Silicon Software
Cognex VisionPro Adapter

Installation and User Guide
Version 2.0

Imprint

Silicon Software GmbH
Steubenstraße 46
68163 Mannheim, Germany
Tel.: +49 (0) 621 789507 0
Fax: +49 (0) 621 789507 10

Document Version: 2.0
Document Language: en (US)

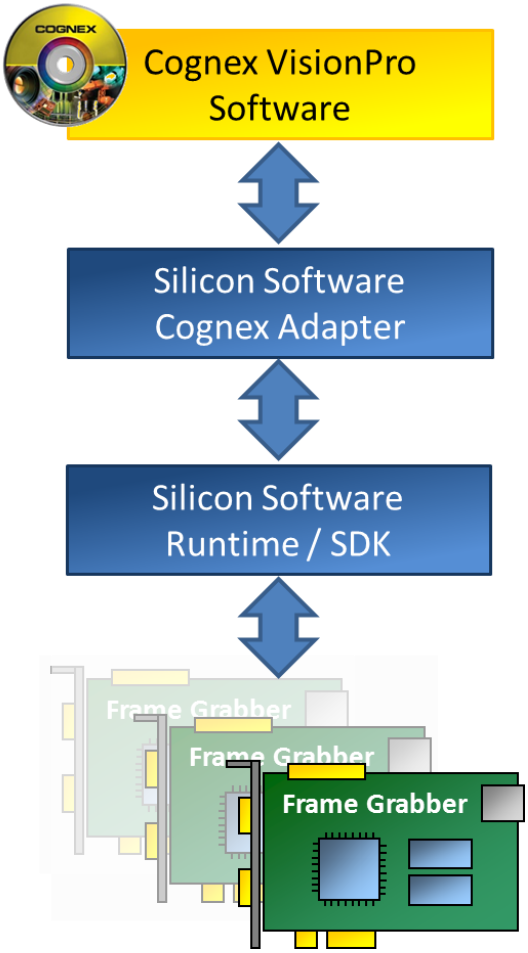
Last Change: April 2014

Content

Silicon Software Runtime Cognex VisionPro Adapter

The Silicon Software Cognex VisionPro adapter is a supporting tool for the integration of Silicon Software frame grabbers and runtime software environment into Cognex' VisionPro software package. It maps the Silicon Software runtime SDK into according interfaces which are needed for the direct integration into VisionPro.

1 Software Architecture



The adapter allows

- loading different image processing functionalities of an acquisition applets feature set onto the frame grabber,
- accessing and modifying parameters of an applet,
- grabbing images according to the configuration and parameters of an applet,
- supporting multiple frame grabbers in a single system.

2 Installation

2.1 Requirements

The Silicon Software Cognex adapter requires at least one correctly installed frame grabber and an installation of the Silicon Software Runtime package version 5.2 (Windows 32bit or 64 bit) or higher.

Current versions of the Silicon Software Runtime package can be found here:

http://www.silicon-software.info/en/downloads.html

For more information about the image processing features of a certain frame grabber model represented by applets, please refer to the corresponding applets documentation.

2.2 Currently Supported Frame Grabber Models

At the moment, the following Camera Link frame grabber models are supported:

microEnable IV A-series:

- microEnable IV AS1-PoCL
- microEnable IV AD1-CL
- microEnable IV AD1-PoCL
- microEnable IV AD1-mPoCL
- microEnable IV AD4-CL
- microEnable IV AD4-PoCL
- microEnable IV AQ4-GE
- microEnable IV AQ4-GPoE

The following output formats are supported:

- FG_GRAY: Gray 8bit
- FG_GRAY16: Gray 16bit
- FG_COL24: Color 24bit
- FG_COL48: Color 48bit

If you need a different setup and output format, please contact Silicon Software sales department or your local sales representative.

The handling of Acquisition Applets is described in section 3 Usage.

Important
Basically the Silicon Software V-series frame grabbers are also supported when running AcquisitionApplets, considering the supported output formats listed above.

