

	Subject:	Atmel Aviiva 2CL with mvTITAN-CL	Created	Last change
			22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0	

Overview

Camera ATMEL Aviiva 2C CL

Running modes

Freerunning
Restart/Reset
Ext. Synchronized
Trigger Shutter
Flash & Reset

Resolution

Horizontal 3 x 1365 pixel (RGB serial, together 4096)
Bits per Pixel 8 bpp
Binning
Partial Scan

Timings

Pixel clock 60 MHz
Horizontal max. 14 kHz
Vertical various fps

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 type="checkbox"/>	Frame Grabber	<input 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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Email: info@matrix-vision.de.

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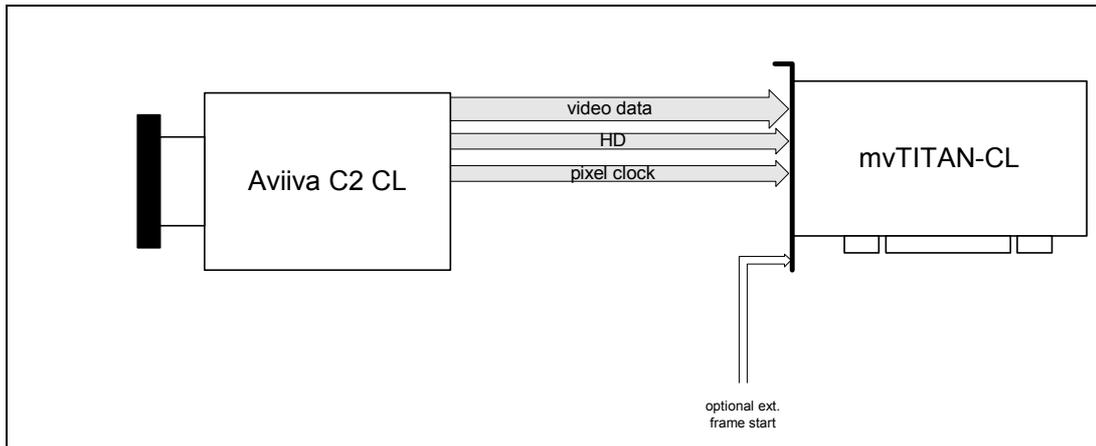
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	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
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Freerunning Mode

Camera runs free, line start signal is generated in the camera and sent to mvTITAN-CL. mvTITAN-CL can generate the needed frame start signal itself or it can be supplied by external.

Signal map



Camera settings set by software

For setting up the camera use the configuration tool *CommCam* supplied with the camera.

Before starting the tool *CommCam* open the mvTITAN-CL. Otherwise the serial communication by CameraLink™ interface isn't available.

In the tool choose *Serial Port / CAMERALINK* and choose the file *clsermv.dll* in the upcoming dialog.

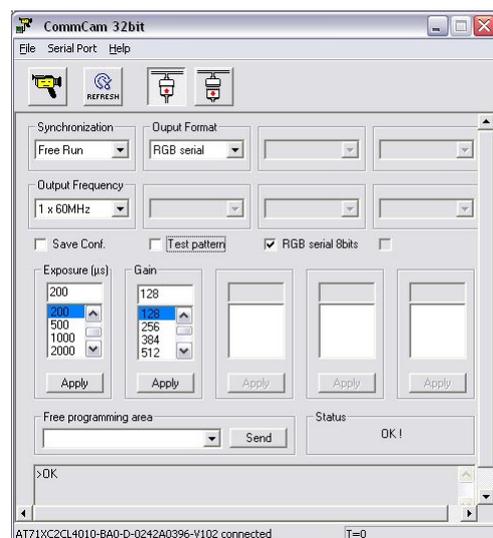
Open the connection with , press  and choose the camera setting *Aviiva_C2_CL.cam* in the following dialog.

Now the camera's features are visible and can be modified in the main dialog.

Important settings:

- Synchronization: *Free Run*
- Output Format: *RGB serial*
- Output Frequency: *1x60 MHz*
- *RGB serial 8 bits* active

Please note that the chosen exposure time sets the line start frequency.



