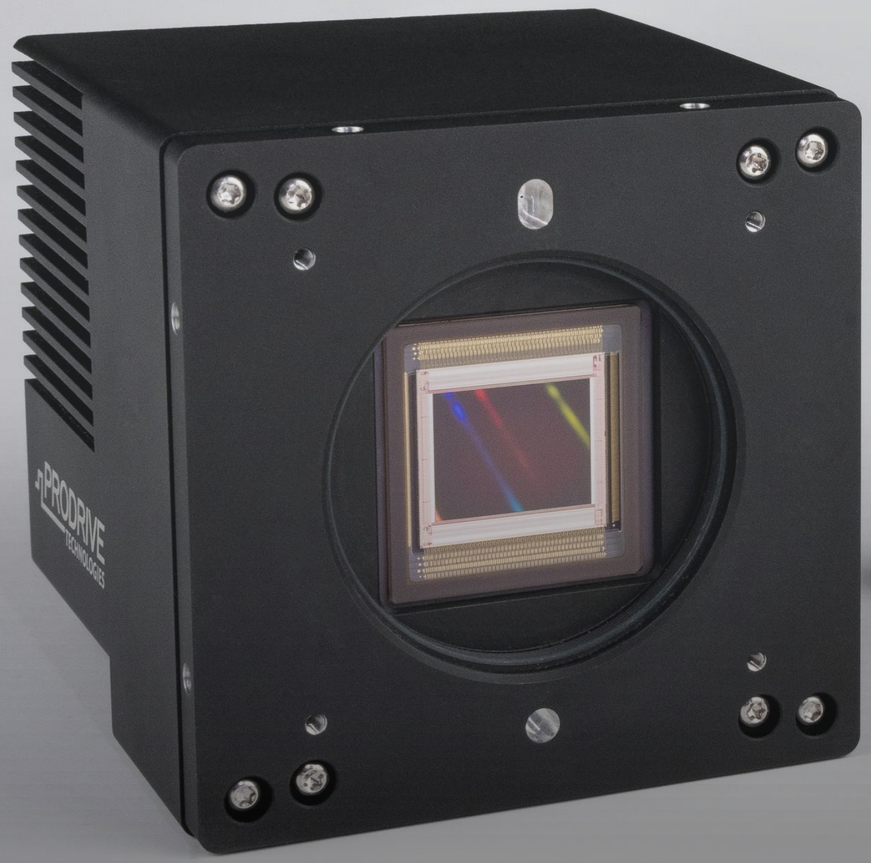
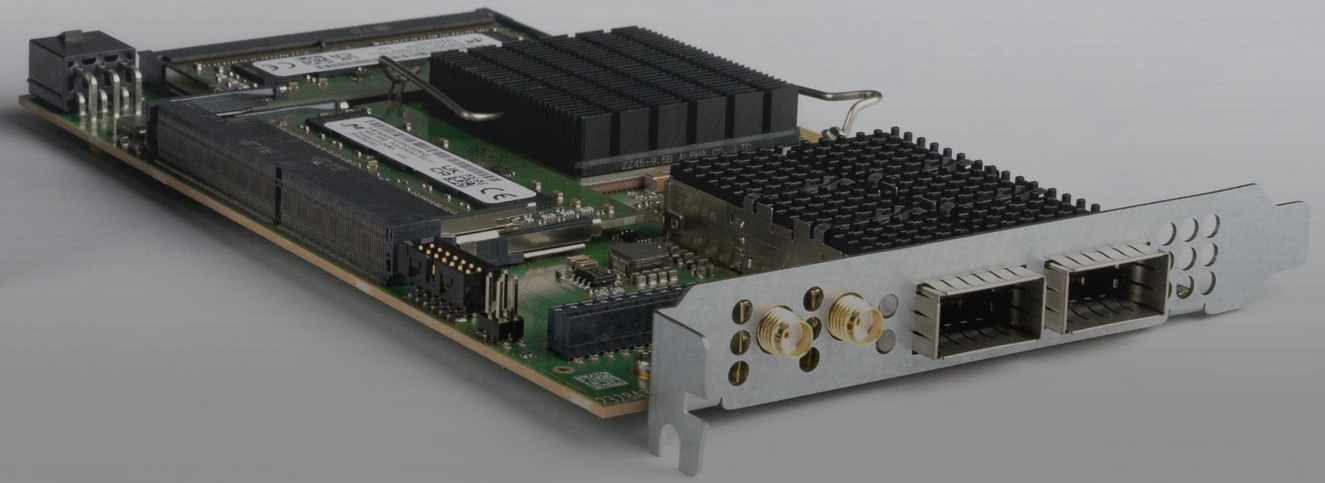
February 2025





Advanced Cameras Catalog

Staying ahead of the field

Table of contents

Creating meaningful technologies that make the world work

Knowledge

Engineering excellence is the driving force behind servo drive innovation in both design and manufacturing. Prodrive has a highly skilled group of electrical, mechanical and software engineers capable of customizing drive technology towards your needs.

Quality

Quality is in the DNA of Prodrive Technologies. With a long history in electronics manufacturing, Prodrive continues in this area with the same philosophy and processes, setting a new standard within the servo drive market.

Automation

Design for manufacturing is key to reduce cost and guarantee quality. Circuit board manufacturing, testing and assembly are highly automated processes which guarantee a constant quality at minimum cost.

Time to market

Due to the agility of Prodrive Technologies' large development department, customization can be performed in a very short time, providing a short time to market for challenging mechatronic applications.

Prodrive Technologies HQ Campus, The Netherlands

Advanced Cameras Overview

'There is always space ahead of the field', which inspires us every day when creating advanced camera solutions that help OEMs in the semiconductor, flat panel display, and life science industries to increase their system's throughput.

