Product Specifications Q-12A65-Fx/CL



Introduction

This document describes the functionality and key specifications of the Quartz 12 Megapixel series. The Q-12A65 is a 12 Megapixel camera equipped with a pipe-lined global shutter CMOS sensor and embedded in a robust housing. The 4096x3072 active pixels provide a 4:3 image format with 5.5 µm square pixels. 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. This is a combined set of image enhancement technologies enabling the best imaging performance for inspections and metrology applications.

Product Features

- **12 Mpx at 66 fps**. (75 fps burst)
- **Capture Best Image Details** with Adimec True Accurate Imaging® Technology
- **Monochrome, Color** solutions
- **Easy Fit to Application** with image flip, ROI and LUT functionality
- **Speed increase** through ROI and burst mode
- **Camera Link Base / Medium / Full / Deca**
- **Robust Design** for intensive use with highest precision

Models

Camera model	Resolution		Max acq. speed	Max InterFace speed
	Mpx	H x V	fps	fps @ IF
Q-12A65-Fm/CL	12	4096 x 3072	75	66 @ CL 10 tap
Q-12A65-Fc/CL	12	4096 x 3072	75	66 @ CL 10 tap

Specifications

All values are typical and measured at 25°C

Sensor type	Monochrome or Bayer color filter
Architecture	Active pixel digital CMOS sensor with micro lenses, pipe-lined global shutter
Pixel size	5.5 µm (H) x 5.5 µm (V)
Optical format	APS-C format (Ø 28.1 mm)
Cover glass	Anti reflection coating
Shutter efficiency	1:50000
Sensitivity at sensor surface (typical)	4.64 Lux s (monochrome)
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

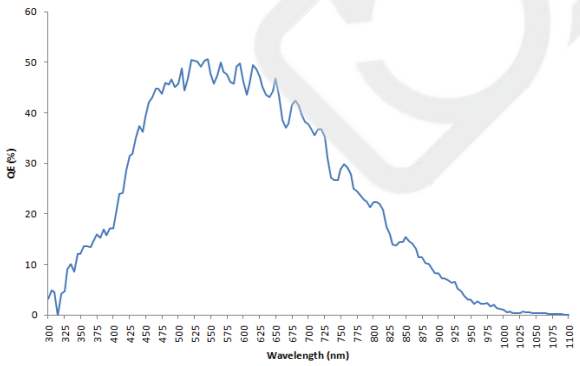


Figure 1. QE curves mono

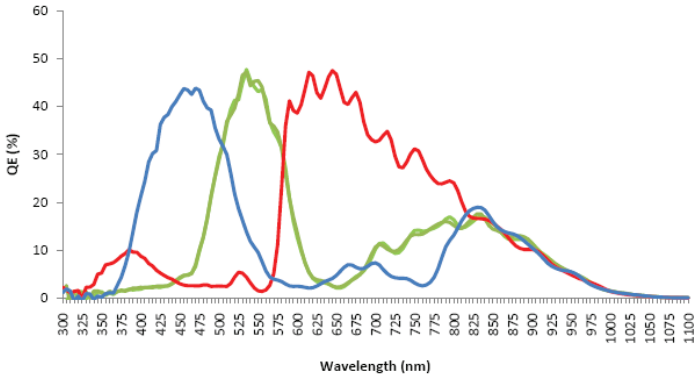


Figure 2. QE curves color versions R,G,B

Functionality

Acquisition

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

12 Mpx resolution

Memory	FIFO buffer of 17 full size images
Intergration time control (continuous mode)	Programmable between 68 µs and 100 ms in units of 1 µs

Processing

Digital Binning	2x, 4x (N.A. in color version)
Defect Pixel Correction	Advanced defect correction, 500 defect correction map capacity
Flat Field Correction	Offset and gain correction per pixel 4 (mono), 3 (color) sets user programmable
HiQ mode	Averages multiple images (max. 8) in-camera and outputs a single image at full or ROI resolution. Shot noise improvement up to 9 dB (see figure 3)
HDR mode	Sensor multi-slope (knee) function enhancing scene Dynamic Range up to 90 dB (non-linear)
ROI	Fully programmable ROI in horizontal and vertical direction Max frame speed increases when ROI is reduced in vertical direction (see figure 4)
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 output image
Camera ID	Camera type, build state and serial number can be queried via software

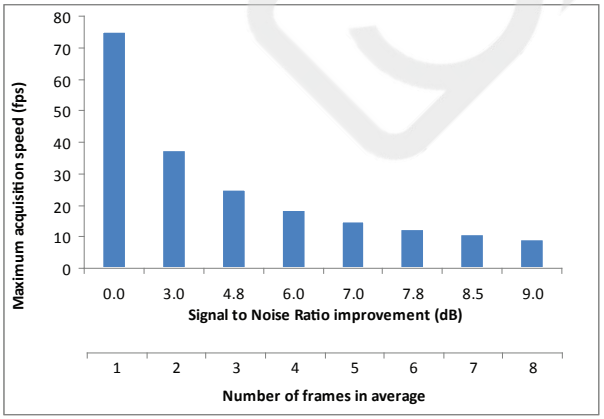


Figure 3. Maximum frame rates at maximum resolution as a function of SNR improvement (due to averaging).

