	Subject:	mvTITAN-G4 with Sony XC-HR300	Created	Last change
			15.01.04	16.01.04
Application Note	Project:	Camera adaption	Version 1.0	

Overview

Camera Sony XC-HR300

Running modes

Freerunning [X]
Restart/Reset [X]
Trigger Shutter Mode M1 & M2 [X]

Resolution

Horizontal 768 pixel
Vertical 572 pixel
Binning []
Partial Scan []

Timings

Pixel clock 29.5 MHz
Horizontal 31.25 kHz
Vertical 50/100 fps

MATRIX VISION GmbH Frame Grabber

Typ mvTITAN-G4
Line Enable by camera [X] Frame Grabber [] external []
Frame Enable by camera [X] Frame Grabber [] external []
Trigger by external [X] Frame Grabber [X]
Flash by camera [] Frame Grabber [] external []

Software

mvAcquireControl [X]
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.

Email: info@matrix-vision.de.

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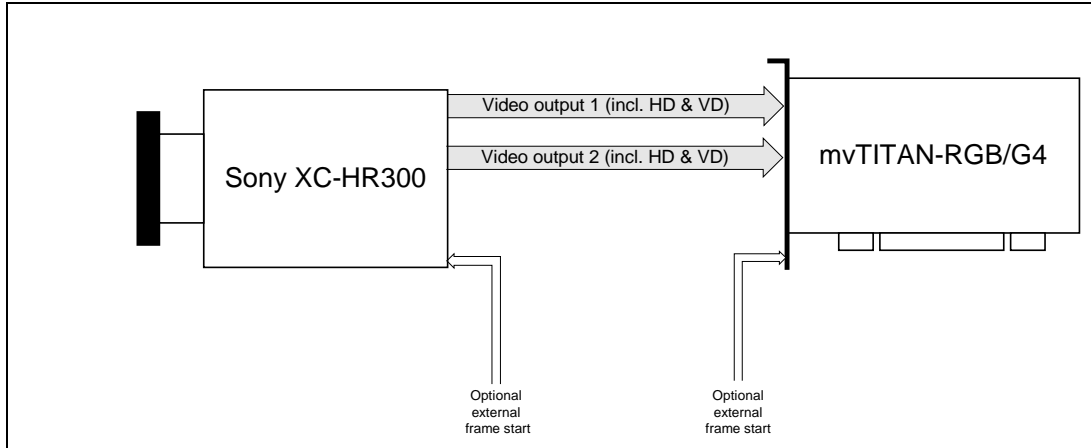
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Freerunning Mode

Camera runs in its own timing and sends the video signal including the signals for synchronization HD and VD to the mvTITAN-RGB/G4.

Signal map



Camera settings set by hardware

Dip-Switch setting (1):

2I	1N
XXX	XXX

Dip-Switch setting (2):

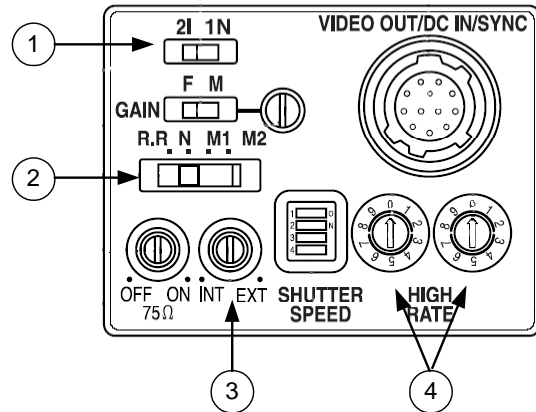
R.R	N	M1	M2
	XXX		


Dip-Switch setting (3):

INT	EXT
XXX	

Dip-Switch setting (4):

SW1	SW2
0	0



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Pin connection

HR10A-10P-12S		Direction	HD26ST	
1	Ground	→	10	Ground
2	+12V DC	←	1	+ 12V DC
3	Video output 1 GND	←	12	Ground
4	Video output 1 (signal)	→	2	Video PAL 1
5	HD output (GND)	←	16	Ground
6	HD output (signal)			not used
7	VD output (signal)			not used
8	Video output 2 (GND)	←	13	Ground
9	Video output 2 (signal)	→	3	Video PAL 2
10	WEN output (signal)			not used
11	Trigger pulse input (signal)			not used
12	Ground	←	15	Ground

Recommended cable for this mode from MATRIX VISION GmbH: KS56-0238 xx.x.

