

USAF target imaged under microscope with 20x magnification

## Features and Benefits

- **Rapid frame rates**  
100 fps full frame sustained
- **1.2 e<sup>-</sup> read noise**  
Lower detection limit than any CCD or interline-based ICCD
- **6.5 μm pixels**  
Extremely high resolution over a 16.6 x 14 mm field of view
- **High resolution Gen 2 and 3 intensifiers**  
Highest available intensifier resolution with QE > 50% and sensitivity options from 180 nm to 850 nm
- **Photocathode gating rate up to 30 kHz**  
Increased Signal to Noise ratio for high speed laser-based experiments
- **Minimum photocathode gating ≤ 3 ns**  
Fast shuttering for high temporal resolution
- **C-mount coupling**  
2 cameras-in-one - seamless switch between ns time-resolved imaging and non-gated low-light imaging
- **PIV Mode**  
As low as 300 ns interframe (limited by P46 phosphor decay time)
- **Dual-Gain amplifiers**  
Extensive dynamic range of 25,000:1 @ 30 fps
- **ROI and pixel binning**  
User-defined ROI (1 pixel granularity) and hardware binning
- **Dynamic Baseline Clamp**  
Ensures quantitative stability
- **Software Exposure Events**  
Rapid software notification via SDK of start / end of exposure synchronization
- **iCam**  
Fast exposure switching

## Nanosecond Time-Resolved scientific CMOS

Fast gating, fast frame rate and modularity

- ✓ Market leading high speed, high resolution and large field-of-view scientific CMOS
- ✓ Nanosecond time resolution with compact, high throughput, high resolution gated image intensifier units
- ✓ Maximizing signal-to-noise: high QE Gen2 and Gen3 photocathodes, low read noise floor and high repetition rate photocathode
- ✓ Ideal for fast Plasma Imaging, Combustion studies including LIF/PLIF and Particle Image Velocimetry (PIV)

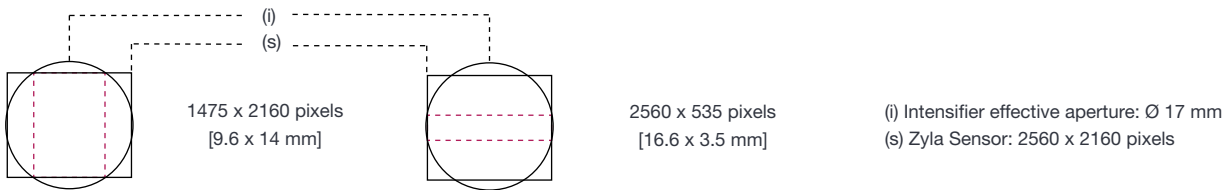
## Specifications Summary

<b>Active area (rectangular, WxH)</b>	1475 x 2160 pixels or 2560 x 535 pixels 16.6 x 3.5 mm or 9.6 x 14 mm
<b>Pixel size (W x H)</b>	6.5 μm
<b>Readout noise</b>	1.2 e <sup>-</sup>
<b>Maximum frame rate (10-tap version, rolling shutter)</b>	100 fps full frame > 1,600 fps with 512 x 512 sub-array
<b>Minimum gating</b>	≤ 3 ns
<b>Photocathode QE</b>	Up to 50%
<b>Useful photocathode spectral range</b>	180 - 850 nm
<b>Maximum photocathode repetition rate</b>	30 kHz
<b>Phosphor options</b>	P43 and P46 (fast acquisition)