Sonic

TDI line scan cameras

Apollo

Camera Link High-Speed (CLHS) frame grabber

Yooka

High frame rate area scan cameras

Yooka series area scan cameras

Introducing the Yooka series, a remarkable line of high-speed area scan cameras tailored for professionals who prioritize exceptional system throughput.

With an impressive bandwidth exceeding 168Gbps, the Yooka series redefines high frame rate imaging within the large area scan domain. Offering an ultra-high speed of up to 2,000 frames per second (fps) in full resolution, it stands as the first industry camera to fully utilize the GSPRINT sensor, ensuring top-notch performance in various applications.

With capture rates of up to 30.000fps (ROI Read-out) and a resolution of up to 21MPx, the Yooka series not only enables precise data capture but also empowers users to elevate throughput while maintaining exceptional performance standards tailored to specific requirements.

Its support for water cooling makes the camera well-suited for integration into systems that are deployed in a clean room environment.

Highlights:

- Gpixel's GSPRINT4510, 5514 or 4521 global shutter image sensors
- Unique high frame rate imaging with capture rates up to 30.000fps
- CLHS optical X-protocol interface at 25 Gb/s per lane
- Optional water-cooling support for clean-room compatible applications
- End-to-end solution including frame grabber

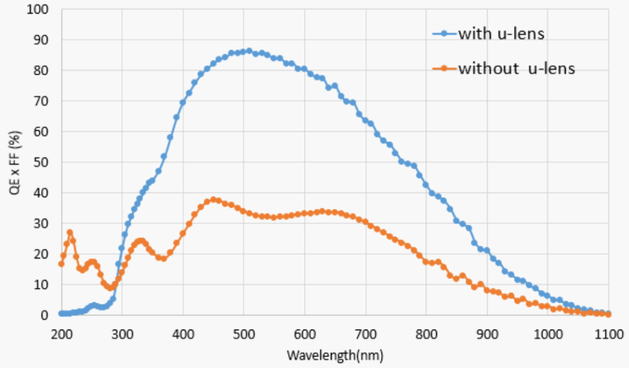
Yooka camera with Apollo frame grabber

Yooka – Specifications

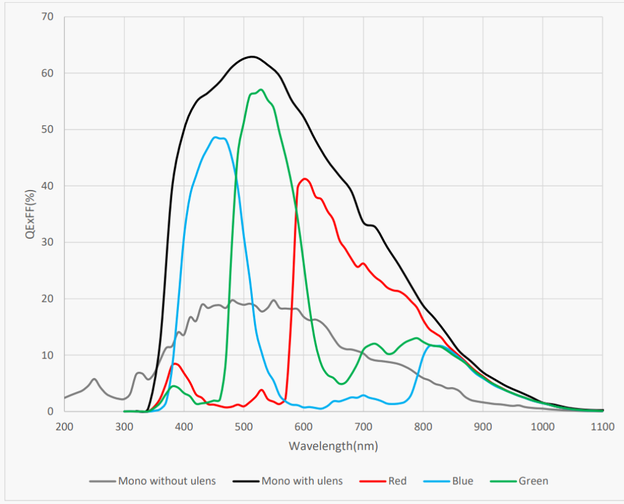
Parameter	Unit	Yooka-10		Yooka-14	Yooka-21	
Sensor	-	GPixel GPSRINT4510		GPixel GPSRINT5514	GPixel GPSRINT4521	
Resolution	Pixels	4,608 x 2,176		4,608 x 3,072	5,120 x 4,096	
Pixel size	µm	4.5 x 4.5		5.5 x 5.5	4.5 x 4.5	
Peak QE	%	63%		86%	63%	
Shutter type	-	Global FSI		Global BSI	Global FSI	
Minimum exposure time	µs	1		TBD	4	
FWC	ke-	32.6 111 (2x2 binning)		15 30k (2x2 binning)	34 107 (2x2 binning)	
Read-out noise	e-	4		1.87	4	
Dynamic range	dB	67.3		66.2	66.8	
ROI Read-Out	-	X: Yes; Y: Yes		X: Yes; Y: Yes	X: Yes; Y: Yes	
Max frame rate (Full resolution)	fps	M-Model 890 (8bit) 890 (10bit) 480 (12bit)	F-Model 1,920 (8bit) 1,000 (10bit) 480 (12bit)	M-Model only 670 (10bit) 350 (12bit)	M-Model 500 (8bit) 460 (10bit) 250 (12bit)	F-Model 1,000 (8bit) 500 (10bit) 250 (12bit)
Pixel format	Bit per pixel	8/10/12		10/12	8/10/12	
Interface (Control & Data)	-	M-Model CLHS, 1xQSFP – 4x25Gbps	F-Model CLHS, 2xQSFP – 8x25Gbps	CLHS, 1xQSFP – 4x25Gbps	M-Model CLHS, 1xQSFP – 4x25Gbps	F-Model CLHS, 2xQSFP – 8x25Gbps
Supply voltage	V_{DC}	12 – 24		12 – 24	12 – 24	
Power (Typical)	W	TBD		TBD	30	
Dimension W-H-D	mm	97 x 97 x 105		97 x 97 x 105	97 x 97 x 105	
Lens mount	-	M58		M58	M58	
Cooling	-	Heatsink (Air) or Water		Heatsink (Air) or Water	Heatsink (Air) or Water	

