

# Rad-icon Product Family



## Key Features

- Large-area, tiled detectors with active area up to 30x30 cm
- 5 lp/mm resolution (99µm pixel)
- Gigabit Ethernet or CameraLink interface
- 14-bit digital video output
- Energy range from 10 to 225 kV
- Ready-to-run software and drivers

## Overview

Teledyne DALSA's *Rad-icon* product family of large-area digital x-ray cameras offers users a high-speed, high-performance x-ray imaging detector with a fast, reliable PC interface (either GigE or CameraLink) 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 cameras in this product line are capable of frame rates up to 30 fps, and communicate via a standard Cat6e or CameraLink 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 camera ships with user-friendly software tools for stand-alone operation or easy integration with your application software.

## Camera Options

Device	Pixels	Active Area	Max. Framerate
Rad-icon 1520	1548x2064	15.3x20.4 cm	16-20 fps
Rad-icon 2022	2064x2236	20.4x22.1 cm	30 fps
Rad-icon 3030	3096x3100	30.6x30.7 cm	30 fps

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



## Specifications

Detector Specifications		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

Camera Specifications		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		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 camera model

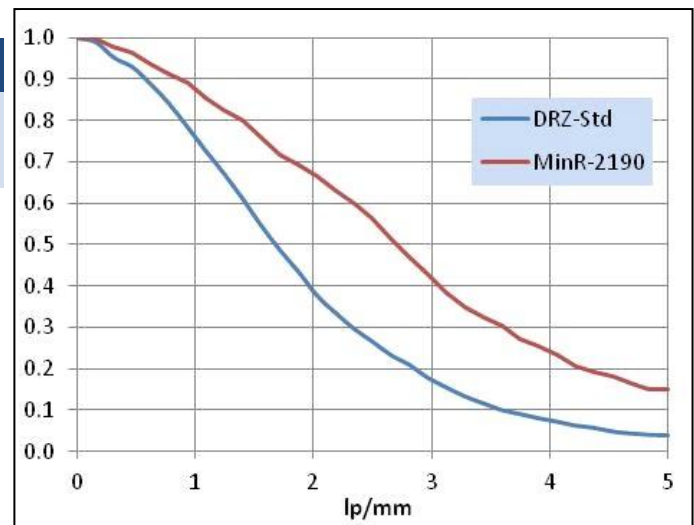
## Resolution & Sensitivity

The Rad-ikon cameras 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 <sup>(1)</sup>
Min-R 2190	4.1 ADU/μR @ 50kVp 5.2 ADU/μR @ 80kVp
DRZ-Std	10.5 ADU/μR @ 50kVp 14.5 ADU/μR @ 80kVp