2.3 Support of V-Series Frame Grabbers (VisualApplets and SmartApplets Projects)

2.3.1 VisualApplets Projects

Basically with the current adapter version it is possible to run a V-series frame grabber, which has loaded a VisualApplets project file (.hap format), considering the following requirements:

- Number of video channels (DMA from frame grabber to PC memory): 1
- Supported output formats:
  FG_GRAY: Gray 8bit
  FG_GRAY16: Gray 16bit
  FG_COL24: Color 24bit
  FG_COL48: Color 48bit

If you need a different setup and output format, please contact Silicon Software sales department or your local sales representative.

2.3.2 SmartApplets 3D Laser Triangulation Projects

With the current adapter version it is possible to run a microEnable IV VD4-CL/-PoCL frame grabber, which has loaded a SmartApplets 3D Laser Triangulation applet file (.hap format).

Please note: Before running SmartApplets projects please refer to VisionPro documentation or contact Cognex support to get information on how to handle the specific Silicon Software output format, described below.

2.3.3 SmartApplets 3D Laser Triangulation Output Format

The triangulation series of SmartApplets uses one combined DMA video channel to transfer the image data as well as the resulting triangulation coordinates list (raw data as additional video output line). Hence, each DMA transfer contains the image data followed by the triangulation results.

The raw data of the triangulation result contains the y-coordinate of the position of the laser line in sub-pixel accuracy with a resolution of 0.39% (1/256). For each image column, four bytes are transferred, containing the coordinate. To obtain the y-coordinate, the transferred value has to be divided by 65536 (2^16) for sub-pixel accuracy. If no laser line can be detected, the applet will output “zero” values for the respective columns.

Beside the output of the combined image data and resulting coordinate values, the applet is able to either output:

- Image data and laser line coordinates
  The image data will be output together with the laser line coordinates. The coordinate list is added as additional line to the image. The DMA transfer will therefore have the increased size of:
  FG_WIDTH * FG_HEIGHT + FG_WIDTH * 4.

- Laser line coordinates only
  The image data will not be output. Just the laser line coordinates are transferred via DMA channel. The DMA transfer will therefore have the size:
  FG_WIDTH * 4.

- Image data only
  Only the image data is output. The results of the laser triangulation are discarded. This can be useful for just monitoring the acquired images. The DMA transfer will therefore have the size:
  FG_WIDTH * FG_HEIGHT.

  The according output format can be defined with the parameter:
  FG_3D_IMAGE_OUTPUT

Depending on the setting of the parameter “FG_3D_Image Output” within the VisionPro software environment, the transferred images need to be processed furthermoer, e.g. to extract the laser line coordinates from the image data.

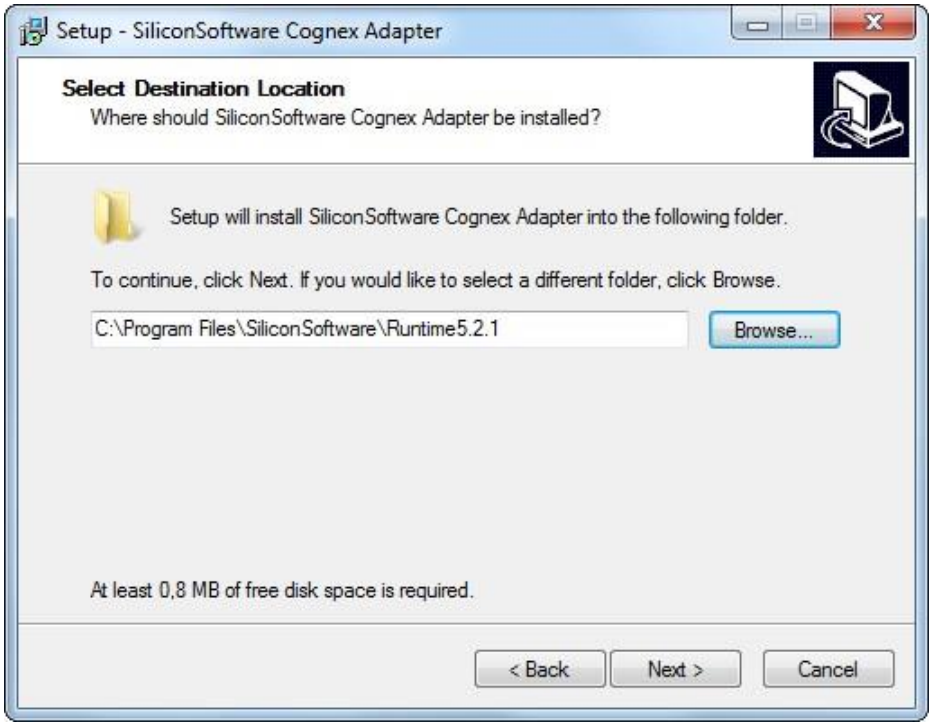
For further information about the SmartApplets 3D Laser Triangulation please refer to the SmartsApplets documentation.