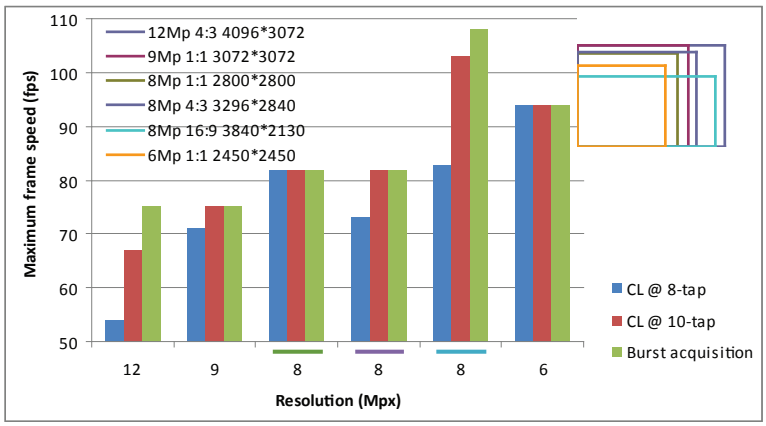


Figure 4. Maximum frame rates for various ROI settings as allowed by Q-xAxxx cameras.

Interfacing

Video

Video output	Camera Link, 2 or 4 taps at 8 or 10 bit; 8 or 10 taps at 8 bit (user programmable)
Interface clock	66/85 MHz (user programmable)
Connector	2x 3M MDR 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	Hirose HR10A-7R-4SB (optional : Binder series 712 type 09-0412-30-04)

Power

Input voltage	12 - 24 Volt ± 10%
Typical power dissipation	9 W @ 12 Vdc at full speed
Reverse voltage protection	Yes
Power connector	Hirose HR10A-7R-6PB (optional: Binder series 712 type 09-0403-30-02)

Mechanical

Type	Camera in housing
Outline	See figure 5
Mounting	2 mounting holes per side on camera front
Lensmount	Standard TFLII-mount with back focus adjustment possibility. (T2, M42, F and F-Nikon mount optional)
Weight	400 g ± 10%, excluding lensmount

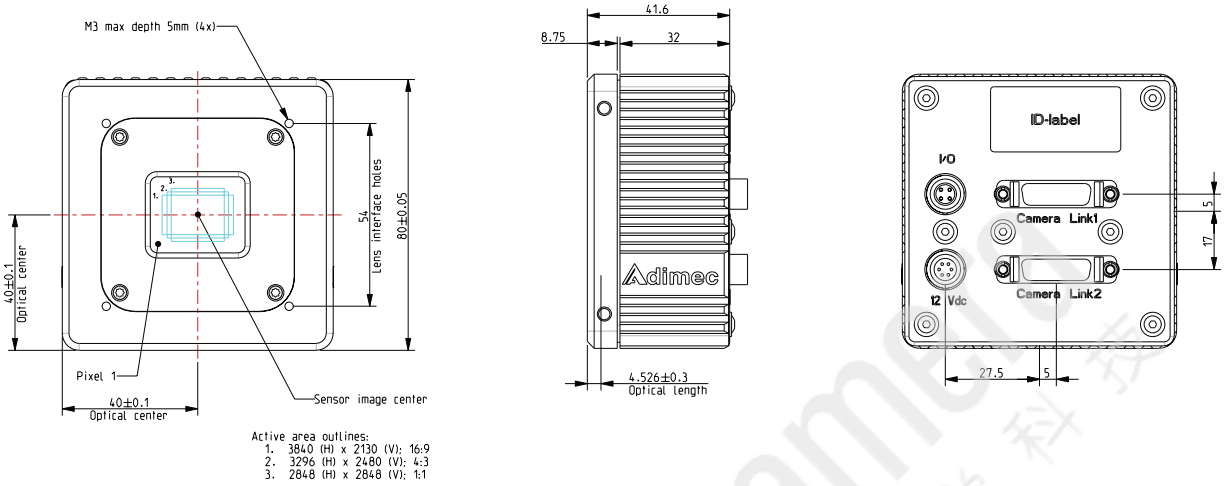


Figure 5. Mechanical Outline

Sensor Mounting Accuracy

XY-centering	± 0.1 mm (see figure 6)
Rotation	± 4 mrad (see figure 6)
Optical distance	± 0.3 mm (see figure 6)
Perpendicularity	± 2 mrad (see figure 6)

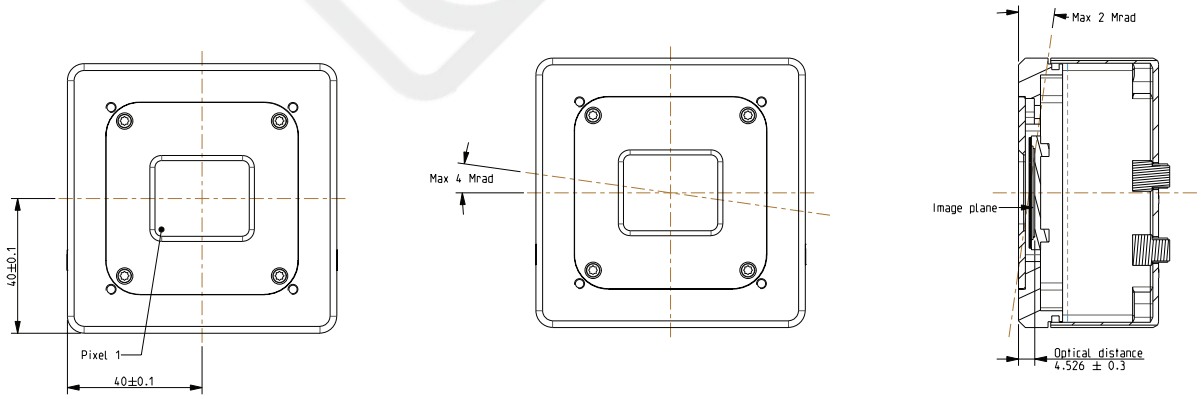


Figure 6. Sensor accuracy reference

Environmental

Operating

Temperature	0°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	2011/65/EC

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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