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

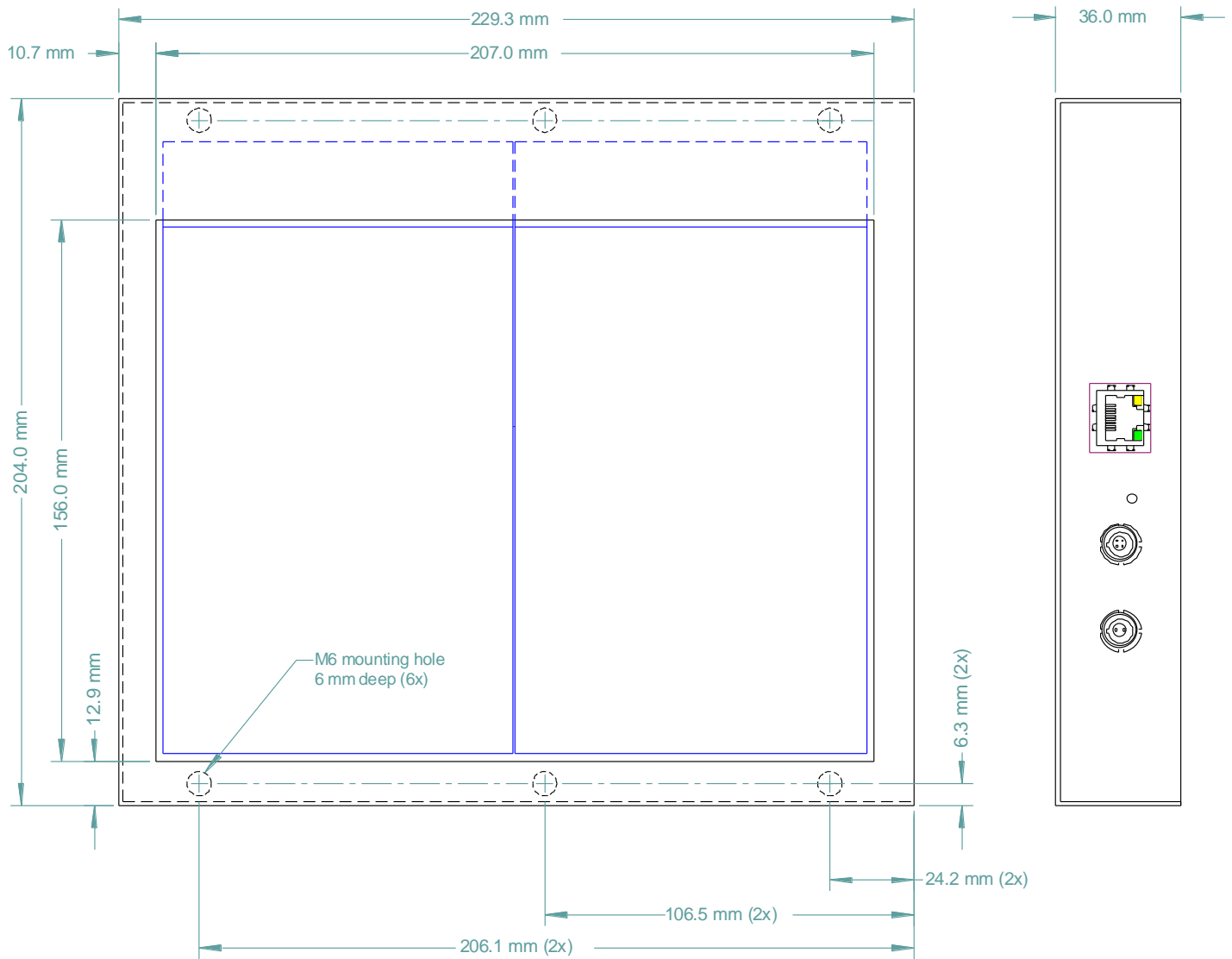


## Software

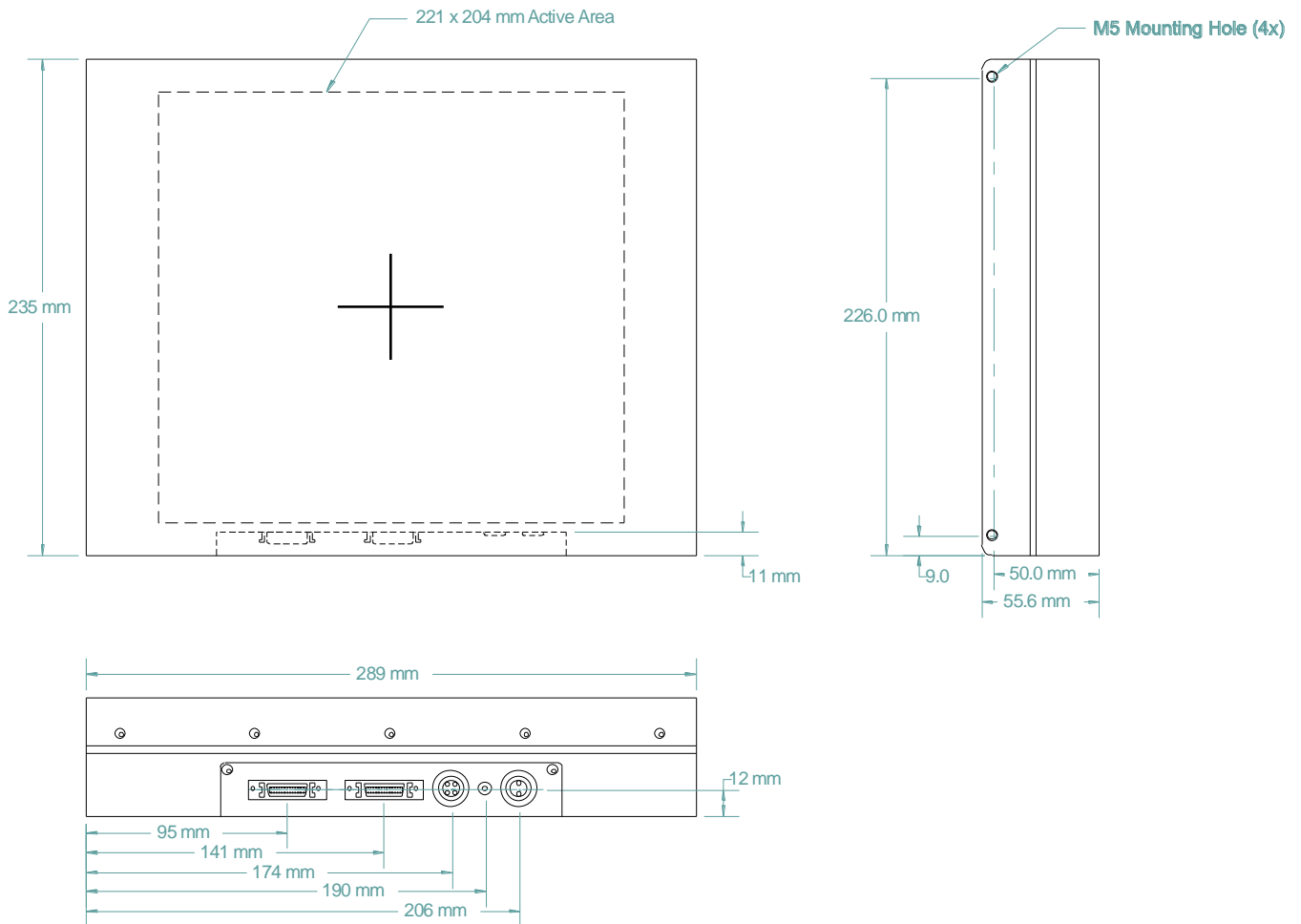
Each Rad-ikon camera ships with our ShadoCam Imaging application, Teledyne DALSA's CamExpert software and a Gigabit Ethernet driver (if applicable). The software is compatible with Windows<sup>®</sup> XP, Windows 7 and 8. Check with your sales representative for compatibility with other Windows versions 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 camera, we recommend using Teledyne DALSA's Sopera LT or Sopera Essentials SDK (sold separately).

