Overview

Camera Jai A11

Running modes

- Freerunning [X]
- Edge Pre-select [X]
- Pulse Width control [X]
- Trigger Shutter [ ] [remarks]
- Flash & Reset [ ] [remarks]

Resolution

- Horizontal 648 pixel
- Vertical 492 pixel
- Binning [ ]
- Partial Scan [ ]

Timings

- Pixel clock 12.270 MHz
- Horizontal 15.734 kHz
- Vertical 29.96 fps

MATRIX VISION GmbH Frame Grabber

- Typ mvGAMMA-G
- 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! [X]
- Other [ ] [e.g. LabView™, Halcon, etc.]

Imprint

MATRIX VISION GmbH
Talstraße 16
D-71570 Oppenweiler
Author: Thomas Wimmer

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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Freerunning Mode

Camera acquires the images with its own timing and sends the video signal including the signals for synchronizing (HD and VD) to the mvGAMMA-G.

Signal map

Camera settings set by software

For setting up the camera it is needed to connect the serial pins of the camera with a free COM port of the host PC. A suitable cable is available from Jai or from us.

To control the camera install the CV-A11 Control Tool supplied by Jai.

After starting you get the following windows:

Be sure the Trigger Mode is set to Normal. Partial scan mode should be set to Full Frame in case of using the camera definition you will find later.

Define the Shutter Mode and the Shutter Speed as your application needs.

The Sync Signal Output must be set to On. So the camera sends its VD and HD within the video signal.

The CLK/WEN settings are irrelevant.
### Pin assignment

<table>
<thead>
<tr>
<th>Jai CV-A11</th>
<th>Direction</th>
<th>mvGAMMA-G</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>+12V DC</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GND video</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Video out</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>HD out</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>18</td>
</tr>
<tr>
<td>9</td>
<td>PCLK out</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>WEN out</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>Trigger input</td>
<td>19</td>
</tr>
</tbody>
</table>

A recommended cable for the 26pin jack from MATRIX VISION GmbH is KS41-EIAJ 03.0 or KS41-EIAJ XT 03.0 (ext. Trigger of mvGAMMA-G on additional cable).

Alternatively an 1:1 connection between the 12p Hirose jacks of mvGAMMA-G and Jai CV-A11 can be used. Suitable cable from MATRIX VISION GmbH is KS-HRS12 03.0.

### Camera definition

```c
/* -------------------------- Jai A11 ------------------------------------ */
DefCamType          "Jai-CV-A11" VM_RS170 NONINTERLACED 60 15734 12270 PCLK_INTERN
DefCamAcquireSetup  "Jai-CV-A11" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam   "Jai-CV-A11" AC 1 0 0 1200
DefHorizontalUnit   "Jai-CV-A11" PIXEL
DefVerticalUnit     "Jai-CV-A11" LINES
DefCamHorizontalAcquire "Jai-CV-A11" 113L 648L 1
DefCamVerticalAcquire "Jai-CV-A11" 22L 492L 1
DefCamClamp         "Jai-CV-A11" 74L 5L
DefCamZero          "Jai-CV-A11" 84L 5L
DefCamFieldGate     "Jai-CV-A11" 260L 330L
```

### Setting up mvAcquireControl

This description requires a proper installation of the mvGAMMA-G and the mvAcquireControl. It is recommended to use the latest versions of the Win32 driver and the mvAcquireControl. You will find these installations on the latest mvIMPACT CD-ROM or as a download from our homepage.

Open the mvGAMMA-G in the mvAcquireControl and choose the camera definition Jai-CV-A11. It is recommended to activate the Greyscale mode in register Acquire and set it to 8bit. So will get 8bpp images.

If an external frame trigger is wanted supply the mvGAMMA-G with this signal on the Ext. Trigger in pin. Switch to register Trigger and set Enable trigger and ext. trigger. Now the mvGAMMA-G will acquire only the images which are sent by the camera right after a ext. trigger pulse.

### Remarks to mvSDK

Choose in your program the camera definition Jai-CV-A11 by use of function SelCamera in the INI-File.

It is recommended to use the colormode COL_GREY with this camera. You will get 8bpp images in the DMA buffer.
**Edge Pre-select mode**

Camera is reset by a trigger signal and integrates the images with a predefined integration time set in the camera. The video signal including the signals for synchronization (HD and VD) is sent to the mvGAMMA-G after the image was acquired.

The restart signal can be send from mvGAMMA-G or can be supplied directly from external to the camera.