Camera definition

Switch (1) set to 2:1 interlaced:

```

/* ----- Sony XC-HR300 ----- */
/* For use in freerunning mode and 2:1 interlaced */
DefCamType           "XC-HR300-2I" VM_RS170 INTERLACED 60 31250 29500 PCLK_INTERN
DefCamAcquireSetup   "XC-HR300-2I" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "XC-HR300-2I" AC 1 0 0 1200
DefHorizontalUnit    "XC-HR300-2I" PIXEL
DefVerticalUnit       "XC-HR300-2I" LINES
DefCamHorizontalAcquire "XC-HR300-2I" 154L 768L 1
DefCamVerticalAcquire "XC-HR300-2I" 20L 286L 1
DefCamClamp          "XC-HR300-2I" 100L 5L
DefCamZero           "XC-HR300-2I" 100L 5L
DefCamFieldGate      "XC-HR300-2I" 260L 330L

```

Switch (1) set to noninterlaced:


```

/* ----- Sony XC-HR300 ----- */
/* For use in freerunning mode and 1N noninterlaced mode */
DefCamType           "XC-HR300-1N" VM_RS170 NONINTERLACED 60 31250 29500 PCLK_INTERN
DefCamAcquireSetup   "XC-HR300-1N" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "XC-HR300-1N" AC 1 0 0 1200
DefHorizontalUnit    "XC-HR300-1N" PIXEL
DefVerticalUnit       "XC-HR300-1N" LINES
DefCamHorizontalAcquire "XC-HR300-1N" 154L 768L 1
DefCamVerticalAcquire "XC-HR300-1N" 39L 582L 1
DefCamClamp          "XC-HR300-1N" 100L 5L
DefCamZero           "XC-HR300-1N" 100L 5L
DefCamFieldGate      "XC-HR300-1N" 260L 330L

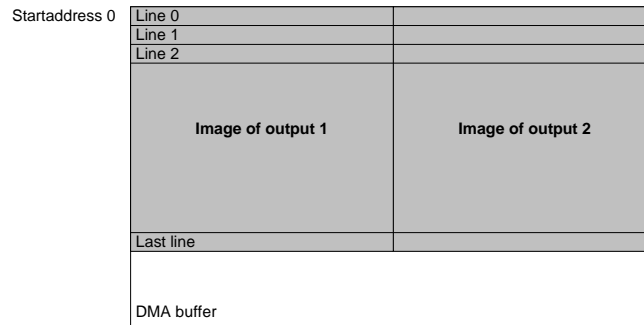
```

Remarks

To set up the camera correctly using with mvAcquireControl or Standard SDK choose the corresponding definition "XC-HR300-2I" or "XC-HR300-1N" and set input channel and sync channel both to 1.

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For **2:1 interlaced mode** you have to choose the colormode *COL_G2* to get images from both outputs of the XC-HR300. The images are stored in the memory as follows:



Please note that in mvConfig it is not possible to show both inputs at the same time. Only output 1 can be displayed if colormode is set to *Greyscale 8* or *10 bit*.

For **1N noninterlaced mode** you have to choose the colormode *COL_GREY* (8bpp) or *COL_GREY10* (10bpp) because the camera sends the images only on output 1.

