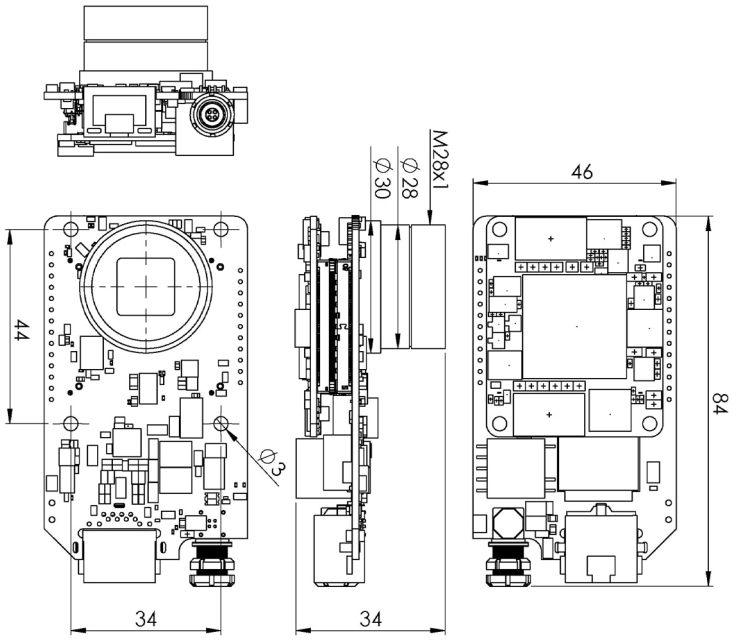
T-REX EVO



T-REX EVO is a highly customizable and user-programmable FPGA-based high-speed smart camera which features a high-end FPGA camera with a Xilinx Zynq FPGA and a high-speed imaging sensor and a Gigabit Ethernet. It includes ARM System-on-Chip (SoC) technology combined with a turbocharged industrial CMOS imaging sensor.

With high-performance FPGA System-on-Chip (SoC) technology, the T-REX EVO camera family opens new dimensions in computer vision. It is a global shutter industrial camera with incredible frame rates and an open FPGA architecture. With FPGA processing power the image processing algorithms can run in real time on the camera: just add your imagination.

T-REX EVO incorporates a fully customizable and user-programmable open-reference design for its high-speed FPGA-based camera and application development system. Its emphasis is on an open hardware/software development model, high-frame rates, real-time image processing on FPGA and modern graphical user-interface support.

A suite of intermediate, versatile Xilinx Zynq 7020 FPGAs is used to develop algorithms and process data in real-time. Images are acquired by a AMS sensor, CMV2000 (2048x1088 pixels, 2/3'' size) or CMV4000 (2048x2048 pixels, 1'' size). The sensor outputs 760 million pixels per second resulting in 331 FPS (CMV2000) and 176 FPS (CMV4000) at full frame. The on-board 512MB LPDDR2 memory with 3.2GB/s of bandwidth enables usage of complex buffered image processing.

The reference design can be easily edited with standard Xilinx Vivado tools. OptoMotive´s custom IP cores seamlessly integrate inside the Xilinx Vivado toolchain. A large portion of FPGA (PL) is free for the programming and development of new algorithms or the implementation of additional IP cores. The 700MHz Dual Core ARM Cortex A9 Programmable Subsystem runs Linux OS with a custom-made EVO control and streaming stack. User applications or custom data post-processing can easily be added to the existing design.

TARGETED FOR:

- Laser triangulation - with a ready-made Peak detector with an on-board image processing core;
- Motion capture - with a ready-made BLOB detector or Running Length Encoder (RLE) on-board image processing core;
- Industrial process automation - to count, detect, check, verify, read, inspect and test different products, levels, components, etc. at and incredible speed;
- Industrial quality control - to inspect defects, cracks or surface blemishes, size, position, dimension and color, foreign objects or quality and
- General R&D.

KEY CAMERA FEATURES

	T-REX EVO	
Resolution	2.2 MP	4.2 MP
Active Pixels (HxV)	2048 x 1088	2048 x 2048
Frame Rate	331 FPS	176 FPS
Sensor Format	**2/3"CMOS**	**1" CMOS**
Pixel Size	5.5 µm	5.5 µm
Sensor: AMS Image Sensor	CMV2000	CMV4000
Interface	**1 Gigabit Ethernet SFP+ for fast data transmission**	
Programmable and Reconfigurable FPGA	Zynq 7020	

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	CAMERA FAMILY	T-REX EVO					
	Camera model	2.2M	2.2IR	2.2C	4.2M	4.2IR	4.2C
IMAGING SENSOR	Model (AMS)	CMV2000			CMV4000		
		2E5M1PP	E12M1PP	2E5C1PP	2E5M1PP	E12M1PP	2E5C1PP
	Color Filter	None	None	Bayer	None	None	Bayer
	Diagonal	12.7 mm (2/3")			15.92 mm (1")		
	Active Pixels H x V	**2048 x 1088**			**2048 x 2048**		
	Pixel Size	**5.5 µm x 5.5 µm**					
	Pixel Data Formats	MONO8 (M and IR), BAYER8 (C only)					
	Region of Interest	YES, with 8 pixel increments					
	Pixel Clock Speed	760 MHz (8 pixels @ 95 MHz)					
	Frame Rate (Full Frame)	**331 FPS**			**176 FPS**		
	RAW Frame Rate*	54 FPS			26 FPS		
	ADC Resolution	**10 bit**					
	Analogue Gain	1 - 3.2x					
	Shutter Type	Electronic global shutter					
	Shutter Time	2.4 us – 90 s					
	Exposure	Linear, 3 slope high dynamic range					
	Dynamic Range	60 dB					
FEATURES	Pixel Correction	Dead pixel correction and programmable LUT					
	Trigger Modes	Free running, trigger, overlap and pulse width					
	Trigger Features	Delay 0 – 1000 ms LP Filter 1.5Hz - 100 kHz					
	Shutter Resolution	21 ns					
PROCESSING	FPGA	Zynq 7020					
	Free FPGA %	Up to 50%, most of the 220 slices of DSP are free.					
	Volatile Memory	512MB LPDDR2					
	Non-volatile Memory	32MB QSPI flash, optional eMMC					
MECHANICAL	Lens Mount	C-mount (1" 32G thread)					
	Temp Range	0 - 50°C					
	Mass	50 g OEM / 290 g with housing					
	Protection	Up to IP67 with housing					
	Housing Material	CNC-machined aluminum, anodized in a special OptoMotive blue color					
	RoHS	RoHS compliant					
	Fixing Holes	4x M3 OEM / 5 x M6 on housing					
ELECTRICAL	Input voltage	Power over Ethernet 42-57V or 5V (OEM)					
	Consumption	up to 11W					
	IO	3x bidirectional 5V TTL					
	IO Isolation	No, but camera has 1.5kV PoE isolation					
	Connectors	RJ45, 4 pin LEMO EXG 00 304					
FUNCTIONALITIES	On-board Image Processing	As an option (if an IP Core is integrated)					
	Open Reference Design	**Yes**					
	Open Architecture	**Yes**					
	Software	Compatible with OptoMotive EVO software (full source included)					
	Operating System	Windows 7, Windows 10, 64bit or 32bit					
	Development Tools	Xilinx Vivado/SDK 2017.2 Microsoft Visual Studio 2017					