



## Installation Guide for Linux

### Baumer GAPI SDK v2.3

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# 1. Introduction

This installation guide is for users who wish to change camera settings, and capture and view camera images, as well as for programmers who need to integrate Baumer cameras into their own software.

## 2. Technical Background

### 2.1 Interfaces

Baumer GAPI SDK Linux supports the following interface:

- GigE

### 2.2 Baumer GAPI SDK

Baumer GAPI is the abbreviation for Baumer “**G**eneric **A**pplication **P**rogramming **I**nterface” in version 2.2. With this API, Baumer provides an interface for optimal integration and control of Baumer cameras with Gigabit Ethernet(GigE).

Baumer GAPI is based on GenICam. GenICam is a standard and stands for **G**eneric **I**nterface for **C**ameras. The objective of the standard is to decouple industrial camera interface technology from the user application programming interface (API). Baumer GAPI has a GenICam interface.

The software package includes:

#### Tools

- Camera Explorer

#### GigE Interface

- GigE Producer

#### SDK

- C++
- Examples for C++
- Libraries

#### Documentation

- Programmer’s Guide
- Installation Guide
- Camera Explorer
- User Guides
- Flyer
- SNFC

quired to establish communications between hardware and software.

After the hardware have been installed, the TCP/IP stack (**C**), which also covers the required UDP, is activated. This protocol family controls the data transfer between networked devices.

As standard, both control and stream data pass through the TCP/IP stack and are transferred to the interface plug-in - in this case a Gigabit Ethernet Plug-in (**D**).

This plug-in provides interface-specific pre-processing of Baumer GAPI (**F**) commands. The Gig Ethernet plug-in ensures the package structure conforms with the GigE Vision™ standard.

#### 2.2.1 Components of the Baumer GAPI stack

The Baumer GAPI stack is described below.

Working with Baumer Gigabit Ethernet cameras requires the installation of matching hardware (**A**) and a network interface card (NIC) which supports GigE, onto your PC. Baumer recommends the employment of NICs with an Intel® chipset. The hardware is delivered with a hardware driver (**B**) which is re-

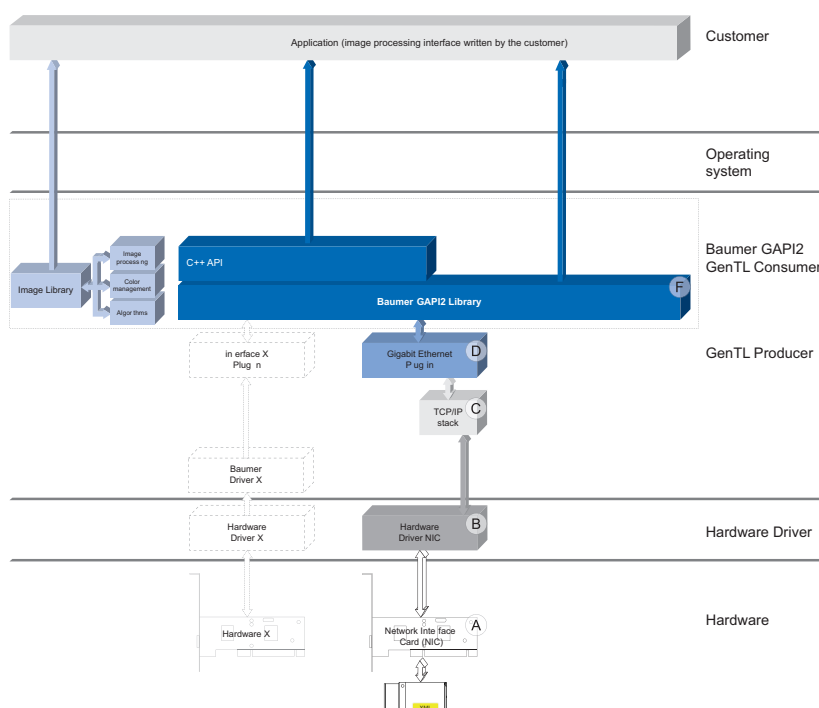


Fig. 1: Baumer GAPI Stack

### 3. General System Requirements

	Single-camera system Recommended	Multi-camera system Recommended
<b>CPU</b>	Intel(R) Core(TM) i5-2520M CPU @ 2.50GHz, Cores: 4	Intel(R) Core(TM) i7-3770 CPU @ 3.40GHz, Cores: 8
<b>RAM</b>	4 GB	8 GB
<b>Operating system (OS)</b>		
<b>GigE Vision</b>	Linux Debian 7 Ubuntu 12.04 Ubuntu 13.04	Ubuntu 14.04 Fedora 20 OpenSUSE 13.1
<b>USB 3.0 Vision</b>	Linux not supported	
<b>Compiler</b>	Linux GCC Version >= 4.7	
<b>C++ Version</b>	C++11	
<b>Graphics</b>	Recommended resolution: 1280 x 1024; Color depth: at least 16 bit	
<b>Ethernet</b>	Gigabit Ethernet compliant NIC (Recommended: Intel® chipset)	

### 4. Installation

#### 4.1 Hardware Installation / Configuration

**Caution**

Observe precautions for handling electrostatic sensitive devices!

