	Subject:	PULNIX PE100 with mvTITAN-G1	Created	Last change
			10.04.03	10.04.03
Application Note	Project:	Camera adaption	Version 1.0	

Overview

Camera PULNIX PE100

Running modes

Freerunning	<input checked="" type="checkbox"/>
Restart/Reset	<input type="checkbox"/>
Ext. Synchronized	<input checked="" type="checkbox"/>
Trigger Shutter	<input checked="" type="checkbox"/>
Flash & Reset	<input type="checkbox"/>

Resolution

Horizontal	644 pixel
Vertical	480 pixel
Binning	<input type="checkbox"/>
Partial Scan	<input type="checkbox"/>

Timings

	double speed	normal speed
Pixel clock	24.545 MHz	12.273 MHz
Horizontal	31.468 kHz	15.734 kHz
Vertical (interlaced)	119.88 fps	59.94 fps
Vertical (progressive)	59.94 fps	29.97 fps

MATRIX VISION GmbH Frame Grabber

Typ	mvTITAN-G1			
Line Enable by	camera <input checked="" type="checkbox"/>	Frame Grabber <input checked="" type="checkbox"/>	external <input type="checkbox"/>	
Frame Enable by	camera <input checked="" type="checkbox"/>	Frame Grabber <input checked="" type="checkbox"/>	external <input 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	<input checked="" type="checkbox"/>
mvIMPACT Go!	<input checked="" type="checkbox"/>
Other	<input type="checkbox"/> [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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Email: info@matrix-vision.de.

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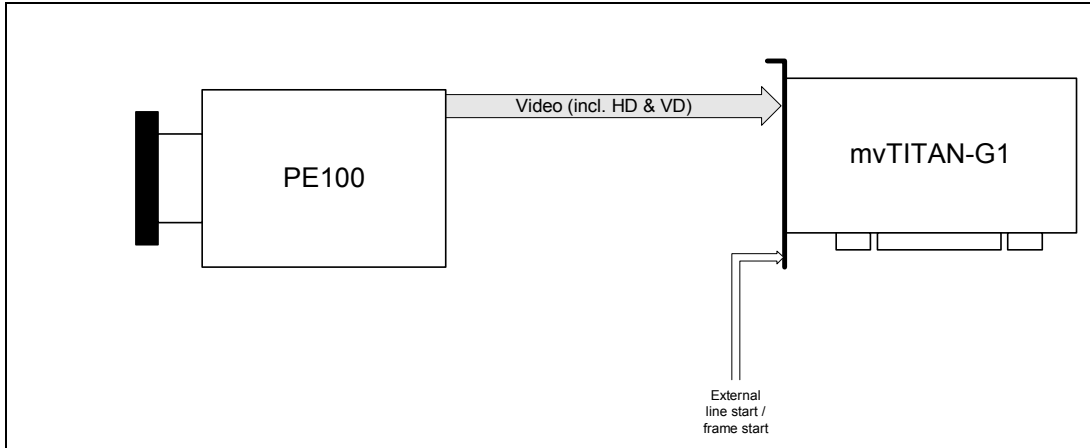
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Freerunning Mode

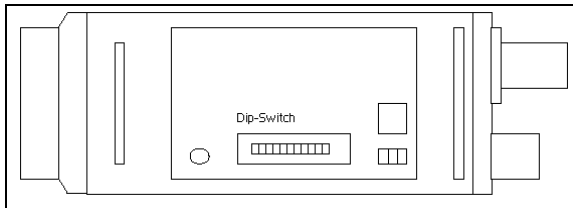
The camera runs with its own timing and sends the VD and HD within the video signal.

Signal map



Camera settings set by hardware

Settings inside the camera:



Dip-Switch settings for normal speed, 2:1 Interlaced

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
OFF	ON	ON	X	X	X	X	X	X	X

'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant

Dip-Switch settings for double speed, 2:1 Interlaced

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
OFF	ON	OFF	X	X	X	X	X	X	X

'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant

Dip-Switch settings for normal speed, progressive


SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
ON	ON	ON	X	X	X	X	X	X	X

'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant

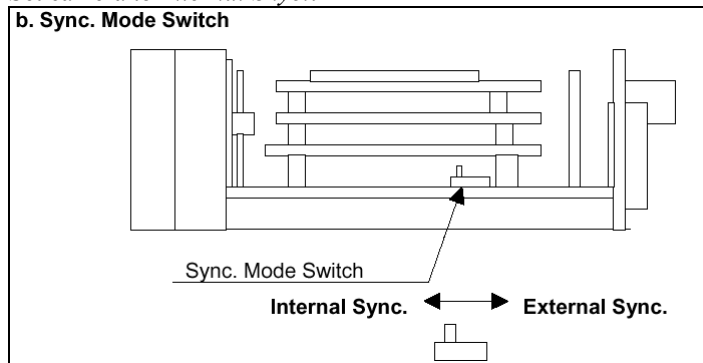
Dip-Switch settings for double speed, progressive