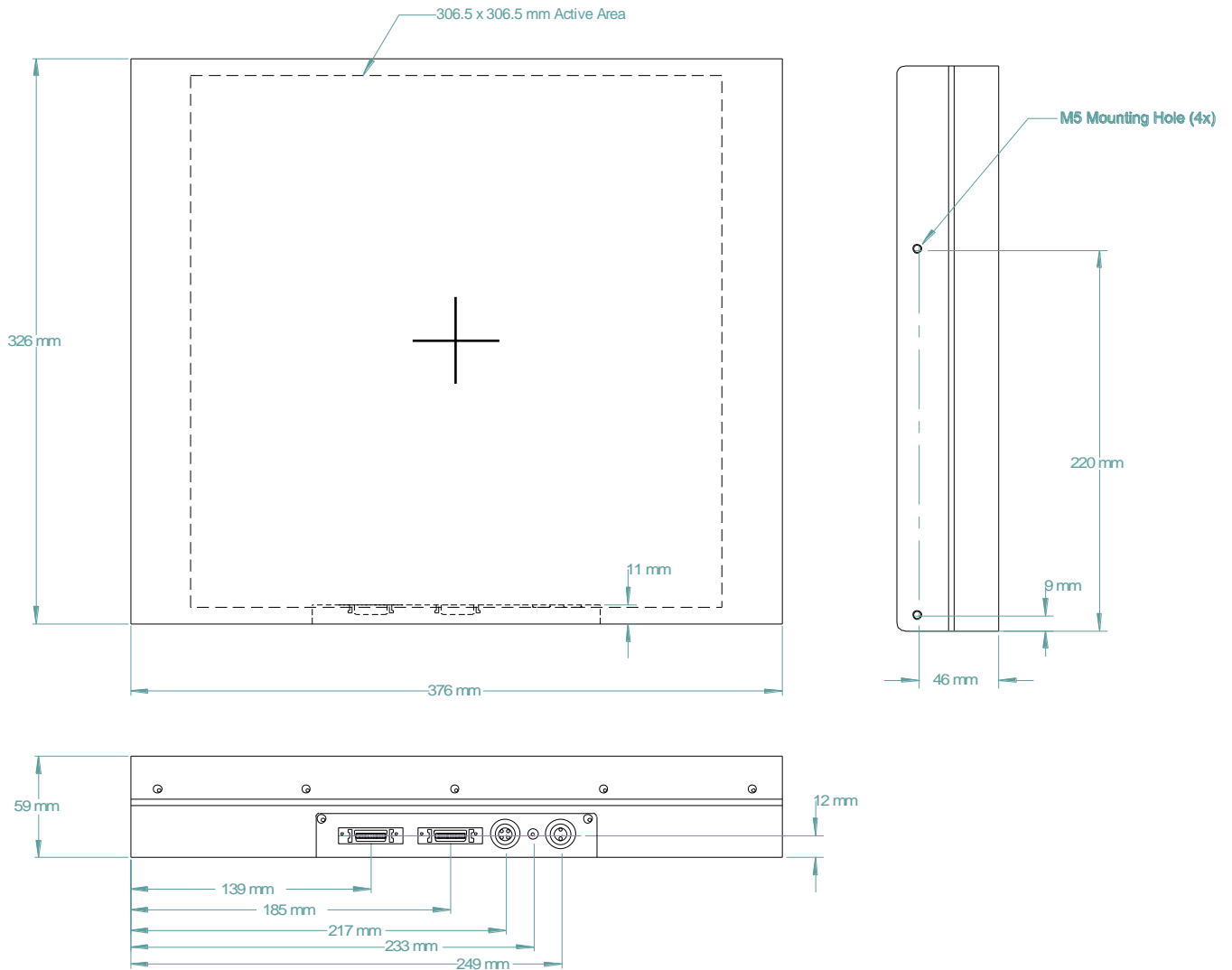
# Mechanical Drawing: *Rad-icon 1520*



# Mechanical Drawing: *Rad-icon 2022*



# Mechanical Drawing: *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 cameras 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 cameras 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. CameraLink 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 (15x20cm, 99µm pixel)
SB1533	Rad-icon 2022 (20x22cm, 99µm pixel)
SB1521	Rad-icon 3030 (30x30cm, 99µm pixel)