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Original factory
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**DATASHEET
CAMERA SYSTEMS
iCMOS 160**

**PHOTEK**
ENVISAGE THE FUTURE

# iCMOS 160

## Ultra-Fast Intensified CMOS Camera



**The Photek iCMOS 160 represents the latest advance in high speed intensified imaging.**

Its market leading speed of 160 frames per second at full resolution, coupled with optional ultra-fast gating, enables higher sensitivity measurements in a wide range of time resolved applications, including plasma physics, fluorescence lifetime imaging and combustion diagnostics.

Frame rates in excess of 1000 fps are possible at reduced frame size. Bespoke versions of the iCMOS 160 can be delivered with any of the wide range of Photek's image intensifiers, including intensifiers with market-leading UV sensitivity and size.

Operation has never been easier thanks to the plug-n-play USB 3.0 interface, fully integrated gate unit and intuitive Image32 software.
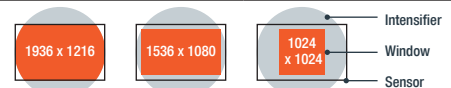
### Key Attributes

> 160 full frames per second

> 2.2 megapixel readout

> Variety of high QE, low noise photocathodes covering full UV to visible wavelengths

> Gating to <3 ns

> Fully integrated gating control

> Fibre optic coupling for maximum efficiency

> USB 3.0 interface

> Easy to use software

### Applications

> Time resolved fluorescence imaging

> Time resolved spectroscopy

> Combustion diagnostics

> Plasma physics

> Laser Induced Fluorescence (LIF)

> Fluorescence Lifetime Imaging Microscopy (FLIM)

> Raman spectroscopy

> Bio and chemiluminescence imaging

## Specifications

| Camera | | Readout Size | Frame Rate |
|---|---|---|---|
| Image Format | Sony IMX174 Sensor, 1920 x 1200 pixels | 1920 x 1200 | 160 |
| Pixel Size | 5.86 microns | 1536 x 1080 | 180 |
| Region of Interest | Up to 16 independently selectable ROIs | 512 x 512 | 368 |
| Exposure Time | 18 µs to 1 s (30 s Long exposure mode) | 256 x 256 | 689 |
| Pixel Clock | 30 MHz to 480 MHz | 128 x 128 | 1210 |
| ADC | 8 / 10 / 12 bits | 1920 x 32 | 2896 |
| Interface | USB 3.0 | | |

| Gating | Standard | High Speed Option |
|---|---|---|
| Min Gate Width | 50 ns | 3 ns |
| Max Repetition Rate | 10 kHz | 300 kHz |

| Gating Control | | |
|---|---|---|
| Gate Controller | Integrated GIC3 controller | |
| Delay/Width Increment | 1 ns steps | |
| Trigger Mode | External / Camera / Time base | |
| Camera Trigger | Synchronous (1 gate trigger per camera frame)          or | Asynchronous (multiplegate triggers per camera frame) |
| Internal Time Base | Programmable in range 1 Hz to 300 kHz | |

| Intensifer | MCP118 | MCP125 |
|---|---|---|
| Active Window Size | 18 mm diameter | 25 mm diameter |
| Input Window Material | Fused Silica or Fibre Optic | Fused Silica or Fibre Optic |
| Pixel Size | 9.1 microns | 13.3 microns |
| Photocathode | S20, SB, S20B, Bialkali, S25 | S20, SB, S20B, Bialkali, S25 |
| Coupling Method | Fibre Optic Taper | Fibre Optic Taper |
| Resolution | 45 lp/mm | 40 lp/mm |
| Uniformity | 10% SD/mean | 10% SD/mean |
| Phosphor (Decay time) | P43 (1 ms to 10%) or P46 (200 ns to 10%) | P43 (1 ms to 10%) or P46 (200 ns to 10%) |
| HV Power Supply | Integrated WP610 PSU | Integrated WP610 PSU |

| Window Readout | | |
|---|---|---|
| Image Window | Programmable window size and position | |
| Sub Sampling | x1, x2, x4 | |



1936 x 1216   1536 x 1080   1024 x 1024
Intensifier
Window
Sensor

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## Features and Benefits

| Features | Benefits |
|---|---|
| High speed full frame imaging of 160 fps | Faster image acquisition and higher sensitivity images |
| Gating to < 3 ns | Accurately capture fast transient events while reducing unwanted background |
| Gating repetition rate up to 300 kHz | Greater signal-to-noise using high repetition rate lasers |
| Fibre optic coupling | Optimum coupling of the Image Intensifier to the CMOS sensor, boosting gain and reducing vignetting |
| 16 independent Regions of Interest | Significantly higher readout rates for smaller regions of interest |
| USB interface | Plug-n-play operation |
| Image32 software | Easy to use software specifically designed for intensified cameras |
| Fully integrated gating control and power supply | No troublesome high voltage cabling |
| High QE image intensifiers | Best-in-class QE throughout the UV ensuring best overall signal-to-noise |
| Highly customizable | Options include alternative sensors, 40 mm intensifiers and multi-MCP configurations for higher gain |

