CREATING AN IMAGE USING LINE SCAN CAMERAS

The image produced by a line scan camera is onedimensional and represents the brightness profile of an object, captured at the current position of the line sensor. A two-dimensional image is generated by performing a scanning movement of either the object or the camera, during which the individual line signals are transferred to the computer and assembled one by one into a 2D image.

DEFINITION OF LINE FREQUENCY

The line frequency f_L can be calculated for a given object speed v_0 and field width FOV, sensor length S and pixel width w from

$$f_L = \left| \frac{v_0 \cdot S}{w \cdot FOV} \right|$$

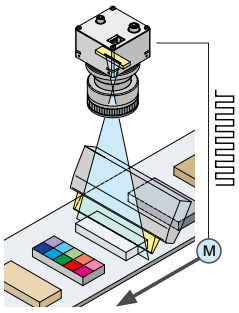
IMPROVING THE IMAGE

High image quality can only be achieved with the appropriate combination of line scan camera, high resolution lens, appropriate lighting and a precise motor unit, whether rotary or linear drive or a conveyer belt.

For an image to be correct in all proportions, the scanning speed and the image acquisition process must be highly synchronized and this is most easily achieved by adjusting the transport speed to the line frequency of the camera. However, in practice, it is usually the transport speed and the image resolution that are constraining and these predefine the line frequency and ultimate choice of line camera.

At constant transport speeds, such as when examining objects on a conveyor belt, a line scan camera can be allowed to operate in a free-running mode.

Where there are velocity fluctuations or discordant movements then external triggering of the line scan camera is required. The trigger pulses, e.g. from an encoder, are equidistant and independent of the movement velocity so that the camera will be triggered after a constant travelled distance. This precise synchronization guarantees images with a reproducible resolution and correct aspect ratio.



The production of a 2D image requires precise synchronization of the line camera sensor and the speed of transport of the object.

This is a printout of the page https://sukhamburg.com/support/technotes/linescancamera/basics/image.html from 5/21/2026

CONTACT

For more information please contact:
Schäfter + Kirchhoff GmbH
Kieler Str. 212
22525 Hamburg
Germany
Tel: +49 40 85 39 97-0
Fax: +49 40 85 39 97-79

info@sukhamburg.com
www.sukhamburg.com

LEGAL NOTICE