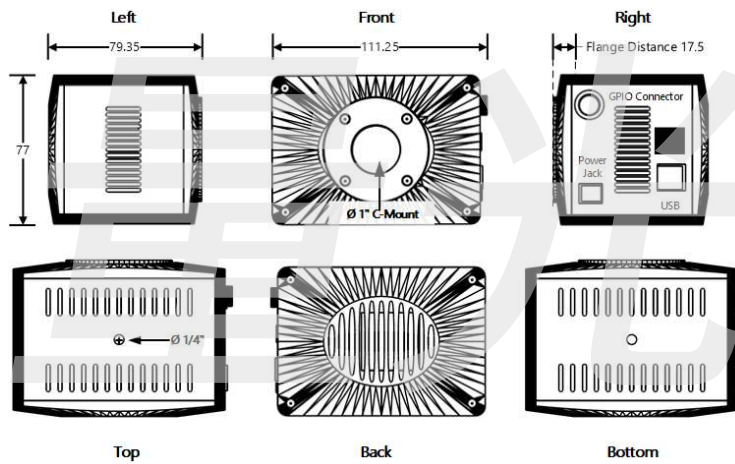
Frame Rate (fps) with USB		Horizontal Scan Range (# Columns)		
		4096	2048	1024
Vertical Scan Range (# Rows)	4096	10	14	16
	2048	20	27	31
	1024	40	54	62
	512	81	107	125
	256	161	215	250
	128	322	429	499
	64	644	859	998
	32	1289	1717	1997
	16	2577	3434	3994
8	5155	6868	7987	
4	10309	13736	15974	



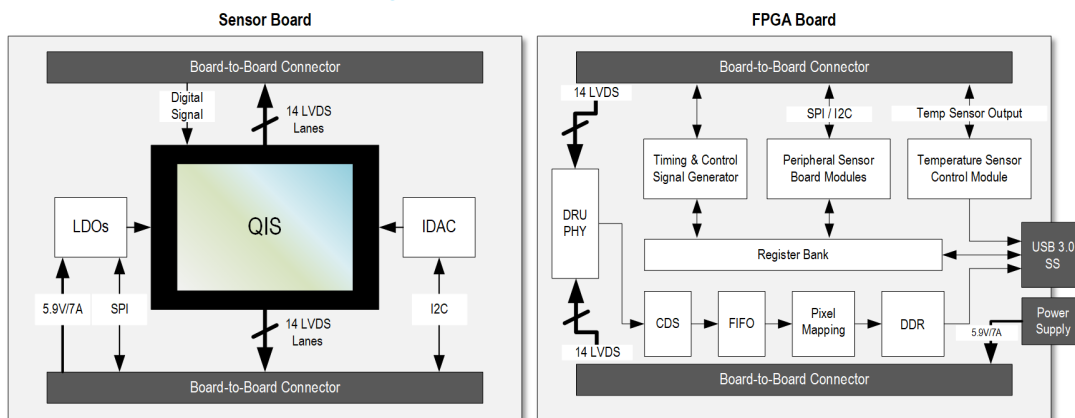
## QIS16TS Dimensions (units: mm)



## QIS16C Dimensions (units: mm)

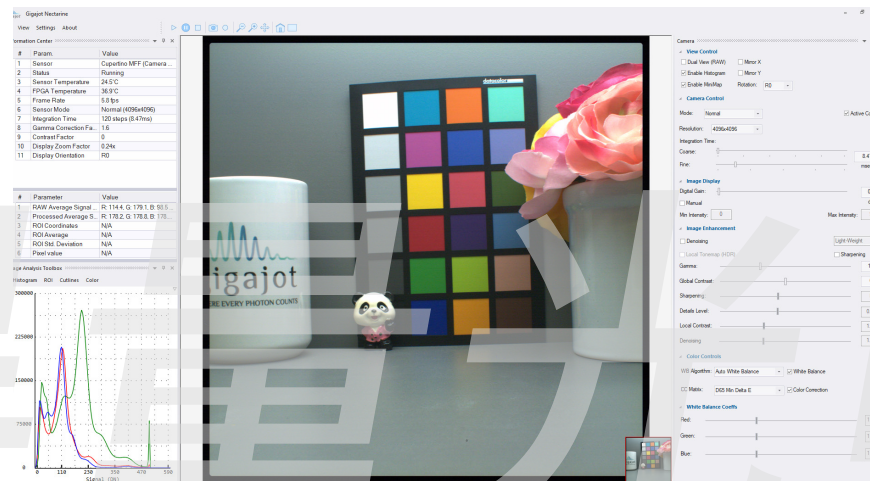


## QIS16 Camera Block Diagram



## Software

- User friendly GUI
- Sensor control: integration time, binning, cropping
- RAW image processing: row and column noise correction, dark frame subtraction, defect correction
- HDR processing
- AI-based low-light noise reduction
- Color processing: automatic and manual white balance, color correction using predefined 3x3 matrices
- Image enhancement: image sharpening, contrast enhancement, global and local tone mapping for HDR mode
- Image analysis tools: image histogram and ROI histogram, image signal level and ROI signal level, horizontal (x-cut) and vertical (y-cut) pixel line plots
- Image manipulation tools: zoom in and out, image rotation and mirroring
- SDK to allow control of camera from Python, MATLAB, LabVIEW and MicroManager under Windows or Linux



## Included in Box

- Sensor board and FPGA board in enclosure
- USB 3.0 cable
- Power supply: 5.9 V AC adapter
- Camera User's Manual
- Download access to camera software
- Lens not included

## Recommended System Requirements

- Intel Core™ i7 9000 Series CPU
- 16GB RAM
- Windows 10 v1909
- NVIDIA GPU (GTX 1660 Ti recommended)
- Nvidia Driver v452
- Microsoft Visual C++ Redistributable v142 (2019)
- 20GB free disk space (Including space for data acquisition)
- USB 3.0 SuperSpeed

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