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
ON	ON	OFF	X	X	X	X	X	X	X

'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant

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Set camera to *Internal Sync.*:



Pin connection

PE100 12 pin Hirose		Direction	mvTITAN-G1 HD26ST	
1	GND	↔	10	GND
2	+12 VDC	←	1	+12 VDC
3	GND Video	↔	12	GND
4	Video out	→	2	Video 1

Recommended cable for this mode from MATRIX VISION GmbH: KS41 03.0

Cameradefinition

```


/* ----- PE100 ----- */
/* free running, 2:1 interlaced mode, normal speed */
DefCamType "PE100" VM_RS170 INV_INTERLACED 60 15734 12272 PCLK_INTERN
DefCamAcquireSetup "PE100" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam "PE100" AC 1 0 0 1200
DefHorizontalUnit "PE100" PIXEL
DefVerticalUnit "PE100" LINES
DefCamHorizontalAcquire "PE100" 114L 644L 1
DefCamVerticalAcquire "PE100" 14L 240L 1
DefCamClamp "PE100" 74L 5L
DefCamZero "PE100" 84L 5L
DefCamFieldGate "PE100" 260L 330L

/* ----- PE100 ----- */
/* free running, progressive mode*/
DefCamType "PE100-P" VM_RS170 NONINTERLACED 60 15734 12272 PCLK_INTERN
DefCamAcquireSetup "PE100-P" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam "PE100-P" AC 1 0 0 1200
DefHorizontalUnit "PE100-P" PIXEL
DefVerticalUnit "PE100-P" LINES
DefCamHorizontalAcquire "PE100-P" 114L 644L 1
DefCamVerticalAcquire "PE100-P" 28L 480L 1
DefCamClamp "PE100-P" 74L 5L
DefCamZero "PE100-P" 84L 5L
DefCamFieldGate "PE100-P" 260L 330L

```

Remarks

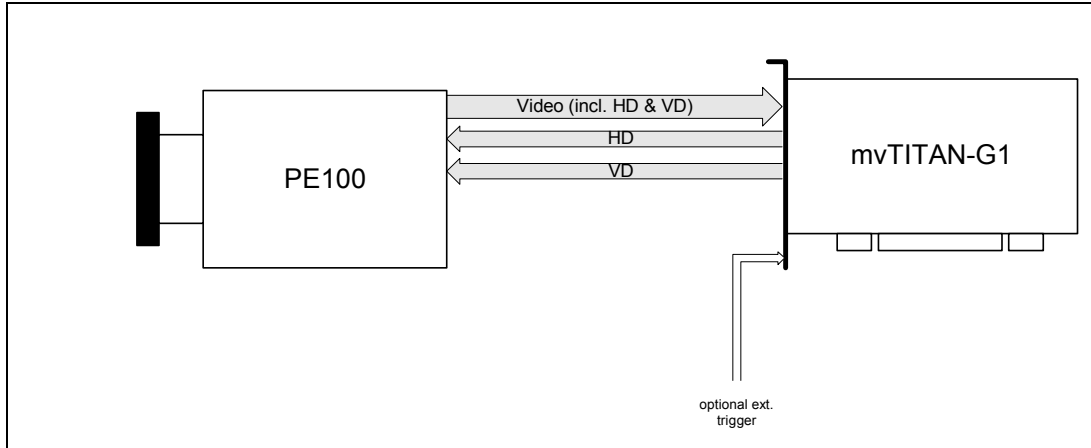
none

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External synchronized mode

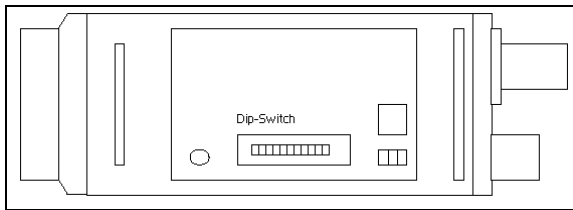
[Insert here the description of the mode including timing diagrams from camera's manual if available]

Signal map



Camera settings set by hardware

Settings inside the camera:



Dip-Switch settings for normal speed, progressive

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
ON	ON	ON	ON	ON	ON	X	X	X	X

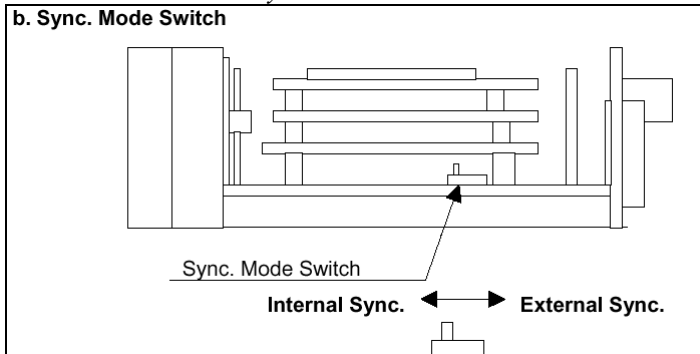
'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant


