

# CANCam-BF

Smart camera with DSP, FPGA and CAN-Interface for demanding image processing in industry, medicine, research and security

With increasing power of embedded processors, smart or intelligent camera systems become a reasonable alternative to PC-based imaging systems in various fields of application. CANCam-BF is a very powerful intelligent camera-system for advanced image processing independent from a host-PC.

Heart of the intelligent camera platform is a BlackFin®-DSP running up to 600 MHz which was especially designed for signal and image processing tasks. This offers many possibilities to realize image processing inside the camera.

To provide a flexible and cost effective software platform, the open source operating system  $\mu$ CLinux with GNU C/C++ compiler is used. Networking capabilities and fieldbus interface (CAN) of this system make development and connectivity easy.

In addition the *Sensor to Image Open FPGA-Technology* is introduced, which gives the vision application designer access to the Xilinx Spartan3 FPGA. This opens various additional possibilities, e.g. to write time critical image processing tasks to run in hardware.

This system is available with several CMOS or CCD linear/matrix imagers for monochrome or color imaging applications. To support other video sources like analog or CameraLink cameras or devices sending data in DVI or VGA format, several interface cards are available.



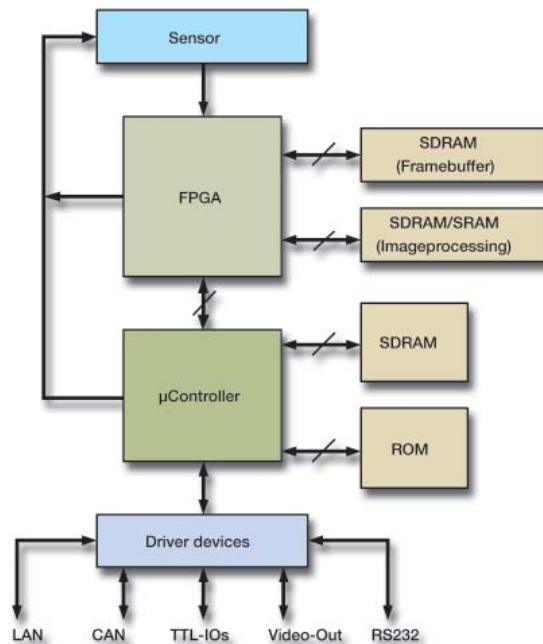
CANCam-BF

CANCam-BF is a stand alone control unit. It can be integrated into existing Ethernet networks. So you can e.g. watch the camera image and configuration data by just opening your web browser. For advanced and secure systems you may prefer configuration by file. You can also load and store pictures, lookup tables or your

application software in the built in file system.

The camera is supported by the powerful imaging software Vimos of atto Systems Ltd (see [www.vimos.com](http://www.vimos.com)). So it is possible to design the image processing software on the PC and download the program to

the camera, where it is running without a PC. A graphical user interface makes development quite easy.



Blockdiagram  
CANCam-BF

## COMPLETE CAMERA SYSTEM

CPU	BlackFin CPU Board
Video Interface AddOn	FPGA Sensor Interface
Sensor	CMOS/CCD imager
Power Supply	8–24 V, 3 Watt
Dimensions Housing in mm	56×46×99
Lense Thread	C-Mount

## CPU-SYSTEM

CPU	AD BF537/600 MHz @ 40°C / AD BF537/400 MHz @ > 40°C–70°C
CPU Memory	32 MByte, optional up to 64 MByte
Flash Memory	8 MByte, optional up to 16 MByte
Operating System	µClinux Kernel 2.6
RS232/CAN Interface	1/Yes
TTL-I/Os	2 inputs, 2 outputs, 1 GPIO
Image Processing Library	on demand (Vimos)
Power Supply	8–24 V, 3 Watt
Dimensions PCB in mm	75×50×10

## AVAILABLE SENSOR BOARDS

CANCAM	BF-0460M/C	BF-0836M/C	BF-1330M	BF-1420M/C	BF-2014M/C	BF-3015C	BF-2K15
Sensor Type	CMOS matrix	CCD matrix	CMOS matrix	CCD matrix	CCD matrix	CMOS matrix	CMOS linear
Monochrome/Color	m/c	m/c	m	m/c	m/c	c	m
Shutter	global	global	rolling	global	global	rolling	global
Pixel	752×480	1024×768	1280×1024	1360×1024	1620×1220	2048×1536	2048
Pixel Size	6 µm×6 µm	4.65 µm×4.64 µm	5.2 µm×5.2 µm	4.65 µm×4.65 µm	4.65 µm×4.65 µm	3.2 µm×3.2 µm	7 µm×7 µm
Pixel Clock	27 MHz	20 MHz	48 MHz	36 MHz	36 MHz	48 MHz	30 MHz
Frames/s	60	36	30	20	14	15	15000

Other sensors on request

## ADDON MODULES

FPGA Sensor Interface	<ul style="list-style-type: none"> <li>■ FPGA: Spartan3 –400 or –1000</li> <li>■ Framebuffer: 8–32 MB SDRAM</li> <li>■ Image Processing Memory: 8–32 MB SDRAM or 256 kB SRAM</li> <li>■ Interface to Sensor to Image sensor boards</li> <li>■ Dimension: 50×50×10 mm</li> </ul>
Analog Camera Interface	<ul style="list-style-type: none"> <li>■ PAL, NTSC cameras, monochrome and color</li> <li>■ Analog cameras up to 30 MHz pixelclock</li> <li>■ Single channel JPEG2000 Encoder</li> <li>■ FPGA: Spartan3A –700 or –1400</li> <li>■ Image Processing Memory: 8–32 MB SDRAM</li> <li>■ Dimension: 90×75×10 mm</li> </ul>
CameraLink Interface	<ul style="list-style-type: none"> <li>■ One Base or Medium interface for CameraLink cameras</li> <li>■ Pixelclock ≤ 66 MHz</li> <li>■ FPGA: Spartan3A –700 or –1400</li> <li>■ Image Processing Memory: 8–64 MB SDRAM</li> <li>■ Dimension: 90×75×10 mm</li> </ul>
DVI/VGA Interface	<ul style="list-style-type: none"> <li>■ DVI up to 1600×1200 @ 60 Hz – or –</li> <li>■ VGA up to 170 MHz Pixelclock (e.g. 1920×1200 @ 60 Hz in 24 bit RGB)</li> <li>■ FPGA: Spartan3A –700 or –1400</li> <li>■ Image Processing Memory: 8–64 MB SDRAM</li> <li>■ Dimension: 90×75×10 mm</li> </ul>

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