TELEDYNE e2v
Everywhereyoulook™

UNiiQA+ Mono CL
CMOS MONO CAMERA

Datasheet

Features

- CMOS Monochrome LineScan Sensors:
  - 4096 pixels, 5x5µm or 4096 pixels, 5x10µm (Versatile models Only)
  - 2048, 1024 or 512 pixels, 10x10µm
- Interface : CameraLink® (Base or Medium/Full)
- Line Rate :
  - Up to 40 kl/s for the Base Version
  - Up to 100 kl/s for the High-Speed Version
  - Line rate limited at 40kl/s in 12bits for all models
- Data Rate :
  - 42.5MHz, 60MHz and 85MHz in 1 or 2 Channels for Base version
  - 42.5MHz, 60MHz and 85MHz in Base, Medium, Full or Full+ (Deca) for the High Speed Version
- Bit Depth : 8, 10 or 12bits
- Flat Field Correction
- Contrast Expansion
- Power Supply : 10 – 15V. PoCl Compliant.
- Low Power Consumption : < 3.5W
- M42x1 Native and F-Mount, C-Mount adapters available
- GenCP Compliant (xml file embedded)

Description

e2v's UNiiQA+ line scan cameras family has been specifically designed to overcome the limitations of your current inspectio system: make cost savings, improve your throughput, inspect larger areas or identify smaller defects.

Three UNiiQA+ product ranges are offered:

- UNiiQA+ Essential: low speed cameras for cost effective equipment or with modest speed requirement
- UNiiQA+ High-Speed: high speed cameras to help improve the performance of your system

The UNiiQA+ family has also been designed to be highly modular to enable engineers to reuse the same camera in multiple equipment, simplify logistics and reduce development cycle time. All UNiiQA+ cameras feature e2v's proprietary CMOS sensors : a single line of highly sensitive pixels of either 5µm or 10µm size.

Application

- Raw material inspection (plastic film, glass, wood…)
- Print and paper inspection
- Food sorting (Belt sorting, Lane sorting, Free fall sorting)
- Parcel and postal sorting
- Barcode reading

Key Specifications

Characteristics	Typical Value				Unit
Sensor Characteristics at Maximum Pixel Rate					
Resolution	**4096**	**2048**	**1024**	**512**	Pixels
pixel size	5 x 5 5 x 10(*)	10 x 10	10 x 10	10 x 10	µm
Max Line Rate (Essential Version)					
CameraLink® Base	20	40	40	40	kHz
Max Line Rate (High Speed version)					
CameraLink® Base (8 or 10bits) (2)	40	80	100	100	kHz
CameraLink® Base or Medium (12bits) (3)	40	40	40	40	kHz
CameraLink® Medium (8/10bits) or Full (8bits)(2)	80	100	100	100	kHz
CameraLink® Deca (8bits)(4)	100	100	100	100	kHz

(*) Versatile Models Only

Characteristics	Typical Value					Unit
Radiometric Performance at Maximum Pixel Rate and minimum camera gain						
Bit depth	8, 10 and 12					Bits
Resolution	**4096** 5 x 5	**4096** 5 x 10	**2048** 10 x 10	**1024** 10 x 10	**512** 10 x 10	Pixels
Response (Peak at 565nm)	162	81	162/324(*)	162/324(*)	162/324(*)	LSB/(nJ/cm²)
Camera Gain	5,9	5,9	11.1	11.1	11.1	e-/LSB_{12bits}
Full Well Capacity	23,7	23,7	47.3/23.7(*)	47.3/23.7(*)	47.3/23.7(*)	Ke-
Response non linearity	1	1	2(**)	2(**)	2(**)	%
Readout Noise	7,5	7,5	10.6	10.6	10.6	e-
Dynamic range	70	70	73/67(*)	73/67(*)	73/67(*)	dB
SNR Max (3/4 Sat)	42	42	45/41.8(*)	45/41.8(*)	45/41.8(*)	dB
PRNU HF Max	3					%

