APPLICATION NOTE

www.baslerweb.com

Interfacing Basler GigE Cameras With Cognex VisionPro 7.2

This Application Note explains how to interface a Basler camera with GigE interface with the Cognex VisionPro 7.2 software package using a standard Gigabit Ethernet card.

A.) Hardware Requirements:

Beside the camera and its power supply itself, you still need an Ethernet cable (Cat 6 or higher) and your PC must be equipped with a Gigabit Ethernet card (Network Interface Connector = NIC). We recommend using a NIC with Intel PRO/1000 chipset.

The drivers for your NIC must have been installed properly before starting with the installation of your Cognex VisionPro software package.

B.) Software Installation Requirements:

After the installation of the Cognex VisionPro software package the installation process for the Cognex Drivers must be launched:



If you decide to select "Custom" as the setup type, as shown in the following dialog, make sure that the "Cognex GigE Interface for Cameras" driver is selected to be installed:

| 🙀 Cognex Driver | s 4.7 - InstallShield W | /izard | | × |
|------------------------------|--|--|---|--------|
| Setup Type Choose the set | up type that best suits y | our needs. | | 44 |
| Please select a setup type. | | | | |
| C Complete | All program features wil space.) Choose which program will be installed. Recomr | l be installed. (Red features you want mended for advand | quires the most disk : installed and where ced users. | they |
| InstallShield | | < <u>B</u> ack | Next > | Cancel |
| 🖶 Cognex Driver | s 4.7 - InstallShield W | /izard | | × |

| Cognex Drivers 4.7 - Instalionielu mizaru | <u> </u> |
|--|--------------------------------|
| Custom Setup Select the program features you want installed. | |
| Click on an icon in the list below to change how a feature is inst | alled. |
| MVS-8100L Driver | Installs Cognex GigE Interface |
| MVS-8500/8500e Driver | for Cameras |
| MVS-8600 Driver | |
| IEEE-1394 DCAM FireWire Driver | |
| Cognex GigE Interface for Cameras | This feature requires 30MB on |
| Dongle (security key) Driver | your hard unve. |
| | |
| | |
| Install to: | |
| C:\Program Files\Cognex\Common\ | _hange |
| InstallShield | |
| Help Space < Back | <u>N</u> ext > Cancel |

C.) Configuring the Local Area Connection (LAN):

By default, Basler GigE cameras are not configured for a static IP address. We recommend configuring the NIC for obtaining an IP address automatically too. In the "Properties" dialog box of the LAN connection you want to configure, select "Internet Protocol (TCP/IP)" and then press the "Properties" button:

| Local Area Connection 5 Properties | ? × | | |
|---|-----|--|--|
| General Authentication Advanced | | | |
| Connect using: | | | |
| Intel(R) PRO/1000 PT Quad Port Ser | ן ב | | |
| This connection uses the following items: | | | |
| File and Printer Sharing for Microsoft Networks One C. Decket Calcadulat | • | | |
| ✓ ➡ Qos Packet Scheduler ✓ Thternet Protocol (TCP/IP) | | | |
| | - | | |
| I <u>n</u> stall <u>U</u> ninstall P <u>r</u> operties | | | |
| Description | | | |
| Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks. | | | |
| Show icon in notification area when connected | | | |
| Notify me when this connection has limited or no connectivity | | | |
| | | | |
| OK Canc | el | | |

In the "Internet Protocol (TCP/IP) Properties" dialog box, select "Obtain an IP address automatically" and press the "OK" button:

| nternet Protocol (TCP/IP) Properties | | | | |
|---|-------------------|--|--|--|
| General Alternate Configuration | | | | |
| You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings. | | | | |
| Obtain an IP address automatically | | | | |
| \square^{\bigcirc} Use the following IP address: – | | | | |
| [P address: | | | | |
| S <u>u</u> bnet mask: | | | | |
| Default gateway: | | | | |
| Obtain DNS server address auto | omatically | | | |
| C Use the following DNS server a | ddresses: | | | |
| Preferred DNS server: | | | | |
| Alternate DNS server: | · · · | | | |
| | Ad <u>v</u> anced | | | |
| | OK Cancel | | | |

Of course, if your camera should be configured for a static IP address and if you know this address, you may also configure the LAN connection for a static IP address in the same subnet which is used by the camera.

