	<b>Subject:</b> Dalsa Piranha P2 with mvTITAN-CL	Created	Last change
		05.08.03	05.08.03
Application Note	Project:	Camera adaption	Version 1.0

## Overview

Camera Dalsa Piranha P2

### Running modes

Freerunning  [remarks]  
 Restart/Reset  [remarks]  
 Ext. Synchronized  [remarks]  
 Trigger Shutter  [remarks]  
 Flash & Reset  [remarks]

### Resolution

Horizontal 1024 pixel  
 Bits per Pixel 8 bpp  
 Binning   
 Partial Scan

### Timings

Pixel clock 2\*40 MHz  
 Horizontal Up to kHz  
 78.125

### MATRIX VISION GmbH Frame Grabber

Typ	MvTITAN-CL				
Line Enable by	camera	<input checked="" type="checkbox"/>	Frame Grabber	<input checked="" type="checkbox"/>	external <input checked="" type="checkbox"/>
Frame Enable by	camera	<input type="checkbox"/>	Frame Grabber	<input checked="" type="checkbox"/>	external <input checked="" type="checkbox"/>
Trigger by	external	<input checked="" type="checkbox"/>	Frame Grabber	<input checked="" type="checkbox"/>	
Flash by	camera	<input type="checkbox"/>	Frame Grabber	<input type="checkbox"/>	external <input type="checkbox"/>

### 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.

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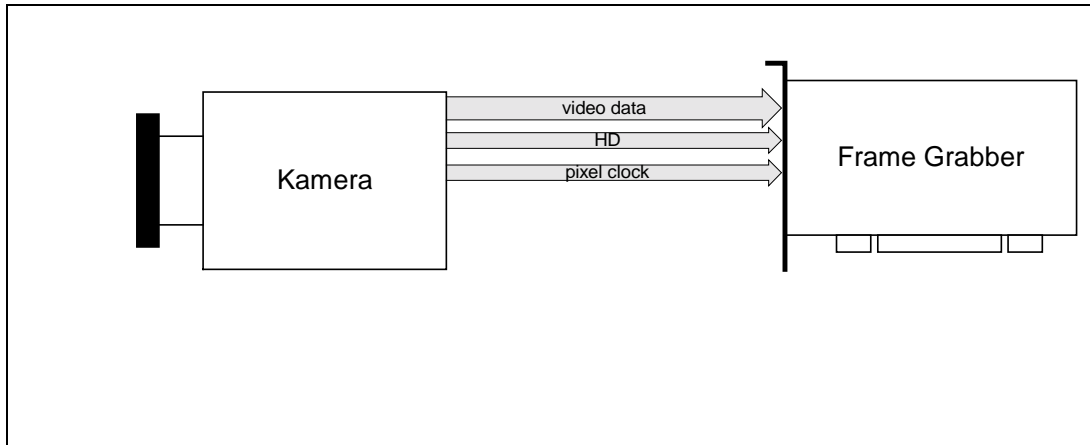
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## Freerunning Mode

The camera is running free, which means that pixel data is transmitted to the frame grabber at the highest possible speed continuously. In this case all necessary information is transmitted to the camera via the Camera Link cable (pixel clock, pixel data and line-, frame- and data valid signals).

### Signal map




### Camera settings set by software

As Dalsa does not offer communication software until now, some program must be used, which can communicate via the Camera Link communication channel via the initialized frame grabber. The exposure mode for the camera must be set to '1' using the command **Set Exposure Mode**.

The command to be called would be: 'sem 1'

### 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

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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

### Cameradefinition

The camera definition can be seen below, the vertical size of the block of data to be considered as 'one image' can be varied by modifying the 2<sup>nd</sup> parameter of the call of the function DefCamVerticalAcquire.

```

/* ----- Dalsa P2-01K40 ----- */
/* For use with mvTITAN-CL */
DefCamType "P2-01K40" VM_DIG2X8 NONINTERLACED 10 24400 40000 PCLK_EXTERN
DefCamAcquireSetup "P2-01K40" VSCAN INV_SYNC NEXT_FIELD
DefCamAnalogParam "P2-01K40" AC 1 0 0 1200
DefHorizontalUnit "P2-01K40" PIXEL
DefVerticalUnit "P2-01K40" LINES
DefCamHorizontalAcquire "P2-01K40" 0L 1024L 1
DefCamVerticalAcquire "P2-01K40" 0L 1024L 1
DefCamGenerateVSync "P2-01K40" 0L 1L

```

### Remarks

The camera sends 8 bit per pixel grey image data parallel from two camera link data channels. Therefore the video mode VM\_DIG2x8 is needed to obtain correct images. 'greyscale acquire' should be checked on the acquire tab of the mvAcquireControl

### Frame start signal

For one image the mvTITAN-CL acquires as much lines as given in the used camera definition and stores them in the memory of the PC. In the example camera definition 1024 per image are set. You can vary this value if you need more or less number of lines per image.