2.4 Installing the Adapter

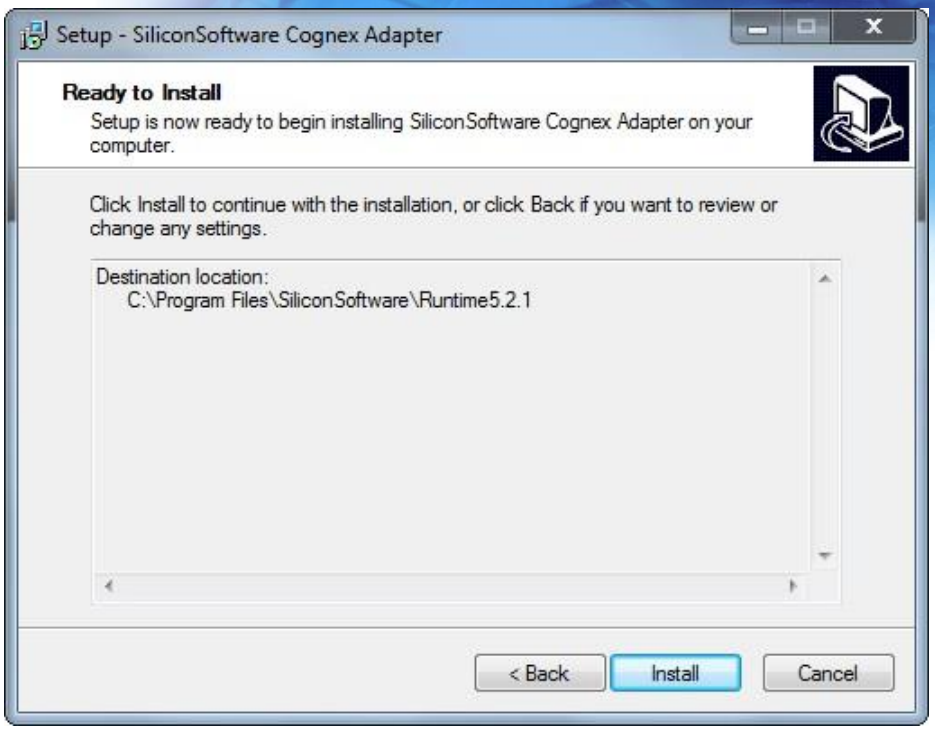
Run the installer (32bit or 64bit version, depending on your target Windows operating system).

Step 1: The installation starts to collect information for the procedure. Press "Next".