D.) The Cognex GigE Vision Configuration Tool

Once you have connected your camera to your PC, please run the "Cognex GigE Vision Configuration Tool". You will find a list of all of your LAN connections displayed. Select the network connection (LAN) you like to configure. You'll see the following dialog:

| Cognex GigE Vision Configuration Tool | | |
|--|---|---|
| <u>File View H</u> elp | | |
| 2 | | |
| Network Connections | Network Connection Information | ▼ Show All |
| 1394 Connection 2 | Name: Local Area Connection 8 | Working with GigE Vision Network Connections |
| Local Area Connection | Device: Intel(R) PR0/1000 PT Quad Port Server Adapter #4 - Packet Scheduler Miniport | How do I use this utility to create my GigE Vision network? |
| Local Area Connection 5 | Status: Up | When the other than the second sec |
| 169.254.51.23 | Speed: 1 Gbps MAC address: 00-15-17-4E-2E-8B | When the provide the provided a subset of the provided and the provided a structure of the provided and t |
| ······································ | DHCP status: Enabled | Our cannot use? |
| | IP address: 169.254.30.15 | Why is there a red warning symbol on my camera or GigE Vision network connection? |
| | Subnet mask: 255.255.0.0 Subnet: 169.254.0.0 | What advanced connection properties should I set for best performance? |
| | Update Network Connection | Why is there a yellow warning icon under Properties? The second |
| | Properties | When do I check the eBus Universal Pro Driver checkbox? |
| | MTU: 9000 Press F5 to update the value. | Why does enabling the eBus Universal Pro Driver display a Hardware Installation warning? |
| | Firewall | I connected a camera. Why doesn't it show up? |
| | Status: Off | Why did my camera disappear? |
| | Press F5 to update the status. | Does this utility provide tooltips to display additional |
| | Driver Status | information about any individual property? |
| | Performance driver: eBUS Universal Pro Driver | |
| | Driver version: 3.0.4.2052 | |
| | 🔽 eBus Universal Pro Driver | |
| <i>y</i> | | |

You can change the adapter's IP address and Subnet mask here, if needed.

Also, you will see the status of your firewall, which should be "Off" in order to be able to receive image data from your camera. As an alternative, you can configure your firewall to unblock certain ports, see "E.) Firewall Configuration" for details. If your NIC supports Jumbo Frames you should configure your adapter to use the maximum Jumbo Frame size (MTU) for best performance. For an Intel PRO/1000 adapter you will find the "Jumbo Frames" setting in the "Advanced" tab in the adapter's "Properties" dialog:

| ntel(R) PRO/1000 PT Quad Port Server Adapter #4 Properties 🛛 😤 🗙 | | | |
|---|--|--|--|
| Teaming VLANs Boot Options Driver General Link Speed Advanced Power Management | | | |
| Advanced Adapter Settings | | | |
| Settings: <u>V</u> alue: | | | |
| Gigabit Master Slave Mode 9014 Bytes | | | |
| Jumbo Frames Locally Administered Address | | | |
| Log Link State Event | | | |
| Performance Options | | | |
| TCP/IP Offloading Ontions | | | |
| Wait for Link Use Default | | | |
| Jumbo Frames | | | |
| Enables Jumbo Frame capability for TCP/IP packets. In situations where large packets make up the majority of traffic and additional latency can be tolerated, Jumbo Frames can reduce CPU utilization and improve wire efficiency. Jumbo Frames are larger than standard Ethernet frames, which | | | |
| are approximately 1.5k in size. | | | |
| Usage Considerations Enable Jumbo Frames only if devices across the network | | | |
| OK Cancel | | | |

Selecting your camera device enables you to change the IP address and Subnet mask of your camera. Please keep in mind that the IP address of your camera must be in the same address range as the IP address of the LAN connection to which the camera is connected to. The Subnet mask of your camera device needs to be the same as the Subnet mask of your LAN connection. The following dialog shows the configuration of a connected camera:

| Cognex GigE Vision Configuration Tool | |
|--|---|
| <u>Eile View H</u> elp | |
| 2 | |
| Network Connections Camera Information Image: Local Area Connection 2 Vendor: Baster Image: Local Area Connection 7 Secial number: [21054514] Image: Local Area Connection 7 MAC address: [00:30:53:10:17:32] Image: Local Area Connection 9 MAC address: [163:254:51:23] Image: Local Area Connection 9 Vendor: Image: Local Area Connection 7 Image: Local Area Connection 9 Vendor: [163:254:51:23] Image: Local Area Connection 9 Vendor: [163:254:0.0] Image: Local Area Con | Show All Working with Cameras Working with Cameras How do I choose an IP address for a camera? To connected a camera. Why doesn't it show up? Why is there a red warning symbol on the camera icon? Why do I see a "Error Setting IP Address" error? What does the Show Feature Snapshot button do? |