	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

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

```

/* ----- AVIIVA-C2-CL4096 -----
DefCamType          "AVIIVA-C2-CL4096" VM_DIG8 NONINTERLACED 25 14000 60000
PCLK_EXTERN
DefCamAcquireSetup  "AVIIVA-C2-CL4096" STANDARD NOT_INVNEXT_FIELD
DefCamAnalogParam   "AVIIVA-C2-CL4096" AC 1 0 0 1200
DefHorizontalUnit   "AVIIVA-C2-CL4096" PIXEL
DefVerticalUnit      "AVIIVA-C2-CL4096" LINES
DefCamHorizontalAcquire "AVIIVA-C2-CL4096" 0L 4096L 1
DefCamVerticalAcquire "AVIIVA-C2-CL4096" 0L 1024L 1
DefCamGenerateVSync "AVIIVA-C2-CL4096" 0L 1L

```

Image acquisition with MVacquireControl

to see correct colored images in MVacquireControl a plug in is needed to convert the 8 bpp images into correct 32 bpp images for displaying and saving.
The plug-in is called *faviiva.dll* and must be placed in the directory *..\\windows\\matrix\\plugin*. This plug-in is not installed with the MVacquireControl by default. For getting this plug-in please refer to your supplier or to MATRIX VISION GmbH directly.

If this plug-in is installed properly you can activate it in the MVacquireControl register *Processing* and choose *Aviiva C2* in the list. With the button *Properties* you can do the White Balance manually or automatically.

Be sure you activated *Greyscale 8bit* in the register *Acquire*.

The format of the acquired images with activated plug-in is 32 bpp color.

	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

Remarks to programming

The camera sends the color components serially. The mvTITAN-CL must be set to the colormode COL_GREY. So the images will be stored as a regular 8bpp greyscale image. You have to convert this 8 bpp format to 32 bpp. You can find more about the color conversion in the camera's manual.

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.

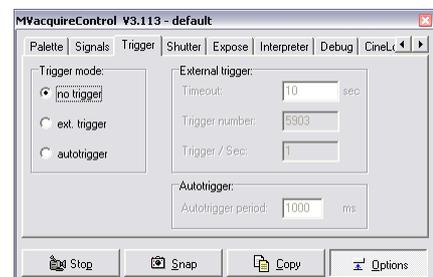
There are two possibilities where the signal can come from:

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*.



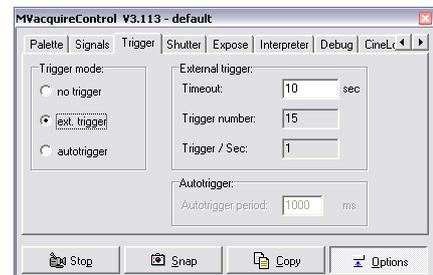
2. the frame start signal is supplied from external

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*.



	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

Restart-Reset mode

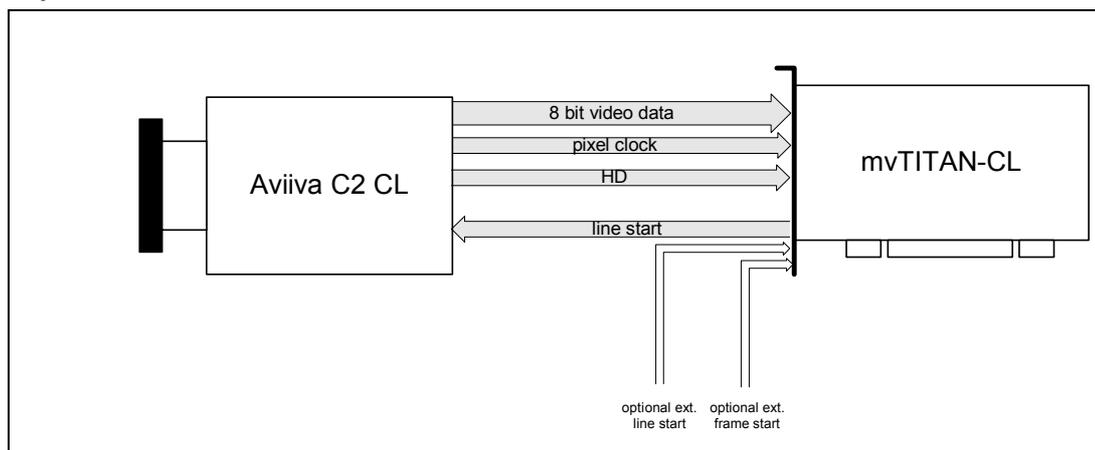
Camera gets line start signal from mvTITAN-CL and sends image data, pixel clock and HD to the mvTITAN-CL.