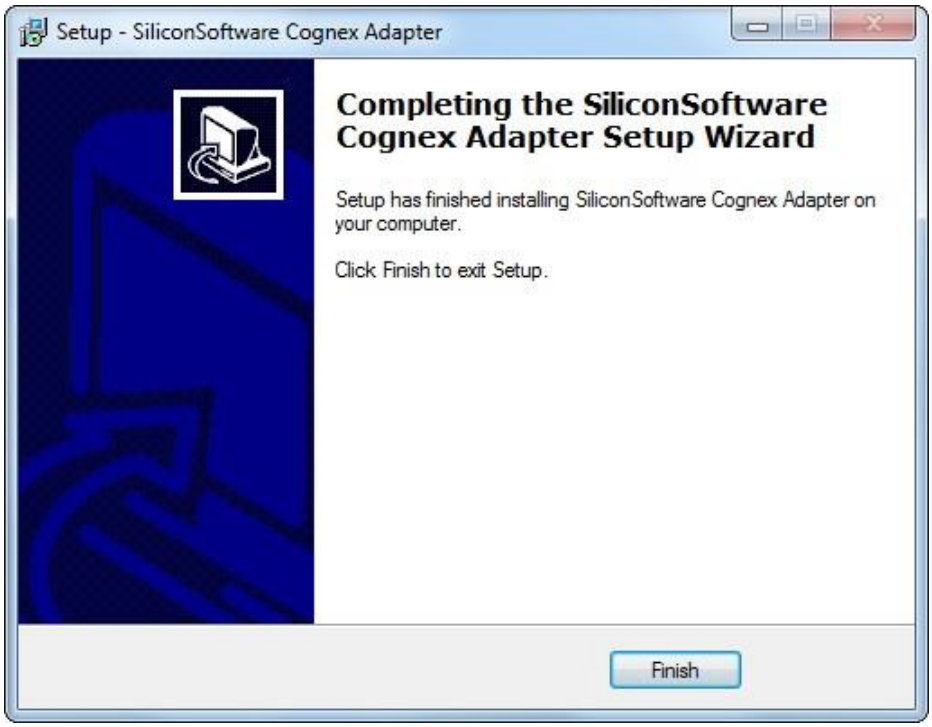
Step 2: Select the destination folder “[..]\Silicon Software\ RuntimeX.X”. Confirm the default setting with "Next" or edit the path manually or use the browser functionality with the "Browse" button to select the destination folder interactively.



Step 3: The installation is now ready to. Just click on the button "Install".



Step 4: Finally the setup procedure reports the successful completion. Just click on the button "Finish"



2.5 Installing the Adapter Manually (Optional)

To integrate the adapter for Silicon Software frame grabber support, the following steps have to be performed:

1. Copy the file SiSoCognexAdapter.dll into the subdirectory \bin of your Silicon Software runtime installation

2. Open the registry editor and add the following entry:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Cognex\AIK\AdapterSiso]
"UseExe"=dword:00000001
"ServerNameBase"="Cognex.AIKserver.AdapterSiSo"
"PoolSize"=dword:04000000
"LibName"="<SISOINSTALLDIR>\\bin\\SiSoCognexAdapter.dll"
```

   where <SISOINSTALLDIR> is your installation directory of the Silicon Software runtime software. E.g. "C:\\Programme\\SiliconSoftware\\Runtime5.2.1\\bin\\SiSoCognexAdapter.dll"

2.6 Testing the Installation

The installation can be checked by running the program “VisionPro – QuickBuild”.
After having started, double click on “image source” and select “camera”. The Silicon Software frame grabbers are listed in the combo box “image acquisition device / frame grabber” according to their model name, port connection number and serial number.

3 Usage

3.1 Frame Grabber Initialization

Start the program “VisionPro – QuickBuild” as described above.

Depending on the installed A-series frame grabber the adapter loads a certain applet by default onto the frame grabber. Please refer to the following table:

Framer grabber model	Default applet	Default camera support
microEnable IV AS1-PoCL microEnable IV AD1-CL microEnable IV AD1-PoCL microEnable IV AD1-mPoCL	Acq_DualAreaGray16.dll	One or two Camera Link Base configuration Area Scan cameras
microEnable IV AD4-CL microEnable IV AD4-PoCL	Acq_FullAreaGray8.dll	One Camera Link Full configuration Area Scan cameras

If another camera/applet combination should be used instead, please change the according system environment setting.

```
SISO_COGNEX_APPLET_<x> = <AppletFilename>
```

Where

<x>	represents the board index, e.g. “0” for the first board
<AppletFilename>	is the filename of the applet to be used, e.g. C:\Programme\SiliconSoftware\Runtime5.2.1\dll\mE4AD4-CL\Acq_FullAreaGray8.dll

This can be configured individually for each frame grabber which is installed in the system. For further details of enumeration of Silicon Software frame grabber, please refer to the Silicon Software runtime documentation.

Important note when using “DualBase” configuration applets, supporting two connected Camera Link Base configuration cameras:
Even if only one physical frame grabber is installed, logically two different “Image Acquisition Devices/Frame Grabber” are listed within VisionPro – one for each possible Camera Link Base configuration camera.

3.1.1 Frame Grabber Initialization Using a Frame Grabber Configuration File (.mcf)

The use of the GUI tool microDisplay allows to parameterize an applet within the Silicon Software runtime environment. Few features among others are the setup of a Bayer filter array (CFA) configuration or of an on-board gamma correction. The parameterization can be stored in the so called “microEnable environmental configuration file” (.mcf format).

In context with usage of the Cognex adapter it is possible to initialize the frame grabber within the VisionPro software by using the “microEnable environmental configuration file” (.mcf). It simply means that the frame grabber is immediately pre-configured and ready-to–run, based on a proper applets configuration.

If you want to initialize the frame grabber in the above described way, please change the according system environment setting.

