

Product Specifications Qs series

Qs-2A120 and Qs-4A60



Introduction

This document describes the functionality and key specifications of the Qs 2 and 4 Megapixel cameras. The Qs-2A120 and Qs-4A60 are equipped with a pipe-lined global shutter CMOS sensor and embedded in a small housing. Pipe-lined global shutter technology assures low read noise combined with accurate shutter performance. All Quartz cameras are fitted with Adimec True Accurate Imaging® technology. True Accurate Imaging is a combined set of image technologies enabling the best imaging performance for inspections and metrology applications.

Product Features

- **Capture Image Details** with Adimec True Accurate Imaging Technology
- **Monochrome, Color, NIR** solutions
- Camera Link base: bandwidth optimal use **through 3 tap or 2 tap**
- **Fast Acquisition** through ROI and Burst mode
- **Compact outline and small footprint**
- **Customization** upon request

Adimec

Performance

All values are typical and measured at 25°C

	Qs-2A120	Qs-4A60
Sensor	Available in monochrome, Bayer color filter and NIR optimized	
Architecture	Active pixel digital CMOS sensor with micro lenses, pipelined global shutter	
Pixel size	5.5 μm (H) x 5.5 μm (V)	
Active pixels	2048 (H) x 1088 (V)	2048 (H) x 2048 (V)
Optical format	2/3"	1"
Quantum efficiency	Spectral response curve normal monochrome and NIR optimized camera (Fig. 1) Spectral response curve color camera (Fig. 2)	
Anti Reflection Coatings	Not available	Anti reflection coating or removable cover glass are optional
Shutter efficiency	1: 50000	
Interface	Camera Link Base, 2 and 3 tap (see page 4)	
Acquisition frame rate (full frame)	169 fps (buffered image acquisition)	90 fps (buffered image acquisition)
Output frame rate (full frame)	76 fps at 2 tap Camera Link 114 fps at 3 tap Camera Link	40 fps at 2 tap Camera Link 60 fps at 3 tap Camera Link
Sensitivity at sensor surface (typical)	0.06 Lux s (monochrome) 0.14 Lux s (color, green only)	
Readout noise	13 e-	
Full well capacity	13.5 ke- (max)	
Linear dynamic range	60 dB (HDR and HiQ mode for dynamic range extension and noise reduction)	
Blooming and Smear	No Blooming or Smear	
Analogue to digital conversion	2048 On-chip 10 bit A/D-converters	

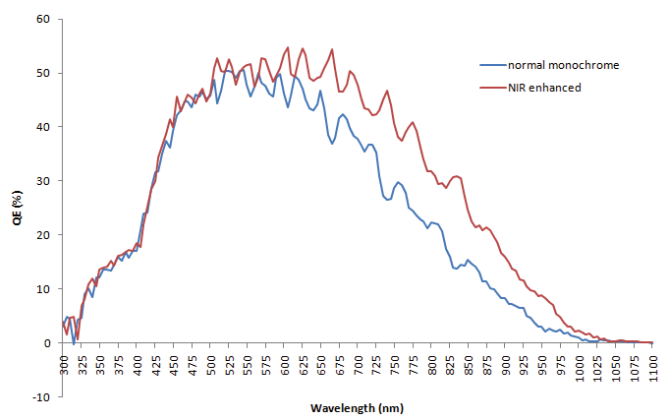


Figure 1. Spectral response curve monochrome camera (Preliminary by sensor manufacturer)

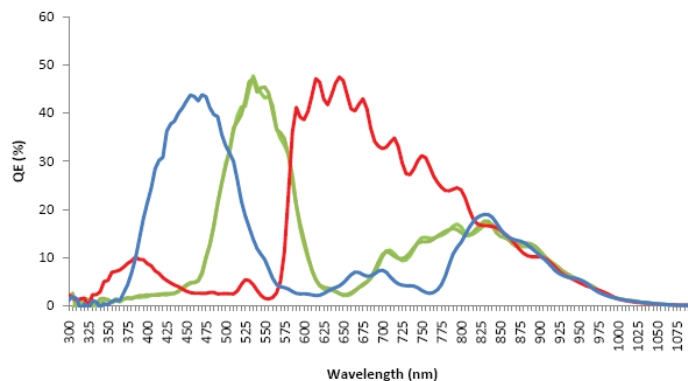


Figure 2. Spectral response curve color camera (Preliminary by sensor manufacturer)

Functionality

Acquisition

	Qs-2A120	Qs-4A60
Image Acquisition	Continuous or externally controlled (triggered). Image acquisition timing is fully separated from the output interface by means of a real-time FIFO buffer. This supports burst mode acquisition	
Gain	Digital Fine Gain selectable between 1x and 8x in steps of 0.01	
Memory	FIFO buffer of 24 full size images	FIFO buffer of 12 full size images
Integration time control (continuous mode)	Programmable between 12 μ s and 100 ms in units of 1 μ s	