The line start signal doesn't influence the exposure time. The exposure time must be set by the camera configuration tool supplied with the camera.

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

For setting up the camera use the configuration tool *CommCam* supplied with the camera.

Before starting the tool *CommCam* open the mvTITAN-CL. Otherwise the serial communication by CameraLink™ interface isn't available.

In the tool choose *Serial Port / CAMERALINK* and choose the file *clsermv.dll* in the upcoming dialog.

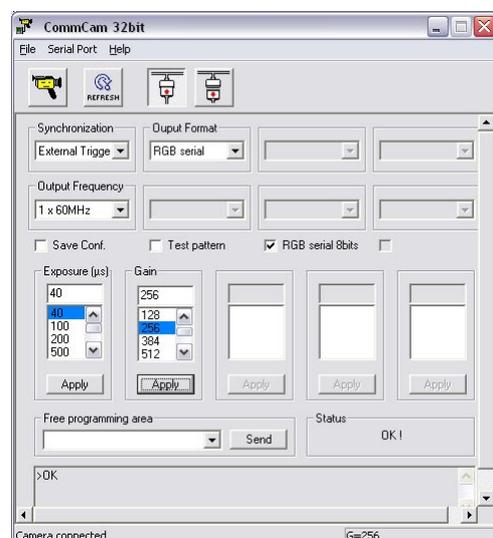
Open the connection with  , press  and choose the camera setting *Aviiva_C2_CL.cam* in the following dialog.

Now the camera's features are visible and can be modified in the main dialog.

Important settings:

- Synchronization: *External Trigger*
- Output Format: *RGB serial*
- Output Frequency: *1x60 MHz*
- *RGB serial 8 bits active*

Please note that the chosen exposure time sets the limit of the maximum possible line start frequency.



	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

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

```

/* ----- AVIIVA-C2-CL4096 -----
DefCamType          "AVIIVA-C2-CL4096" VM_DIG8 NONINTERLACED 25 14000 60000
PCLK_EXTERN
DefCamAcquireSetup  "AVIIVA-C2-CL4096" STANDARD NOT_INVNEXT_FIELD
DefCamAnalogParam   "AVIIVA-C2-CL4096" AC 1 0 0 1200
DefHorizontalUnit   "AVIIVA-C2-CL4096" PIXEL
DefVerticalUnit      "AVIIVA-C2-CL4096" LINES
DefCamHorizontalAcquire "AVIIVA-C2-CL4096" 0L 4096L 1
DefCamVerticalAcquire "AVIIVA-C2-CL4096" 0L 1024L 1
DefCamGenerateVSync "AVIIVA-C2-CL4096" 0L 1L

```

Image acquisition with MVacquireControl

To see correct colored images in MVacquireControl a plug in is needed to convert the 8 bpp images into correct 32 bpp images for displaying and saving.

The plug-in is called *faviiva.dll* and must be placed in the directory *..\windows\matrix\plugin*. This plug-in is not installed with the MVacquireControl by default. For getting this plug-in please refer to your supplier or to MATRIX VISION GmbH directly.

If this plug-in is installed properly you can activate it in the MVacquireControl register *Processing* and choose *Aviiva C2* in the list. With the button *Properties* you can do the White Balance manually or automatically.

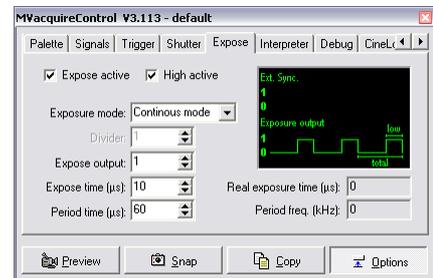
Be sure you activated *Greyscale 8bit* in the register *Acquire*.

	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

To activate the output of the line start signal switch to the register *Expose*.