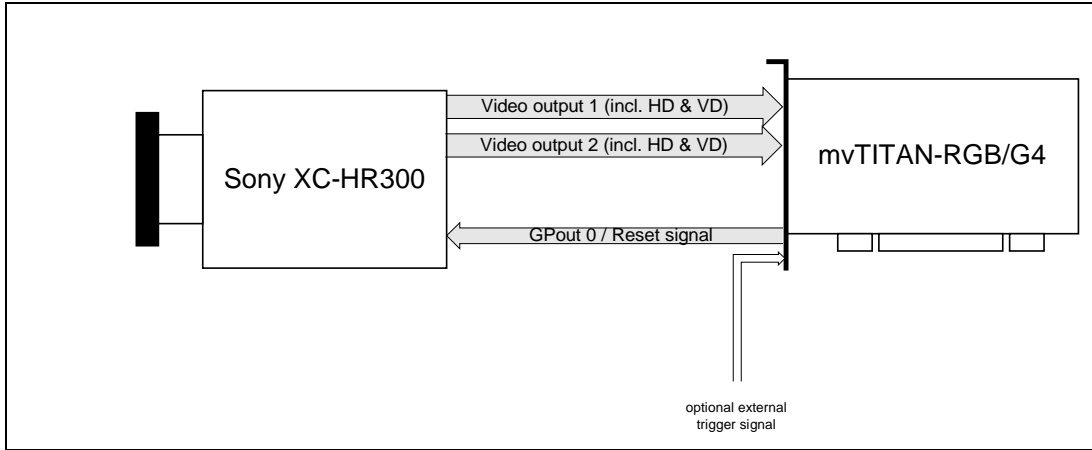
More details about the behavior of the camera and the frame grabber please read the concerning technical manuals of XC-HR300 and mvTITAN-RGB/G4.

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Restart/Reset mode

Camera is reset by a reset signal which comes either from external or better from mvTITAN-RGB/G4. Camera sends after recognized trigger signal the video signal including signals for synchronization to mvTITAN-RGB/G4.

Signal map



Camera settings set by hardware

Dip-Switch setting (1):

2I	1N
XXX	XXX

Dip-Switch setting (2):

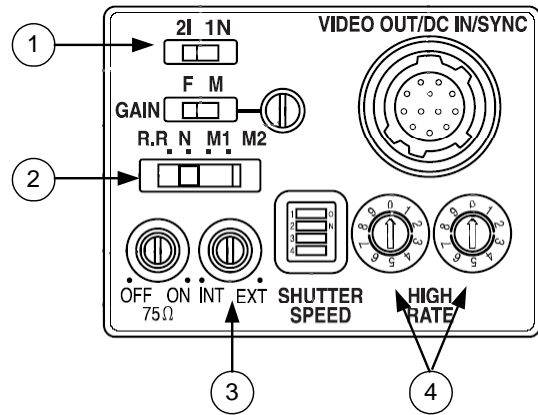
R.R	N	M1	M2
XXX			


Dip-Switch setting (3):

INT	EXT
XXX	

Dip-Switch setting (4):

SW1	SW2
0	0



	Subject: mvTITAN-G4 with Sony XC-HR300	Created	Last change
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Pin connection

HR10A-10P-12S		Direction	HD26ST	
1	Ground	→	10	Ground
2	+12V DC	←	1	+ 12V DC
3	Video output 1 GND	←	12	Ground
4	Video output 1 (signal)	→	2	Video PAL 1
5	HD output (GND)	←	16	Ground
6	HD output (signal)			not used
7	Reset	←	19	GP-Out 0
8	Video output 2 (GND)	←	13	Ground
9	Video output 2 (signal)	→	3	Video PAL 2
10	WEN output (signal)			not used
11	Trigger pulse input (signal)			not used
12	Ground	←	15	Ground

