



## Key Features

- Large-area, tiled detectors with active area up to 30 x 30 cm
- 5 lp/mm resolution (99  $\mu\text{m}$  pixel)
- Gigabit Ethernet or Camera Link interface
- 14-bit digital video output
- Energy range 10 - 225 kV
- Ready-to-run software and drivers

## Applications

- Industrial inspection, biomedical and scientific

# Rad-icon Large-Area Industrial X-Ray Detectors

## Overview

Teledyne DALSA's *Rad-icon* product family of large-area digital x-ray imaging cameras offers users a high-speed, high-performance x-ray imaging detector with a fast, reliable PC interface (either GigE or Camera Link) for easy integration. The Rad-icon product line leverages Teledyne DALSA's advanced CMOS image sensing technology, which enables the delivery of low-dose x-ray images and yields higher image quality than a-Si flat panels and image intensifier devices. The detectors in this product line are capable of frame rates up to 30 fps, and communicate via a standard Cat6e or Camera Link data cable over lengths up to 100m.<sup>(1)</sup>

Rad-icon detectors are available with different Gd<sub>2</sub>O<sub>2</sub>S (GadOx) scintillator options to address a range of resolution and sensitivity requirements. The camera interface allows easy access to features such as adjusting the frame rate, single and multiple frame acquisitions, and control of advanced timing modes. Each detector ships with user-friendly software tools for stand-alone operation or easy integration with your application software.

<sup>(1)</sup> Max. cable length for CameraLink models is 7 m.

## Camera Options

Device	Pixels	Active Area	Max. Frame Rate
<b>Rad-icon 1520</b>	1548 x 2064	15.3 x 20.4 cm	16-20 fps
<b>Rad-icon 2022</b>	2064 x 2236	20.4 x 22.1 cm	30 fps
<b>Rad-icon 3030</b>	3096 x 3100	30.6 x 30.7 cm	30 fps

# Rad-icon Product Family Datasheet

## Specifications

Detector Specifications	Value	Units
Typ. dark current (23°C) <sup>(1)</sup>	20	ADU/s <sup>(2)</sup>
Read noise (rms)	4-6	ADU
Typ. dynamic range	3000:1	
Digitization	14	bits
Image lag	<0.1	%
Non-linearity (10..90% FS)	<2	%
Typ. readout period <sup>(3,4)</sup>	30-40	ms
Max. frame rate (full res.) <sup>(4)</sup>	30	fps
Output (pixel) data rate	40	MHz

<sup>(1)</sup> dark current doubles approx. every 8°C

<sup>(2)</sup> ADU = Analog-Digital Unit = 1 LSB (Least Significant Bit)

<sup>(3)</sup> time required to transfer image from sensor to camera memory

Electrical Specifications	Value	Units
Typical supply voltage	12.0	Volts
Supply voltage range	11 to 26	Volts
Maximum supply current <sup>(4)</sup>	3.0	Amps
Typical power dissipation <sup>(4)</sup>	10-20	Watts
Camera interface <sup>(4)</sup>	Gigabit Ethernet or CameraLink	
Trigger connector	TTL	

General Specifications	Value	Units
Operating temperature	+10 to +40	°C
Storage temperature	-10 to +55	°C
Humidity (non-condensing)	20 to 80	% R.H.
Weight <sup>(4)</sup>	4-8	kg

