Overview

Camera Basler L310KC

Running modes
- Free running [X]
- ExSync Controlled [X]

Resolution
- Horizontal 3x 2098 pixel
- Bits per Pixel 8 or 10 bpp
- Binning [
- Partial Scan []

Timings
- Pixel clock 20, 40 or 60 MHz
- Horizontal Up to 8 kHz

MATRIX VISION GmbH Frame Grabber

Typ mvTITAN-CL
- Line Enable by camera [X] Frame Grabber [X] external [X]
- Trigger by external [X] Frame Grabber []

Software
- MVacquireControl [X]
- mvIMPACT Go! [X]
- Other [ ] [e.g. LabView™, Halcon, etc.]

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This document requires the general knowledge of the usage and the technical data of the used frame grabber, camera and application.
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Freerunning Mode

Camera generates its own pixel clock and line start signal and sends the lines with its synchronization signals to the mvTITAN-CL. MvTITAN-CL cannot control the image acquisition of the camera.

Signal map

Camera settings set by software

To set up the camera it is necessary to install the Basler CameraControl Tool supported by Basler-VC. You will find the latest version on the hompage www.baslerweb.de of Basler-VC. You can either use the Classic CameraControl Tool or the CCT+ for setting up the camera. In the following all settings are described with CCT+.

Please be sure that the mvTITAN-CL is currently open before starting the CCT+ so that the serial communication port of the CameraLink™ interface is available. If you are using one mvTITAN board in the system and connect the camera to the first input choose clserMV, Port 0 for communication port.

The camera must be set to the following:

- Video Data Output must be set to 20MHz 8Bit RGB to send the 3 color components to parallel output. So the mvTITAN-CL will acquire 24bpp images.
- Test image must be No test image
- Exposure mode must be Free-run, programmable
Pin connection (CameraLink™ base standard)

<table>
<thead>
<tr>
<th>MDR 26 pin</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>inner Shield Pin 26</td>
</tr>
<tr>
<td>Pin 2</td>
<td>Tx Data 0- Pin 25</td>
</tr>
<tr>
<td>Pin 3</td>
<td>Tx Data 1- Pin 24</td>
</tr>
<tr>
<td>Pin 4</td>
<td>Tx Data 2- Pin 23</td>
</tr>
<tr>
<td>Pin 5</td>
<td>XCLK- Pin 22</td>
</tr>
<tr>
<td>Pin 6</td>
<td>Tx Data 3- Pin 21</td>
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<tr>
<td>Pin 7</td>
<td>SerTC+ Pin 20</td>
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<tr>
<td>Pin 8</td>
<td>SerTFG- Pin 19</td>
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<tr>
<td>Pin 9</td>
<td>CC1- Pin 18</td>
</tr>
<tr>
<td>Pin 10</td>
<td>CC2+ Pin 17</td>
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<tr>
<td>Pin 11</td>
<td>CC3- Pin 16</td>
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<tr>
<td>Pin 12</td>
<td>CC4+ Pin 15</td>
</tr>
<tr>
<td>Pin 13</td>
<td>inner Shield Pin 14</td>
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<tr>
<td>Pin 14</td>
<td>inner Shield Pin 13</td>
</tr>
<tr>
<td>Pin 15</td>
<td>Tx Data 0+ Pin 12</td>
</tr>
<tr>
<td>Pin 16</td>
<td>Tx Data 1+ Pin 11</td>
</tr>
<tr>
<td>Pin 17</td>
<td>Tx Data 2+ Pin 10</td>
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<tr>
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<td>XCLK+ Pin 9</td>
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<td>Tx Data 3+ Pin 8</td>
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<td>CC1+ Pin 5</td>
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<td>CC4- Pin 2</td>
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<td>inner Shield Pin 1</td>
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Recommended cable for this mode from MATRIX VISION GmbH:
KSCL 03.0, length 3 meters
KSCL 05.0, length 5 meters
KSCL 10.0, length 10 meters

Cameradefinition
/* -------------------------- L301kc -----------------------------------
DefCamType "L301kc" VM_DIG24 NONINTERLACED 25 8000 20000 PCLK_EXTERN
DefCamAcquireSetup "L301kc" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam "L301kc" AC 1 0 0 1200
DefHorizontalUnit "L301kc" PIXEL
DefVerticalUnit "L301kc" LINES
DefCamHorizontalAcquire "L301kc" 1L 2096L 1
DefCamVerticalAcquire "L301kc" 0L 255L 1
DefCamGenerateVSync "L301kc" 0L 1L

Remarks to mvAcquireControl
To set up the mvAcquireControl correctly you must do the following:
• Choose camera definition “L301kc” in register Camera
• Do not activate Greyscale in register Acquire
• Enable trigger should be deactivated except you have connected an external trigger signal to the Trigger-In pins
• Disable Shutter Control
• Disable Expose
We support a plug-in for mvAcquireControl called Basler L301 conversion with which you can correct the vertical differences between the lines caused by the sensor’s optical geometry. For a proper display please be sure that the actual number of pixel on your monitor is 32bpp. Otherwise you will get wrong color with this plug-in.

With a click on Properties you can open the properties dialog box in which you can define the horizontal and the vertical offset. In general you have to fit the Y values to correct the vertical differences between the lines. More about this and the sensors geometry please take a look at the camera’s manual.