Cameradefinition

Switch (1) set to 2:1 interlaced:

```

/* ----- Sony XC-HR300 ----- */
/* For use in Restart/Reset mode and 2:1 interlaced mode */
DefCamType           "XC-HR300-RR-2I" VM_RS170 NONINTERLACED 60 31250 29500
PCLK_INTERN
DefCamAcquireSetup   "XC-HR300-RR-2I" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "XC-HR300-RR-2I" AC 1 0 0 1200
DefHorizontalUnit    "XC-HR300-RR-2I" PIXEL
DefVerticalUnit       "XC-HR300-RR-2I" LINES
DefCamHorizontalAcquire "XC-HR300-RR-2I" 154L 768L 1
DefCamVerticalAcquire "XC-HR300-RR-2I" 22L 286L 1
DefCamClamp          "XC-HR300-RR-2I" 100L 5L
DefCamZero           "XC-HR300-RR-2I" 100L 5L
DefCamFieldGate      "XC-HR300-RR-2I" 260L 330L

```

Switch (1) set to noninterlaced:


```

/* ----- Sony XC-HR300 ----- */
/* For use in Restart/Reset mode and 1N noninterlaced mode */
DefCamType           "XC-HR300-RR-1N" VM_RS170 NONINTERLACED 60 31250 29500
PCLK_INTERN
DefCamAcquireSetup   "XC-HR300-RR-1N" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "XC-HR300-RR-1N" AC 1 0 0 1200
DefHorizontalUnit    "XC-HR300-RR-1N" PIXEL
DefVerticalUnit       "XC-HR300-RR-1N" LINES
DefCamHorizontalAcquire "XC-HR300-RR-1N" 154L 768L 1
DefCamVerticalAcquire "XC-HR300-RR-1N" 39L 582L 1
DefCamClamp          "XC-HR300-RR-1N" 100L 5L
DefCamZero           "XC-HR300-RR-1N" 100L 5L
DefCamFieldGate      "XC-HR300-RR-1N" 260L 330L

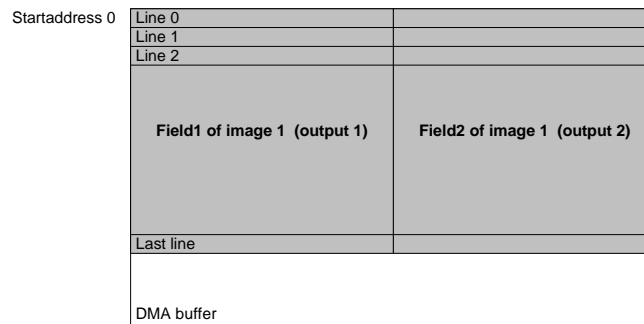
```

Remarks to needed color modes

To set up the camera correctly using with mvAcquireControl or Standard SDK choose the corresponding definition "XC-HR300-RR-2I" or "XC-HR300-RR-1N" and set input channel and sync channel both to 1.

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For **2:1 interlaced mode** you have to choose the colormode *COL_G2* to get the fields from both outputs of the XC-HR300. The images are stored in the memory as follows:



Please note that in mvConfig it is not possible to show both inputs at the same time. Only output 1 can be displayed if colormode is set to *Greyscale 8* or *10 bit*.

For **1N noninterlaced mode** you have to choose the colormode *COL_GREY* (8bpp) or *COL_GREY10* (10bpp) because the camera sends the images only on output 1.

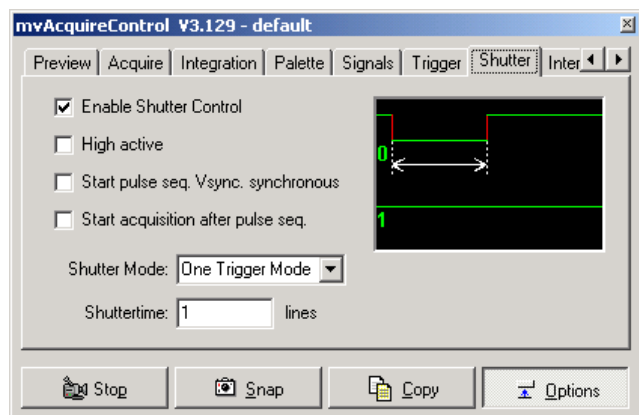
Remarks for setting up reset signal

In mvAcquireControl:

Additionally to the camera definition settings you have to activate the output of the reset signal on GPout 0 output of mvTITAN-RGB/G4. For that switch to register *Shutter*:

Enable Shutter Control and choose *One Trigger Mode* for *Shutter Mode*. Be sure *High active* is disabled.