## Specifications - Image Intensifier Units<sup>\*1</sup>

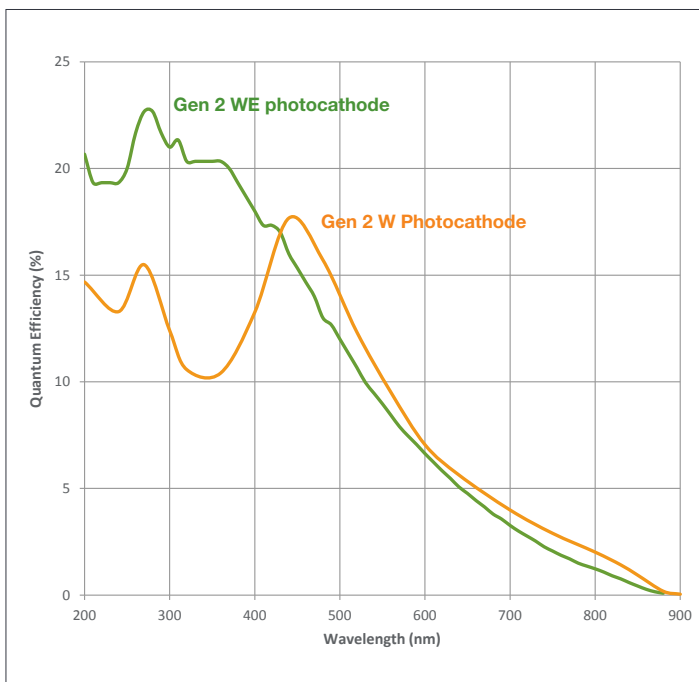
	18F-03	18F-04	18F-63	18F-64	18F-E3	18F-E4
<b>Effective aperture</b>	Ø 17 mm					
<b>Input window</b>	Quartz	Quartz	Glass	Glass	Quartz	Quartz
<b>Accessible active area on Zyla sensor (rectangular, W x H)</b>	1475 x 2160 pixels [9.6 x 14 mm] or 2560 x 535 pixels [16.6 x 3.5 mm] (refer to sensor active area below)					
<b>Photocathode type</b>	W	W	HVS	HVS	WE	WE
<b>Photocathode QE @ room temperature (%)</b>	18	18	>47.5	>47.5	22	22
<b>Wavelength range</b>	180-850 nm	180-850 nm	280-760 nm	280-760 nm	180-850 nm	180-850 nm
<b>Phosphor type [decay time to 10%]</b>	P43 [2 ms]	P46 [200 ns]	P43 [2 ms]	P46 [200 ns]	P43 [2 ms]	P46 [200 ns]
<b>Minimum gate width (ns)</b>	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
<b>Intensifier resolution limit (Lp/mm)</b>	> 57	> 57	> 50	> 50	> 57	> 50
<b>Maximum photocathode repetition rate</b>	30 kHz					