##### Network Card (see Fig. 1)

- Switch the PC off (A).
- Disconnect the power supply (B).
- Open the PC case (C).
- Place the Network Card into an unused PCI port (If necessary, remove the interface slot cover) (D).
- Close the PC case (E).
- Re-connect the power supply (H).

##### Camera (see Fig. 2)

- Connect the camera to the GigE board (1) using an appropriate cable (2) (at least Cat-5e).
- If required, connect a trigger and/or flash to the Digital-IO supply (3).
- Connect the camera to a power supply (4).

##### Camera feedback (VisiLine®):

- Power on: LED green
- Readout active: LED yellow

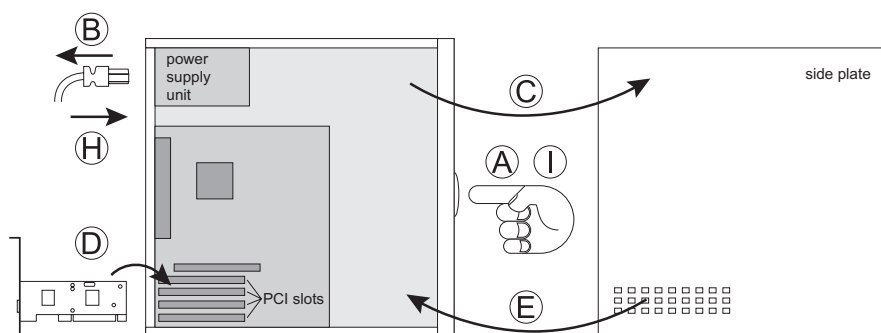


Fig. 2: Installation of the GigE board

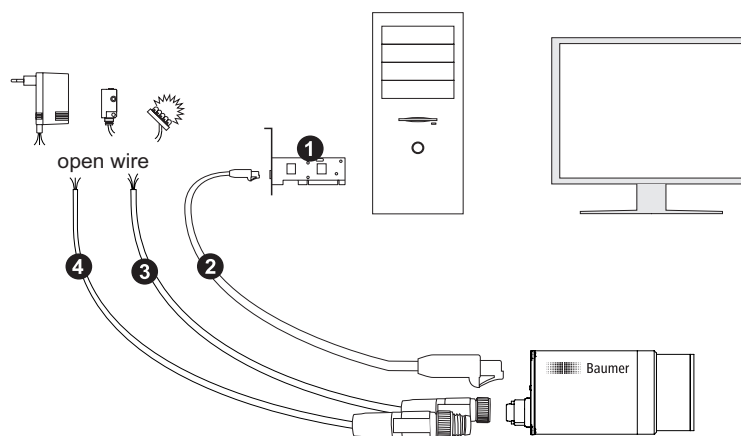


Fig. 3: Installation example (VisiLine® without PoE)

1 - Network Interface card (NIC); 2 - GigE cable;  
3 - Process interface cable; 4 - Power cable

## 4.2 Software Installation

### Notice

Installing the package via the console [Terminal Program] is essentially the same for all versions of Linux. Therefore, this installation method is described here.

### 4.2.1 Preliminary steps

When preparing to install the actual Baumer software package, check the following items:

- If any other version of the Baumer GAPI SDK v2.x software is already installed on your system, these must be removed! You can have both Baumer GAPI SDK v1.x and Baumer GAPI 2 installed on the system.

### Download the correct version for your system

#### Notice

The required installer packets for the different Linux operating systems vary. Download the correct packet for your system!

#### 1. Query the OS version of your system.

Input via the console [Terminal Program]:

```
lsb_release -a
```

Possible output:

```
No LSB modules are available.
Distributor ID: Debian
Description:    Debian GNU/Linux 7.1 (wheezy)
Release:        7.1
Codename:       wheezy
```

#### 2. Query whether your system is 32 / 64 bit.

Input via the console [Terminal Program]:

```
uname -m
```

Possible outputs:

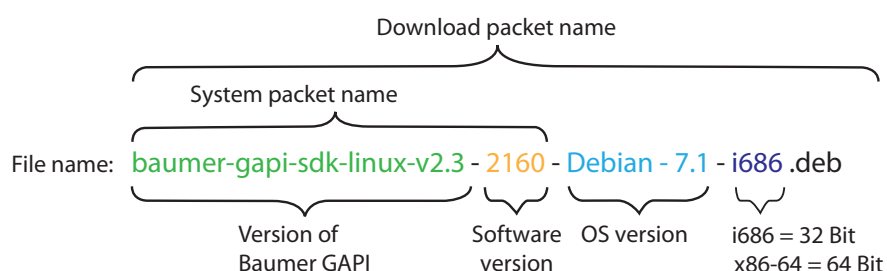
x86\_64 → you have a 64 bit system

i686 → you have a 32 bit system

#### 3. Download the correct installer packet for your system.

Download area: [www.baumer.com/vision/login](http://www.baumer.com/vision/login)

Registration is required.



## 4.2.2 Installing Baumer GAPI SDK

### 1. Switch to admin mode.

Input via the console [Terminal Program]:

```
su root
```

Enter the administrator password:

```
Password: <your password>
```

### 2. Change to the download directory.

Input via the console [Terminal Program]:

```
cd Downloads/
```

Display the folder content:

```
ls
```

Possible output:

```
baumer-gapi-sdk-linux-v2.3-2160-Debian-7.1-i686.deb
```

### 3. Install the downloaded packet.

Debian/Ubuntu: `dpkg -i baumer-gapi-sdk-linux-v2.3-2160-Debian-7.1-i686.deb`

Fedora: `yum install baumer-gapi-sdk-linux-v2.3-2160-Debian-7.1-i686.rpm`

openSUSE: `zypper install baumer-gapi-sdk-linux-v2.3-2160-Debian-7.1-i686.rpm`

### 4.2.3 Querying the installed files

Input via the console [Terminal Program]:

```
dpkg-query -L baumer-gapi-sdk-linux
```

**Possible output:**

#### Notice

The QT files are installed, but have been removed here to increase clarity, .

```
/usr/local/lib/baumer/libbgapi2_img.so
/usr/local/lib/baumer/libbgapi2_genicam.so
/usr/local/lib/baumer/libsharedlibs.so
/usr/local/lib/baumer/libevisionlib.so
/usr/local/lib/baumer/libbgapi2_gige.cti
/usr/local/lib/baumer/liblibtiff.a
/usr/local/src/baumer/sdk_example/install_example_linux.sh
/usr/local/src/baumer/sdk_example/CMakeLists.txt
/usr/local/src/baumer/sdk_example/C++Linux
/usr/local/src/baumer/sdk_example/C++Linux/01_ImagePolling_TriggerModeOff

/usr/local/src/baumer/sdk_example/C++Linux/01_ImagePolling_TriggerModeOff/01_Image-
Polling_TriggerModeOff_consoleOutput_SXG10c.txt

/usr/local/src/baumer/sdk_example/C++Linux/01_ImagePolling_TriggerModeOff/01_Image-
Polling_TriggerModeOff

/usr/local/src/baumer/sdk_example/C++Linux/01_ImagePolling_TriggerModeOff/01_Image-
Polling_TriggerModeOff/CMakeLists.txt

/usr/local/src/baumer/sdk_example/C++Linux/01_ImagePolling_TriggerModeOff/01_Image-
Polling_TriggerModeOff/01_ImagePolling_TriggerModeOff.cpp

/usr/local/src/baumer/inc/bgapi2_def.h
/usr/local/src/baumer/inc/bgapi2_genicam.hpp
/usr/local/src/baumer/inc/bgapi2_featurenames.h
/usr/local/bin/bexplorer
/usr/share/doc/baumer/ProgrammersGuide2.pdf
/usr/share/doc/baumer/InstallationGuide_BGAPI2_Linux.pdf
/usr/share/doc/baumer/bexplorer_help.pdf
```

#### 4.2.4 Querying information about the installed package

Input via the console [Terminal Program]:

```
aptitude show baumer-gapi-sdk-linux
```

##### Possible output:

```
Package: baumer-gapi-sdk-linux
New: yes
State: installed
Automatically installed: no
Version: 2.3-2160-Debian-7.1-i686
Priority: extra
Section: misc
Maintainer: support.cameras@baumer.com
Uncompressed Size: 8.192
Depends: libc6 (>= 2.11.3), libstdc++6 (>= 4.4.5), libxcb1 (>= 1.6)
Description: Baumer GAPI SDK Linux
The Baumer Generic Application Programming Interface package includes software,
documentation, help files and examples.
Homepage: http://www.baumer.com/vision/login (Latest software version and technical
documentation.)
```



#### 4.2.5 Changing the font.

You have the option change the font, e.g. for the display in the *Baumer Camera Explorer* test tool.