Spectral sensitivity characteristics

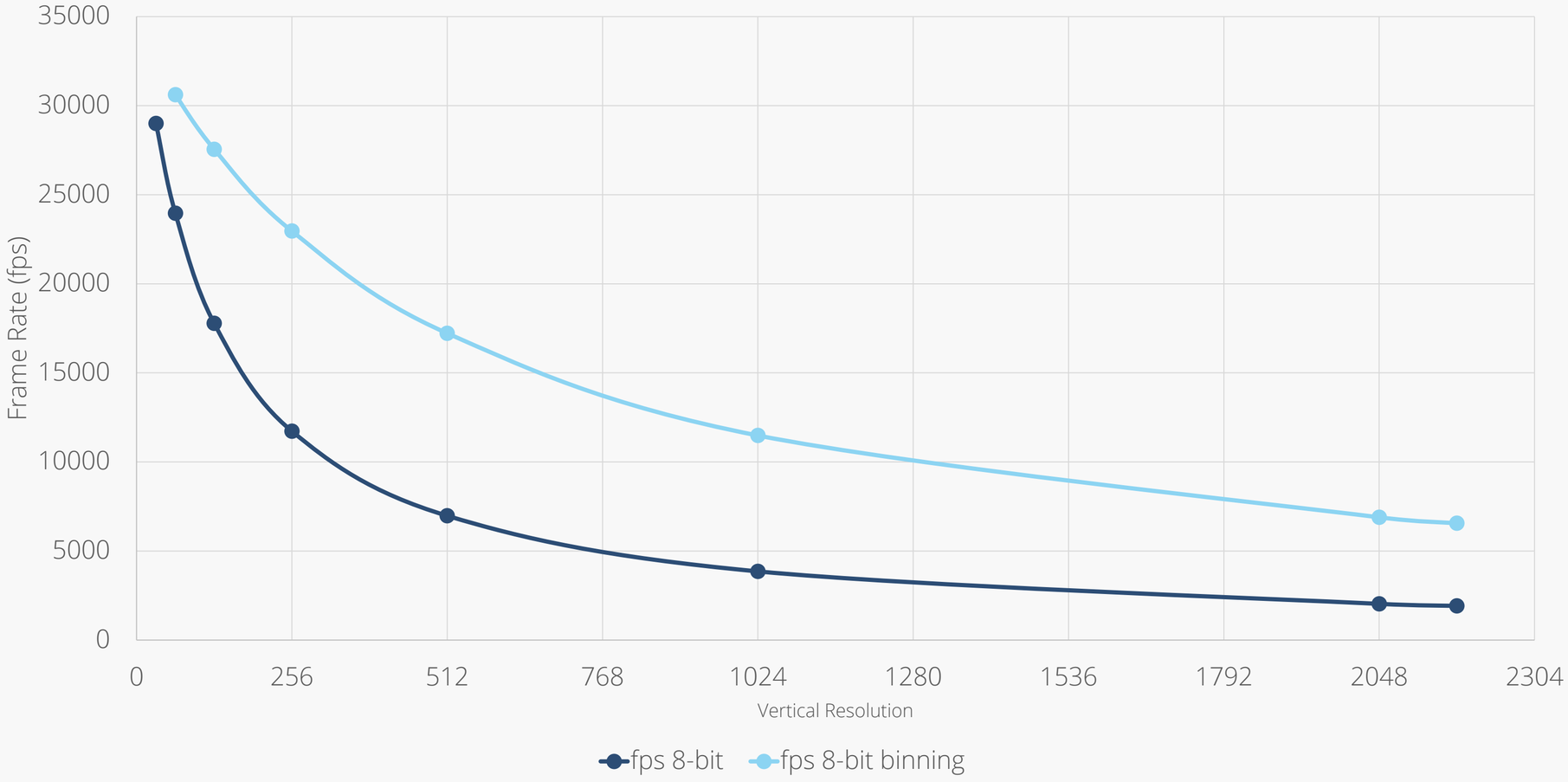
Yooka-14 (Preliminary)



