

# High Speed *megaPixel* CMOS Camera

## MC1310/11

- MC1310 monochrome
- MC1311 RGB colour with BAYER filter
- Up to 500 fps @ 1280 (H) x 1024 (V) resolution
- 8 or 10 Bit
- "Full" Camera Link® output with 660 MB/s max. data rate
- Random selection of window size and position
- Asynchronous global shutter
- Horizontal and vertical pixelbinning
- ImageBLITZ® image trigger
- Low power consumption
- Small, compact size

### Flexible resolution and speed

The MC1310/11 of Mikrotron is a high-speed *megaPixel* CMOS camera with a resolution of 1280 (H) x 1024 (V) pixel and up to 500 fps. Contrary to high resolution CCD-sensors, modern CMOS-sensors offer high resolution and extremely high data rates. Because window size, position (ROI), and clock frequency is randomly programmable, resolution and frame rate of MC1310/11 can be easily adapted to any specific requirements.

### Easy configuration

MC1310/11 configuration is done via the Camera Link® interface. Eight sets of camera configuration schemes can be stored in non-volatile memory of the cameras microcontroller. Even the FPGA configuration file can be downloaded for very special customer needs e.g. image preprocessing in MC1310/11 hardware.

Window size and position (ROI) on the sensor plus clock speed are programmable. With a pixel clock of 33 MHz on the "Base" Camera Link® connector and a window size of 100 x 100 pixel a frame rate of more than 5.000 fps can be achieved. Maximum video data rate at the 64-Bit "Full" Camera Link® connector is 660 MB/s.

### "Freeze Frame" full frame shutter

The MC1310/11 has a "Freeze Frame" shutter. This shutter "freezes" and stores the complete full frame at the end of the exposure time while exposing the next image.

In this way the full frame shutter makes the sharply defined exposure of very fast, dynamic processes possible. MC1310/11 can expose images synchronously or asynchronously. In synchronous (free run) mode exposure time equals frame time or, for shorter exposure times, the electronic shutter can be activated with a minimal shutter time of 4µs. In asynchronous mode an image is exposed by an external trigger.



### Camera Link® compatible output

Using 2x10-Bit data output the full dynamic range of the sensor is available on the output. If less bandwidth and more speed is desired, any 8-Bits out of the 10-Bits of the sensor can be selected and output as 2x8-Bit, 8x8-Bit as "Full" Camera Link® output format or 10x8bit as "Extended Full" Camera Link®.

### Horizontal and Vertical Pixelbinning

With high frame rates the exposure time is short. For more sensitivity the level of two adjacent or pixel in one row or one column or both can be summed.

### ImageBLITZ® image trigger

ImageBLITZ® integrates the function of an optical sensor or any other external actuator inside MC1310/11 hardware without any support of an image processing system.

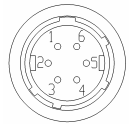
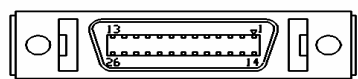
The hardware inside the camera controls with very high repetition rate the intensity along an arbitrary selectable piece of one of the 1024 rows of the sensor. If along that piece of the selected row a selectable number of grey values are beyond or below a selectable threshold, one complete image is automatically exposed and output.

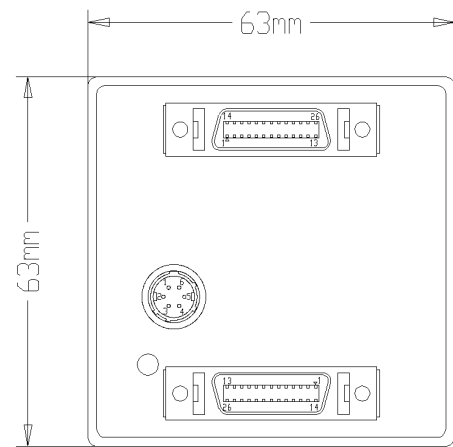
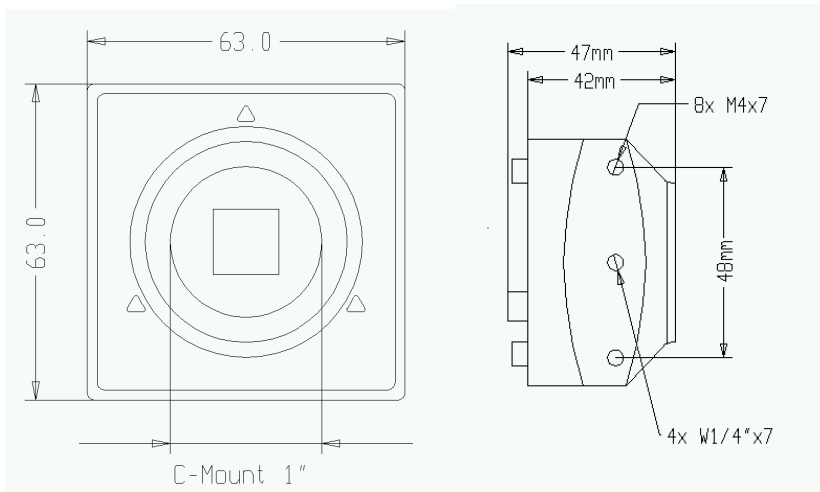
This is the advantage: no mounting and adjustment of an optical sensor and each object is captured at the exact same position of the image.

### Camera configuration tool

The MC1310/11 is delivered with a configuration program for Windows® operating systems. The clearly defined control surface allows to work with it intuitively. All parameters of the camera, e.g. image size and position, speed, shutter, exposure time may be set directly or via sliders. The resulting commands are transmitted by the serial interface of Camera Link®. The selected settings may be stored in the camera or in a separate file. Also integrated is a monitor to show the transmitted commands and answers from the camera.

Technical Data	
MC1310 Sensor	linear response, monochrome
MC1311 Sensor	linear response, RGB colour with BAYER filter and UV-IR filter
Number of pixel	1280(H) x 1024 (V)
Pixel size	12 x 12 µm
Optical active area	15,36 (H) x 12,29 (V) mm 19,67 mm diagonal
Fill factor	40%
Spectral bandwidth	400 ... 800 nm
Illumination @ ADC Vref = 1V	1600 LSB/lux-sec at 550 nm
Dynamic range	59 dB
Frame rates	500 fps @ 1.280 x 1.024 Pixel 1.000 fps @ 1.280 x 512 Pixel
Video output	Selectable: "Base" / "Full"/"Extended Full" Camera Link®
Pixel clock	20 - 85 MHz
Synchronisation	Internal or external pixel clock
Asynchronous shutter	Internal timer, 1024 steps, 4 µs to 32 ms or by pulse width of trigger signal
Gain	Digital x 1, 2, 4
Camera configuration	Camera Link®, 9,6 – 115 KBd, n, 8, 1
Power supply	8 ... 24 V DC
Power consumption max.	4.5W
Thermal resistance typ.	0.17°/W
Case temperature	+5...50°C
Shock & vibration	70g, 7grms
Lens	C-mount, F-mount with adapter
Dimensions (W x H x D)	63 x 63 x 47 mm
Weight	app. 300 g

Connectors			
<b>6-pin. Hirose power connector</b>			
Pin	Signal	Pin	Signal
1	VCC	4	DGND*
2	VCC	5	GND
3	STRB	6	GND
*DGND...digital GND for STRB signal			
			
<b>Two 26-pin Camera Link® Connectors</b>			
All signals according to "Base" / "Full" Camera Link® specification			
Signal	Description		
CC1	EXP		
CC4	External Clock		
			



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