```
SISO_COGNEX_APPLET_<x> = <ConfigurationFilename>
```

Where

<x>	represents the board index, e.g. “0” for the first board
<ConfigurationFilename>	is the .mcf file name of the applet to be used, e.g. C:\Programme\SiliconSoftware\MyMCFs\my configuration.mcf

This can be configured individually for each frame grabber which is correctly installed in the system. For further details of enumeration of Silicon Software frame grabber, please refer to the Silicon Software runtime documentation.

Important note when using “DualBase” configuration applets, supporting two connected Camera Link Base configuration cameras: Even if only one physical frame grabber is installed, logically two different “Image Acquisition Devices/Frame Grabber” are listed within VisionPro – one for each possible Camera Link Base configuration cameras.

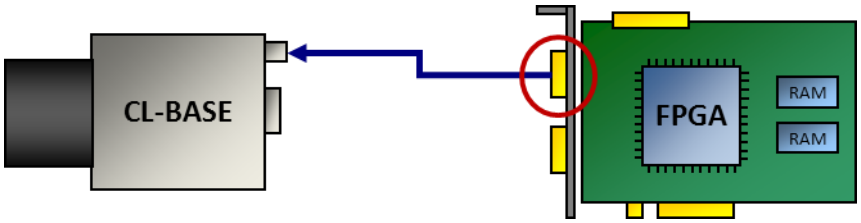
3.2 Representation of a Silicon Software Frame Grabber as VisionPro Device

Each combination of Silicon Software frame grabber and Camera Link camera is represented as an independent device within Cognex VisionPro software. Each port of a single frame grabber can be differentiated by its port number as illustrated at the figures within the examples below.

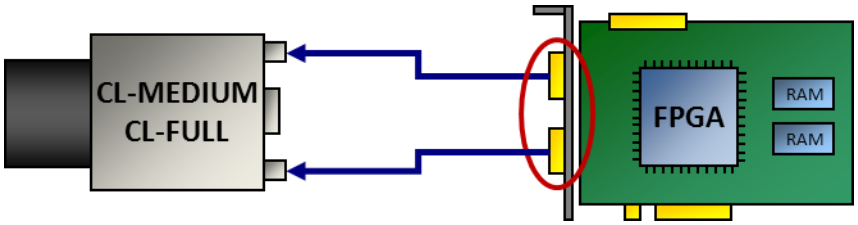
3.2.1 Example:Setup #1