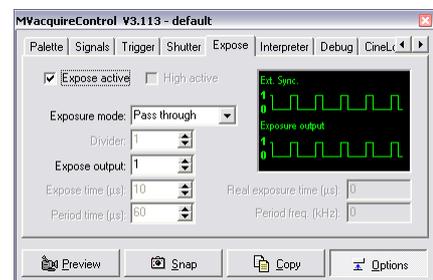
Settings for signal generated on mvTITAN-CL:

- activate *Expose active*
- activate *High active*
- Exposure mode *Continuous mode*
- Expose output *1*
- Exposure time settings is not relevant, a *10* is a good value
- Periode time* defines the frequency of the line start signal. The *periode time* is given in microseconds (μ s).
- Depending on the integration time set in the camera you can output a line start signal with a frequency up to 14 kHz or about 71 μ s *periode time*.



Settings for external supplied line start signal:

- activate *Expose active*
- Exposure mode *pass through* if you supply an active high signal. Otherwise use *pass through inv*.
- Exposure output *1*
- The external line start signal must be supplied 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.
- Depending on the integration time set in the camera you can supply a line start signal with a frequency up to 14 kHz.



Remarks to programming

The camera sends the color components serially. The mvTITAN-CL must be set to the colormode COL_GREY. So the images will be stored as a regular 8bpp greyscale image. You have to convert this 8 bpp format to 32 bpp. You can find more about the color conversion in the camera's manual.

Activating output of internally generated line start signal:

To activate the output use the command *mvSetExpose (dev, mode, low, total)*. The internally generated line start signal is activated with *mode = 1*. The *low* value defines the length of the pulse and can be set to *10*. The pulse length doesn't influence the image acquisition. The *total* value defines the periode time with which the signal is output. Depending on the integration time set in the camera you can output a line start signal with a frequency up to 14 kHz or about 71 μ s *periode time*. Define the used used output with *mvSetExposeOutput (dev, output)*. For the Aviiva C2 CL use *1* for *output*.

Activating output of line start signal supplied externally:

To activate the output use the command *mvSetExpose (dev, mode, low, total)*. The internally generated line start signal is activated with *mode = 4* for pass through mode if you get an active high signal from your application or *mode = 5* if you get an active low signal. Also useful are the modes 2 or 3 if your application needs this. You can find more details about these modes in the mvTITAN-CL's manual. The values *low* and *total* are ignored. Nevertheless be sure that *total* is always greater than *low*. Define the used used output with *mvSetExposeOutput (dev, output)*. For the Aviiva C2 CL use *1* for *output*. 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. Depending on the integration time set in the camera you can supply a line start signal with a frequency up to 14 kHz.

	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

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.

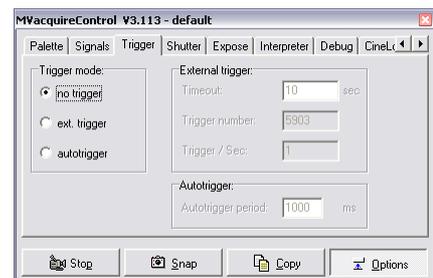
There are two possibilities where the signal can come from:

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*.



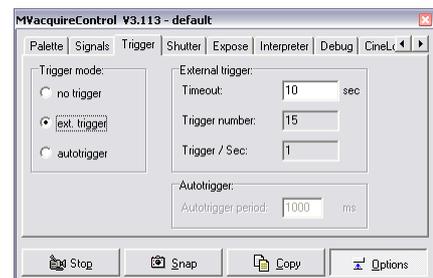
2. the frame start signal is supplied from external

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*.