## Quantum Efficiency Curves
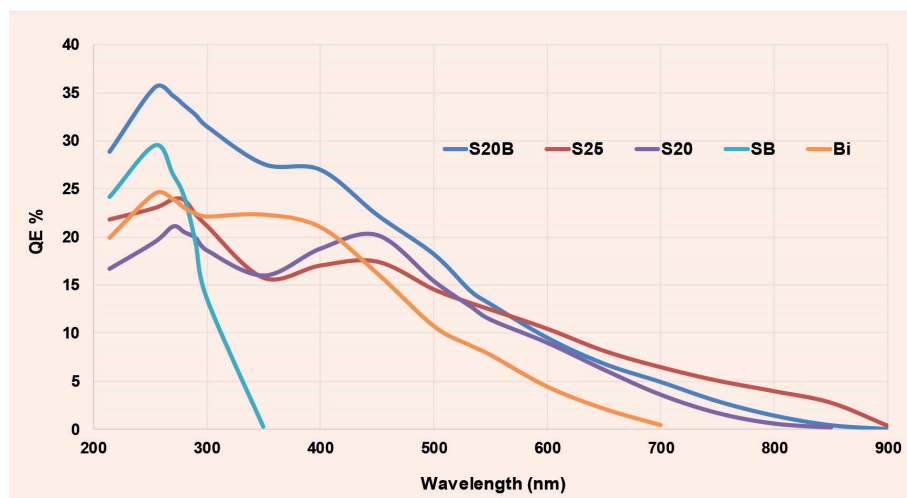


**Note:** The spectral graphs shown opposite are representative of standard 50 ns gated cameras and are for indication only.

Detectors with Fibre Optic input windows will have no response below 300 nm. If high UV response and fast gating is required, a mesh substrate is recommended.

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## Software

To harness the power of the iCMOS Camera, Photek provides its unique and easy to use imaging software. The **Image32** image processing software provides a wide range of tools for manipulating images and analyzing data.

A simple to use dialog box for controlling the camera is provided for camera setup including: region of interest, sub sampling, exposure time, gain and recording options.

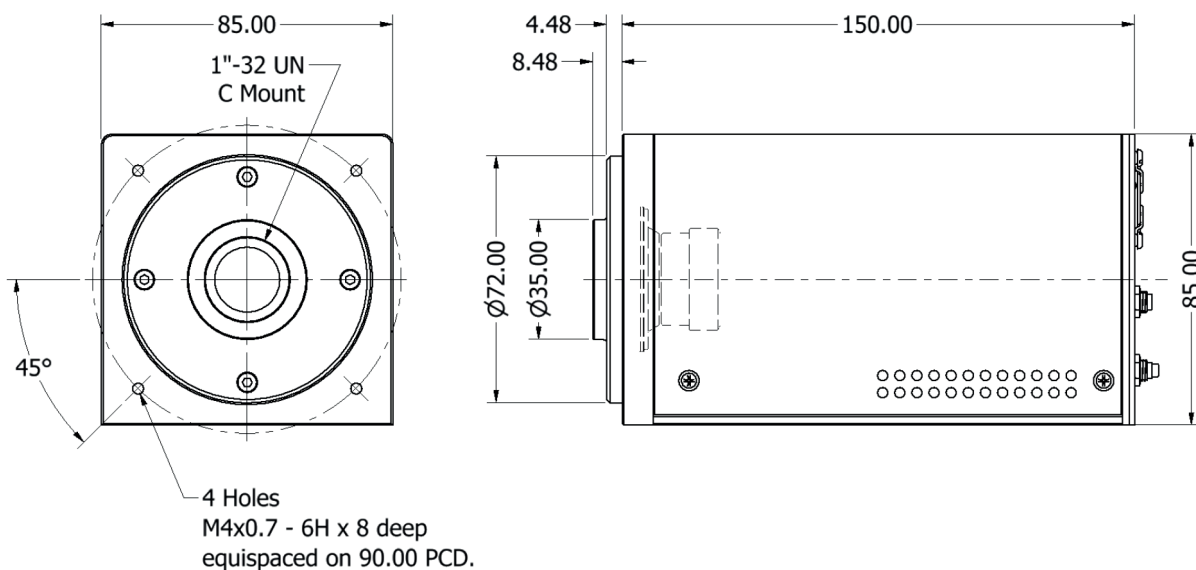Contact Photek for customisation of **Image32** for your application.

**Included with the iCMOS 160 Camera:**
AC Power Brick and mains cable, USB 3.0 Camera Cable, USB 2.0 Control Cable, Image32 Software, User Manual.

| Computer Requirements | | Operating Conditions | |
|---|---|---|---|
| Processor: | i5 CPU, 2 GHz minimum | Operating Temperature: | 10°C to 40°C |
| RAM: | 4 GB minimum | Relative Humidity: | <70% (non-condensing) |
| Operating System: | Windows 7,8,10 | Storage Temperature: | 0°C to 55°C |
| USB: | USB 3.0 port available | Power Requirements | |
| Min Monitor Resolution: | 1024 x 768 | 12 V Power brick supplied, 100-240 VAC, 50-60 Hz | |

## Mechanical



85.00

1"-32 UN
C Mount

45°

4 Holes
M4x0.7 - 6H x 8 deep
equispaced on 90.00 PCD.

4.48
8.48
150.00
Ø72.00
Ø35.00
85.00

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## About Photek

**Photek is a specialist manufacturer of vacuum based tubes and camera systems for photon detection.**

Our product range includes; Camera Systems, Image Intensifiers, Photomultiplier Tubes, Streak Tubes plus a range of associated electronics.

We are experts in large area and ultra-high speed imaging and advanced photon counting camera systems.

Our continuing success is built upon continuous innovation and product development, and by harnessing and applying knowledge to find solutions for all of our customers' applications.

**Photek is accredited to ISO 9001 and ISO 14001.**



## Contact Us

**Our team of specialist engineers and scientists are ready to discuss your application requirements in depth.**

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