For acquiring one image the mvTITAN-CL needs a frame start signal. Each time a frame start signal is recognized the mvTITAN-CL acquires one image.

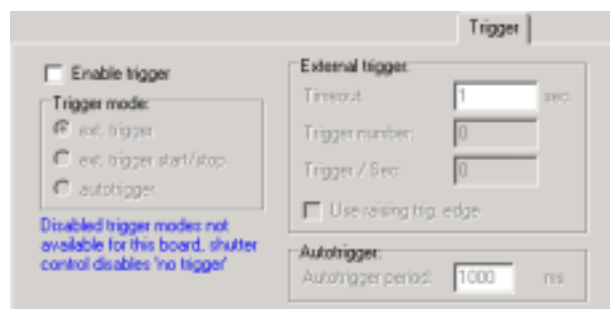
There are two possibilities where the signal can come from:


#### 1. the mvTITAN-CL generates the frame start signal itself ( like free running mode)

Use the camera definition printed above and be sure that the external trigger input is deactivated. The external input is deactivated by default.

In this mode the mvTITAN-CL generates automatically a frame start signal right after the last line was acquired so that no line is lost.

Using MVAcquireControl switch to register *Trigger* and be sure the *Trigger mode* is set to *no trigger*:

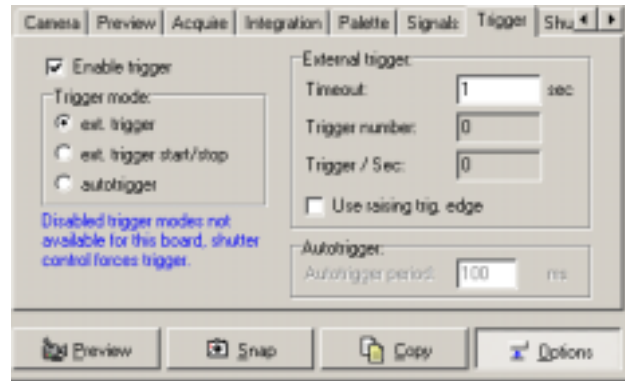


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## 2. the frame start signal is supplied from external

Connect your external frame start signal to the *Trigger-In* pins of the 8 pin connector *J8*.

Now you just have to activate the external trigger input and the following image acquisitions will be started with only with the next frame start pulse. The acquisition of a image will start with the next HD pulse so with the next line after the external trigger pulse was recognized.



To activate the external trigger input in your program use the function *mvSelExtTrig (dev, 1)*. Using *MVAcquireControl* switch to register *Trigger* and set *Trigger mode* to *ext. trigger*.

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## Restart-Reset mode

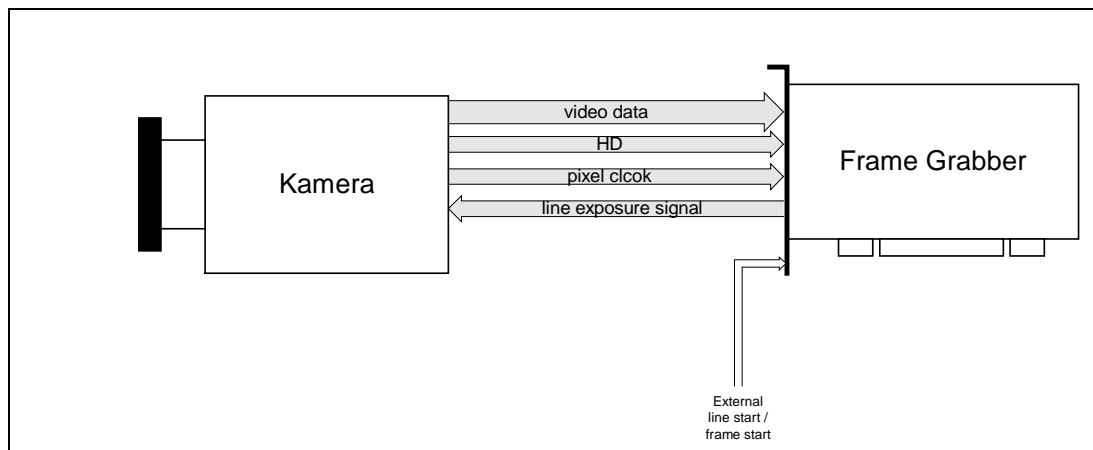
Camera gets line start signal from mvTITAN-CL and sends image data, pixel clock, exposure signal and HD to the mvTITAN-CL.

The line start signal doesn't influence the exposure time. The exposure time can be defined by applying a pulse sequence to the CC1 channel of the Camera Link™ cable.

The mvTITAN-CL can generate the line start signal itself or an external line start signal can be passed through to the camera.

mvTITAN-CL can generate the needed frame start signal itself or it can be supplied by external.