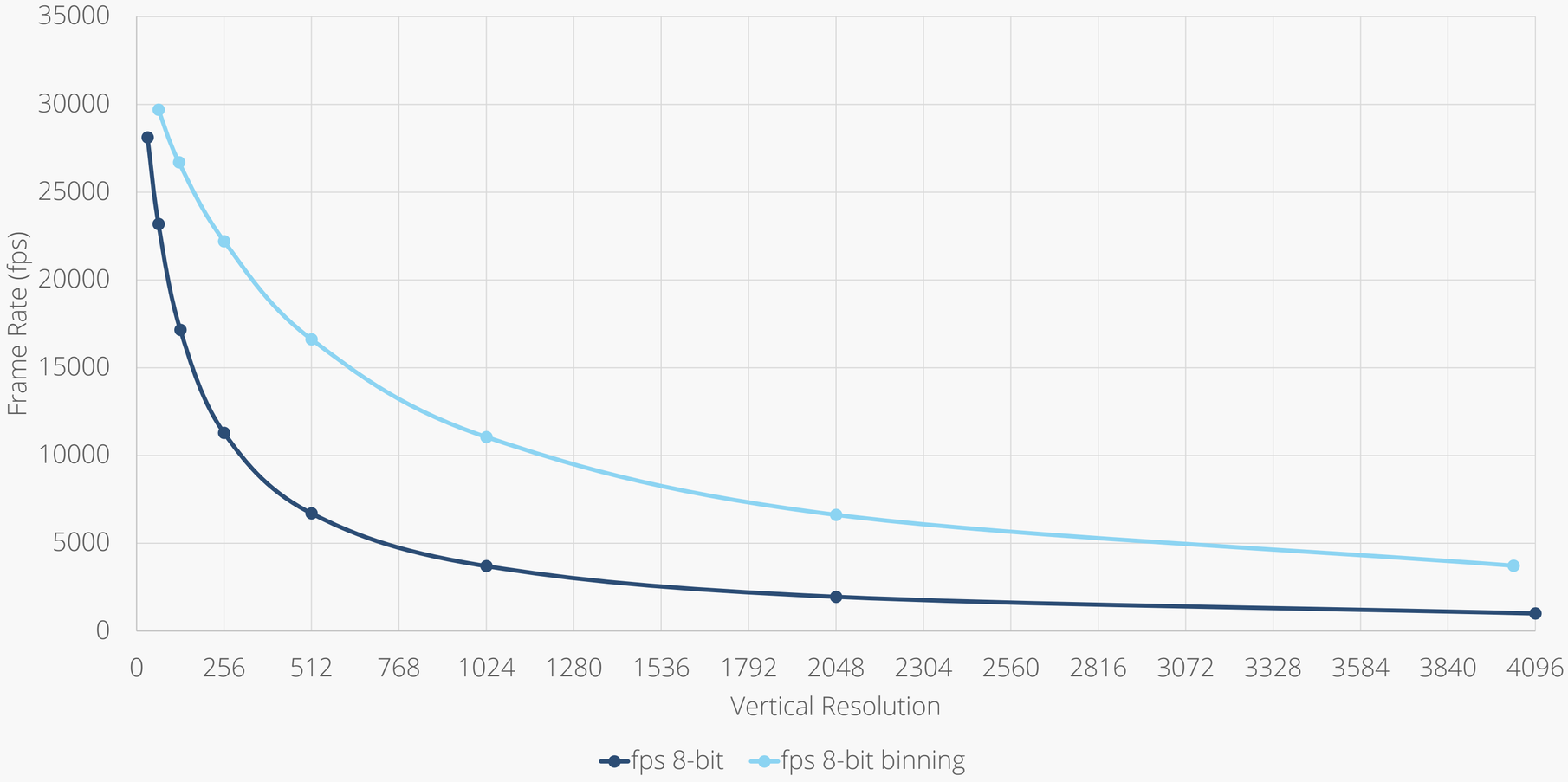
Yooka-10 & 21



Yooka – Specifications – 10F Frame rates in ROI mode



Yooka – Specifications – 21F Frame rates in ROI mode



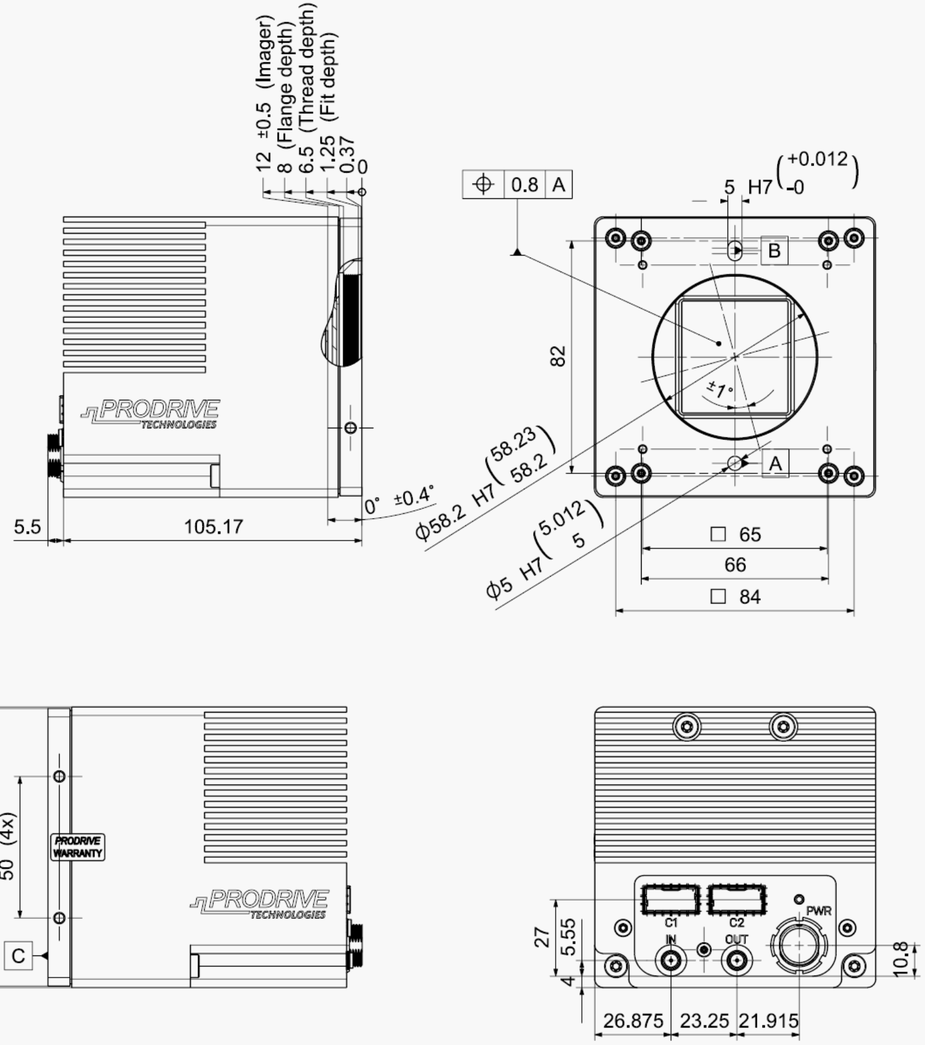
Yooka - Triggering

- Note that the trigger input and output are electrically isolated from the power input. This prevents any undesired ground loop between power supply, camera and trigger source.
- Trigger source:
  - External input
  - Camera internal
  - Pulse messages from the frame grabber

