Comprehensive Academic and Technical Science
CAT-SCIENCE

CAMTESTER

Camera test object

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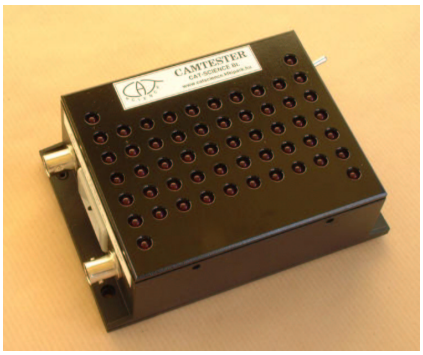
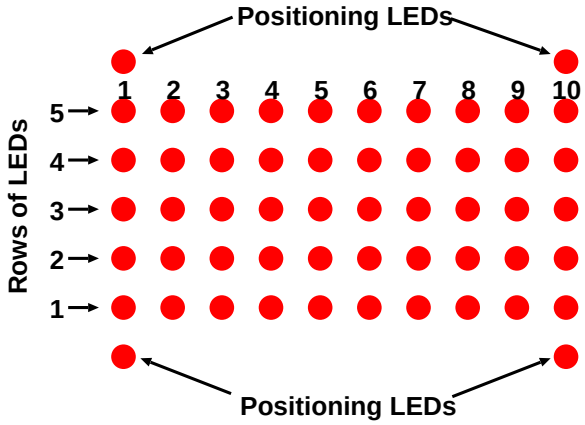


Overview

In high performance camera measurements it is of upmost importance to test if the data acquisition system records all images and that exposures occur at the expected times. CAMTESTER is an object designed for testing these features. The unit consists of a set of LEDs (Light Emitting Diodes) switched on and off in a well defined scheme. The camera takes images of this object and pictures reveal the time instance and length of the camera exposure.