In case of Camera Link Medium Configuration and Camera Link Full Configuration the two physical frame grabber camera ports (0, 1) are logically combined as one device. In case of a single camera and a single frame grabber, using a single DMA setup for the transfer of the images, the frame grabber output (DMA video channel) is mapped to VisionPro devices according to the following table:

VisionPro device #	Silicon Software frame grabber board index	Silicon Software frame grabber port / DMA
0	0	0

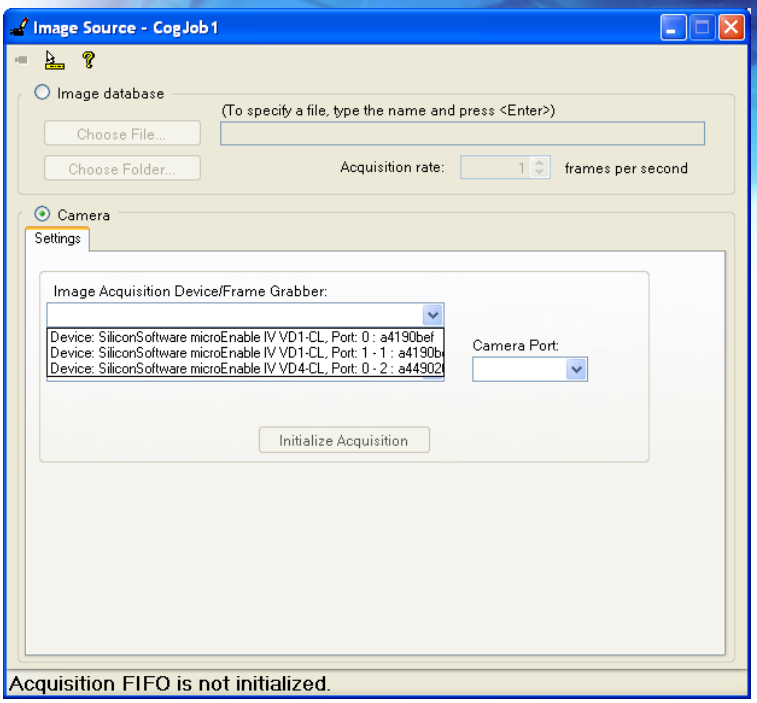


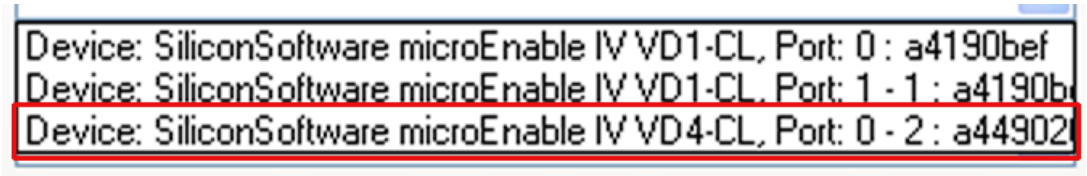
Setup of one camera (CL-BASE) to one port (frame grabber port/DMA “0”) of a Silicon Software frame grabber (frame grabber board index “0”). In Cognex VisionPro software, one device number is listed.



Setup of one camera (CL-MEDIUM or CL-FULL) to both ports (frame grabber port/DMA “0”) of a Silicon Software frame grabber (frame grabber board index “0”). In Cognex VisionPro software, one device number is listed.

The following example shows this specific constellation. The device #2 “Device: SiliconSoftware microEnable IV VD4-CL” supports one Camera Link Full/Medium configuration or a Camera Link Single Base camera:

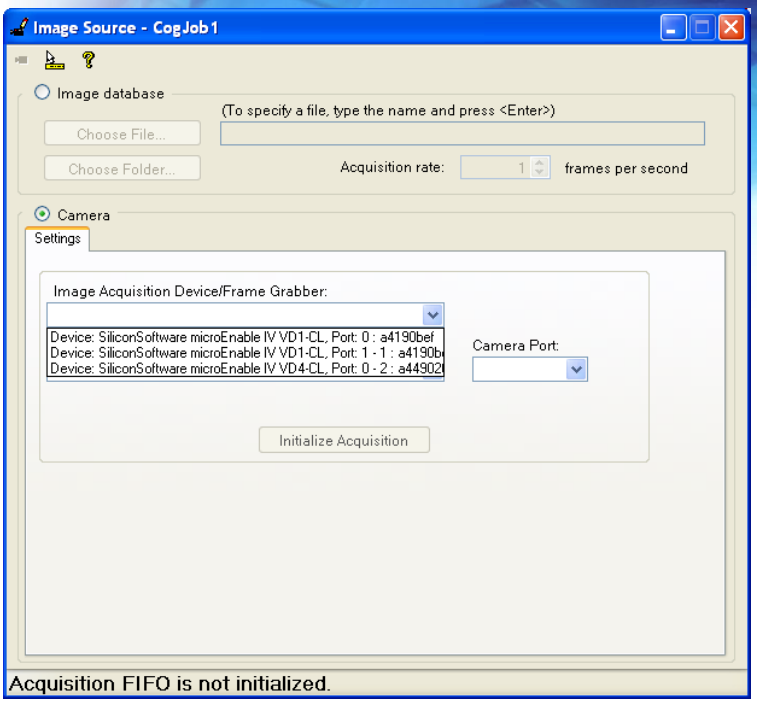


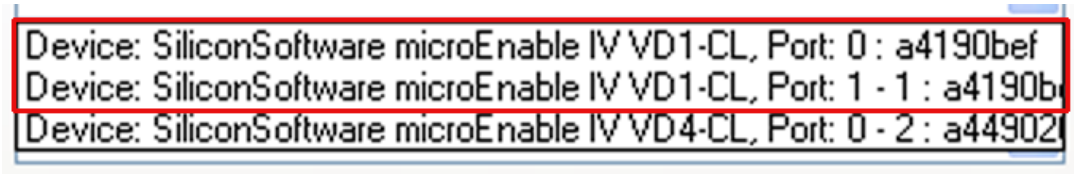


3.2.2 Example: Setup #2

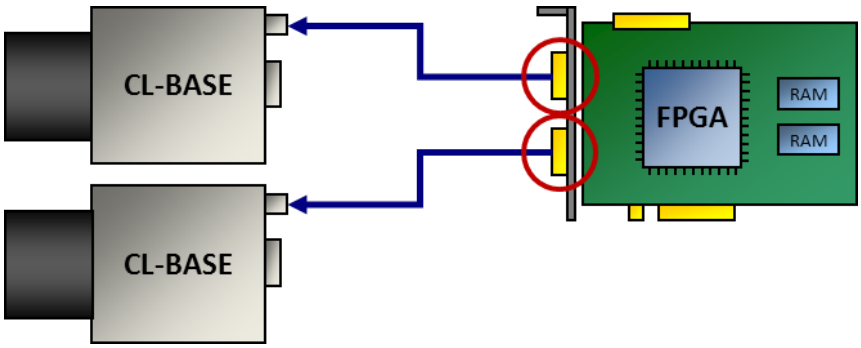