## Sensor Active Area

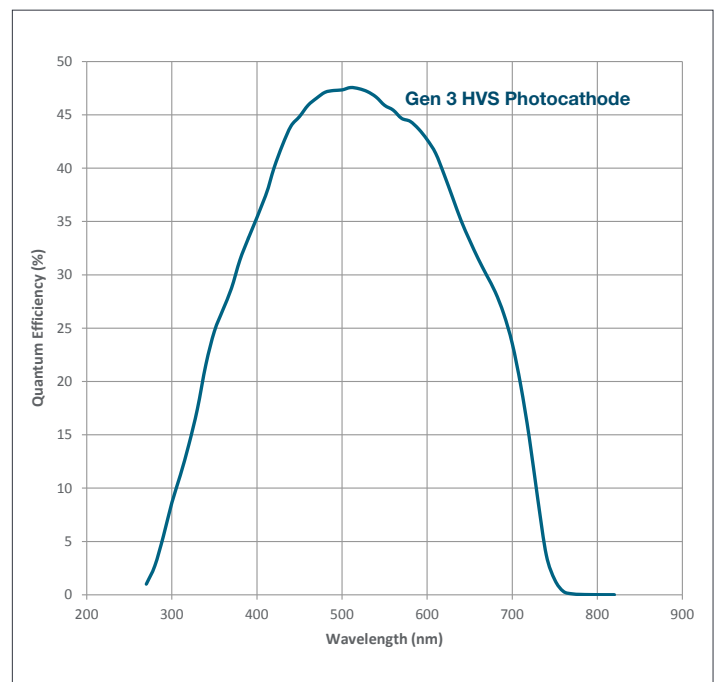


## Quantum Efficiency Curves<sup>\*2</sup>

Gen 2 Image Intensifiers



Gen 3 Image Intensifiers

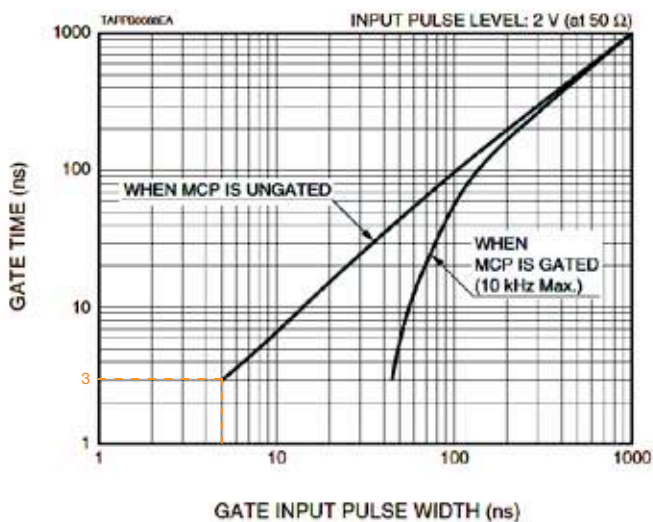


## Specifications - Gating Unit<sup>1</sup>

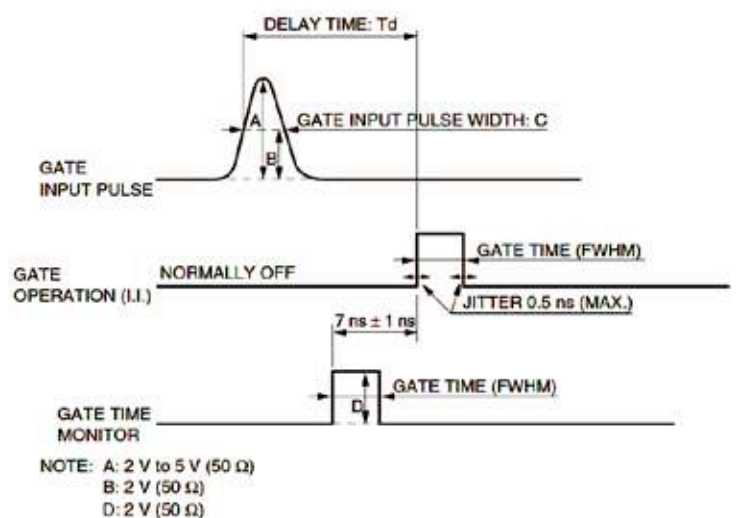
Parameter		All units
Operation Mode	Normal Mode	Continuous mode
	Gate Mode	Normally OFF, turns ON when the gate signal is input
Gate Signal Delay	Level	TTL Positive logic
	Input Impedance	50 Ω
	Pulse Width	5 ns to DC
	Repetition Rate (max.) - when MCP is gated <sup>*3</sup>	30 kHz 10 kHz
	Gate off time	20 μs min.
	Gate Time	3 ns to DC
Gate Output	Gate Rise Time (typ.)	2 ns
	Gate Fall Time (typ.)	3 ns
	Delay Time - when MCP is gated	36 ns ± 2 ns 86 ns ± 2 ns
	Jitter (max.)	0.5 ns
	Output Level	2 V Positive logic (at 50 Ω termination)
Gate Time Monitor	Pulse Width	Gate time (FWHM)
	Output Impedance	50 Ω

## Gating Unit Curves

Gate Time Input / Output Characteristics



Time Sequence



$T_d$ : 36 ns ± 2 ns (when MCP is ungated) 86 ns ± 2 ns (when MCP is gated)  
MCP gate operation starts 26 ns prior to the rise edge of GATE OPERATION and ends 26 ns after the fall edge.