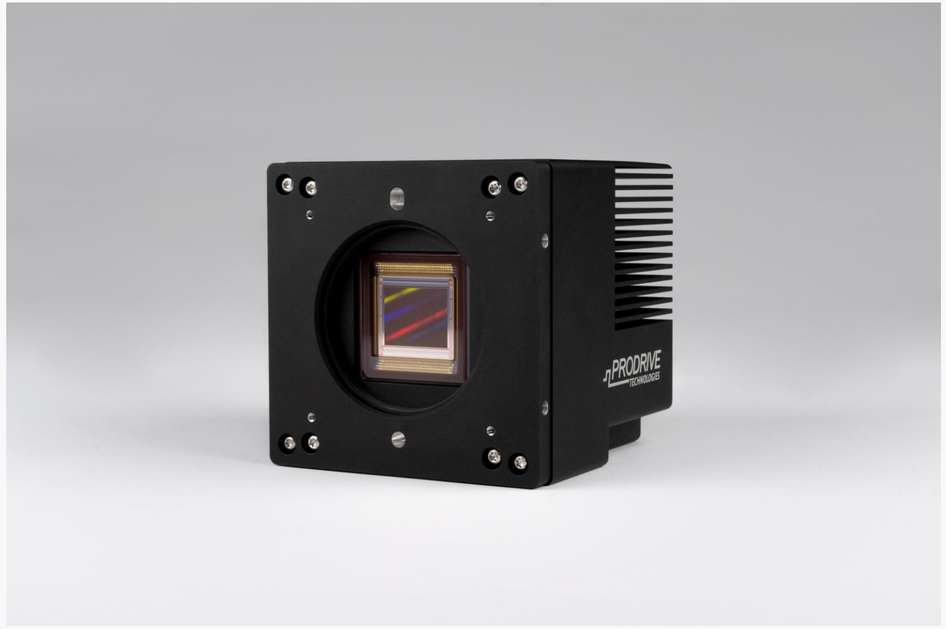
	Parameter	Min	Typ	Max	Unit	Remarks
Trigger input	Frequency			100k	[Hz]	
	Pulse width	5			[µs]	
	Input latency			100	[ns]	
	Input latency jitter			10	[ns]	
	Input high level	2.0		5.5	[V]	
	Input low level	-0.5		0.8	[V]	
Trigger output	Frequency			100k	[Hz]	
	Output latency			100	[ns]	
	Output latency jitter			10	[ns]	
	Output high level	3.0	3.3	5.5	[V]	
	Output low level	0		0.4	[V]	
	Output current			10	[mA]	

Yooka – Mechanical & Environmental

	Parameter	Unit	Specification
Mechanical	Width	mm	99
	Depth	mm	105.17
	Height	mm	99
	Surface treatment	-	Bead blasted & black anodized
	Mass	Kg	1.8
Environmental	Ambient Temperature [Operation]	°C	5°C to 40°C
	Ambient Temperature [Storage]	°C	-20°C to 80°C
	Relative humidity [Operation]	%	15% to 85%
	Relative humidity [Storage]	%	15% to 85%
Directives	Restriction of Hazardous Substances	-	RoHS Directive 2011/65/EU
	Waste Electrical and Electronic Equipment	-	WEEE Directive 2012/19/EU
	Registration, Evaluation, Authorization ad Restriction of Chemicals	-	REACH EC 1907/2006
Standards	Safety	-	NEN-EN-IEC 62368-1 2023
	Electromagnetic Compatibility (Immunity)	-	EN55035:2017
	Electromagnetic Compatibility (Emissions)	-	EN55032:2015 + A11:2020 EN55011:2016 + A11:2020 EN61326-1:2021
	Shock & Vibration (packed product)	-	ISTA-2A
Connectivity	Power connector mating type	-	Yamaichi YCP-BPR15CCX-02FCRIX OR YCP-BAR15CCX-02FCRIX
	Transceiver types	-	QSFP28 MM (up to 300m) QSFP28 SM (up to 10km)
	Trigger connector mating type	-	SMA male threaded 6.35 mm [.25"]



Yooka – Ordering information



Model	Fiber Optic Cable	Optical Transceiver	Apollo Frame Grabber
Yooka-10M	1x	2x	1x
Yooka-10F	2x	4x	2x
Yooka-14M	1x	2x	1x
Yooka-21M	1x	2x	1x
Yooka-21F	2x	4x	2x

Yooka set configuration

Model	Prodrive Part Number
Yooka-10M	6001-2418-69
Yooka-10F	6001-2418-65
Yooka-14M	TBD
Yooka-21M	6001-2418-68
Yooka-21F	6001-2418-64

Yooka ordering information

Model	Prodrive Part Number
Multi-mode fiber cable 5 meter	6001-2505-11
Single-mode fiber cable 50 meter	TBD
100G QSFP28 Multi-Mode Optical Transceiver	6001-2505-09
100G QSFP28 Single Mode Optical Transceiver	6001-2505-10
Apollo CLHS Frame Grabber GEN3 – 25G	6001-2438-54
Yooka-F Cable Set - 4 multi-mode optical transceivers - 2 multi-mode fiber cables (5 meter) - 1 power cable	6001-2442-94
Yooka-M Cable Set - 2 multi-mode optical transceivers - 1 multi-mode fiber cable (5 meter) - 1 power cable	TBD
Power cable (2 meter)	6001-2427-39

Yooka accessories

Sonic series TDI line scan cameras

Experience the highest throughput and unprecedented image quality with our Sonic 1MHZ TDI line scan camera, designed for high-end optical inspection applications.

The Sonic camera redefines TDI imaging by delivering speeds of up to 1MHz with resolutions ranging from 8k to 16k pixels. Its BSI sensor technology, featuring 256 TDI stages, allows for faster image acquisition even in challenging light conditions.

A special DUV version is available, offering enhanced sensitivity at 200nm and 266nm while maintaining peak sensitivity in the visible spectrum.

The optical CL High-Speed interface ensures reliable data transmission over long distances through thin optical fibers. When paired with the Apollo series frame grabber, the Sonic camera provides an end-to-end solution for optical inspection.