In case of the standard Dual Camera Link Base Configuration the two physical frame grabber camera ports (0,1) are NOT logically combined, but two devices are established.

The following example shows this specific constellation. The device “Device: SiliconSoftware microEnable IV VD1-CL” supports two Camera Link Base configuration cameras on both frame grabber ports “0” und “1” and therefor is listed twice:

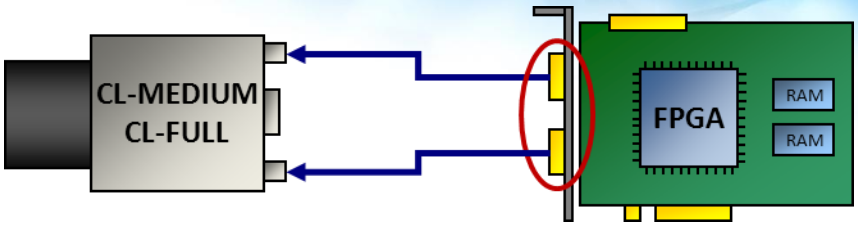




VisionPro device #0 allows to acquire images from a connected Camera Link Base configuration camera on Port 0 and VisionPro device #1 allows to acquire images from a connected Camera Link Base configuration camera on Port 1 – physically it is the frame grabber model microEnable IV VD1-CL.



Furthermore the example setup includes a second physical frame grabber (VisionPro device #2) supporting one Camera Link Full/Medium camera on the combined port “0&1”.



The mapping of frame grabber camera ports and frame grabber outputs (DMA video channel) to VisionPro devices can be seen in the following table:

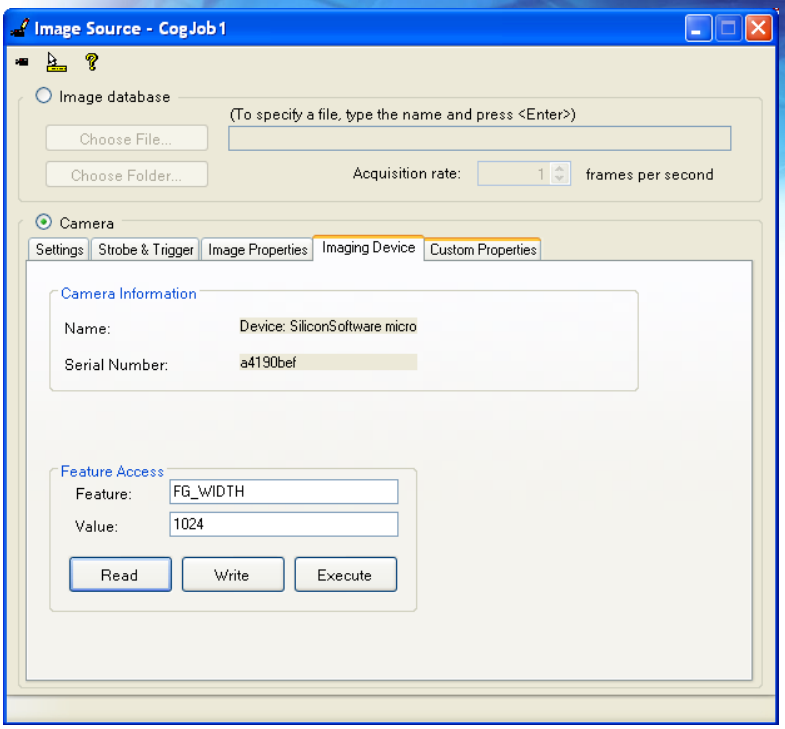
VisionPro device #	Silicon Software frame grabber board index	Silicon Software frame grabber port / DMA
0	0	0
1	0	1
2	1	0

In Cognex VisionPro software, three independent device numbers are listed.

3.3 Accessing Applet Parameters