**Signal map**

![Signal map diagram]

**Camera settings set by software**

For setting up the camera it is needed to connect the serial pins of the camera with a free COM port of the host PC. A suitable cable is available from Jai or from us.

To control the camera install the *CV-A11 Control Tool* supplied by Jai.

After starting you get the following windows:

Be sure the *Trigger Mode* is set to *Edge Pre-select*.

Partial scan mode should be set to *Full Frame* in case of using the camera definition you will find later.

Define the *Shutter Mode* and the *Shutter Speed* as your application needs.

The *Sync Signal Output* must be set to *On*. So the camera sends its VD and HD within the video signal.

The *CLK/WEN* settings are irrelevant.
Pin connection

<table>
<thead>
<tr>
<th>Jai CV-A11</th>
<th>Direction</th>
<th>mvGAMMA-G</th>
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<tbody>
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<td>1 GND</td>
<td>→</td>
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<tr>
<td>2 +12V DC</td>
<td>←</td>
<td>1 +12V DC</td>
</tr>
<tr>
<td>3 GND video</td>
<td>←</td>
<td>10 GND</td>
</tr>
<tr>
<td>4 Video out</td>
<td>→</td>
<td>2 Video 1 in</td>
</tr>
<tr>
<td>5 GND</td>
<td>←</td>
<td>17 GND</td>
</tr>
<tr>
<td>6 HD out</td>
<td>→</td>
<td>7 HD in</td>
</tr>
<tr>
<td>7 NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 GND</td>
<td>←</td>
<td>18 GND</td>
</tr>
<tr>
<td>9 PCLK out</td>
<td>→</td>
<td>9 PCLK in</td>
</tr>
<tr>
<td>10 WEN out</td>
<td>→</td>
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A recommended cable for the 26pin jack from MATRIX VISION GmbH is KS41-EIAJ 03.0 or KS41-EIAJ XT 03.0 (ext. Trigger of mvGAMMA-G on additional cable). Alternatively an 1:1 connection between the 12p Hirose jacks of mvGAMMA-G and Jai CV-A11 can be used. Suitable cable from MATRIX VISION GmbH is KS-HRS12 03.0.

Cameradefinition

```c
/*  -------------------------- Jai A11 ------------------------------------ */
DefCamType              "Jai-CV-A11" VM RS170 NONINTERLACED 60 15734 12270 PCLK_INTERN
DefCamAcquireSetup      "Jai-CV-A11" STANDARD NOT_INV NEXT_FIELD
DefCamAnalogParam       "Jai-CV-A11" AC 1 0 0 1200
DefHorizontalUnit       "Jai-CV-A11" PIXEL
DefVerticalUnit         "Jai-CV-A11" LINES
DefCamHorizontalAcquire "Jai-CV-A11" 113L 648L 1
DefCamVerticalAcquire   "Jai-CV-A11" 22L 492L 1
DefCamClamp             "Jai-CV-A11" 74L 5L
DefCamZero              "Jai-CV-A11" 84L 5L
DefCamFieldGate         "Jai-CV-A11" 260L 330L
```

Remarks to mvAcquireControl

This description requires a proper installation of the mvGAMMA-G and the mvAcquireControl. It is recommended to use the latest versions of the Win32 driver and the mvAcquireControl. You will find these installations on the latest mvIMPACT CD-ROM or as a download from our homepage.

Open the mvGAMMA-G in the mvAcquireControl and choose the camera definition Jai-CV-A11. It is recommended to activate the Greyscale mode in register Acquire and set it to 8bit. So will get 8bpp images.

Reset signal sent by mvGAMMA-G

For activating the output of the mvGAMMA-G to reset the camera switch to register Shutter:

Following settings must be done:
- Enable Shutter Control
- Disable High active
- Disable Start pulse seq. Vsync synchronous
- Disable Start acquisition after pulse seq.
- Choose mode One Trigger Mode
- Shuttertime must be set >1
Switch to register *Trigger*.

By default the mode *autotrigger* is automatically enabled. This means the mvGAMMA-G generates the trigger signal itself which is needed for output the shutter signals. The time between two trigger signals is set by *Autotrigger period*.

Instead of using the autotriggered mode you can supply the mvGAMMA-G with an external signal which triggers the output of the shutter signals. For that supply the mvGAMMA-G with such a signal on the *Trigger In* pin and switch from *autotrigger* to *ext. trigger*. Now the camera is reset every time a signal occurred on the *Trigger In* pin of the mvGAMMA-G.