Notes :
(*) High Dynamic / High Response. : High dynamic with the Use of Multi-Column Gain 1/2
(**) e2v norm: more severe than EMVA 1288 Standard

Functionality (Programmable via Control Interface)		
Analog Gain	Up to 12 (x4)	dB
Offset	-4096 to +4096	LSB
Trigger Mode	Timed (Free run) and triggered (Ext Trig, Ext ITC) modes	
Mechanical and Electrical Interface		
Size (w x h x l)	60 x 60 x 33.65	mm
Weight	<150	g
Lens Mount	F, C and M42x1 (on the Front Face)	-
Sensor alignment (see chapter 2.1)	±100	µm
Sensor flatness	50	µm
Power supply	Single 10 DC to 15 DC	V
Power dissipation	< 3,6 PoCL compliant	W
General Features		
Operating temperature	0 to 50 (front face), 70 (internal)	°C
Relative Humidity for Operation	85%	%
Storage temperature	-40 to 70	°C
Regulatory	CE, FCC , Reach, RoHS and Chinese RoHs compliant	

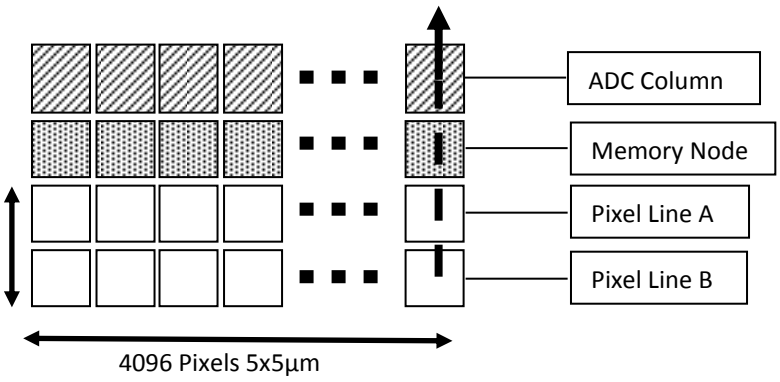
Image Sensor

The Uniiqa+ sensor is composed of one pair of sensitive lines of 4096 pixels of 5µm square.

Each pixel on the same column uses the same Analog to Digital Column converter (ADC Column).

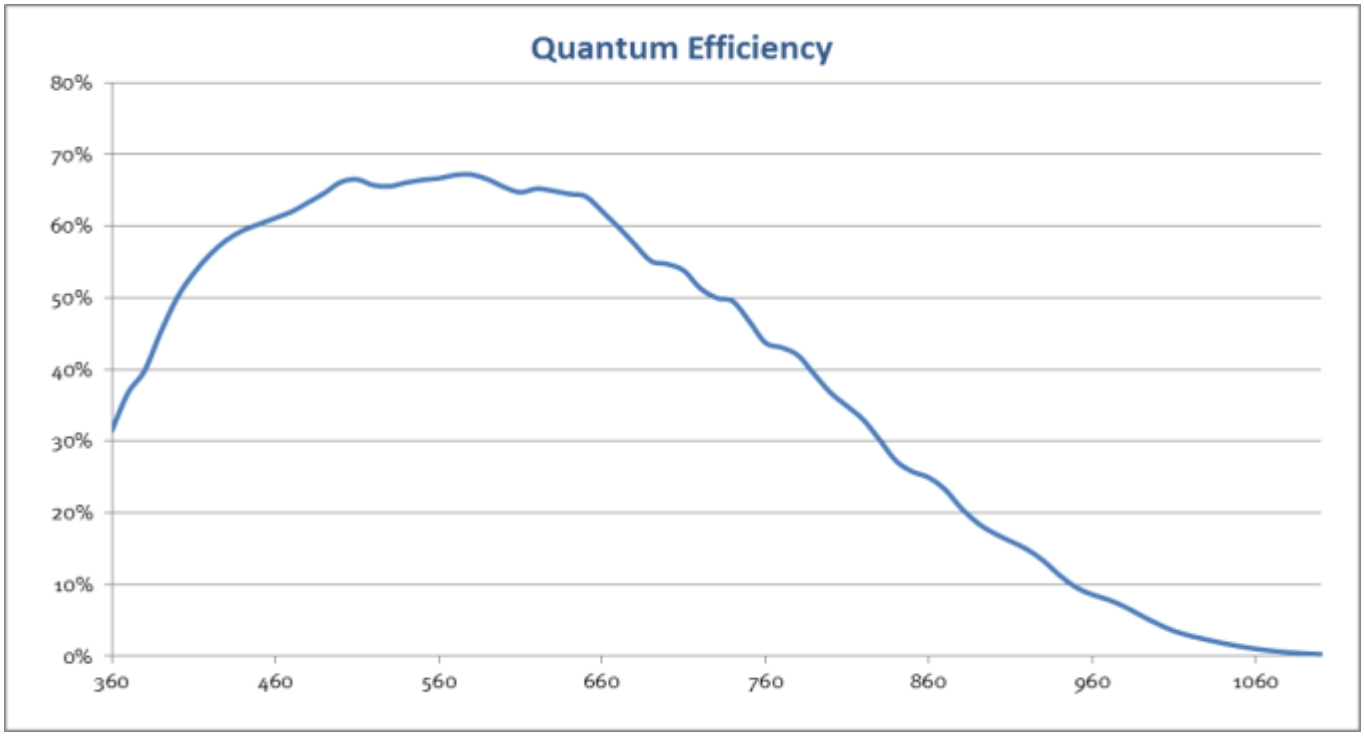
This structure allows several definitions :