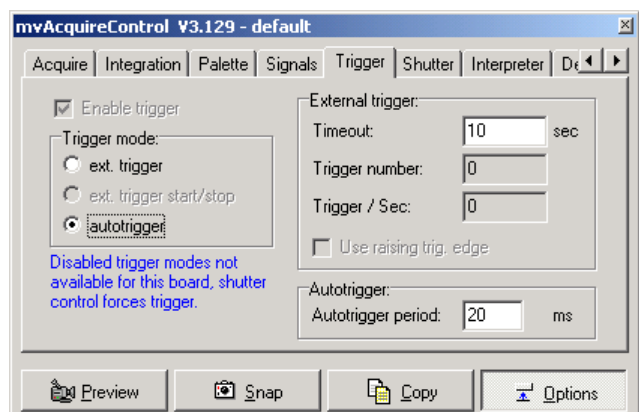
The *Shuttertime* can be set to *1* or greater. This defines the length of the reset pulse which is not relevant for the image acquisition.




As soon as shutter control is enabled the *Autotrigger* mode is activated. To set up the trigger mode switch to *Trigger*:

If using an external trigger signal connected to the *Trigger In* pin of the mvTITAN-RGB/G4 choose *ext. trigger* and provide the mvTITAN-RGB/G4 with such signal.

If no external trigger signal is present choose *autotrigger* to simulate the trigger signal. In this case you must define the frequency of this signal by *Autotrigger period*.



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Please stay in the valid frequency range for the reset signal to avoid corrupted images. In case of 2:1 interlaced this is up to 100Hz (10ms period time) or 50 Hz (20ms period time) in case of 1N noninterlaced. These limits can vary if using partial scan. Please take a look in camera's manual to get the limits.

In program based on Standard-SDK:

First define format of pulse which is sent to the camera by calling command *mvDefPulsSeq()*. The signal array *pPulse* must be like that:

Element	Value
0	length of pulse in number of lines (default: 1)
1	-1

use a calling like that:

```
mvDefPulsSeq(dev, 0, 0, pPulse);
```

So an active low signal with a pulse length of 1 line is output each time a trigger arose.

Now define the triggermode.

If you are using an external trigger signal connected to the *Trigger In* pin of the mvTITAN-RGB/G4 activate the trigger input with `mvSelExtTrig (dev ,1);`


Now each time a trigger signal was recognized on the Trigger In pin the reset signal is sent to the camera and an image is acquired.

If no external trigger signal is available deactivate the trigger input with `mvSelExtTrig (dev ,0);`

Now the trigger signal must be simulated. To activate this simulation and to define the frequency with which the reset signal is output use `mvSetTriggerPeriod(dev, time);`. Where *time* defines the period time of the so called autotrigger.

Please stay in the valid frequency range for the reset signal to avoid corrupted images. In case of 2:1 interlaced this is up to 100Hz (10ms period time) or 50 Hz (20ms period time) in case of 1N noninterlaced. These limits can vary if using partial scan. Please take a look in camera's manual to get the limits.

More details about the behavior of the camera and the frame grabber please read the concerning technical manuals of XC-HR300 and mvTITAN-RGB/G4.