E.) Firewall Configuration

Any application using the GigE Vision network protocol must be able to accept data from the camera on UDP port 3956. On systems with the Windows firewall enabled, this can be achieved by selecting "Unblock" when the operating system notifies the user that the VisionPro application needs to accept connections from the network. To ensure optimal performance, UDP ports 49153 through 49169 should also be unblocked. If you are using the Windows firewall, you can unblock these ports by clicking on the "Windows Firewall" icon in the control panel, switching to the "Exceptions" tab, and clicking the "Add Port" button to unblock UDP ports between 49153 and 49169.

F.) Configuring the Camera / Grabbing Images with VisionPro Quickbuild

An easy test for successful interfacing between VisionPro and a Basler GigE camera can be performed using the VisionPro Quickbuild application.

After starting the VisionPro Quickbuild application, double click on the Image Source item:



The Image Source dialog box will show up. As source, select Camera and then select your camera device from the Image Acquisition Device dropdown box. If you click on the arrow of the Video Formats dropdown box, a context menu will show up, listing the available video formats, which might be Bayer Color and/or Mono for Generic GigE Vision devices. Finally, press the Initialize Acquisition button. Once the acquisition is initialized, you can close the Image Source dialog box (it can be opened again by double clicking Image Source):

| | (To specify a file, type the name and press <enter>)</enter> | |
|--------------------------|--|------|
| Choose File | | |
| Choose Folder | Acquisition rate: | cond |
| Camera | | |
| tings | | |
| Image Acquisition Devic | e/Frame Grabber | f |
| aigE Vision: Basler: acA | 750-30gc : 21054514 | |
| Video Formats: | | |
| The set without | | |
| Generic GigEVision (Mon | no) 💌 | |
| Generic GigEVision (Mon | o) | |
| Generic GigEVision (Mon | no) | |

Back in the QuickBuild dialog box press the "Run Job Continuously" button. You should now see a live image, as shown in the screenshot below:



VisionPro provides you with a lot of programming samples. Samples showing how to configure a GenICam compliant GigE Vision camera can be found in the GigEVisionProperties folder within the Cognex programming samples folder:

| C:\Program Files\Cognex\VisionPro\samples\Programming\Acquisition | | | |
|---|--|------------------|--------|
| Ele Edit View Favorites I | ools Help | | |
| S Back • S - 🏂 > Search 🌮 Folders 🛄 • | | | |
| Address 🚞 C:\Program Files\Cogn | ex\VisionPro\samples\Programming\Acqui | sition | 💌 🔁 Go |
| Name 🔶 | Size Type | Date Modified | |
| C 1394DCAM | File Folder | 02/03/2012 16:41 | |
| C AcqEvents | File Folder | 02/03/2012 16:41 | |
| C AcqImageProcess | File Folder | 02/03/2012 16:41 | |
| C AcqToolEditCt | File Folder | 02/03/2012 16:41 | |
| C AutoLineScan | File Folder | 02/03/2012 16:41 | |
| CreateAcqFifo | File Folder | 02/03/2012 16:41 | |
| C FlirCamera | File Folder | 02/03/2012 16:42 | |
| FrameGrabberList | File Folder | 02/03/2012 16:41 | |
| GigEVisionProperties | File Folder | 02/03/2012 16:41 | |
| Hardware Trigger | File Folder | 02/03/2012 16:41 | |
| LineScan8600 | File Folder | 02/03/2012 16:41 | |
| CiveDisplay | File Folder | 02/03/2012 16:41 | |
| C Operators | File Folder | 02/03/2012 16:41 | |
| PIOAnd8504 | File Folder | 02/03/2012 16:41 | |
| PIOand8602 | File Folder | 02/03/2012 16:41 | |
| PixelMemory | File Folder | 02/03/2012 16:41 | |
| C SyncSimulAcq | File Folder | 02/03/2012 16:41 | |
| C TriggerMode | File Folder | 02/03/2012 16:41 | |
| | | | |
| | | | |
| | | | |
| | | | |

www.baslerweb.com

Tel

Fax

+49 4102 463 500

+49 4102 463 599

bc.sales.europe@baslerweb.com

USA

Tel. +1 610 280 0171 Fax +1 610 280 7608 bc.sales.usa@baslerweb.com Asia

Tel. +65 6425 0472 Fax +65 6425 0473 bc.sales.asia@baslerweb.com

