	Subject:	Basler L301KC on mvTITAN-CL	Created	Last change
			28.07.03	31.07.03
Application Note	Project:	Camera adaption	Version 1.0	

Overview

Camera Basler L310KC

Running modes

Free running
 ExSync Controlled

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 Frame Grabber external
 Trigger by external Frame Grabber

Software

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

Imprint

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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.

Information in this document is subject to change without notice and does not represent a commitment on the part of MATRIX VISION GmbH.

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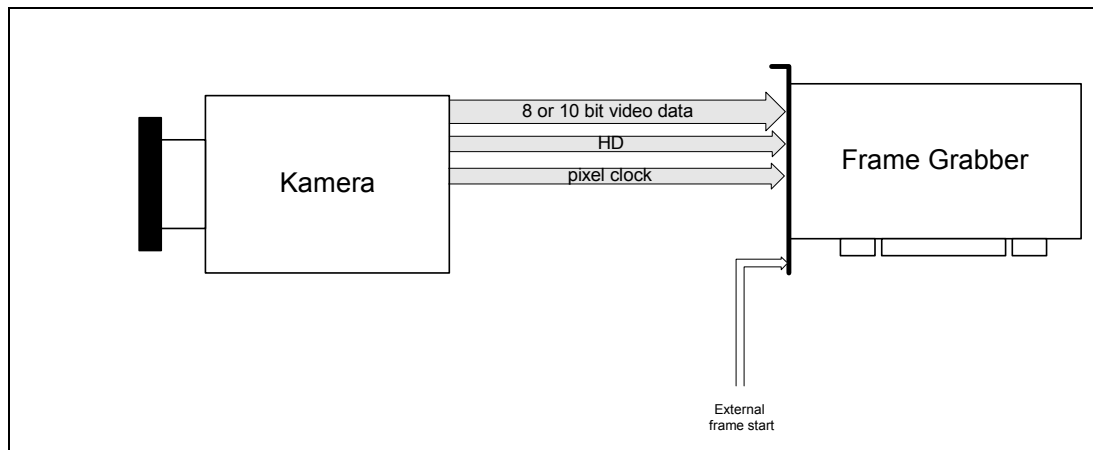
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Freerunning Mode

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

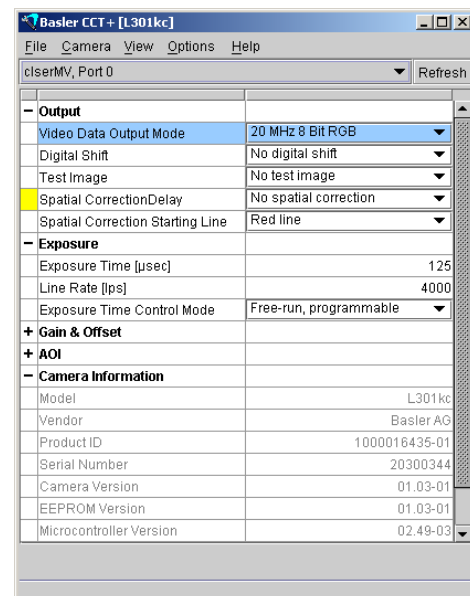
To set up the camera it is necessary to install the Basler CameraControl Tool supported by Basler-VC. You will find the latest version on the homepage www.baslerweb.de of Basler-VC.


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 *Free-run, programmable*



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Pin connection (CameraLink™ base standard)

MDR 26 pin		MDR 26 pin	
Pin 1		inner Shield	Pin 26
Pin 2		Tx Data 0-	Pin 25
Pin 3		Tx Data 1-	Pin 24
Pin 4		Tx Data 2-	Pin 23
Pin 5		XCLK-	Pin 22
Pin 6		Tx Data 3-	Pin 21
Pin 7		SerTC+	Pin 20
Pin 8		SerTFG-	Pin 19
Pin 9		CC1-	Pin 18
Pin 10		CC2+	Pin 17
Pin 11		CC3-	Pin 16
Pin 12		CC4+	Pin 15
Pin 13		inner Shield	Pin 14
Pin 14		inner Shield	Pin 13
Pin 15		Tx Data 0+	Pin 12
Pin 16		Tx Data 1+	Pin 11
Pin 17		Tx Data 2+	Pin 10
Pin 18		XCLK+	Pin 9
Pin 19		Tx Data 3+	Pin 8
Pin 20		SerTC-	Pin 7
Pin 21		SerTFG+	Pin 6
Pin 22		CC1+	Pin 5
Pin 23		CC2-	Pin 4
Pin 24		CC3+	Pin 3
Pin 25		CC4-	Pin 2
Pin 26		inner Shield	Pin 1

