THE RIGHT APPROACH FOR EVERY INSPECTION SYSTEM

In the case of 3-CCD or 3-CMOS color sensors the light is split into red, green and blue by using a prism. Therefore, a single pixel line for a better color reproduction.

Monoline color stands for single-line sensors with a color filter in an R-G-B-R-G-B sequence.

Dual line with Bayern Pattern adds a second line of green pixels for improved color information as one pixel consists of either blue and green or red and green values, and a third interpolated color.

Time Delay Integration (TDI) comes typically with CCD image sensors because no extra read noise is introduced to the image. Although TDI employs the same principle as dual line, it offers superior sensitivity due to the inclusion of actually several hundreds lines. Certainly, the exact optical configuration requires special expertise.

Due to the inclusion of actually several hundreds lines. Certainly, the exact optical configuration requires special expertise.

As there is no line scan camera being a perfect fit for every inspection system, NET offers cameras with different features that meet most different demands.

Note: Each square illustrates one pixel.

Network cameras already high-speed 100% inspection make full use of new cost-effective line scan sensors.

Advantages of line scan technologies of choice.

Selectable region of interest

Exposure control

Scan direction change

Test pattern output

Flat field correction

Onboard A/D converter

Latest CMOS and CCD linear image sensor

Sensor range 2048 pixel up to 16384 pixel

Up to 125 kHz line scan rate

CLISBee-S line scan cameras have been developed for use running different image processing tasks under various industries. They are available in several variants of systems for paper machines, food industries, coating processes, solar glass and many other fields.

In case of 3-CCD or 3-CMOS color sensors the light is split into red, green and blue by using a prism.

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As there is no line scan camera being a perfect fit for every inspection system, NET offers cameras with different features that meet most different demands.
### TECHNICAL DATA - Camera Link Cameras

#### NIT-4000

<table>
<thead>
<tr>
<th>Feature</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
<th>CLISBee-S</th>
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<tbody>
<tr>
<td>Connector</td>
<td>Hirose 4pin</td>
<td>Hirose 4pin</td>
<td>Hirose 4pin</td>
<td>Hirose 4pin</td>
<td>Hirose 6pin</td>
<td>Hirose 6pin</td>
<td>Hirose 6pin</td>
<td>Hirose 6pin</td>
<td>Hirose 6pin</td>
<td>Hirose 6pin</td>
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<tr>
<td>Sensor type</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
<td>CMOS</td>
</tr>
<tr>
<td>Conformity</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
<td>CE/FCC/RoHs</td>
</tr>
<tr>
<td>Dimensions w x H x D [mm]</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
<td>60 x 100 x 73.5</td>
</tr>
<tr>
<td>Minimum sensitivity [V/lux-sec]</td>
<td>90</td>
<td>50</td>
<td>25</td>
<td>50</td>
<td>50</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>45</td>
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<tr>
<td>Operating temperature</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 50 °C</td>
<td>0 - 40 °C</td>
<td></td>
</tr>
<tr>
<td>Sensor length [mm]</td>
<td>28.6</td>
<td>28.7</td>
<td>29.4</td>
<td>28.7</td>
<td>28.7</td>
<td>28.7</td>
<td>43.0</td>
<td>5.7</td>
<td>5.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Lens</td>
<td>Nikon F / C-mount</td>
<td>Nikon F / C-mount</td>
<td>Nikon F / C-mount</td>
<td>Nikon F / C-mount</td>
<td>M72 x 0.75</td>
<td>Nikon F</td>
<td>Nikon F</td>
<td>Nikon F</td>
<td>Nikon F</td>
<td>Nikon F</td>
</tr>
<tr>
<td>Analog gain</td>
<td>-3dB to 9 dB</td>
<td>x1~x20</td>
<td>0 - 22 dB</td>
<td>x1~x11.2</td>
<td>x1~x11.2</td>
<td>x1~x11.2</td>
<td>x1~x11.2</td>
<td>x1~x11.2</td>
<td>x1~x11.2</td>
<td>x1~x11.2</td>
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<tr>
<td>Data rate [MHz]</td>
<td>25</td>
<td>125</td>
<td>25</td>
<td>160</td>
<td>320</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>320</td>
<td>1280</td>
</tr>
<tr>
<td>Sensor size [μm]</td>
<td>7.00 x 7.00</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>7.00 x 7.00</td>
<td>7.00 x 7.00</td>
<td>7.00 x 7.00</td>
<td>3.50 x 3.50</td>
<td></td>
</tr>
<tr>
<td>Output [MHz]</td>
<td>2x 40</td>
<td>4x 40</td>
<td>4x 60</td>
<td>8x 40</td>
<td>2/4/8x 85</td>
<td>8x 80</td>
<td>8x 80</td>
<td>8x 80</td>
<td>8x 80</td>
<td>8x 80</td>
</tr>
<tr>
<td>Video out</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
<td>Camera Link</td>
</tr>
<tr>
<td>Number of pixel</td>
<td>614 4</td>
<td>614 4</td>
<td>614 4</td>
<td>8192</td>
<td>8192</td>
<td>8192</td>
<td>8192</td>
<td>8192</td>
<td>16384</td>
<td></td>
</tr>
<tr>
<td>Offset (10 Bit)</td>
<td>0DN / +60DN</td>
<td>-60DN / +60DN</td>
<td>0DN / +63DN</td>
<td>-60DN / +60DN</td>
<td>-60DN / +60DN</td>
<td>-60DN / +60DN</td>
<td>-60DN / +60DN</td>
<td>-60DN / +60DN</td>
<td>-60DN / +60DN</td>
<td>-127DN / +127DN</td>
</tr>
<tr>
<td>Pixel size [μm]</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>14.00 x 14.00</td>
<td>7.00 x 7.00</td>
<td>7.00 x 7.00</td>
<td>7.00 x 7.00</td>
<td>3.50 x 3.50</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The CLISBee-S camera series is designed by Nippon Electric – experts for CMOS & CCD high-speed cameras.
THE RIGHT APPROACH FOR EVERY INSPECTION SYSTEM