Highlights:

- Up to 1MHz line rate for high throughput applications
- Bi-directional scanning
- BSI sensor with 256 TDI stages for high sensitivity
- 266/355nm DUV enhanced sensitivity
- Support for water cooling
- End-to-End solution including frame grabber

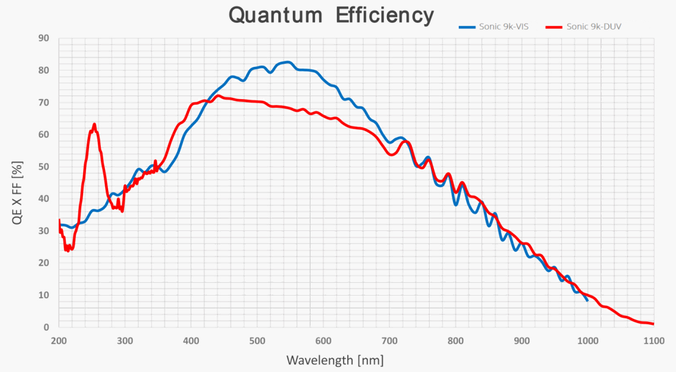
Sonic TDI camera with Apollo frame grabber

Sonic – Specifications

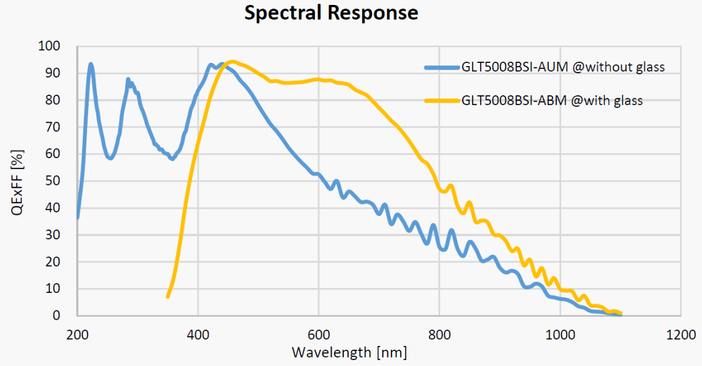
Parameter	Unit	Sonic-9k	Sonic-8k	Sonic-16k
Sensor	-	GPixel GLT5009BSI	GPixel GLT5008BSI	GPixel GLT5016BSI
Resolution	Pixels	9,072	8,192	16,384
Pixel size	µm	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0
Peak QE	%	82.4% @ 550nm	63.9% @ 266nm 93.4% @ 440nm	70.7% @ 266nm; 87.8% @ 420nm 94.2% @ 460nm; 87.6% @ 600nm
TDI stages	#	256	256	256
FWC	ke-	15.8 (10 bit) 15.9 (12 bit)	16.8 (10 bit) 17.8 (12 bit)	16.3 (10 bit) 15.2 (12 bit)
Read-out noise	e-	10.5 (10 bit) 6.2 (12 bit)	12.1 (10 bit) 7.4 (12 bit)	15.3 (10 bit) 7.5 (12 bit)
Dynamic range	dB	63.5 (10 bit) 68.1 (12 bit)	62.9 (10 bit 67.6 (12 bit)	60.5 (10 bit) 66.1 (12 bit)
Max line rate	-	608kHz (10 bit) 300kHz (12 bit)	1MHz (10 bit) 500kHz (12 bit)	500kHz (10 bit) 500kHz (12 bit)
Pixel format	Bit per pixel	10/12	10/12	10/12
Interface (Control & Data)	-	CLHS, MTP-12 – 4x25Gbps	CLHS, MTP-12 – 4x25Gbps	CLHS, MTP-12 – 4x25Gbps
Supply voltage	V_{DC}	12	12	TBD
Power (Typical)	W	20	18	TBD
Dimension W-H-D	mm	76 x 58.9 x 160	76 x 58.9 x 160	TBD
Lens mount	-	M58	M58	M90
Cooling	-	Heatsink (Air) or Water	Heatsink (Air) or Water	Heatsink (Air) or Water

Spectral sensitivity characteristics

Sonic-9k



Sonic-8k



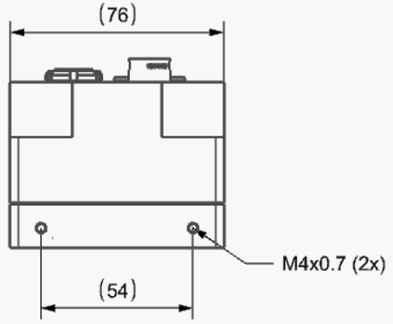
Sonic – Triggering and direction control

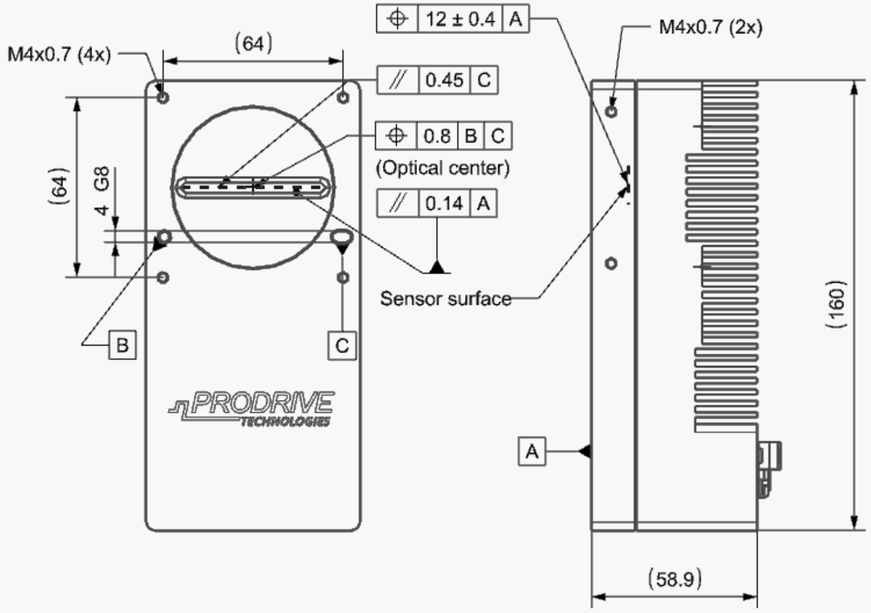
- Note that the trigger and direction control inputs are electrically isolated from the power input. This prevents any undesired ground loop between power supply, camera and trigger source.
- Trigger source:
  - External input
  - Camera internal
  - Pulse messages from the frame grabber