Dip-Switch settings for double speed, progressive

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
ON	ON	OFF	ON	ON	ON	X	X	X	X

'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant

Set camera to *External Sync* mode:



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Pin connection

PE100 12 pin Hirose		Direction	mvTITAN-G1 HD26ST	
1	GND	↔	10	GND
2	+12 VDC	←	1	+12 VDC
3	GND Video	↔	12	GND
4	Video out	←	2	Video 1
6	HD in	←	26	HD out
7	VD in	←	24	VD out

Recommended cable for this mode from MATRIX VISION GmbH: not yet available

Cameradefinition

```

/* ----- PE100 ----- */
/* free running, progressive mode*/
DefCamType           "PE100-P" VM_RS170 NONINTERLACED 60 15734 12272 PCLK_INTERN
DefCamAcquireSetup   "PE100-P" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "PE100-P" AC 1 0 0 1200
DefHorizontalUnit    "PE100-P" PIXEL
DefVerticalUnit       "PE100-P" LINES
DefCamHorizontalAcquire "PE100-P" 114L 644L 1
DefCamVerticalAcquire "PE100-P" 28L 480L 1
DefCamClamp          "PE100-P" 74L 5L
DefCamZero           "PE100-P" 84L 5L
DefCamFieldGate      "PE100-P" 260L 330L

```

Setting up HD out and VD out

For setting up the horizontal and vertical frequency the mvTITAN-G1 sends to the camera on HDout and VDout you have to use the command *mvDefDisplayMode()*.

Sample calling in used INI file (normal speed):


```

...
[TITAN]
...
InitBoard
...
DefDisplayMode 0 NULL 0 0 0 758 512 0 0 10 10 0 0 0 15734
...

```

With this calling a horizontal frequency of 15,734 kHz is sent on HDout. The resultant vertical frequency on VDout is about 30 Hz.

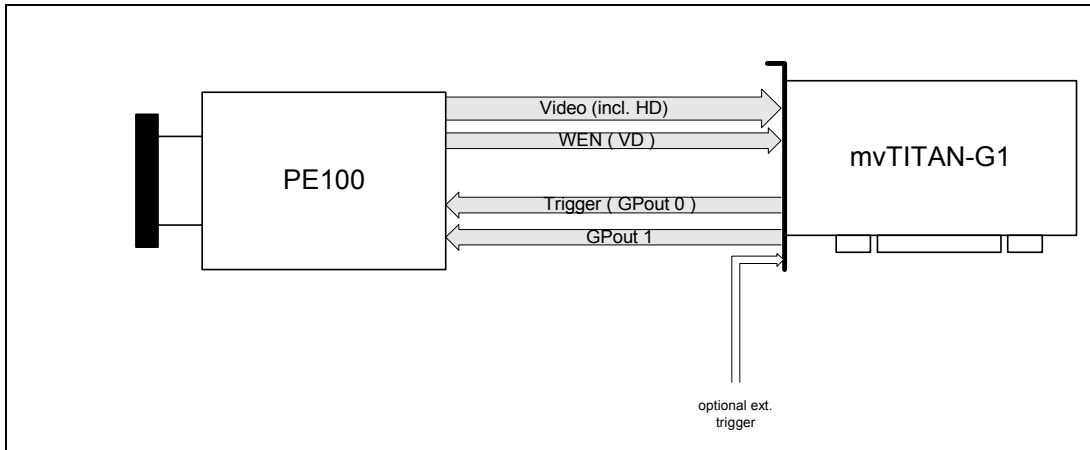
Read more about *mvDefDisplayMode()* in the mvTITAN-G1's manual.

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Trigger Shutter Mode

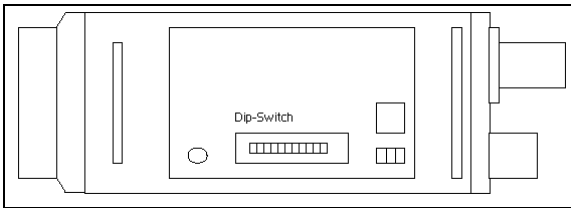
The camera runs with its own timings and the mvTITAN-G1 resets the camera. The length of the trigger pulse does not define the shuttertime of the camera! HD is sent within the video signal and VD is sent on WEN out pin.