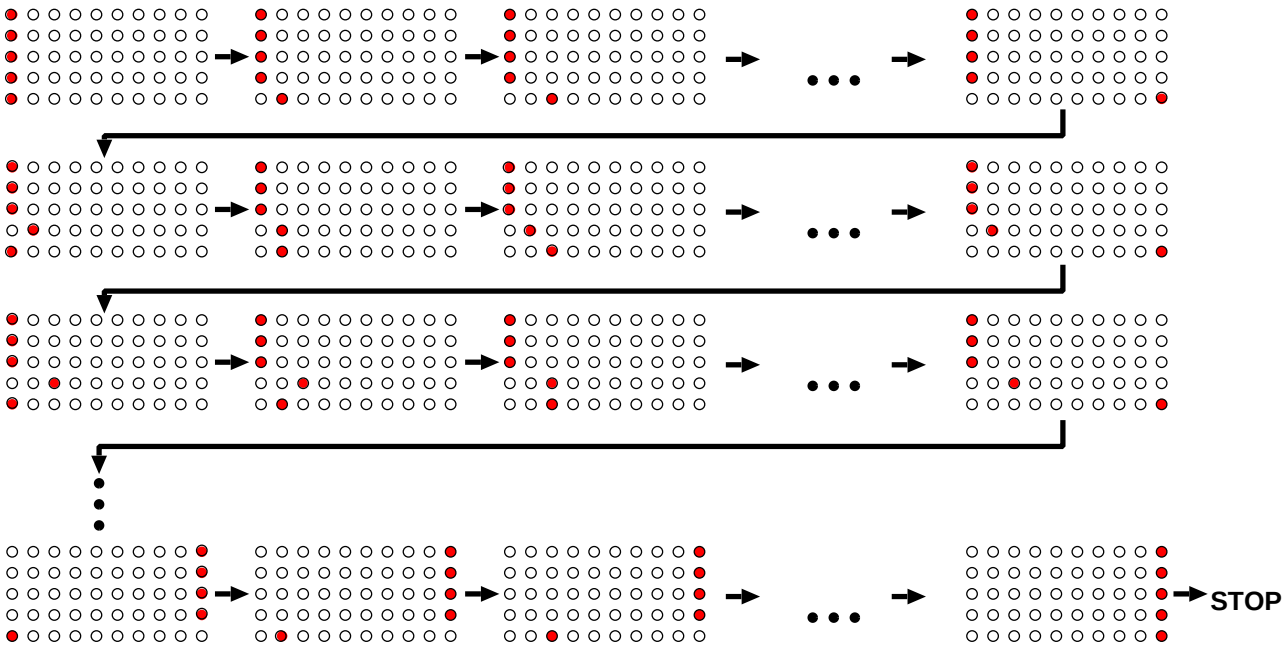
Description

CAMTESTER consists of 50 LEDs arranged in 5 rows and 10 columns as shown in the figure. Additional continously lit LEDs are located on the 4 corners of the array to ease alignment. After power-on LEDs in column 1 are lit, all others are dark. When CAMTESTER is triggered the light in row 1 moves from column 1 one step right at every tick of the clock signal. From column 10 the light jumps back to column 1 and it moves from column 1 to 2 in row 2. The process is repeated until the light in row 2 proceeds to the last LED.



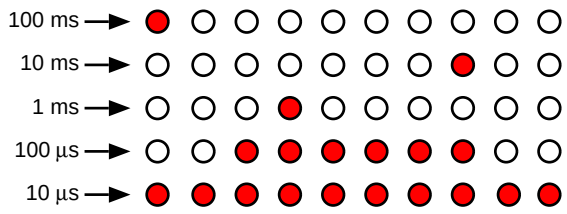
Arrangement of LEDs on CAMTESTER.

When the next time row 1 is finished row 2 jumps back to the first LED and row 3 proceeds one step. The whole sequence is repeated until finally the light in all rows reaches the last LED. At the next clock CAMTESTER returns to the initial state and stops.



Sequence of CAMTESTER *images.*

Camera images of CAMTESTER reveal the length of the exposure by the number of LEDs lit in the lowermost row where at least one diode is dark. The start time of the exposure can be determined by the light pattern on the rows above. An example is shown below.



Example image of CAMTESTER. *(100 kHz base clock.)*

Decoding of an image

If CAMTESTER is set to a base clock frequency of 100 kHz, the example image to the left can be interpreted the following way. The lowermost row where at least one LED is dark is row 2. In this row the LEDs step at every 100 μs, this way the exposure time was $550 \pm 50 \mu s$. From rows 3-5 the start of the exposure is 73.2 ms. This example shows that the precision of the time measurement is optimal if the exposure time of the camera is somewhat less than one row scan time.

To be able to select an optimum clock frequency the internal clock base of CAMTESTER can be selected to be 1000, 500, 200, 100, 50, 20, 10, 5 kHz. For applications requiring a time resolution better than 1/10 of the exposure time CAMTESTER can be operated in a high-resolution mode when the first two rows act as a single 20-LED row.

CAMTESTER operation can be started by a manual start button or from an external TTL trigger. IDL program for the evaluation of a sequence of images is available.

Specifications.

Supply voltage	9-12 V DC
Internal clocks	1 MHz, 500, 200, 100, 50, 20 10, 5 kHz
Controls	Power switch, external-internal clock switch, manual start button, high resolution switch
Trigger input	TTL H→L active, BNC connector
Ext. clock input	TTL L→H active, max. 1 MHz, BNC connector
Image physical size	90×60 mm (W×H)
LEDs	5 mm diameter, normal intensity, red

Other camera data acquisition products

CAMTIMER	RS-232 controlled camera timing generator and time measurement unit. 4 TTL or RS-644 (LVDS) outputs each composed of up to 10 individually programmable pulse sequences. 4 inputs (TTL or RS-644) for time measurements. 8 digital I/O lines (TTL or RS-644).
CAMLINK	Fiber optical remote data acquisition unit. 16/32 RS-644 digital input lines, bus mastering PCI card on PC end. FIFO memory in front-end to prevent data loss during strong PC activity. 19" rack mount unit with optional second fiber link for RS-232 camera control.

For more information on the CAMTESTER unit, other camera data acquisition products and for custom solutions contact:

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