Low-cost cameras allow high-speed 100% inspection with flexible selection of color at competitive line scan rates. At the top is a low-cost camera being governed for fast entry into a complex system. NET offers cameras with different features that meet most diverse needs.

- **MONOCHROME LINES**
  - Time Delay Integration (TDI) comes typically with CCD image sensors because no extra read noise is introduced to the image. Although TDI employs the same principle as dual line, it offers superior sensitivity due to the inclusion of actually several hundreds lines. Certainly, the exact optical configuration requires special expertise.

- **3-CCD / 3-CMOS**
  - In the case of 3-CCD or 3-CMOS color sensors the light is split into red, green and blue by using a prism. Dual/multi line sensors have a multiple sensitivity of a single line sensor and also dispose of exposure control. This allows to address inspection tasks with more detailed images.

- **3-LINE-COLOR**
  - Dual line with Bayern Pattern adds a second line of green pixels for improved color information as one pixel consists of either blue and green or red and green values, and a third interpolated color.

- **DUAL LINE**
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- **TIME DELAY INTERGRATION (TDI)**
  - Dual/multi line sensors have a multiple sensitivity of a single line sensor and also dispose of exposure control. This allows to address inspection tasks with more detailed images.

- **SINGLE LINE**
  - Single line is usually referred to as standard line scan type. This sensor type is considered when low to medium sensor sensitivity is required for customers’ applications. If this applies - even for high line rates due to the inclusion of actually several hundreds lines. Certainly, the exact optical configuration requires special expertise.

- **DUAL LINE WITH BAYERN PATTERN**
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CLISBee-S – FAST RUNNING LINES TECHNICAL DATA – CAMERA LINK CAMERAS TECHNICAL DATA – GIGE VISION CAMERAS / COAXPRESS CAMERAS

**As a result, CLISBee-S is suitable for virtually any line scan application, which depends on highest quality, or requires data transfer rates of up to 6.25 Gb/s.**

Due to the image sensors’ high photosensitivity, an anti-blooming and flatfield correction, CLISBee-S delivers optimal results for inspection. The camera is available with offset data transfer rates of up to 2.5 Gb/s in cameras of line scan applications that really improve the image result, like anti-blooming and flatfield correction, CLISBee-S delivers optimal results for inspection systems. 

**NET & NED offer innovative line scan cameras.**

**The CLISBee-S camera series is designed by Electro-Sensory Devices Corporation (NED), a manufacturer of high speed line scan cameras for industrial machine vision systems.**

NED is a recognized name in the field of high-speed linear image sensors. The CLISBee-S is available with offset data transfer rates of up to 6.25 Gb/s in cameras of line scan applications that really improve the image result, like anti-blooming and flatfield correction, CLISBee-S delivers optimal results for inspection systems.
## Technical Data - Camera Link Cameras

<table>
<thead>
<tr>
<th>Model</th>
<th>Line Scan Rate [kHz]</th>
<th>Sensor Length [mm]</th>
<th>Number of Pixels</th>
<th>Data Rate [MHz]</th>
<th>Offset (10 Bit)</th>
<th>Offset (8 Bit)</th>
<th>Lens</th>
<th>Video Out</th>
<th>Sensor Type</th>
<th>Analog Gain</th>
<th>Digital Gain</th>
<th>Conformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLISBee-S</td>
<td>34, 62, 68, 125</td>
<td>28.7, 28.7, 28.7, 28.7</td>
<td>2048, 2048, 2098 x 3, 2048</td>
<td>80, 120, 240</td>
<td>-60DN / +60DN, -60DN / +63DN, -60DN / +60DN, -60DN / +60DN</td>
<td>-15DN / +15DN, -40DN / 40DN, -15DN / +15DN, -127DN / +127DN</td>
<td>Nikon F / C-mount</td>
<td>GigE Vision</td>
<td>CMOS, 3-Line CCD</td>
<td>x1<del>x11.2, 0</del>21.5 dB</td>
<td>x1<del>x2, x1</del>x2, x1<del>x2, x1</del>x2</td>
<td>CE / FCC / RoHs</td>
</tr>
<tr>
<td>NET &amp; NED</td>
<td>14, 11, 19, 33</td>
<td>5, 7.3, 29.4, 28.7</td>
<td>2730 x 3, 2098 x 3, 4096, 4096 x 2</td>
<td>120, 25, 320</td>
<td>-60DN / +60DN, -60DN / +60DN, -60DN / +60DN, -60DN / +60DN</td>
<td>-15DN / +15DN, -15DN / +15DN, -15DN / +15DN, -127DN / +127DN</td>
<td>M72 x 0.75</td>
<td>CoaXPress</td>
<td>CMOS, CMOS, 3-CMOS, CMOS</td>
<td>x1<del>x11.2, 0</del>22 dB, x1<del>x11.2, 0</del>21.5 dB</td>
<td>x1<del>x2, x1</del>x2, x1<del>x2, x1</del>x2</td>
<td>CE / FCC / RoHs</td>
</tr>
</tbody>
</table>