	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

Trigger Shutter Mode

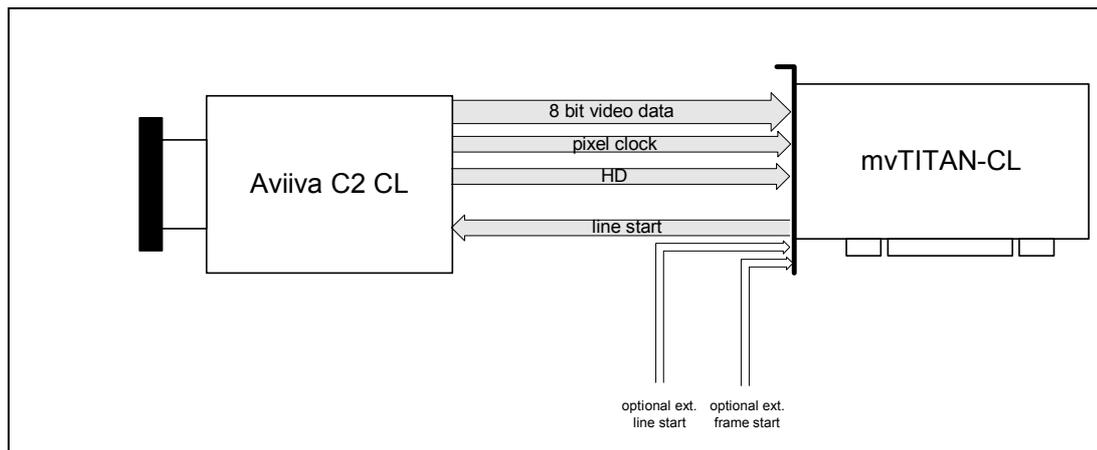
Camera is reset by the line start signal sent by the mvTITAN-CL. After a reset the camera sends the image data, pixel clock and the HD to the mvTITAN-CL.

The periode time of the line start signal defines the exposure time of the camera.

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

For setting up the camera use the configuration tool *CommCam* supplied with the camera.

Before starting the tool *CommCam* open the mvTITAN-CL. Otherwise the serial communication by CameraLink™ interface isn't available.

In the tool choose *Serial Port / CAMERALINK* and choose the file *clsermv.dll* in the upcoming dialog.

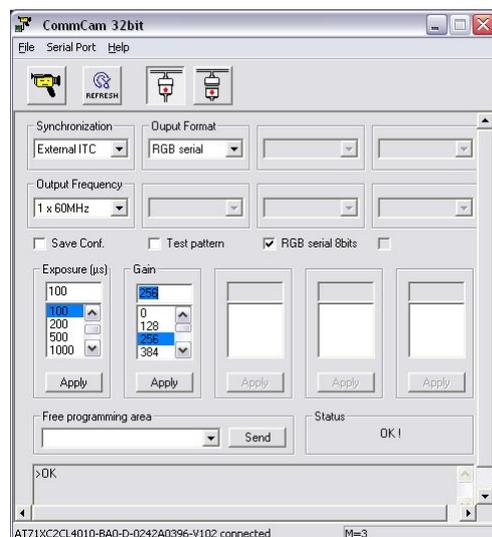
Open the connection with  , press  and choose the camera setting *Aviiva_C2_CL.cam* in the following dialog.

Now the camera's features are visible and can be modified in the main dialog.

Important settings:

- Synchronization: *External ITC*
- Output Format: *RGB serial*
- Output Frequency: *1x60 MHz*
- *RGB serial 8 bits active*

In this mode the periode time of the line start signal defines the exposure time. The maximum line start frequency in this mode is 14 kHz.



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Application Note	Project:	Camera adaption	Version 1.0

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

```

/* ----- AVIIVA-C2-CL4096 -----
DefCamType          "AVIIVA-C2-CL4096" VM_DIG8 NONINTERLACED 25 14000 60000
PCLK_EXTERN
DefCamAcquireSetup  "AVIIVA-C2-CL4096" STANDARD NOT_INVNEXT_FIELD
DefCamAnalogParam   "AVIIVA-C2-CL4096" AC 1 0 0 1200
DefHorizontalUnit   "AVIIVA-C2-CL4096" PIXEL
DefVerticalUnit     "AVIIVA-C2-CL4096" LINES
DefCamHorizontalAcquire "AVIIVA-C2-CL4096" 0L 4096L 1
DefCamVerticalAcquire "AVIIVA-C2-CL4096" 0L 1024L 1
DefCamGenerateVSync "AVIIVA-C2-CL4096" 0L 1L

```

Image acquisition with MVacquireControl

To see correct colored images in MVacquireControl a plug in is needed to convert the 8 bpp images into correct 32 bpp images for displaying and saving.

The plug-in is called *faviiva.dll* and must be placed in the directory *..\windows\matrix\plugin*. This plug-in is not installed with the MVacquireControl by default. For getting this plug-in please refer to your supplier or to MATRIX VISION GmbH directly.