**Remarks to mvSDK**

Choose in your program the camera definition *Jai-CV-A11* by use of function *SelCamera* in the INI-File.

It is recommended to use the colormode *COL_GREY* with this camera. You will get 8bpp images in the DMA buffer.

To activate the signal output for resetting the camera use the shuttercontrol method. Define a single signal output by *mvDefPulseSeq()*.

Example:

```c
mvDefPulseSeq(dev, 0, 0, pPulse)
```

with `pPulse` array:

- Element 0: 2
- Element 1: -1

Decide if you want to use the autotrigger mode or an external signal for starting the output of the reset signal.

If using the autotriggered mode define the period time with *mvSetTriggerPeriod(dev, period_time)*.

To tell the mvGAMMA-G to use the *Trigger In* pin for starting use the function *mvSelExtTrig(dev,1)*.

You will find more about the programming of the shutter control in the mvGAMMA-G’s manual.
Pulse Width Control Mode

Camera is reset by a trigger signal. The length of the pulse defines the integration time on the camera. The video signal including the signals for synchronization (HD and VD) is sent to the mvGAMMA-G after the image was acquired.
The restart signal can be send from mvGAMMA-G or can be supplied directly from external to the camera.

Signal map

Camera settings set by software

For setting up the camera it is needed to connect the serial pins of the camera with a free COM port of the host PC. A suitable cable is available from Jai or from us.
To control the camera install the CV-A11 Control Tool supplied by Jai.
After starting you get the following windows:

Be sure the Trigger Mode is set to Pulse Width Control.
Partial scan mode should be set to Full Frame in case of using the camera definition you will find later.
Define the Shutter Mode and the Shutter Speed as your application needs.
The Sync Signal Output must be set to On. So the camera sends its VD and HD within the video signal.
Set the Trigger Polarity to Active L and the HD Synchronous Accumulation to Sync.
The CLK/WEN settings are irrelevant.
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<td>↔</td>
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Remarks to mvAcquireControl

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Reset signal sent by mvGAMMA-G

For activating the output of the mvGAMMA-G to reset the camera switch to register Shutter:

Following settings must be done:
- Enable Shutter Control
- Disable High active
- Disable Start pulse seq. Vsync synchronous
- Disable Start acquisition after pulse seq.
- Choose mode One Trigger Mode
- Shuttertime defines pulse length and so the integration time. The time given in number of lines depends on your application.
Switch to register Trigger.
By default the mode autotrigger is automatically enabled. This means the mvGAMMA-G generates the trigger signal itself which is needed for output the shutter signals. The time between two trigger signals is set by Autotrigger period.
Instead of using the autotriggered mode you can supply the mvGAMMA-G with an external signal which triggers the output of the shutter signals. For that supply the mvGAMMA-G with such a signal on the Trigger In pin and switch from autotrigger to ext. trigger. Now the camera is reset every time a signal occurred on the Trigger In pin of the mvGAMMA-G. In this case the pulse length of the external signal doesn’t define the integration time in the camera.

Remarks to mvSDK
Choose in your program the camera definition Jai-CV-A11 by use of function SelCamera in the INI-File.
It is recommended to use the colormode COL_GREY with this camera. You will get 8bpp images in the DMA buffer.

To activate the signal output for resetting the camera use the shuttercontrol method. Define a single signal output by mvDefPulseSeq().

Example:
mvDefPulseSeq(dev, 0, 0, pPulse)

with pPulse array:

Element 0: number of lines, this time is equal to the integration time.
Element 1: -1

Decide if you want to use the autotrigger mode or an external signal for starting the output of the reset signal. 
If using the autotriggered mode define the period time with mvSetTriggerPeriod(dev, period_time).
To tell the mvGAMMA-G to use the Trigger In pin for starting use the function mvSelExtTrig(dev,1).
In this case the pulse length of the external signal doesn’t define the integration time in the camera.

You will find more about the programming of the shutter control in the mvGAMMA-G’s manual.
Glossary

<table>
<thead>
<tr>
<th>Expression</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD</td>
<td>Vertical drive, signal is sent to signalize next field (noninterlaced) or frame (interlaced). Also called Frame Enable, VSync or frame start signal.</td>
</tr>
<tr>
<td>HD</td>
<td>Horizontal drive, signal is sent to signalize next line. Also called Line Enable, HSync or line start signal.</td>
</tr>
<tr>
<td>Bpp</td>
<td>Bits per pixel</td>
</tr>
</tbody>
</table>