Processing

Digital Binning	2x, 4x (N.A. in color version)
Defect Pixel Correction	Advanced defect correction, 100 defect correction map capacity
Flat Field Correction	Offset and gain correction per pixel 3 sets user programmable
HiQ mode	Averages multiple images (max. 6) in-camera and outputs a single image at full or ROI resolution Shot noise improvement up to 8 dB (see figure 3)
HDR mode	Sensor multislope (knee) function enhancing Scene Dynamic Range up to 90 dB (non-linear)
ROI	Fully programmable ROI in horizontal and vertical direction Frame speed increases proportionally with ROI in vertical direction
Mirroring	Selectable horizontal and vertical mirror
Video compression	10-bit output LUT, fully user programmable

Service & Miscellaneous

Test mode	Internal test pattern generator available for checking the complete digital image chain
User storage	Availability of storage for 16 signed integers and 16 strings of 32 characters
Image tagging	Attaches digital information to an output image
Camera ID	Camera type, build state and serial number can be read via software
Customization	All Qs models are customizable to fit specific system outline and/or functionality requirements

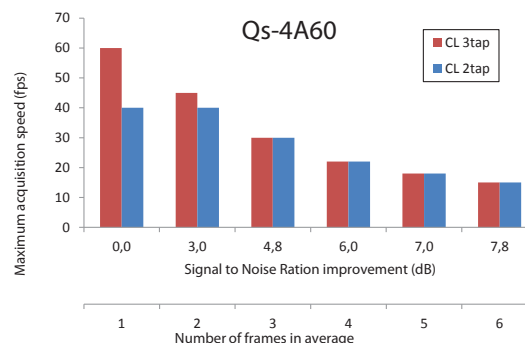
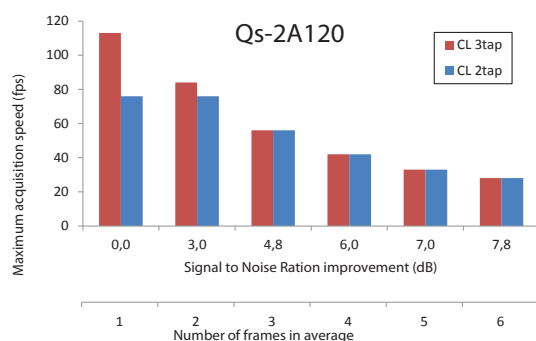


Figure 3: Shot noise improvement versus maximum frame speed.

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Interfacing

	Qs-2A120	Qs-4A60
Video		
Video output	Camera Link base, 2 or 3 tap (user programmable)	
Output resolution	8 or 10 bit (2 tap only) (user programmable)	
Interface clock	66/85 MHz (user programmable)	
Connector	1x 3M HMDR 26	
Camera Control		
Interface	Camera Link	
Baud rate	57600	
Protocol	ASCII based	
I/O		
Output	Strobe signal (user programmable)	
Input	Trigger signal (programmable polarity)	
Connector	Binder series 712 type 09-0412-30-04	
Power		
Input voltage	10 - 24 Volt +/- 10%	
Typical power dissipation	4.5W @ 12 Vdc at full speed	
Reverse voltage protection	Yes	
Power connector	Binder series 712 type 09-0403-30-02	
Mechanical		
Mounting	2 mounting holes per side on camera front	
Lensmount	Standard C-mount with back focus adjustment possibility	
Outline	See figure 4	
Weight	295 g ± 10%, excluding lensmount	