If this plug-in is installed properly you can activate it in the MVacquireControl register *Processing* and choose *Aviiva C2* in the list. With the button *Properties* you can do the White Balance manually or automatically.

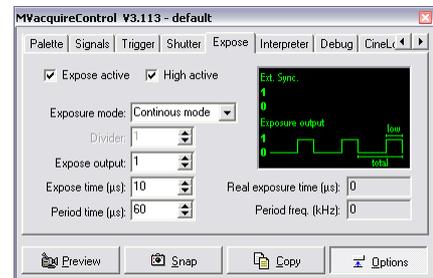
Be sure you activated *Greyscale 8bit* in the register *Acquire*.

	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

To activate the output of the line start signal switch to the register *Expose*.

Settings for signal generated on mvTITAN-CL:

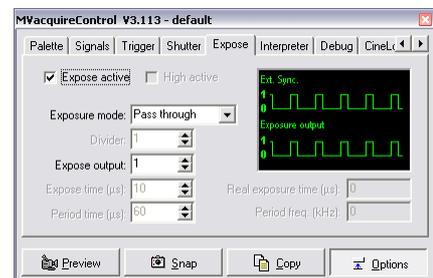
- activate *Expose active*
- activate *High active*
- Exposure mode *Continuous mode*
- Expose output *1*
- Exposure time settings is not relevant, a *10* is a good value. *Periode time* defines the frequency of the line start signal. The periode time is given in microseconds (μ s) and defines in this mode the integration time in the camera.



Settings for external supplied line start signal:

- activate *Expose active*
- Exposure mode *pass through* if you supply an active high signal. Otherwise use *pass through inv.*
- Exposure output *1*

The external line start signal must be supplied 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.



Remarks to programming

The camera sends the color components serially. The mvTITAN-CL must be set to the colormode COL_GREY. So the images will be stored as a regular 8bpp greyscale image. You have to convert this 8 bpp format to 32 bpp. You can find more about the color conversion in the camera's manual.

Activating output of internally generated line start signal:

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

The internally generated line start signal is activated with *mode = 1*.

The *low* value defines the length of the pulse and can be set to *10*. The pulse length doesn't influence the image acquisition. The *total* value defines the periode time with which the signal is output. Define the used used output with *mvSetExposeOutput (dev, output)*. For the Aviiva C2 CL use *1* for *output*.

Activating output of line start signal supplied externally:

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

The internally generated line start signal is activated with *mode = 4* for pass through mode if you get an active high signal from your application or *mode = 5* if you get an active low signal. Also useful are the modes 2 or 3 if your application needs this. You can find more details about these modes in the mvTITAN-CL's manual.

The values *low* and *total* are ignored. Nevertheless be sure that *total* is always greater than *low*.

Define the used used output with *mvSetExposeOutput (dev, output)*. For the Aviiva C2 CL use *1* for *output*.

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.

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Application Note	Project:	Camera adaption	Version 1.0

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.

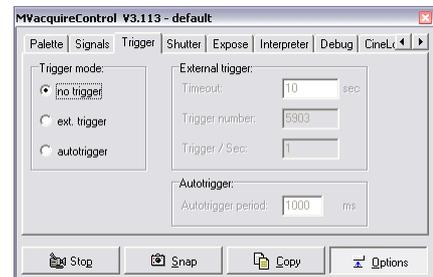
There are two possibilities where the signal can come from:

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*.



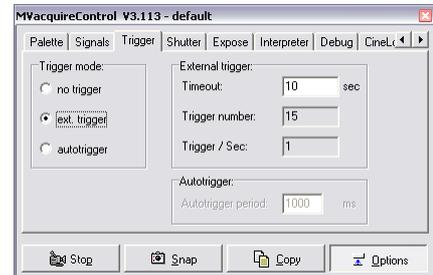
2. the frame start signal is supplied from external

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*.



	Subject: Atmel Aviiva 2C CL with mvTITAN-CL	Created	Last change
		22.04.03	25.04.03
Application Note	Project:	Camera adaption	Version 1.0

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.
pixel clock	Data valid signal which tells the frame grabber that the current pixel data is valid.