<sup>(4)</sup> depends on detector model

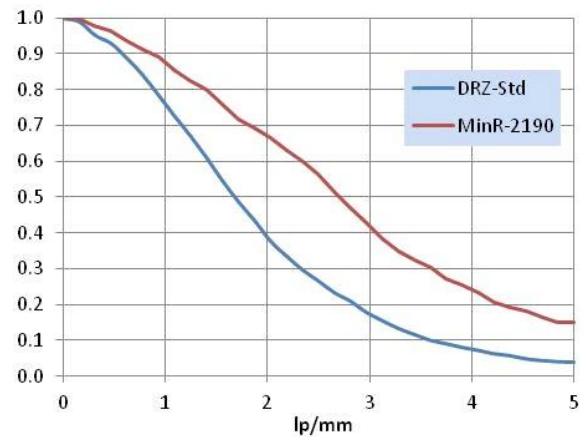
## Resolution & Sensitivity

The Rad-icon detectors are designed to work with x-ray sources operating at a wide range of kVp settings. X-ray energies as low as 10-15 keV can be detected. The cameras can be used with x-ray energies as high as 225kV, although we recommend the use of additional shielding and/or collimation at higher energies in order to protect the sensor element and electronics from damage.

The pixel spacing of each camera model determines the limiting resolution of the sensor. The actual Modulation Transfer Function (MTF) of the detector depends on the type of scintillator that is installed. A thicker phosphor screen will produce more signal, but at the expense of high-frequency contrast. Typical MTF curves for the two standard scintillator options are shown in the graph below.

Scintillator	Typical Sensitivity [ADU/ $\mu$ Gy] <sup>(1)</sup>	
	50kVp	80kVp
Min-R 2190	470	590
DRZ-Std	1200	1650