	Parameter	Min	Typ	Max	Unit	Remarks
Trigger input	Frequency			100k	[Hz]	
	Pulse width	30		500	[ns]	Maximum pulse width applies to 1MHz operation
	Input latency			100	[ns]	
	Input latency jitter			10	[ns]	
	Input high level	2.4		3.6	[V]	
	Input low level	-0.5		0.8	[V]	
Direction Input	Input latency			TBD	[ns]	
	Input latency jitter			TBD	[ns]	
	Input high level	3.0	3.3	5.5	[V]	
	Input low level	0		0.4	[V]	

Sonic – Mechanical & Environmental

	Parameter	Unit	Specification
Mechanical	Width	mm	76
	Depth	mm	58.9
	Height	mm	160
	Surface treatment	-	Bead blasted & black anodized
	Mass	Kg	1.0
Environmental	Ambient Temperature [Operation]	°C	10 – 30
	Ambient Temperature [Storage]	°C	-20 – 80
	Relative humidity [Operation]	%	15 – 85
	Relative humidity [Storage]	%	15 – 85
Directives	Low Voltage	-	
	Restriction of Hazardous Substances	-	RoHS Directive 2011/65/EU
	Waste Electrical and Electronic Equipment	-	WEEE Directive 2021/19/EU
	Registration, Evaluation, Authorization ad Restriction of Chemicals	-	REACH EC 1907/2006
Standards	Safety	-	NEN-EN IEC 62368-1 2023
	Electromagnetic Compatibility (Immunity)	-	EN55035:2017
	Electromagnetic Compatibility (Emissions)	-	EN55032:2015 + A11:2020 EN55011:2016 + A11:2020 EN61326-1:2021
	Shock & Vibration (packed product)	-	ISTA-2A
Connectivity	Power connector mating type	-	Yamaichi YCP-BPR15CCX-02FCRIX OR YCP-BAR15CCX-02FCRIX
	Transceiver types	-	Transceiver integrated in camera No external transceiver required.
	Trigger & Direction connector mating type	-	SMA male threaded 6.35 mm [.25"]





Sonic – Ordering information

Model	Fiber Optic Cable	Optical Transceiver	Apollo Frame Grabber
All sonic models	1x	1x	1x

Sonic set configuration

Model	Prodrive Part Number
Sonic-9k-608-VIS	6001-2408-1500
Sonic-9k-608-DUV	TBD
Sonic-8k-1000-VIS	TBD
Sonic-8k-1000-UV	TBD
Sonic-8k-500-VIS	TBD
Sonic-8k-500-UV	TBD

Sonic ordering information

Model	Prodrive Part Number
Multi-mode fiber cable 5 meter	6001-2505-11
100G QSFP28 Multi-Mode Optical Transceiver	6001-2505-09
Apollo CLHS Frame Grabber GEN3 – 25G	6001-2438-54
Sonic Cable Set - 1 Multi-mode optical transceivers - 1 multi-mode fiber cable (5 meter) - 1 power cable (2 meter)	TBD
Power cable (2 meter)	6001-2427-39

Sonic accessories

Apollo series frame grabber

The Apollo series frame grabber card is a high-performance PCIe GEN3 x16 frame grabber supporting the acquisition of images from 1 to 8 high-speed cameras through 8 lanes each operating at a speed of up to 25Gbps per channel.

The frame grabber card supports two bi-directional QSFP28 modules to enable multi-lane optical transceivers. The onboard high-performance AMD UltraScale+ FPGA can be utilized to offload computationally intensive algorithms from the host computer system. Moreover, the CLHS protocol is supported off-the-shelf, and support for CoaXPress-over-Fiber (8-lanes CXP-25) is available on request.

Highlights:

- Supports the most advanced CLHS or CXP cameras the high bandwidth of the Apollo card allows the interfacing of multiple high-speed cameras
- Offload the host computer by running custom image processing algorithms in the onboard FPGA
- Never miss a frame through an extensive onboard buffer memory
- Configure multi-camera applications through support for up to 8 high-speed CLHS cameras
- High reliable camera interfacing through the use of optical transceivers very high cable lengths between the camera and host computer are supported

Apollo Gen3 Frame Grabber

Apollo – Specifications

	Parameter	Specification
Host bus	Host bus	PCI Express 3.0
	Link width	X16
	Sustained bandwidth	100 Gbps
	Power consumption	28W Idle, ready for acquisition 36W at continuous acquisition at 100 Gbps
Interface	Camera interface standard	CLHS X-protocol (fiber)
	Maximum link speed	25.78125 Gbit/s per lane
	Camera interface connectors	QSFP28 [2x]
	Trigger I/O	SMA [2x] Bidirectional
	Diagnostics	Power ok LED
		FPGA diagnostics LED
		2x QSFP status LEDs
		Power supply monitoring
		Temperature monitoring
Software	Host Operating System	Linux for x86-64 - Ubuntu 22.04.0 LTS - Ubuntu 24.04.0 LTS Microsoft Windows 10 and 11 support 1803 (OS Build 17134) and up
	APIs	- FocalPoint SDK - GenICan GENTL Producer Libraries - pyFocalPoint python integration