- 4k pixels 5x5µm
- 2k Pixels 10x10µm by binning of 4 pixels
- Then, 1k or 0,5k 10x10µm are achieved by applying an ROI on the centre of the sensor.

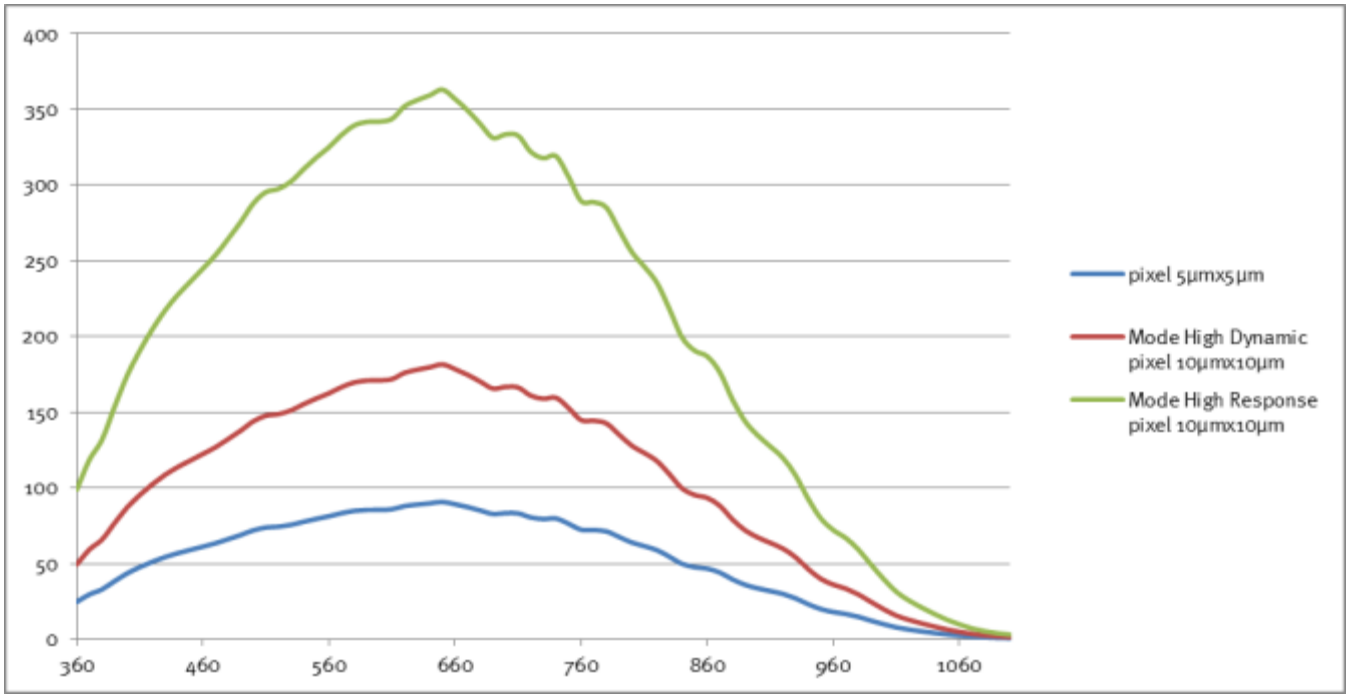


Response & QE curves

Quantum Efficiency