## Technical Data - GigE Vision Cameras/CoaXPress Cameras

<table>
<thead>
<tr>
<th>Model</th>
<th>Line Scan Rate [kHz]</th>
<th>Sensor Length [mm]</th>
<th>Number of Pixels</th>
<th>Data Rate [MHz]</th>
<th>Offset (10 Bit)</th>
<th>Offset (8 Bit)</th>
<th>Lens</th>
<th>Video Out</th>
<th>Sensor Type</th>
<th>Analog Gain</th>
<th>Digital Gain</th>
<th>Conformity</th>
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</thead>
<tbody>
<tr>
<td>XXCAM</td>
<td>11, 53, 34, 125, 25</td>
<td>28.6, 28.7, 29.4, 28.7, 43.0</td>
<td>614, 614, 6000 x 3, 8192, 8192</td>
<td>80, 120, 320</td>
<td>0DN / +60DN, -60DN / +63DN, -60DN / +60DN, -60DN / +60DN, -60DN / +60DN</td>
<td>-15DN / +15DN, -60DN / 60DN, -60DN / 60DN, -60DN / 60DN, -60DN / 60DN</td>
<td>Nikon F / C-mount</td>
<td>GigE Vision</td>
<td>CMOS, 3-Line CCD</td>
<td>x1<del>x11.2, 0</del>22 dB, x1<del>x11.2, 0</del>21.5 dB, x1<del>x11.2, 0</del>21.5 dB, x1<del>x11.2, 0</del>21.5 dB</td>
<td>x1<del>x2, x1</del>x2, x1<del>x2, x1</del>x2</td>
<td>CE / FCC / RoHs</td>
</tr>
</tbody>
</table>

Note: The cameras are designed for high-speed line scan applications. They are available with CCD and CMOS sensors and are suitable for inspecting non-flat objects. The cameras are offered with various specifications, including line scan rates, sensor lengths, number of pixels, data rates, offsets, and lenses. The conformities include CE, FCC, and RoHS standards.
THE RIGHT APPROACH FOR EVERY INSPECTION SYSTEM

- In the case of 3-CCD or 3-CMOS color sensors the light is split into red, green and blue by using a prism.
- 3-line color sensors distribute each color (red, green, blue) on a single pixel line for a better color reproduction.
- Dual line with Bayern Pattern adds a second line of green pixels for improved color information as one pixel consists of either blue and green or red and green values, and a third interpolated color.
- Monoline color stands for single-line sensors with a color filter in an R-G-B-R-G-B sequence.
- Time Delay Integration (TDI) comes typically with CCD image sensors because no extra read noise is introduced to the image. Although TDI employs the same principle as dual line, it offers superior sensitivity due to the inclusion of actually several hundreds lines. Certainly, the exact optical configuration requires special expertise.

As there is no line scan camera being a perfect fit for every inspection system, NET offers cameras with different features that meet most different demands.

APPLICATION & ACCESSORIES

As an example of the right approach for every inspection system, we may take the following example: NET offers cameras with selectable region of interest, exposure control, scan direction change, test pattern output, flat field correction, onboard A/D converter, latest CMOS and CCD linear image sensor, sensor range 2048 pixel up to 16384 pixel, up to 125 kHz line scan rate, C-mount, F-mount, or M72-mount.

NET CLISBee-S line scan cameras have been developed for use in various different image processing tasks in various industries. They can be applied for 100% print defect detection in the printing of labels not only in pharmaceutical systems for paper machines, film extruders, coating processes, solar technology, and paint finishing machines or even in the production of bond paper. High-resolution systems can be applied for 100% print defect detection in the printing of labels, glass inspection, print inspection, and glass inspection. Customer profit from a low cost solution with no color lag and an easy optical setup.

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Tel: +39 030 5237 163

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Tel: +1 219 934 9042

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Yokohama-shi, 222-0033, Japan
www.net-japan.com
info@net-japan.com
Fax: +81 45 476 2423
Tel: +81 45 478 1020

Note: Each square illustrates one pixel.