## Key Specifications For Zyla sCMOS Models\*\*

Sensor type	Front Illuminated Scientific CMOS	
Active pixels (W x H)	2560 x 2160 (5.5 Megapixel)	
Sensor size	16.6 x 14.0 mm 21.8 mm diagonal	
Pixel size (W x H)	6.5 $\mu$ m	
Pixel readout rate (MHz)	560 (280 MHz x 2 sensor halves) 200 (100 MHz x 2 sensor halves)	
Read noise (e <sup>-</sup> ) *4	<b>Rolling Shutter</b>	<b>Global Shutter</b>
200 MHz	1.2	2.6
560 MHz	1.45	2.6
Sensor operating temperature *5	0°C (up to 35°C ambient)	
Dark current, e <sup>-</sup> /pixel/sec @ min temp *6	0.14	
Readout modes	Rolling Shutter and Global Shutter (Snapshot)	
Pixel well depth (e <sup>-</sup> )	30,000	
Linearity (% , maximum) *7	Better than 99%	
Pixel binning	Hardware binning: 2 x 2, 3 x 3, 4 x 4, 8 x 8	
User defined ROI granularity	1 pixel *	
I/O	External Trigger, Fire, Fire n, Fire All, Fire Any, Arm	
Trigger Modes	Internal, External, External Start, External Exposure, Software Trigger	
Software Exposure Events*8	Start exposure - End exposure (row 1), Start exposure - End exposure (row n)	
Hardware timestamp accuracy	25 ns	
Anti-blooming factor	x 10,000	

\* Minimum ROI height 12 rows

## Model Specific Specifications

Model	V	X
Data range	11-bit and 16-bit	11-bit and 16-bit
Interface options	Camera Link 3-tap	Camera Link 10-tap

## Maximum Frame Rate Table\*9

Array Size	V (3 tap version)		X (10 tap version)	
	Rolling Shutter	Global Shutter	Rolling Shutter	Global Shutter
2560 x 2160 (full frame)	30	30	100	50
2048 x 2048	39	39	105	52
1920 x 1080	80	80	198	97
1475 x 2160	53	50	100	50
2560 x 535	123	123	397	192
1024 x 1024	161	102	209	103
512 x 512	419	201	419	201
128 x 128	1,639	721	1,639	721

## Creating The Optimum Product for You

How to customize the iZyla:

### Step 1.

Select the image intensifier type that best suits your needs.

### Step 2.

Select the camera type.

### Step 3.

Choose the accessories.

### Step 4.

Please indicate which software you require.



**LCI-GTD UNIT-18 F-** **E4**  
example shown

### Step 1.

Choose image intensifier option

- |  |   |
|--|---|
| <b>03:</b> Gen 2 W Photocathode, P43 phosphor  | <b>64:</b> Gen 3 HVS photocathode, P46 phosphor |
| <b>04:</b> Gen 2 W Photocathode, P46 phosphor  | <b>E3:</b> Gen 2 WE photocathode, P43 phosphor  |
| <b>63:</b> Gen 3 HVS Photocathode, P3 phosphor | <b>E4:</b> Gen 3 WE photocathode, P46 phosphor  |

Note: All units include a gated intensifier unit and its control unit, a 1:1 high throughput relay lens and C-mount adaptors to the Zyla and camera lens.

**DG-152** **V** **-C1E-FI-T**  
example shown

### Step 2.

Choose the camera type

- V:** 30 fps, 11 bit and 16 bit, Camera Link 3-tap  
**X:** 100 fps, 11 bit and 16 bit, Camera Link 10-tap

### Step 3.

Choose the accessories:

**ACC-SRS-DG535** External Delay Generator to synchronize Zyla acquisition, intensifier gating and experiment source (e.g. Laser(s))

**Zyla Accessories** Please refer to Zyla specifications sheet for details on accessories available including fiber optic extenders and PC

**Camera Lenses** Please contact your local Andor representative for options of UV, UV-VIS and VIS-NIR camera lenses

### Step 4.

The Zyla also requires at least one of the following software options:

**Solis Imaging** A 32-bit application compatible with 64 and 32-bit Windows (XP, Vista and 7) offering rich functionality for data acquisition and processing. AndorBasic provides macro language control of data acquisition, processing, display and export.

