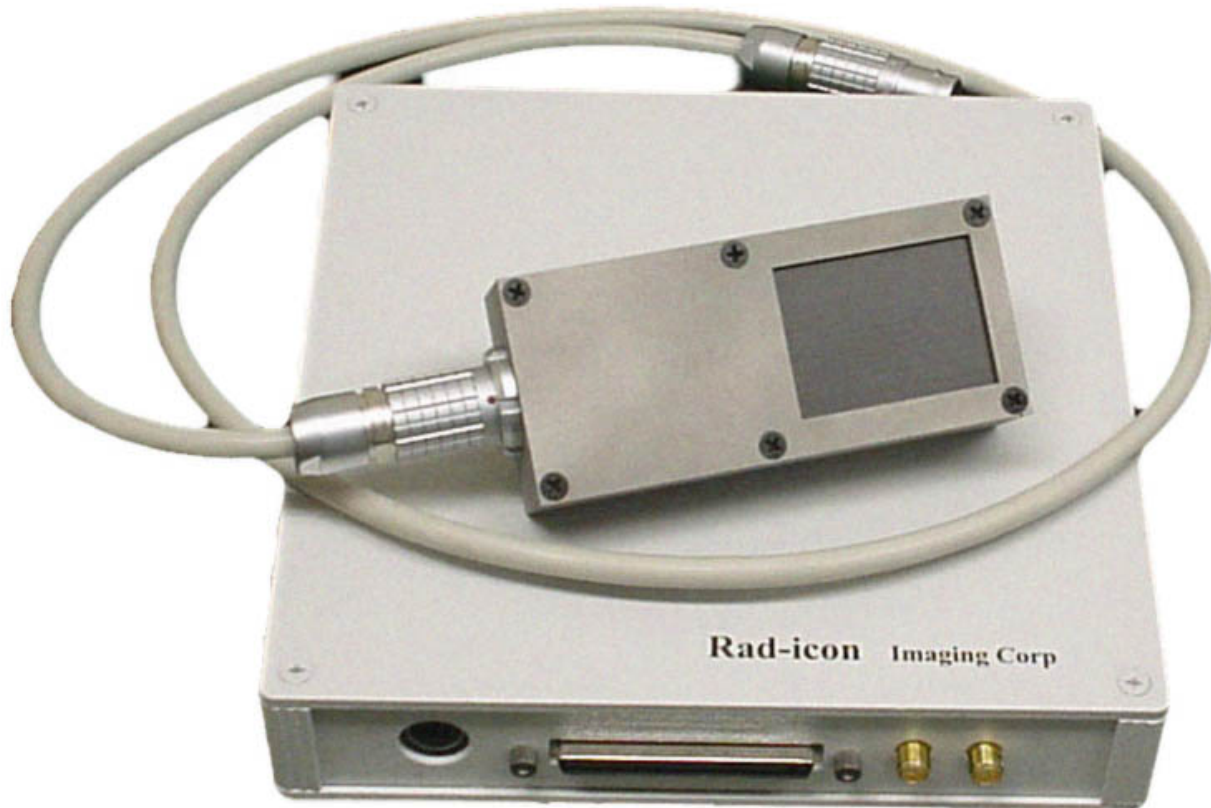Preliminary Datasheet

Remote RadEye™ HR

High-Resolution Detachable X-Ray Sensor

Key Features:

- Detachable, rugged sensor module on 1 meter cable
- 27 by 36 mm active area
- 22 lp/mm (22.5 µm) resolution

- Energy range from 10 to 90 kV
- 12-bit digital video output
- Digital frame grabber or USB interface
- Ready-to-run software and drivers

The Remote RadEye™ HR detachable x-ray sensor is a very high-resolution, miniature image sensor designed for compact, high-performance x-ray imaging systems. The sensor head is located at the end of a detachable cable that can reach into tight corners. The camera electronics are mounted in a separate enclosure which can be placed up to one meter away. While designed for portable NDT applications, the Remote RadEye HR can also be used in fixed installations.
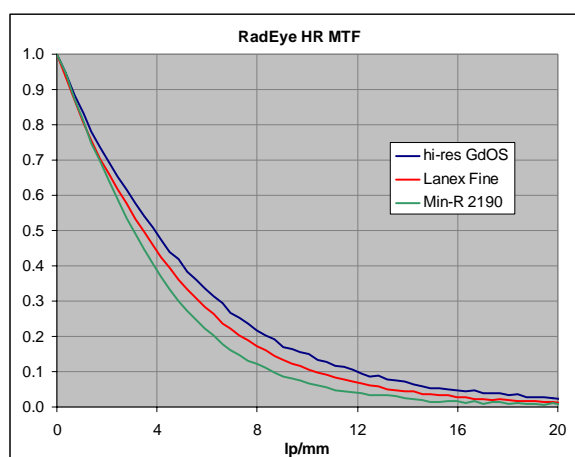
Description:

The Remote RadEye™ HR is a complete detection system for high-resolution radiation imaging. The sensor module contains a two-dimensional photodiode array featuring a 1200 by 1600 pixel matrix with 22.5 µm pixel spacing. A Gd_2O_2S scintillator screen, placed in direct contact with the photodiode array, converts incident x-ray photons to light, which in turn is detected by the photodiodes. The RadEye HR sensor is rated for operation with x-ray energies ranging from 10 to 90 keV.