Apollo Gen3 Frame Grabber

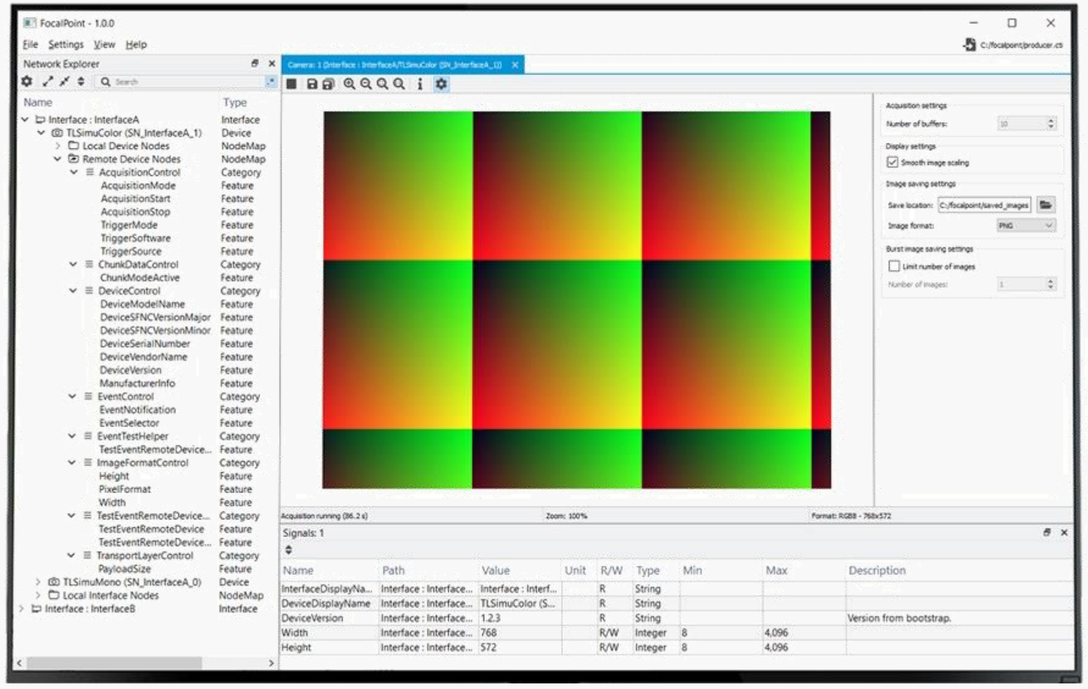
Focal Point

FocalPoint is an image acquisition and control software development toolkit designed for the Apollo series frame grabbers and their corresponding cameras. It provides a visually intuitive interface, allowing users to configure the frame grabber and connected cameras while facilitating smooth acquisition with live image previews.

This toolkit allows users to effortlessly configure the frame grabber and connected cameras while facilitating seamless acquisition with live image previews.

Complementing this toolkit is FocalPointSDK, an open-source library tailored for GenTL consumer applications. With a C++ abstraction layer over the GenTL C interface, it streamlines resource management and simplifies the image acquisition process. Key highlights of FocalPointSDK include loading GenTL CTI files, enumerating interfaces and devices, parsing GenAPI register description files, and accessing GenAPI features

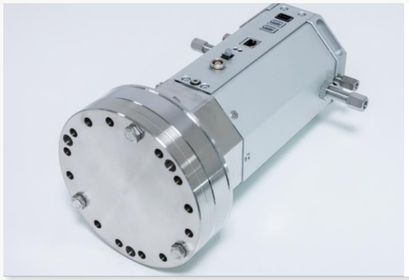
SDK
FocalPointSDK is a library for GenTL consumer applications. It provides a C++ abstraction for the GenTL C interface and as such aims to simplify resource management as well as image acquisition.



Highlights:

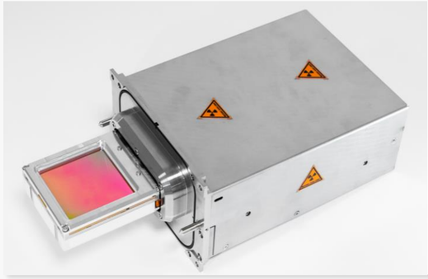
- The following is a list of the key features of FocalPointSDK:
- Loading GenTL CTI files.
- Interface and device enumeration.
- Parsing GenAPI register description files and accessing GenAPI features.
- Simplified frame acquisition.

Custom Solutions



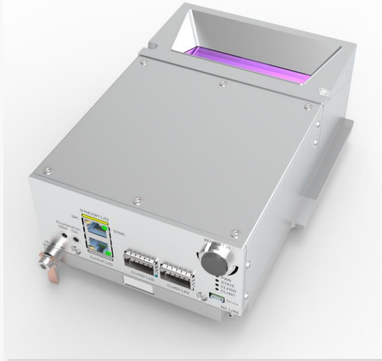
MB-SEM Detectors

- Multi Beam SEM Detector
- Ultra High Vacuum compatible
- Custom sensor integration
- >200Gb/s vacuum feedthrough



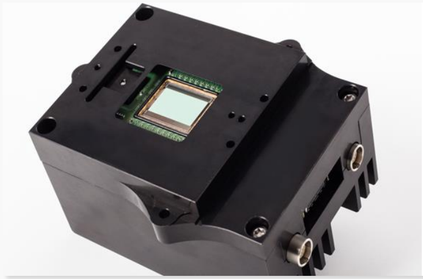
TEM Cameras

- Ultra high vacuum applications
- >200Gb/s data rate
- Large, ultra-thin sensor integration
- Custom sensor integration
- In-vacuum integrated active cooling



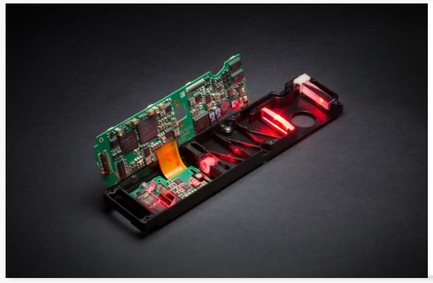
High Speed Area Scan Camera

- Custom sensor integration
- High resolution, large area scan
- >168Gb/s data rate
- CLHS over Fiber interface
- Actively cooled sensor



Custom TDI Camera

- Based on a custom sensor
- 4x100kHz line rate
- 4 digital TDI stages
- 4096 pixels
- 128 TDI blocks
- 2 read-out engines



Vision in the loop solution

- Position measurement with integrated algorithms
- Auto-Focus actuators and control
- Laser and LED Illumination design
- Active calibration and alignment

CONTACT

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