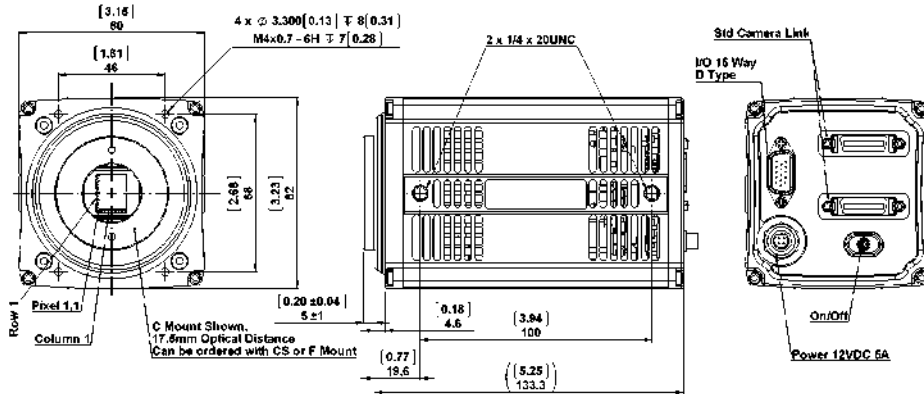
**Andor SDK** A software development kit that allows you to control the Andor range of cameras from your own application. Available as 32 and 64-bit libraries for Windows (XP, Vista and 7) and Linux. Compatible with C/C++, LabView and Matlab.

**Third party software compatibility**

Drivers are available so that the Zyla can be operated through a large variety of third party imaging packages. See Andor web site for detail: [andor.com/software/](http://andor.com/software/)

## Product Drawings

Dimensions in mm [inches]



Third-angle projection

### Operating and Storage Conditions

- Operating Temperature: 0°C to 35°C ambient
- Relative Humidity: < 70% (non-condensing)
- Storage Temperature: -10°C to 50°C

Weight:

1 kg

## Connecting to the Zyla

### Camera Control

Connector type: 3 meter Camera Link 3-tap or 10-tap connectors (longer cable lengths available as accessories)

### TTL / Logic

Connector type: 15 way D Type with TTL I/Os for External Trigger, Frame Readout and Fire Pulse

### Regulatory Compliance

RoHS compliant

Compliant with the requirements of the EU EMC and LV Directives through testing to EN 61326-1 and EN 61010-1  
**(Applicable to Enclosed 'E' camera)**

