C-Cam Technologies

BCi4-6600 CMOS Camera

BCi4-6600 CMOS Camera

- **6.6 Megapixel**
- **2208 x 3000 pixels (H x V)**
- **Compact design**
- **Programmable Window Of Interest**
- **8 bit, 10 bit or 12 bit digital output**
- **Monochrome and Colour versions available**
- **Serial LVDS, USB 2.0, IEEE-1394 or Camera Link interface**
- **Opto-isolated trigger input/output**

The BCi4-6600 camera is a very compact, high-resolution CMOS camera. The camera is equipped with the IBIS4-6600, portrait-format image sensor. With 3.5 µm square pixels, the user can define a Window Of Interest within the 2208 x 3000 pixel area that is a multiple of 24 pixels square. The sensor has a remarkably good signal-to-noise ratio in combination with excellent contrast performance. Also the dark current of the sensor is much lower than in classical CMOS image sensors allowing longer exposure times.

The image sensor has a Dual-Slope exposure mode that prevents over-exposure of brighter parts of an image while preserving excellent contrast in the darker areas of the image. Together with the non-destructive readout mode the dynamic range is extended from 60 dB up to 90 dB. The BCi4-6600 camera can be switched between normal and Dual-Slope mode.

Several sub-sample modes are implemented for a lower resolution output of the selected Window Of Interest.

The camera operates in single shot mode, which makes it ideal for machine vision applications. In this mode, the user has the freedom to decide when the camera has to capture an image, not the other way around, as is the case with most analogue camera systems. Continuous capture mode is also supported.

The in-camera memory of 16 Mbytes is used as image FIFO in USB2.0 and IEEE-1394 interfaces and can be used with custom camera logic for other purposes, such as reference image, camera calibration data…

C-Cam Technologies supply several standard interfaces:
Serial LVDS, USB 2.0, IEEE-1394 or Camera Link. All interfaces have a local, opto-isolated trigger input and output. The Camera Link and Serial LVDS interfaces also allow for remote triggering via the interface cable. The IEEE-1394 camera is DCAM 1.30 compliant.

The BCi4-6600 comes with Drivers and DLL files and sample code in Visual C for Windows (98, Me, 2000, XP and NT4.0) and Linux. Software engineers can easily adapt the code to integrate into their own applications. Include-files for high-level languages are supplied.

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Sensor Specifications

Imager type	CMOS integrating active pixel sensor (APS) IBIS4-6600 designed by FillFactory with on-chip non-uniformity correction
Sensor types	Monochrome or colour in Bayer pattern
Total pixels	6,697,108 (2222H x 3014V)
Total light-sensitive pixels	6,624,000 (2208H x 3000V)
Window of Interest (WOI)	A rectangle image format specified by the user with an area that is a multiple of 24 by 24 pixels, with several sub-sample modes
Active image area	7.74mm (H) x 10.51mm (V)
Pixel pitch	3.5 x 3.5 µm
Fill factor	50 % (no microlenses)
Spectral response	> 20 % (QE * FF)
Spectral sensitivity range	400 – 1000nm
Temporal noise	20 electrons, 500 µV RMS
Well capacity	21,500 electrons
Dark current signal	170 electrons/sec @ 21°C
Avg. auto-saturation time	127 seconds @ 21°C
Blooming suppression	tbd
Smear	None
Standard dynamic range	59.5 dB (940 : 1) linear 61 dB (1100 : 1) full range
High dynamic range	90 dB in Dual-Slope mode
Grey level resolution	8 bits = 256 grey levels or 10 bits = 1024 grey levels or 12 bits = 4096 grey levels
Pixel crosstalk	15%
FPN	< 0.35 % RMS of saturation level
PRNU	< 1.5 % RMS of signal level

Image Specifications

Pixel rate	40 MHz
Frame rate (full frame)	Approx. 5 frames/second in continuous mode
Shutter	On-chip electronic shutter rolling curtain type
Shutter synchronisation	Remote via software or via cable, local via I/O interface
Maximum exposure time	1 frame, 170 msec
Minimum exposure time	1 line, 60 µsec

In-camera Resources

Memory	16 Mb
FPGA Logic	100 k gates

Interface Specifications

Interface type	**Connector**
LVDS	Binder 712 series 7-pole,
USB 2.0	Binder 712 series 4-pole,
IEEE-1394	std. 6-pole
Camera Link	MDR26p
Cable length	
LVDS	3, 5, 7m
USB 2.0	0.5, 1, 2, 3, 5m
IEEE-1394	max 4.5m
Camera Link	3, 5, 7, 10 m
Remote Trigger	via LVDS or Camera Link interface
Local Trigger I/O	Isolated, 1 input, 1 output
Connector	Binder 712 series 3-pole

Mechanical Specifications

Dimensions	(not incl. lens)
LVDS, Camera Link, USB	50 x 50 x 53 mm
IEEE-1394	50 x 50 x 62 mm
Weight	< 200 grams (not incl. lens)
Housing	Aluminium black anodised
Lens adapter	C-mount standard stainless steel, adjustable
Tripod mount	1/4 inch mount (1 off)
Machine mount	M6 x 1 (2 x 2 off)

Environmental Requirements

Operating temperature	0°C to +50°C
Storage temperature	-30°C to +80°C (non-condensing)

Power Requirements

LVDS, IEEE-1394, USB	Power supply through interface cable
Camera Link	8 - 12 Volts via separate connector Binder 712 series 2-pole
Power consumption	< 2 Watt

Ordering Information

BCi4-6600	–	U	–	M	-	40
		U = USB 2.0		M = Monochrome		MHz
		LS = LVDS		B = Bayer colour		
		1394 = Firewire				
		CL = Cameralink				

E.g. BCI4-6600-U-M-40 specifies a Monochrome BCi4-6600 with USB 2.0 interface, 40 MHz pixel rate,

The BCi4-6600 camera is also available without housing for OEM, in Scheimpflug version and in tethered-head version (sensor on a flex-cable). See our website for further details.

C-Cam Technologies

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