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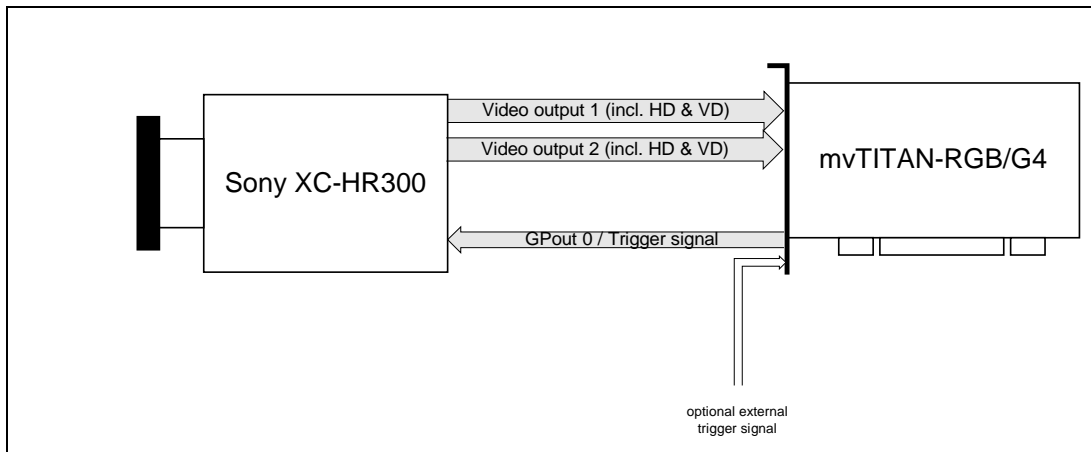
Trigger Shutter Mode M1 & M2

In Trigger Shutter Mode M1 the camera runs in its own timing and sends black images including all signals for synchronization continuously. When a trigger signal from the mvTITAN-RGB/G4 is recognized it integrates an image and sends it with the next VD.

In Trigger Shutter Mode M2 the camera is reset by the trigger signal from the mvTITAN-RGB/G4 and sends the video signal afterwards including the signals for synchronization.

The length of the trigger signal defines the integration time.

Signal map



Camera settings set by hardware

Dip-Switch setting (1):

2I	1N
XXX	XXX

Dip-Switch setting (2):

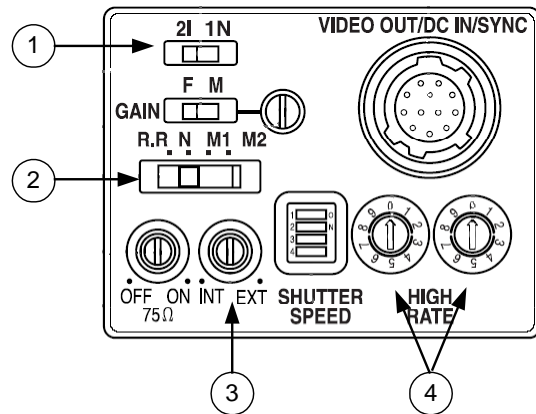
R.R	N	M1	M2
		XXX	XXX


Dip-Switch setting (3):

INT	EXT
XXX	

Dip-Switch setting (4):

SW1	SW2
0	0



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Application Note	Project:	Camera adaption	Version 1.0	

Pin connection

HR10A-10P-12S		Direction	HD26ST	
1	Ground	→	10	Ground
2	+12V DC	←	1	+ 12V DC
3	Video output 1 GND	←	12	Ground
4	Video output 1 (signal)	→	2	Video PAL 1
5	HD output (GND)	←	16	Ground
6	HD output (signal)			not used
7	VD output (signal)			not used
8	Video output 2 (GND)	←	13	Ground
9	Video output 2 (signal)	→	3	Video PAL 2
10	WEN output (signal)			not used
11	Trigger pulse input (signal)	←	19	GP-Out 0
12	Ground	←	15	Ground

Recommended cable for this mode from MATRIX VISION GmbH: KS56-0238 xx.x.