Power: +12VDC ± 5% @ 5A

Ripple: 200 mV peak-peak 0 - 20 MHz

120 - 240 VAC 50/60 Hz external power supply PSE-approved available

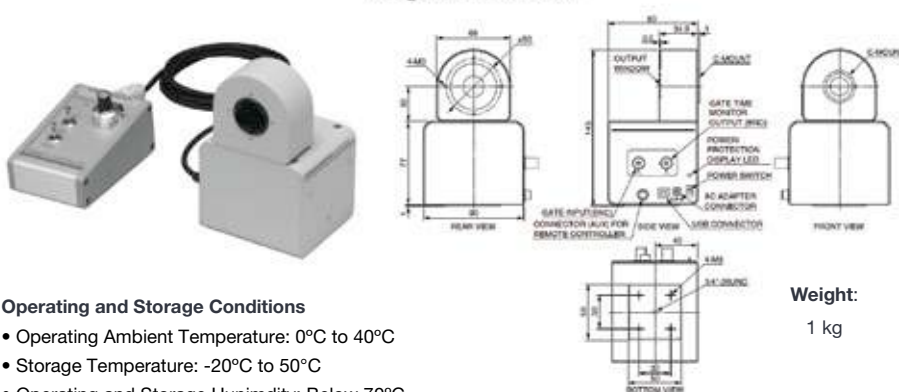
## 15-way D-type pinouts

Pin	Signal	Type
1	ARM	Output
2	Aux_Out_1*	Output
3	FIRE row n	Output
4	FIRE row 1	Output
5	Aux_Out_2	Output
6	Ground	GND
7	External Trigger	Input
8	Spare Input	Input
9	Reserved	N/A
10	Reserved	N/A
11	Reserved	N/A
12	Reserved	N/A
13	Reserved	N/A
14	Reserved	N/A
15	Reserved	N/A

\* Aux\_Out\_1 is configurable as Fire, Fire n, Fire All or Fire Any. See Zyla hardware manual.

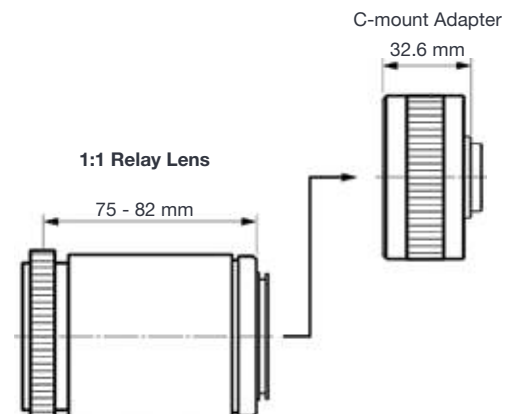
## Gated Unit Drawings

### Image Intensifier Head



Remote controller: 70 (W) × 48 (H) × 111 (D)

## Relay Lens Drawings





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### Items shipped with your camera

- 1x Camera Link card and 3 meter connector cable(s).
- 1x Power supply with mains cable
- 1x 7-way Multi I/O timing cable, offering Fire, External Trigger, Shutter and Arm (3 meter)
- 1x Quick Start Guide
- 1x CD containing Andor user guides
- 1x Individual system performance sheet

### Items shipped with your gated intensifier

- 1 x Power supply
- 1 x 2 meter USB cable
- 1 x CD containing remote control PC interface
- 1 x User Guide

## Footnotes: Specifications are subject to change without notice

1. Figures are typical unless otherwise stated.
2. As measured by manufacturer.
3. Only available through specific gated unit software.
4. Readout noise is for the entire system and is taken as a median over the sensor area excluding any regions of blemishes. It is a combination of sensor readout noise and A/D noise.
5. Specified cooling temperature assumes ambient temperature of up to 35°C.
6. Dark current measurement is taken as a median over the sensor area excluding any regions of blemishes.
7. Linearity is measured from a plot of Signal vs. Exposure Time over the full dynamic range.
8. Software Exposure Events provide rapid software notification (SDK only) of the start and end of acquisition, useful for tight synchronization to moving peripheral devices e.g. Z-stage.
9. The maximum frames/s table for Zyla indicate the maximum speed at which the device can acquire images in a standard system at full frame and also a range of sub-array size, for both rolling and global shutter readout modes, 11-bit single amplifier. Note that the write speed of the PC hard drive can impose a further restriction to achieving sustained kinetic series acquisition.

### Recommended Computer Requirements:

- 2.4 GHz Quad Core
- 4GB RAM (increase RAM if to be used for continuous data spooling)
- Hard Drive:
  - Minimum 250 MB/s continuous write for 'V' model
  - Minimum 850 MB/s continuous write for 'X' model
- PCI Express x4 or greater for 'V' model
- PCI Express x8 or greater for 'X' model
- Windows (XP, Vista or 7) or Linux
- \* See technical note entitled: 'Andor sCMOS Data Flow Considerations and PC Recommendations'
- \*\* Note, Andor supply PC workstations for Neo, see page 4.



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