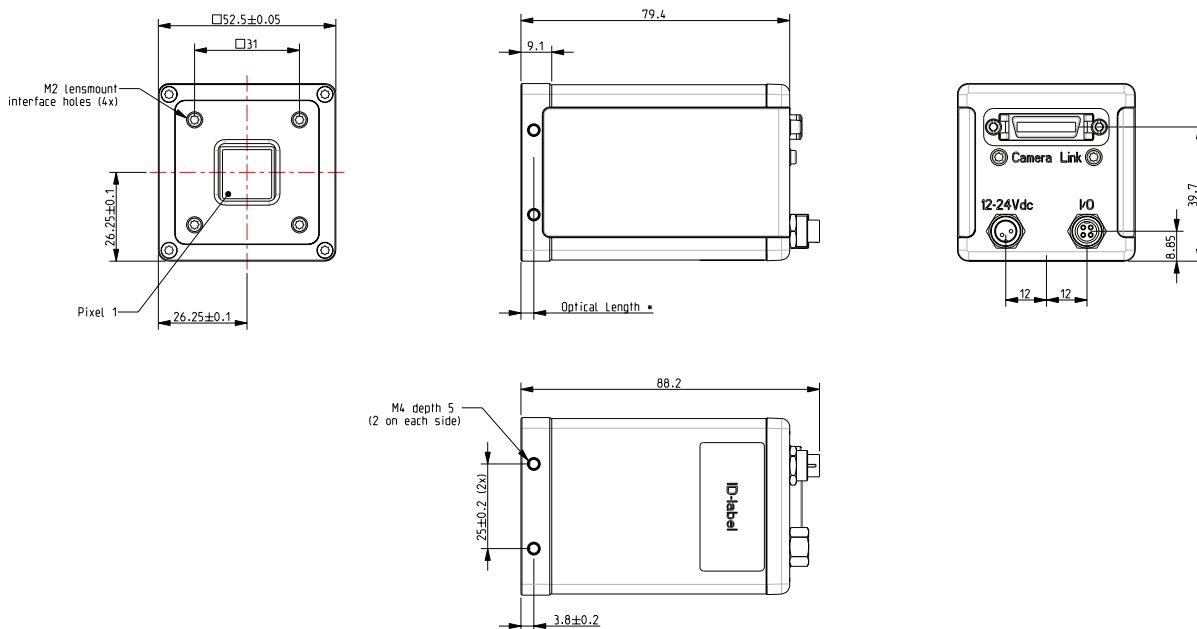


Figure 4: Outline drawing

Sensor Mounting Accuracy

XY-centering	+/- 0.1 mm (see figure 5)
Rotation	+/- 4 mrad (see figure 6)
Optical distance	+/- 0.3 mm (see figure 7)
Perpendicularity	+/- 2 mrad (see figure 7)

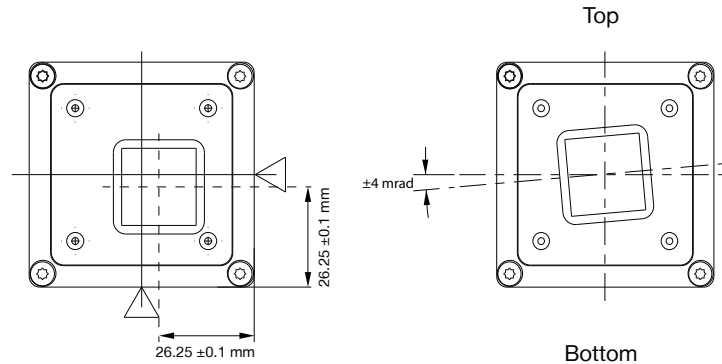


Figure 5. XY-Centering

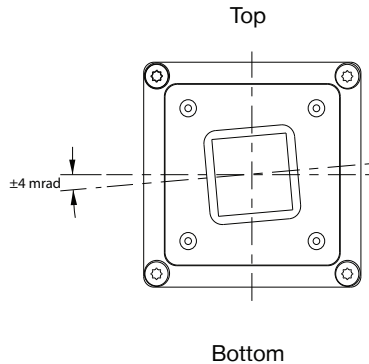


Figure 6. Rotation

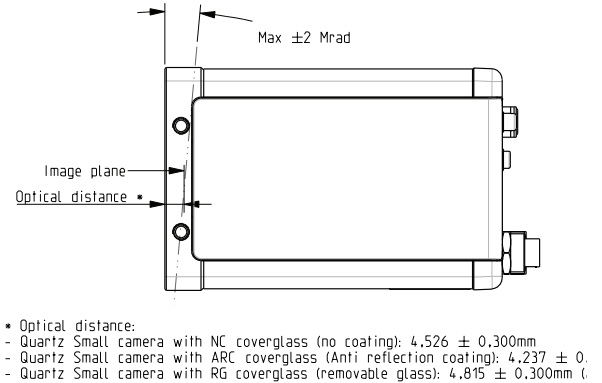


Figure 7. Optical distance and Perpendicularity

Environmental

Operating

	Qs-2A120	Qs-4A60
Temperature	-10°C to +40°C	
Humidity (relative)	20% - 80% RH, non-condensing	
Shock	10 g, half sine shape, 6-10 ms duration	
Vibration	3 g, sinusoidal vibration sweeps 5-150 Hz	

Storage

Temperature	-25°C to +65°C
Humidity (relative)	5% - 95% RH, non-condensing
Shock	25 g, half sine shape, 6-10 ms duration
Vibration	10 g, sinusoidal vibration sweeps 5-150 Hz

Compliance & Reliability

RoHS

Directive	2002/95/EC
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CE-mark

Electromagnetic compatibility	2004/108/EC
Generic standard	EN61000-6-4 and EN61000-6-2

Reliability

MTBF	> 75,000 h @ 40°C
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