Camera definition

Switch (1) set to 2:1 interlaced:

```

/* ----- Sony XC-HR300 ----- */
/* For use in Restart/Reset and Trigger Shutter mode and 2:1 interlaced mode */
DefCamType           "XC-HR300-RR-2I" VM_RS170 NONINTERLACED 60 31250 29500
PCLK_INTERN
DefCamAcquireSetup   "XC-HR300-RR-2I" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "XC-HR300-RR-2I" AC 1 0 0 1200
DefHorizontalUnit    "XC-HR300-RR-2I" PIXEL
DefVerticalUnit       "XC-HR300-RR-2I" LINES
DefCamHorizontalAcquire "XC-HR300-RR-2I" 154L 768L 1
DefCamVerticalAcquire "XC-HR300-RR-2I" 22L 286L 1
DefCamClamp          "XC-HR300-RR-2I" 100L 5L
DefCamZero           "XC-HR300-RR-2I" 100L 5L
DefCamFieldGate      "XC-HR300-RR-2I" 260L 330L

```

Switch (1) set to noninterlaced:


```

/* ----- Sony XC-HR300 ----- */
/* For use in Restart/Reset and Trigger Shutter mode and 1N noninterlaced mode */
DefCamType           "XC-HR300-RR-1N" VM_RS170 NONINTERLACED 60 31250 29500
PCLK_INTERN
DefCamAcquireSetup   "XC-HR300-RR-1N" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam    "XC-HR300-RR-1N" AC 1 0 0 1200
DefHorizontalUnit    "XC-HR300-RR-1N" PIXEL
DefVerticalUnit       "XC-HR300-RR-1N" LINES
DefCamHorizontalAcquire "XC-HR300-RR-1N" 154L 768L 1
DefCamVerticalAcquire "XC-HR300-RR-1N" 39L 582L 1
DefCamClamp          "XC-HR300-RR-1N" 100L 5L
DefCamZero           "XC-HR300-RR-1N" 100L 5L
DefCamFieldGate      "XC-HR300-RR-1N" 260L 330L

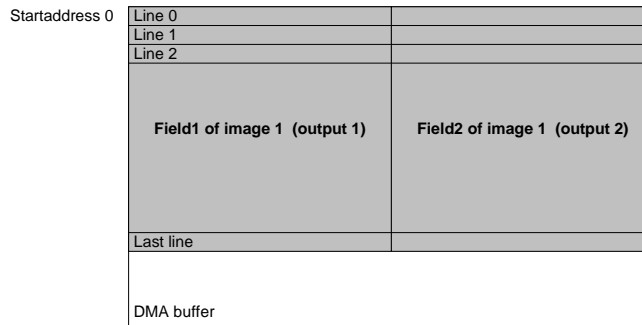
```

Remarks to needed color modes

To set up the camera correctly using with mvAcquireControl or Standard SDK choose the corresponding definition "XC-HR300-RR-2I" or "XC-HR300-RR-1N" and set input channel and sync channel both to 1.

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For **2:1 interlaced mode** you have to choose the colormode *COL_G2* to get the fields from both outputs of the XC-HR300. The images are stored in the memory as follows:



Please note that in mvConfig it is not possible to show both inputs at the same time. Only output 1 can be displayed if colormode is set to *Greyscale 8* or *10 bit*.

For **1N noninterlaced mode** you have to choose the colormode *COL_GREY* (8bpp) or *COL_GREY10* (10bpp) because the camera sends the images only on output 1.

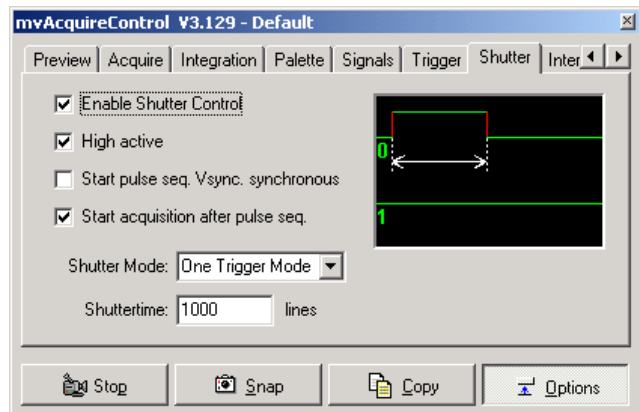
Remarks for setting up reset signal

In mvAcquireControl:

