

cameleon

FPGA smart camera family

Product Brief v1.0

Cameleon is an innovative USB2.0 camera based on FPGA system-on-chip (SOC) technology. The camera with a powerful HSDK (hardware-software development kit) opens ways for rapid customization and integration of various digital systems into camera itself. The camera is a ready made solution, but still open for a user to add his own features if he wishes so.

The true power of FPGA (Field-Programmable Gate Array) over the sequential microprocessor is a pipelined parallel data processing. Parallelism reduces system clock and power consumption considerably while boosting processing power. With the latest set of tools from Xilinx (System Generator and Accel DSP) you can rapidly develop DSP algorithms even in MathWorks Matlab (example included).

Key camera features:

- Industrial vision proven CMOS Aptina sensors from VGA to 3 mega pixel
- Up to 3 sensors per one camera perfectly synchronized
- Can capture video or processed information
- Since the image processing is integrated inside the camera the host computer processor is free for other tasks
- Large 1.6M gates Xilinx Spartan 3E FPGA
- 64MB in-camera DDR SDRAM buffer
- USB powered
- 48 additional IO pins for expansion and user programming
- Multiple cameras can be synchronized to an external trigger or to a master camera (strobe)
- Firmware (soft-hw and sw) can be upgraded in a minute
- Full source code of the complete system simplifies integration and enables user to customize the camera to his needs or to train FPGA SoC designing (research and development)

The camera is sold in two basic configurations: MONO (single sensor) or STEREO (dual sensors). You can upgrade your camera any time by purchasing additional sensor head.

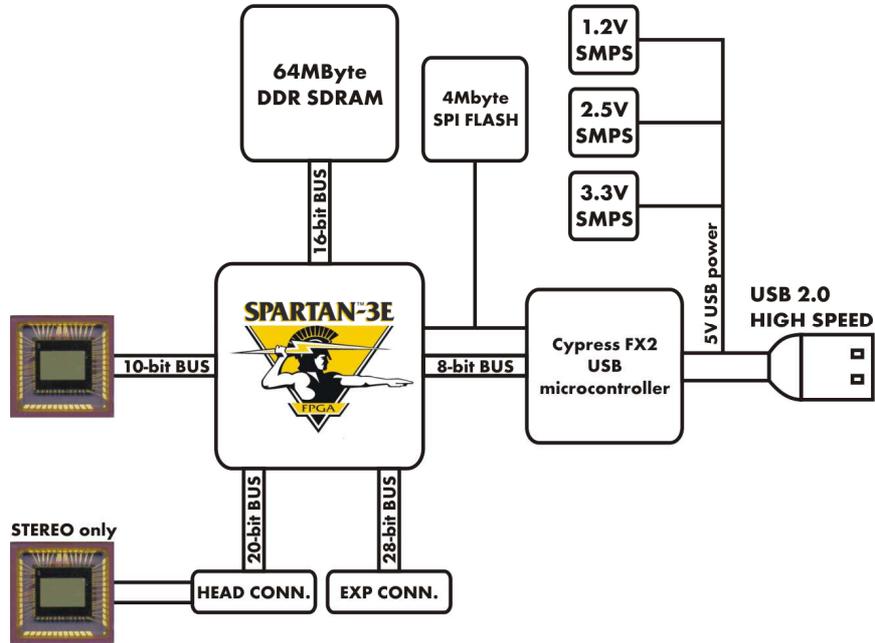


Figure 1: Camera structure block scheme

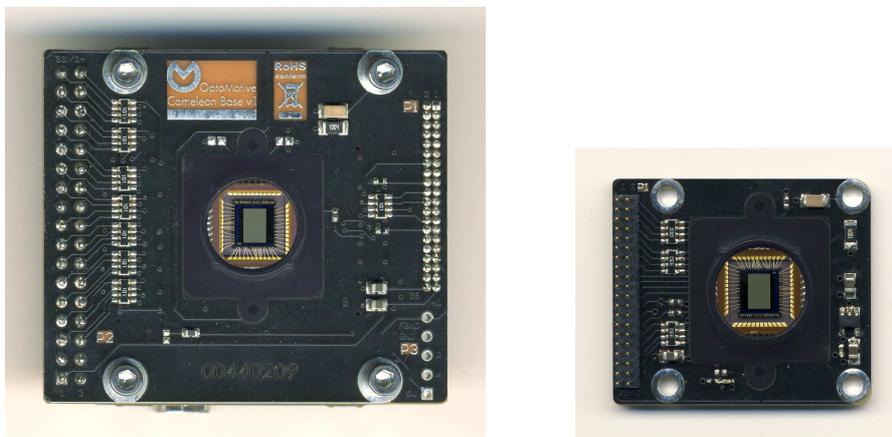


Figure 2: Camera base board with FPGA module (left) and sensor head (right) (scale 1:1)

SPECIFICATION

Specification		Value		
Camera model		BASE	MEGA	3MEGA
Imaging sensor	Model (Aptina)	MT9V034	MT9T001	MT9T031
	Sensor type (CMOS)	global shutter	rolling shutter, global reset	rolling shutter, global reset
	Colour	mono or Bayer	mono	Bayer only
	Optical format	1/3"	1/2"	1/2"
	Active pixels	752 x 480	1280x1024	2048x1536
	Region of interest	YES	YES	YES
	Pixel size	6.0 x 6.0 μm	5.2 x 5.2 μm	3.2 x 3.2 μm
	Pixel clock	27 MHz	48 MHz	48 MHz
	Frame rate (full res)*	64 FPS	30 FPS	12 FPS
	ADC resolution	10 bit	10 bit	10 bit
	Responsivity	4.8 V/lux-sec	2.1 V/lux-sec	>1 V/lux-sec
	Dynamic range	55dB linear 110dB HDR	61dB	68dB
	Auto Exposure, Gain	YES, YES	NO, NO	NO, NO
FPGA module	FPGA type	Xilinx Spartan 3E 1600		
	DDR SDRAM	64MB, 16bit, 100MHz		
	SPI FLASH	4 MB		
	USB	BULK High speed up to 36 MB/s		
Camera base	Size (including lens mount)	47 x 54 x 30 mm		
	Mass (including lens mount)	37g		
	Trigger modes	Free running Snapshot on trigger Sync and start on trigger		
	Power consumption at 5V USB supply	Mono 310 mA Stereo 350 mA		
Head	Size (including lens mount)	30 x 35 x 18 mm		
	Mass (including lens mount)	7 g		
	Cable length	Up to 1m		

*This is sensor maximal frame rate. USB data rate limits streaming video frame rate.