The sensor module features a rugged steel enclosure with a stainless steel cover and a carbon-fiber window that shields the sensor against ambient light and protects the sensitive electronics from accidental damage. A one meter shielded cable is included to connect the sensor head to the electronics module. Here the analog video signal is processed, digitized to 12-bit resolution and made available for transmission to a PC. The electronics module features either a high-speed parallel digital frame grabber interface, or a USB connection for use with a PC or laptop. Please refer to our Shad-o-Box™ and Shad-o-Snap™ data sheets for additional details.

The standard version of the Remote RadEye HR delivers 4000:1 dynamic range (defined as the maximum signal divided by the read noise) at a frame rate of up to 1.3 frames per second. All models operate from a standard desktop power supply and consume less than five Watts of power. An optional battery pack is available for the USB model only.

Resolution:

The intrinsic resolution of the Remote RadEye HR detector is 22.5 µm, which corresponds to just over 22 line pairs per mm. The actual Modulation Transfer Function (MTF) for three different scintillators is shown in the graph to the right. A thicker phosphor screen will produce more signal, but at the expense of high-frequency contrast. Please refer to our appnote AN07 for more information on scintillator performance and tradeoffs.

Specifications:

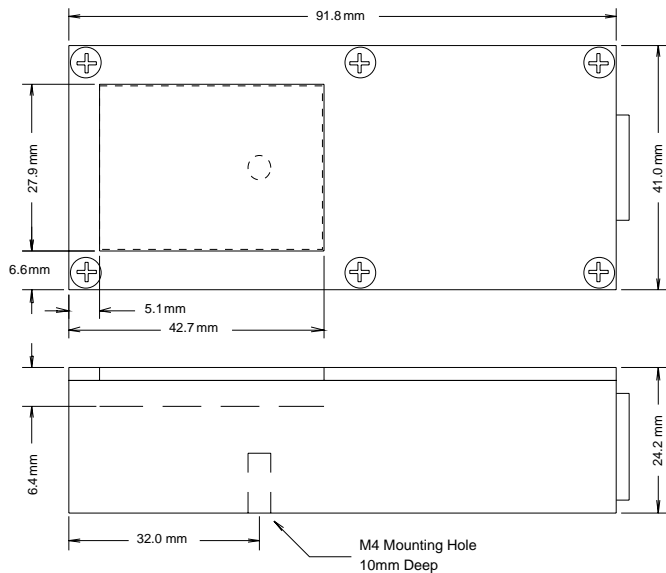| Detector Specifications	Shad-o-Box	Shad-o-Snap	Units
Avg. dark current (23°C)*	50	50	ADU/s**
Read noise (rms)	tbd	tbd	ADU
Dynamic range	4000:1	4000:1	
Digitization	12	12	bits
Conversion gain	60	60	electr/ADU
Sensor data rate	1500	1000	kHz
Min. frame period	1.32	1.98	sec

* dark current doubles approx. every 8°C
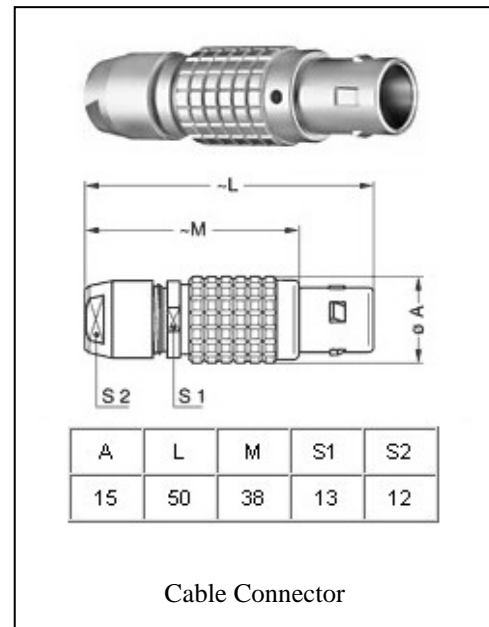** ADU = Analog-Digital Unit ≡ 1 LSB (Least Significant Bit)

General Specifications	All Versions	Units
Operating Temperature	0 to 50	°C
Storage Temperature	-25 to +85	°C
Humidity (non-condensing)	10 to 80	% R.H.

Mechanical Dimensions:

The size of the electronics enclosure is 160 by 160 by 32 mm. The sensor cable length is 1m – see drawing below for connector sizes. The dimensions of the sensor module are given below:

RadEye HR Remote Sensor Head

A	L	M	S1	S2
15	50	38	13	12

Cable Connector

Ordering Information:

The Remote RadEye HR detectors can be ordered in two image quality grades (Standard and Premium), and with either with a Kodak Min-R® 2190 or Lanex® Fine scintillator. Additional scintillators may be available by special order. The standard detector is rated for the 10-90 kV energy range. All cables are included.

The electronics modules are available with either a Shad-o-Box digital frame grabber interface or a Shad-o-Snap USB interface. Electronics modules ship with a desktop power supply and cables for 120V/60Hz. For international orders, please specify a universal input power supply (90-264V, 50-60Hz) and the type of power cord you require.

P/N	Description
RM1158	Shad-o-Box Electronics Module
RM1160	Shad-o-Snap Electronics Module
RM1180	RadEye HR Remote Sensor Module (10-90 kV)
-01	Premium Grade[1], Min-R 2190
-02	Standard Grade[2], Min-R 2190
-03	Premium Grade, Lanex Fine
-04	Standard Grade, Lanex Fine

[1] up to three line defects   [2] up to ten line defects