**Remarks to Programming**

For programming the mvTITAN-CL connected to the Basler L103kc you have to pay attention to the following:

- Choose camera definition “L301kc”, if no camera definitions are used set the videomode VM_DIG24.
- A suitable colormode is COL_RGB24. You will get an 24bpp image in the DMA-buffer. The vertical differences are not corrected.
- If using an external trigger signal on the Trigger In input you can use mvSelExtTrig(dev, 1) for activating the external trigger input. With this setting all following image acquisitions will start with the external trigger signal.
ExSync controlled

The mvTITAN-CL generates the line sync signal (ExSync) with which the camera is synchronized. The camera acquires one line and sends the video data, the pixel clock and the HD to the mvTITAN-CL. The line sync signal can either be generated by the mvTITAN-CL or an external line start signal can be passed through to the camera with or without modification.

Signal map

Camera settings set by software

To set up the camera it is necessary to install the Basler CameraControl Tool supported by Basler-VC. You will find the latest version on the homepage www.baslerweb.de of Basler-VC. You can either use the Classic CameraControl Tool or the CCT+ for setting up the camera. In the following all settings are described with CCT+.

Please be sure that the mvTITAN-CL is currently open before starting the CCT+ so that the serial communication port of the CameraLink™ interface is available. If you are using one mvTITAN board in the system and connect the camera to the first input choose clserMV, Port 0 for communication port.

The camera must be set to the following:
- Video Data Output must be set to 20MHz 8Bit RGB to send the 3 color components to parallel output. So the mvTITAN-CL will acquire 24bpp images.
- Test image must be No test image
- Exposure mode must be set to ExSync, level-controlled, ExSync, programmable or ExSync, edge-controlled
- If ExSync, programmable is chosen set the needed Exposure Time in CCT+
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DefCamHorizontalAcquire "L301kc" 1L 2096L 1
DefCamVerticalAcquire "L301kc" 0L 255L 1
DefCamGenerateVSync "L301kc" 0L 1L
*/```
Remarks to mvAcquireControl

To set up the mvAcquireControl correctly you must do the following:

- Choose camera definition “L301kc” in register Camera
- Do not activate Greyscale in register Acquire
- To activate the output of the line start signal open register Expose and activate Expose active.

Choose one of the following modes which fits your application:

1. Continuous mode:
   No external signal must be connected to the mvTITAN-CL. The mvTITAN-CL generates a signal on the basis of expose time and Period time.

2. Incr. raising edge:
   An external line start signal must be supplied to the Sync In inputs of the mvTITAN-CL. The period time is defined by the external line start signal and the Divider. Each raising edge of the external signal is count. The pulse length is defined by Expose time.

3. Incr. falling edge
   An external line start signal must be supplied to the Sync In inputs of the mvTITAN-CL. The period time is defined by the external line start signal and the Divider. Each falling edge of the external signal is count. The pulse length is defined by Expose time.

4. Pass through
   The signal connected to the Sync In input is passed through the mvTITAN-CL to the camera without modification.

5. Pass through inverted
   The signal connected to the Sync In input is passed through the mvTITAN-CL to the camera and is inverted.

We support a plug-in for mvAcquireControl called Basler L301 conversion with which you can correct the vertical differences between the lines caused by the sensor’s optical geometry.

For a proper display please be sure that the actual number of pixel on your monitor is 32bpp. Otherwise you will get wrong color with this plug-in.

With a click on Properties you can open the properties dialog box in which you can define the horizontal and the vertical offset. More about this and the sensors geometry please take a look at the camera’s manual.

Remarks to Programming

For programming the mvTITAN-CL connected to the Basler L103kc you have to pay attention to the following:

- Choose camera definition “L301kc”, if no camera definitions are used set the videmode VM_DIG24.
- A suitable colormode is COL_RGB24. You will get an 24bpp image in the DMA-buffer. The vertical differences are not corrected.

Program the exposure mode which fits to your application with function mvSetExpose().

The available modes:
1. Continuous mode:
   No external signal must be connected to the mvTITAN-CL. The mvTITAN-CL generates a
   signal on the basis of low and total.

2. Incr. raising edge:
   An external line start signal must be supplied to the Sync In inputs of the mvTITAN-CL. The
   period time is defined by the external line start signal. An divider can be set with the function
   mvSetExposeDivider(). Each raising edge of the external signal is count. The pulse length is
   defined by low.

3. Incr. falling edge
   An external line start signal must be supplied to the Sync In inputs of the mvTITAN-CL. The
   period time is defined by the external line start signal. An divider can be set with the function
   mvSetExposeDivider(). Each falling edge of the external signal is count. The pulse length is
   defined by low.

4. Pass through
   The signal connected to the Sync In input is passed through the mvTITAN-CL to the camera
   without modification.

5. Pass through inverted
   The signal connected to the Sync In input is passed through the mvTITAN-CL to the camera
   and is inverted.

More about programming the mvTITAN-CL you will find in mvTITAN-CL’s manual.
### Glossary

<table>
<thead>
<tr>
<th>Expression</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD</td>
<td>Vertical drive, signal is sent to signalize next field (noninterlaced) or frame (interlaced). Also called Frame Enable, VSync or frame start signal.</td>
</tr>
<tr>
<td>HD</td>
<td>Horizontal drive, signal is sent to signalize next line. Also called Line Enable, HSync or line start signal.</td>
</tr>
<tr>
<td>Bpp</td>
<td>Bits per pixel</td>
</tr>
</tbody>
</table>