All parameters of an applet are mapped to so called “features” or “characteristics” within VisionPro software. These can be accessed by the user interface entering the name (e.g. FG_WIDTH) and the value in case of write access. Read and write accesses are available according to the general rules of accessing applet parameters. This can be compared to an access within the tool microDisplay.

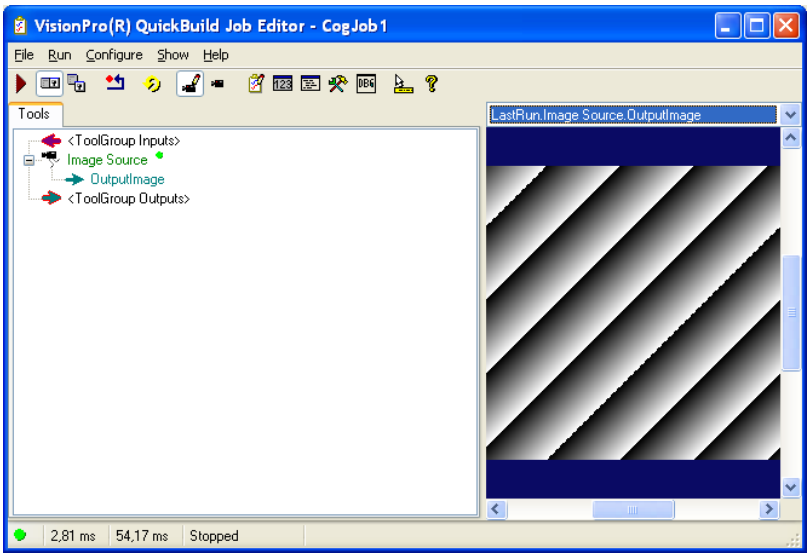
The figure below shows, how to access the parameter FG_WIDTH of a loaded applet.



Please note: The VisionPro “Strobe&Trigger” tab is currently not supported. Please access the corresponding frame grabber parameter by using the user interface as described above.

3.4 Running Image Acquisition

By pressing the button „Quick Build-run…” an image acquisition is performed according to settings, which have been previously made within the VisionPro application. The resulting image is displayed.



Contact Details

SILICONSOFTWARE GmbH
Steubenstrasse 46
D - 68163 Mannheim, Germany
Phone: +49(0)621.789 507 39
Fax: +49(0)621.789 507 10
Email: vertrieb@silicon-software.de
Web: www.silicon-software.info

SILICONSOFTWARE Inc.
1 Tara Boulevard, Suite 200
Nashua, NH 03062, USA
Phone: +1 603 324 7172
Fax: +1 603 324 7101
Email: info@silicon-software.com
Web: www.silicon-software.info

Disclaimer

Trademarks

Copyright Note