<sup>(1)</sup> W target, 2 mm glass window, no filtration

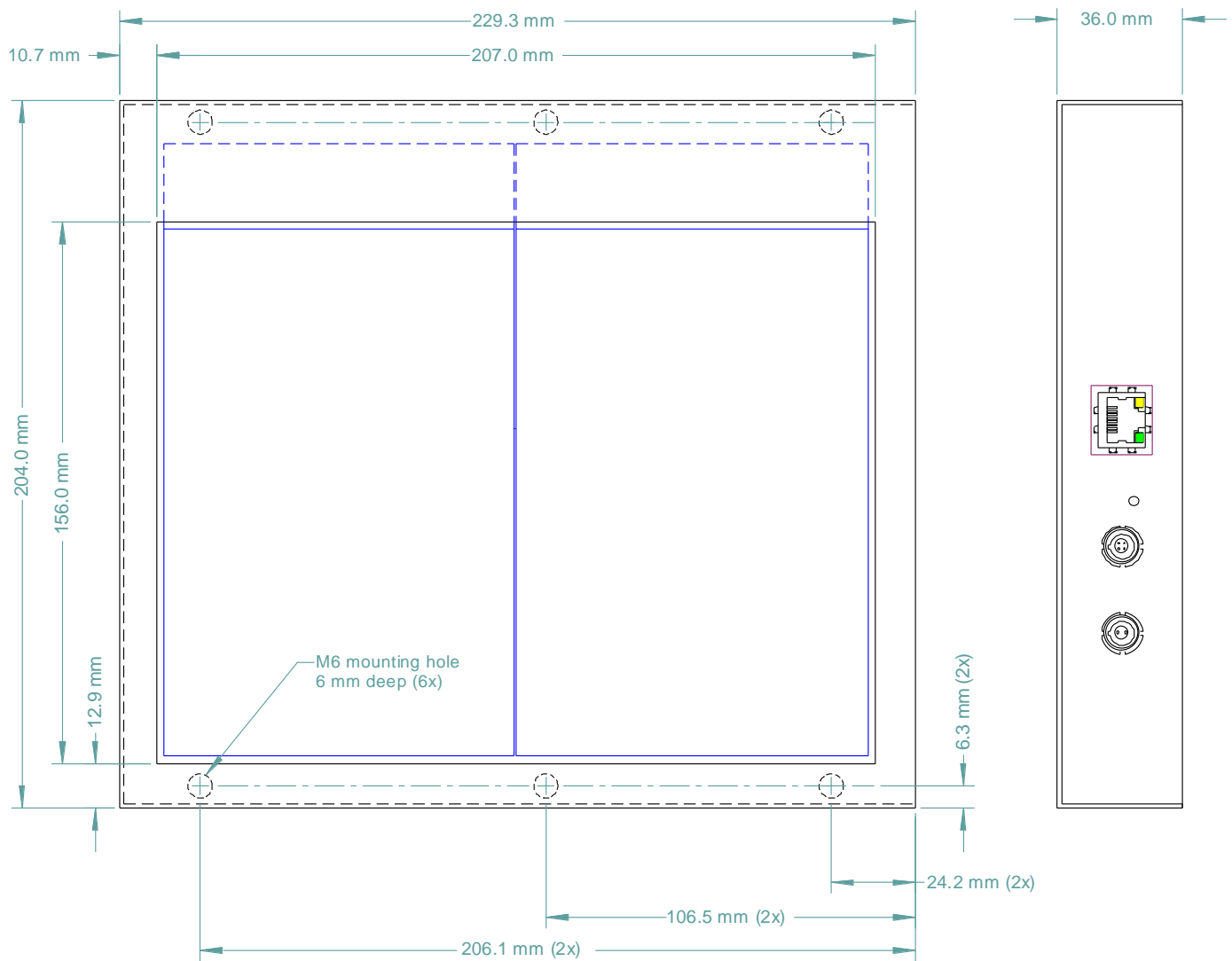


## Software

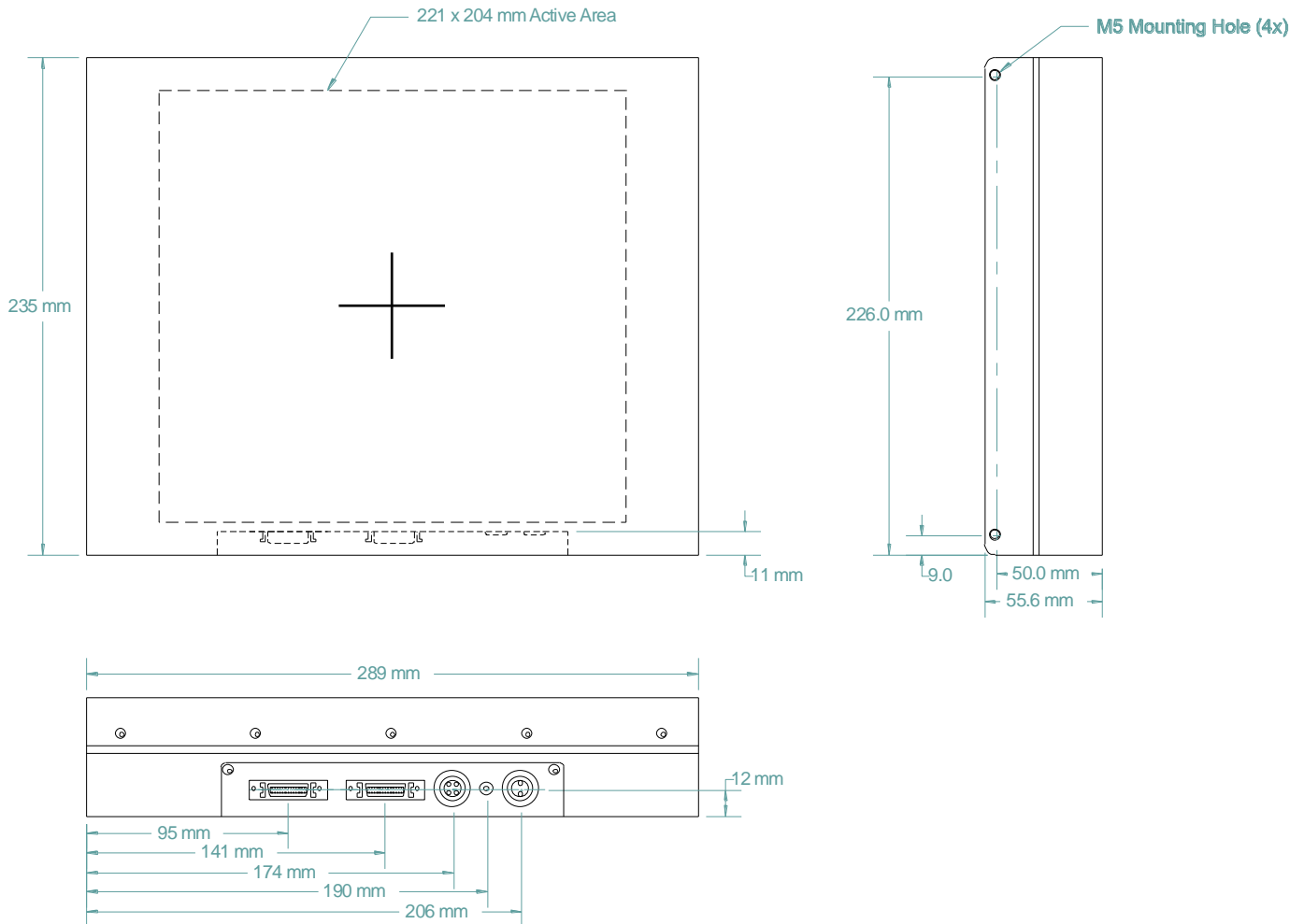
Each Rad-icon detector ships with our ShadoCam Imaging application, Teledyne DALSA's CamExpert software and a Gigabit Ethernet driver (if applicable). The software is compatible with Windows 7, 8 and 10. Check with your sales representative for compatibility with other Windows versions or with the Linux operating system. The Ethernet models can be connected on a network, but for optimal performance a dedicated network adapter is highly recommended.