Signal map



Camera settings set by hardware

Settings inside the camera:



Dip-Switch settings for normal speed, progressive

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
ON	OFF	ON	ON	ON	X	X	X	X	X

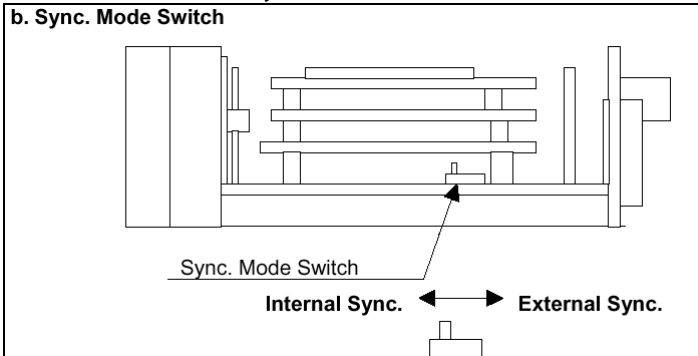
'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant


Dip-Switch settings for double speed, progressive

SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10
ON	OFF	OFF	ON	ON	X	X	X	X	X

'ON': switched on, 'OFF': switched off, 'X': switch setting not relevant

Set camera to *External Sync* mode:



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Pin connection

PE100 12 pin Hirose		Direction	mvTITAN-G1 HD26ST	
1	GND	↔	10	GND
2	+12 VDC	←	1	+12 VDC
3	GND Video	↔	12	GND
4	Video out	←	2	Video 1
7	TRIG IN	←	19	GPout 0
11	WEN out	→	6	VD in

Recommended cable for this mode from MATRIX VISION GmbH: not yet available

Cameradefinition

```

/* ----- PE100 ----- */
/* Random Trigger shutter mode, progressive scan*/
DefCamType "PE100-RTS" VM_RS170 NONINTERLACED 60 15734 12272 PCLK_INTERN
DefCamAcquireSetup "PE100-RTS" VSCANV NOT_INV NEXT_FIELD
DefCamAnalogParam "PE100-RTS" AC 1 0 0 1200
DefHorizontalUnit "PE100-RTS" PIXEL
DefVerticalUnit "PE100-RTS" LINES
DefCamHorizontalAcquire "PE100-RTS" 114L 644L 1
DefCamVerticalAcquire "PE100-RTS" 28L 480L 1
DefCamClamp "PE100-RTS" 50L 5L
DefCamZero "PE100-RTS" 50L 5L
DefCamFieldGate "PE100-RTS" 260L 330L

```

Remarks

In this mode the camera sends the HSync in the video signal and the VSync (WEN) on separate pins. Therefore the frame grabber must be set to a mixed mode: HSync internal and VSync external. Condition for this is a driver with at least the following versions:
mvTITAN-DLL: V1.4.26
Matrixfg.sys: 1.90.0.0
Titan.bin: 3.1.8.26
Usind MVacquireControl at least the version V3.111 is needed.

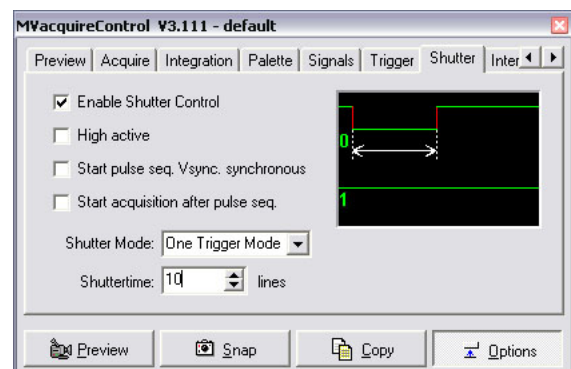
Setting up trigger signal


For the camera reset GPout 0 of mvTITAN-G1 is used. The best way to setup GPout 0 as a trigger signal is to use the shutter control.

In MVacquireControl switch to register *Shutter* and do the following settings:

- Enable Shutter Control
 - Disable *High active*
 - Disable *Start puls seq. Vsync synchrononous*
 - Disable *Start acquisition after pulse seq.*
 - Set Shutter mode to *One Trigger Mode*
- The setting in *Shuttertime* defines the length of the pulse and must be at least 1 line.


Automatically the *autotrigger* in register *Trigger* is activated. Define in *Autotrigger periode* the time between two images to acquire. Use periode times with at least 50ms.



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If you are using the optional external trigger signal connect it to the *Trigger In* pin of the mvTITAN-G1 switch from *autotrigger* to *ext. trigger* and the camera reset signal will be output right after each external trigger pulse.

If using the shuttercontrol in software you have to use the functions *mvDefPulsSeq()* and *mvSetTriggerPeriod()* to define the shutter control method. You will find more about these functions in the mvTITAN-G1'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.