### Signal map




### Camera settings set by software

As Dalsa does not offer communication software until now, some program must be used, which can communicate via the Camera Link communication channel via the initialized frame grabber. The exposure mode for the camera must be set to '4' using the command **Set Exposure Mode** to activate the 'smart exsync. Mode', which is a mode, where the line exposure time can be controlled via the frame grabber. In this mode high or logic 1 on the CC1 channel means, that the line is exposed, low or logic 0 end the exposure.

The command to be called would be: 'sem 4'

### 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

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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

### Cameradefinition

The camera definition can be seen below, the vertical size of the block of data to be considered as 'one image' can be varied by modifying the 2<sup>nd</sup> parameter of the call of the function DefCamVerticalAcquire.

```

/* ----- Dalsa P2-01K40 -----
/* For use with mvTITAN-CL */
DefCamType "P2-01K40" VM_DIG2X8 NONINTERLACED 10 24400 40000 PCLK_EXTERN
DefCamAcquireSetup "P2-01K40" VSCAN INV_SYNC NEXT_FIELD
DefCamAnalogParam "P2-01K40" AC 1 0 0 1200
DefHorizontalUnit "P2-01K40" PIXEL
DefVerticalUnit "P2-01K40" LINES
DefCamHorizontalAcquire "P2-01K40" 0L 1024L 1
DefCamVerticalAcquire "P2-01K40" 0L 1024L 1
DefCamGenerateVSync "P2-01K40" 0L 1L

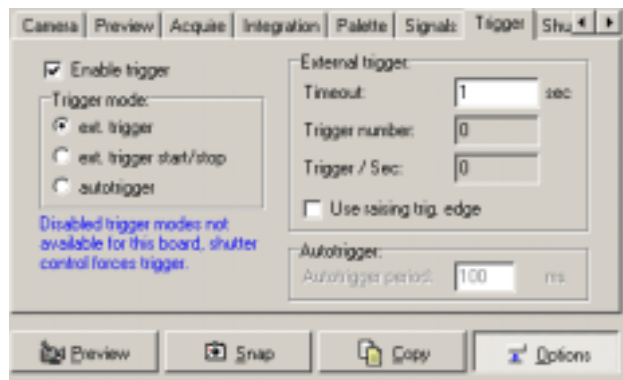
```

### Remarks


#### 1. The frame start signal is supplied from external

Connect your external frame start signal to the *Trigger-In* pins of the 8 pin connector *J8*.

Now you just have to activate the external trigger input and the following image acquisitions will be started with only with the next frame start pulse. The acquisition of a image will start with the next HD pulse so with the next line after the external trigger pulse was recognized.



To activate the external trigger input in your program use the function *mvSelExtTrig (dev, 1)*. Using *MVAcquireControl* switch to register *Trigger* and set *Trigger mode* to *ext. trigger*.

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## 2. Activating output of line start signal supplied externally and the exposure time is controlled by the frame grabber:

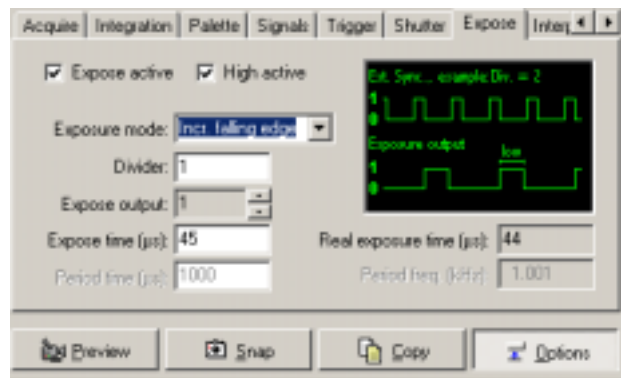
To activate the output use the command *mvSetExpose ( dev, mode, low, total )*.


To use a signal generated externally as the line start signal you can use any mode from 2 to 5. However if you want to define the width of the pulse generated on the CC1 channel of the Camera Link™ cable the modes 2 or 3 are the ones to work with. You can find more details about these modes in the mvTITAN-CL's manual. In the mvAcquireControl these modes are known as the 'Incremental modes' (falling or raising edge).

The values *low* and *total* are ignored. Nevertheless be sure that *total* is always greater than *low*. Define the used output with *mvSetExposeOutput ( dev, output )*. For the Aviva C2 CL use 1 for *output* to activate signal generation on CC1.

Now you can supply your external line start signal to the *Sync-In* pins of the 8 pin plug J8. More about this connector you can find in the appendix of the mvTITAN-CL's manual.

If you need to generate a pulse every 'x' pulse detected on the *Sync-In* pins you can define this by using the function *mvSetExposeDivider* in your application or by working with the expose divider edit box in the mvAcquireControl.



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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.