For writing custom applications to acquire images from the detector, we recommend using Teledyne DALSA's Sopera Essential, or the Sopera LT SDK (free download available at <http://www.teledynedalsa.com/imaging/products/software/sopera/lt/>).

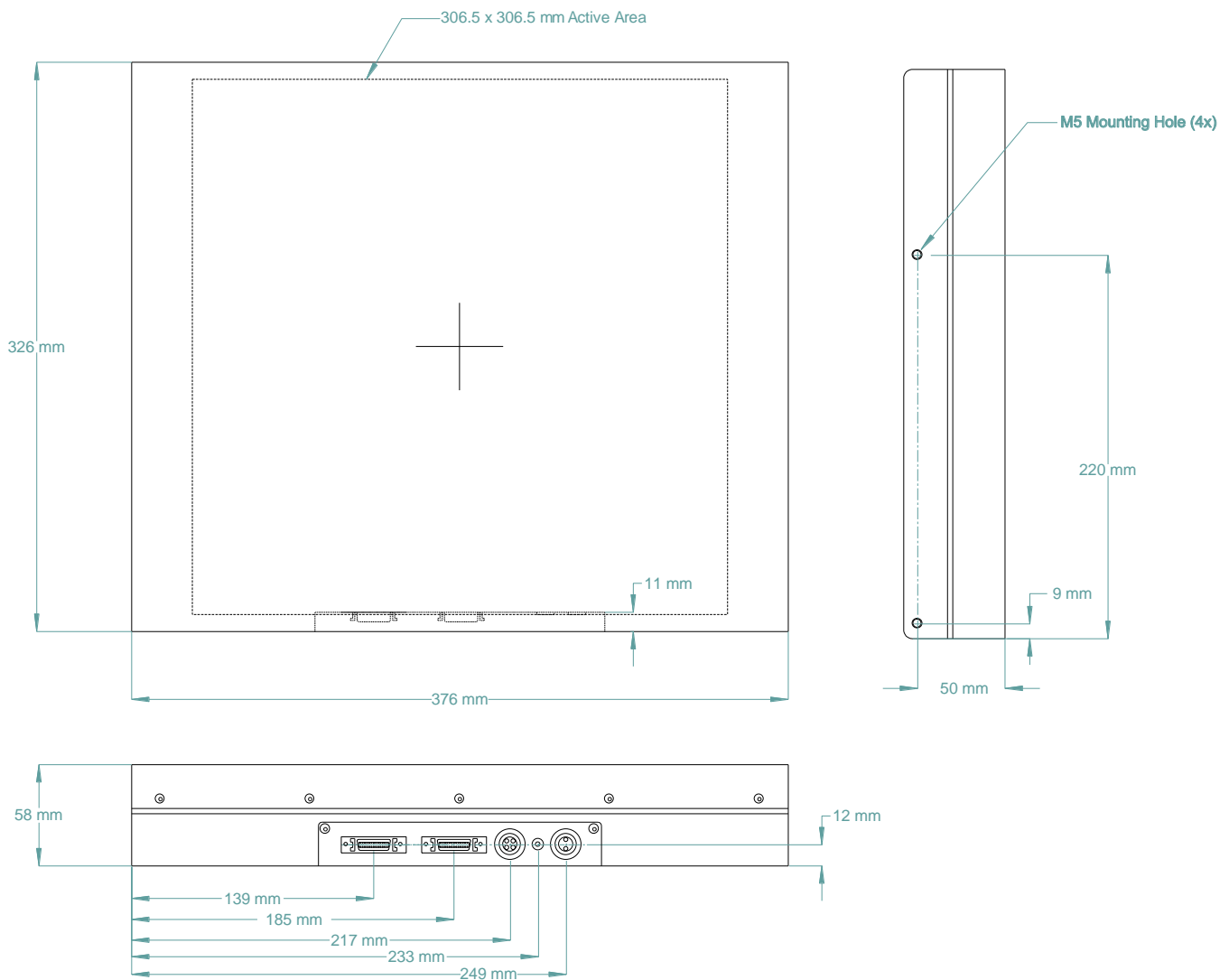
## Mechanical Dimensions Rad-icon 1520



## Mechanical Dimensions Rad-icon 2022



## Mechanical Dimensions Rad-icon 3030



## I/O Connectors

### Data Connector:

RJ45: HALO HFJ11-1G16E-L12RL<sup>(1)</sup>

CameraLink: 3M 10226-55G3PC<sup>(2)</sup>

### Power Connector:

2-pin LEMO

EGG.0B.302<sup>(1)</sup>

EGG.2B.302<sup>(2)</sup>

Pin 1 +12 VDC

Pin 2 ground



### Trigger I/O Connector

4-pin LEMO EGG.0B.304<sup>(1)</sup>/EGG.2B.304<sup>(2)</sup>

TTL (open collector), opto-isolated

Pin 1 Trig out+

Pin 2 Trig out-

Pin 3 Trig in+

Pin 4 Trig in-



<sup>(1)</sup> Rad-icon 1520    <sup>(2)</sup> Rad-icon 2022 and 3030 models

## Ordering Information

Rad-icon detectors are available in a single, industrial image quality grade (blemish specification available on request). Specify option -01 for Carestream Min-R<sup>®</sup> 2190 scintillator, or option -02 for a Mitsubishi Chemical DRZ-Std scintillator. Min-R 2190 not available on the Rad-icon 3030; contact us for additional scintillator options.

All detectors ship with a universal input power supply (90-264V, 50-60Hz), power cord, Ethernet cable (if applicable) and software CD. For international orders, please specify the type of power cord you require. Camera Link models require a CameraLink (full) frame grabber and cables (sold separately). Please contact your Teledyne DALSA sales representative for more information.

P/N	Description
SB1504	Rad-icon 1520 (15 x 20 cm, 99 µm pixel)
SB1533	Rad-icon 2022 (20 x 22 cm, 99 µm pixel)
SB1521	Rad-icon 3030 (30 x 30 cm, 99 µm pixel)

## Contact Information

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