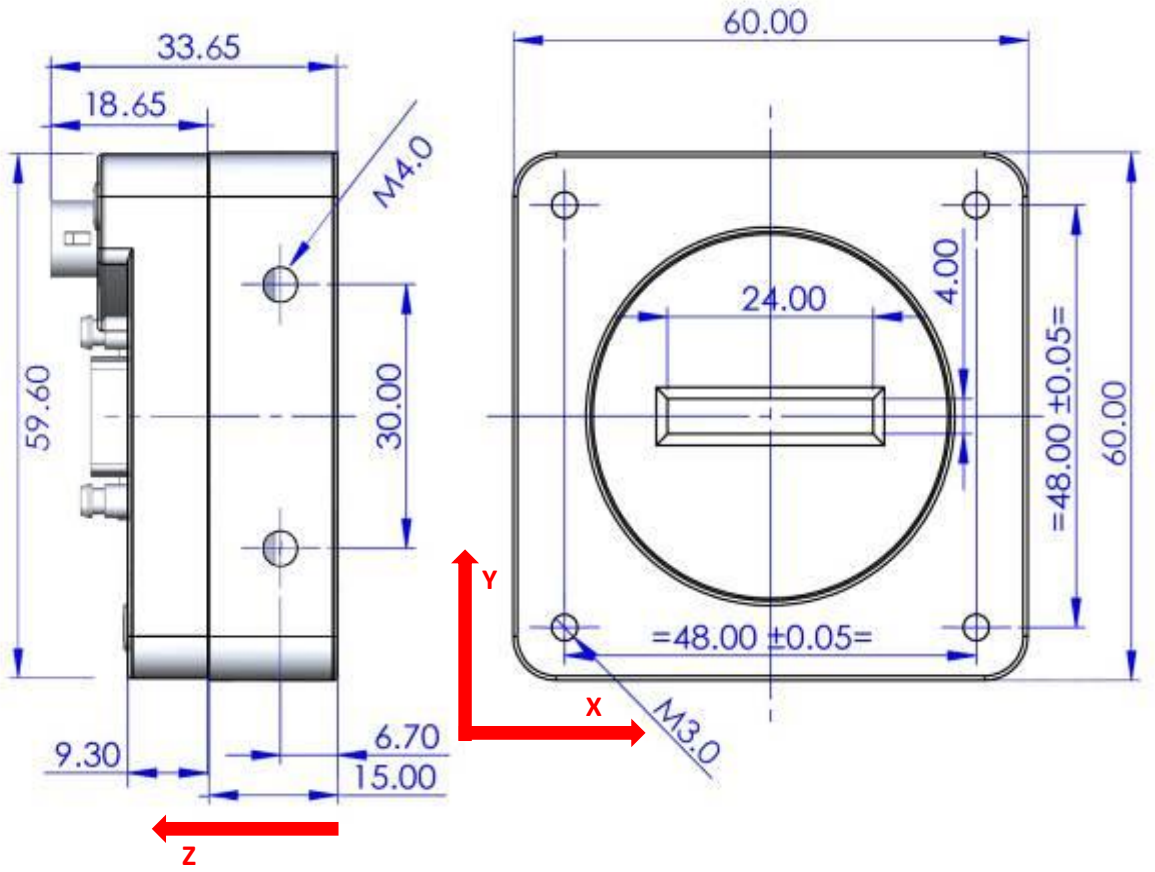


Spectral Response Curves



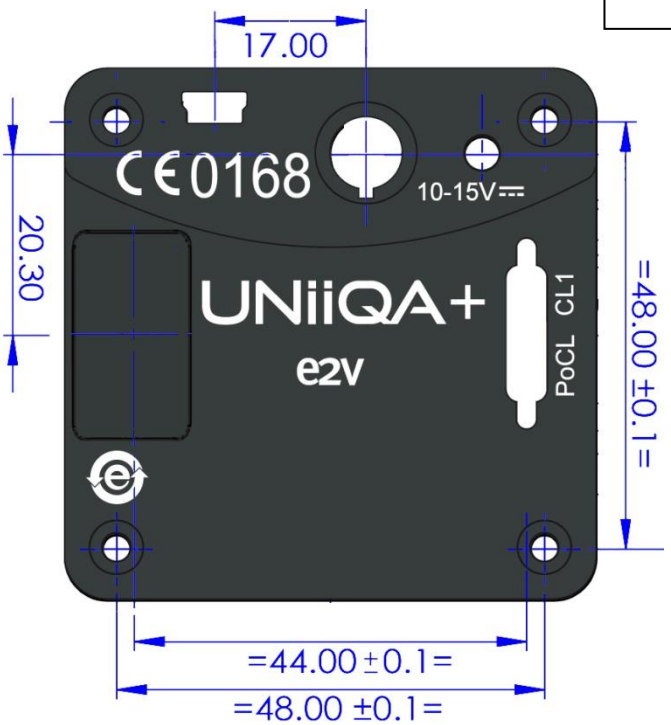
(*) High Dynamic / High Response. : High dynamic with the Use of Multi-Column Gain 1/2

Camera Hardware and Interface

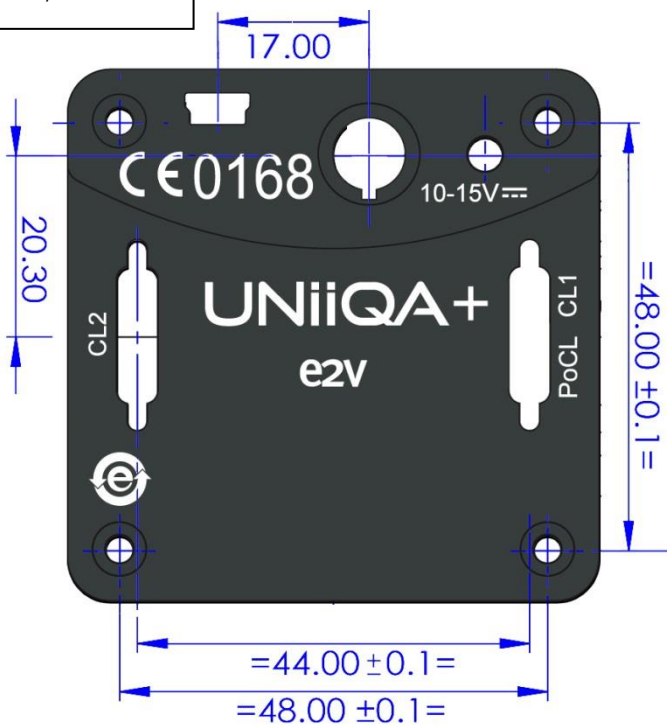


The Step file is available on the web : www.e2v.com/cameras

Essential Model



High Speed Model

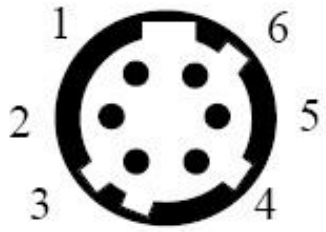


Input/output Connectors and LED

Power Connector

Camera connector type: Hirose HR10A-7R-6PB (male)