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

Camera definition

```


/* ----- 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:

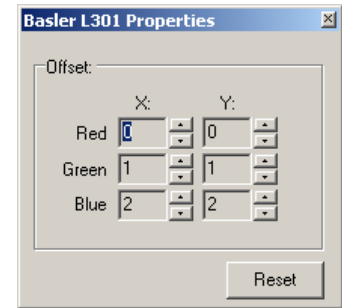
- Choose camera definition "L301kc" in register *Camera*
- Do not activate *Greyscale* in register *Acquire*
- Enable trigger should be deactivated except you have connected an external trigger signal to the Trigger-In pins
- Disable Shutter Control
- Disable Expose

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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:

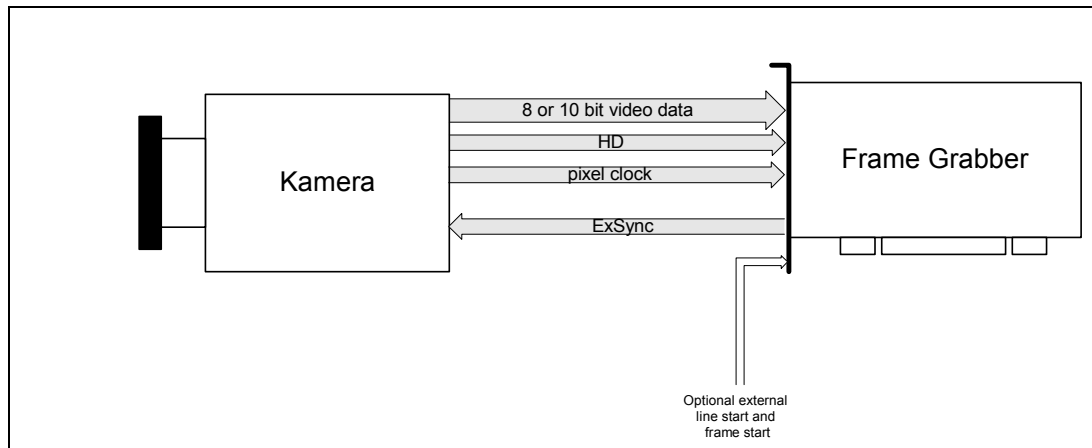
- Choose camera definition "*L301kc*", if no camera definitions are used set the videomode *VM_DIG24*.
- A suitable colormode is *COL_RGB24*. You will get an 24bpp image in the DMA-buffer. The vertical differences are not corrected.
- If using an external trigger signal on the *Trigger In* input you 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.

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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



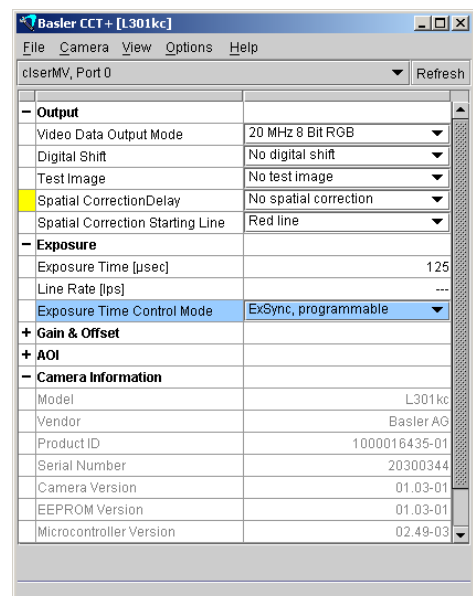
Camera settings set by software


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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Pin connection (CameraLink™ base standard)

MDR 26 pin		MDR 26 pin	
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Pin 12		CC4+	Pin 15
Pin 13		inner Shield	Pin 14
Pin 14		inner Shield	Pin 13
Pin 15		Tx Data 0+	Pin 12
Pin 16		Tx Data 1+	Pin 11
Pin 17		Tx Data 2+	Pin 10
Pin 18		XCLK+	Pin 9
Pin 19		Tx Data 3+	Pin 8
Pin 20		SerTC-	Pin 7
Pin 21		SerTFG+	Pin 6
Pin 22		CC1+	Pin 5
Pin 23		CC2-	Pin 4
Pin 24		CC3+	Pin 3
Pin 25		CC4-	Pin 2
Pin 26		inner Shield	Pin 1

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

Camera definition

```

/* ----- 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

```

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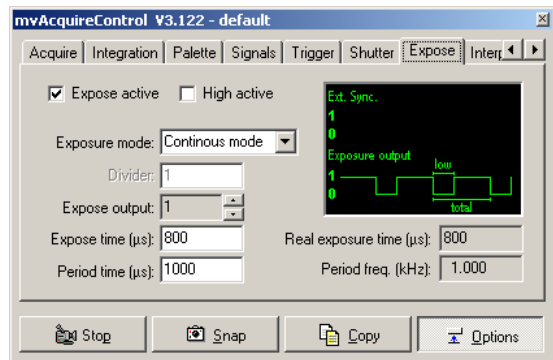
Remarks to mvAcquireControl

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:

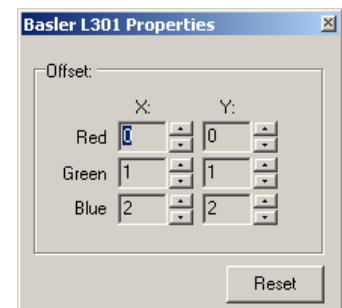
1. Continuous mode:
No external signal must be connected to the mvTITAN-CL. The mvTITAN-CL generates a signal on the basis of *expose time* and *Period time*.
2. Incr. raising edge:
An external line start signal must be supplied to the *Sync In* inputs of the mvTITAN-CL. The period time is defined by 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 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.


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

The available modes:

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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.

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Glossary

Expression	Explanation
VD	Vertical drive, signal is sent to signalize next field (noninterlaced) or frame (interlaced). Also called Frame Enable, VSync or frame start signal.
HD	Horizontal drive, signal is sent to signalize next line. Also called Line Enable, HSync or line start signal.
Bpp	Bits per pixel