Additionally to the camera definition settings you have to activate the output of the reset signal on GPout 0 output of mvTITAN-RGB/G4. For that switch to register *Shutter*:

Enable *Shutter Control* and choose *One Trigger Mode* for *Shutter Mode*. Activate *High active* and *Start acquisition after pulse seq.*

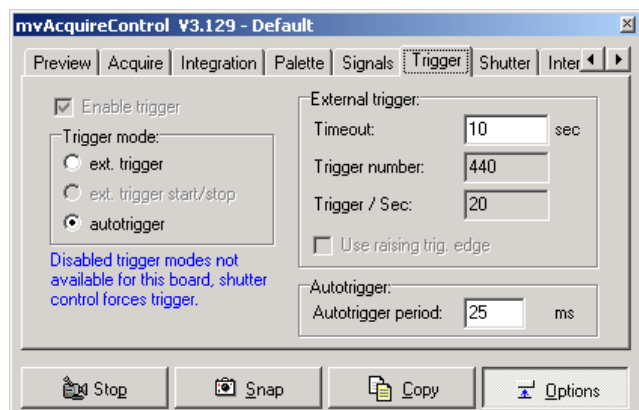
The length of the trigger signal can be defined in *Shuttertime*. This time corresponds to the integration time in the camera.




As soon as shutter control is enabled the *Autotrigger* mode is activated. To set up the trigger mode switch to *Trigger*:

If using an external trigger signal connected to the *Trigger In* pin of the mvTITAN-RGB/G4 choose *ext. trigger* and provide the mvTITAN-RGB/G4 with such signal.

If no external trigger signal is present choose *autotrigger* to simulate the trigger signal. In this case you must define the frequency of this signal by *Autotrigger period*.



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Please be sure to set the pulse length and the frequency of the trigger signal correct to avoid corrupted images. The camera needs a time for transferring the image after the trigger pulse is finished. The needed time depends on the number of lines to be transferred. This time will be shorter if partial scan is active. Exact values you will find in the camera's manual. If the next trigger pulse comes while the image is still transferred you will get corrupted images.

In program based on Standard-SDK:

First define format of pulse which is sent to the camera by calling command *mvDefPulsSeq()*. The signal array *pPulse* must be like that:

Element	Value
0	length of pulse in number of lines (default: 1)
1	-1

use a calling like that:

```
mvDefPulsSeq(dev, 0, 1, pPulse);
```

So an active high signal with the defined pulse length is output each time a trigger arose on output GPout 0. The length of pulse is equal to the integration time used in camera.

Now define the triggermode.

If you are using an external trigger signal connected to the *Trigger In* pin of the mvTITAN-RGB/G4 activate the trigger input with `mvSelExtTrig (dev ,1);`


Now each time a trigger signal was recognized on the Trigger In pin the reset signal is sent to the camera and an image is acquired.

If no external trigger signal is available deactivate the trigger input with `mvSelExtTrig (dev ,0);`

Now the trigger signal must be simulated. To activate this simulation and to define the frequency with which the reset signal is output use `mvSetTriggerPeriod(dev, time);` Where *time* defines the period time of the so called autotrigger.

Please be sure to set the pulse length and the frequency of the trigger signal correct to avoid corrupted images. The camera needs a time for transferring the image after the trigger pulse is finished. The needed time depends on the number of lines to be transferred. This time will be shorter if partial scan is active. Exact values you will find in the camera's manual. If the next trigger pulse comes while the image is still transferred you will get corrupted images.

More details about the behavior of the camera and the frame grabber please read the concerning technical manuals of XC-HR300 and mvTITAN-RGB/G4.

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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.