Cable connector type: Hirose HR10A-7P-6S (female)



Camera side description

Signal	Pin	Signal	Pin
PWR	1	GND	4
PWR	2	GND	5
PWR	3	GND	6

Power supply from 10 to 15v
Power 3,5W max with an typical inrush current peak of **0,32A** during power up

The Camera is compliant PoCl (Power Over Camera Link) : The Power Connector is not used if the Frame Grabber can be also compliant PoCL

CameraLink Output Configuration

	Channels	Pixels per Channel			
Version "Essential"		**4k**	**2k**	**1k**	**0,5k**
Base : 1 Channel 8/10/12bits	1 x 85MHz (60/42.5MHz)	1 x 4096	1 x 2048	1 x 1024	1 x 512
Base : 2 Channels 8/10/12bits	2 x 85MHz (60/42.5MHz)	2 x 2048	2 x 1024	2 x 512	2 x 256
Version "High Speed"					
Base : 1 Channel 8/10/12bits	1 x 85MHz (60/42.5MHz)	1 x 4096	1 x 2048	1 x 1024	1 x 512
Base : 2 Channels 8/10/12bits	2 x 85MHz (60/42.5MHz)	2 x 2048	2 x 1024	2 x 512	2 x 256
Medium : 4 Channels 8/10/12bits	4 x 85MHz (60/42.5MHz)	4 x 1024	4 x 512	4 x 256	NR
Full : 8 Channels 8bits	8 x 85MHz (60/42.5MHz)	8 x 512	8 x 256	NR	NR
Deca : 10 Channels 8bits	10 x 42.5MHz (60/85MHz)	10 x 409	NR	NR	NR

NR : Not required as the fastest speed (100kHz) is already achieved by the precedent output mode with the lowest data rate (ex : 100kHz is achieved on 512 pixel in base mode with 2 x 42.5Mhz. Medium is not required, even for 10bits.

Standard Conformity

The UNIIQA+ cameras have been tested using the following equipment:

- A shielded power supply cable
- A Camera Link data transfer cable ref. 1MD26-3560-00C-500 (3M), 1SF26-L120-00C-500 (3M)
- A linear AC-DC power supply

e2v recommends using the same configuration to ensure the compliance with the following standards.

CE Conformity

The UNIIQA+ cameras comply with the requirements of the EMC (European) directive 2004/108/EC (EN 50081-2, EN 61000-6-2).

CE 0168

FCC Conformity

The UNIIQA+ cameras further comply with Part 15 of the FCC rules, which states that: Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual , may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

RoHS / Chinese RoHS

RoHS per EU Directive 2011/65/EC and WEEE per EU Directive 2002/96/EC
China Electronic Industry Standard SJ/T11364-2006

GenICam / GenCP

GenICam/GenCP XML Description File, Superset of the GenICam™ Standard Features Naming Convention specification

V1.5, Camera Link Serial Communication : GenICam™ Generic Control Protocol (Gen CP V1.0)

Models

	Camera Part Number	Description	Details
UNIIQA+ Essential	EV71YC1MCL4005-BA2	Versatile Base CameraLink	4k pixels 5x5µm up to 20kHz 2k, 1k and 0,5k pixels 10x10µm up to 40kHz
	EV71YC1MCL4005-BA0	4k Pixels Base CameraLink	4k pixels 5x5µm up to 20kHz
	EV71YC1MCL2010-BA0	2k pixels Base CameraLink	2k pixels 10x10µm up to 40kHz
UNIIQA+ High Speed	EV71YC1MCL4005-BA3	Versatile Full CameraLink	4k pixels 5x5µm up to 100kHz 2k, 1k and 0,5k pixels 10x10µm up to 100kHz
	EV71YC1MCL4005-BA1	4k Pixels Full CameraLink	4k pixels 5x5µm up to 100kHz
	EV71YC1MCL2010-BA1	2k pixels Full CameraLink	2k pixels 10x10µm up to 100kHz