##### 1. Switch to user mode.

Input via the console [Terminal Program]:

```
exit
```

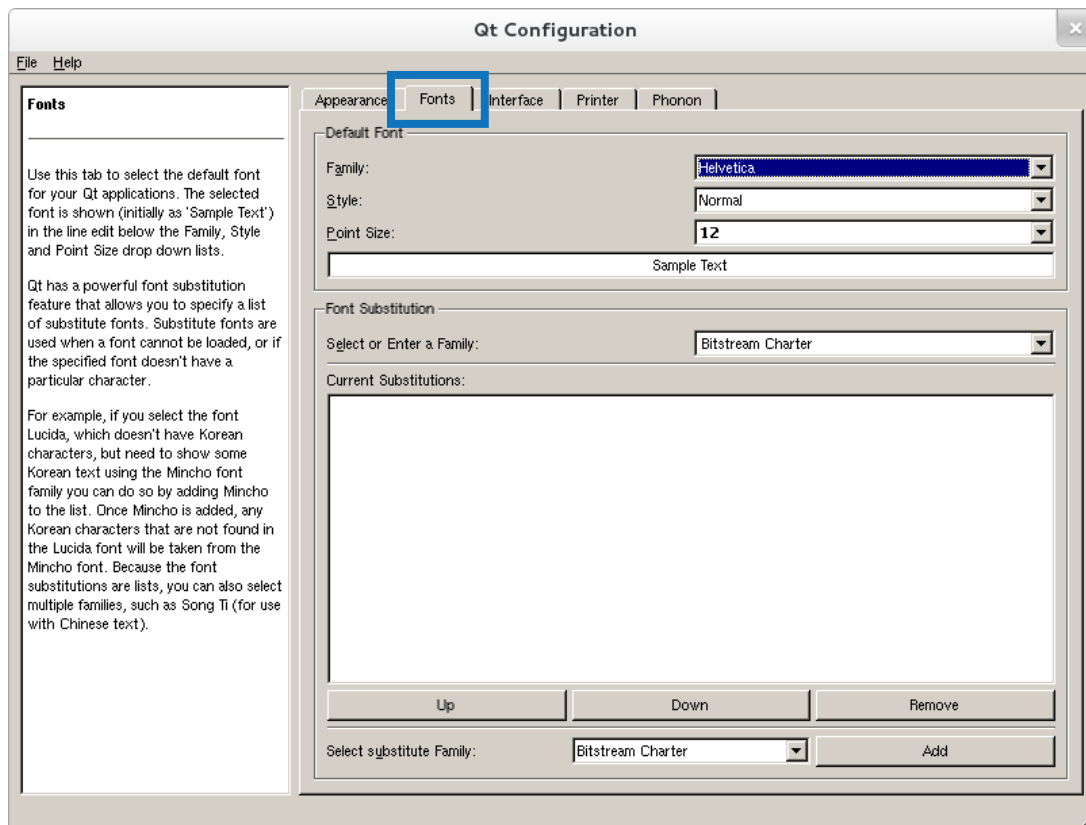
##### 2. Change the directory.

```
cd /usr/local/lib/baumer/Qt-4.8.4/bin
```

##### 3. Start the QT Configuration Program.

```
./qtconfig
```

##### 4. Select the *Fonts* tab and adjust the settings as needed.



## 5. Removal

### 5.1 Removing the installed package

#### 1. Switch to admin mode.

Input via the console [Terminal Program]:

```
su root
```

Enter the administrator password:

```
Password: <your password>
```

#### 2. Remove the installed package.

Debian/Ubuntu: `dpkg -r baumer-gapi-sdk-linux`

Fedora: `yum remove baumer-gapi-sdk-linux`

openSUSE: `zypper remove baumer-gapi-sdk-linux`

## 6. Network Settings

One way to configure the network settings for the transfer of data between the camera and your PC is to adjust the settings in the *interface* file.

The interface file is located in the folder: */etc/network*.

### Notice

To make changes in the *interface* file, you must first switch to Admin mode.

### Notice

MTU (Maximum Transmission Unit) or Jumbo Frames are Ethernet frames that exceed the standard frame size of 1518 bytes. Typical sizes include for example 4, 9, 12 or 16 KB.

However, there are no standards for MTUs, their size depends on the manufacturer.

They are used to decrease the interrupt load of all network devices involved.

In order to use MTUs, all network components must support this feature.

### 6.1 Configuring Single-GigE Interface

The adjustable parameters are shown in the table below.

Command	Description
ethx	x = number of your interface (e.g. 1)
address	IP address of your adapter (e.g. 192.168.1.10)
netmask	Netmask of your adapter (e.g. 255.255.255.0)
broadcast	Broadcast of your adapter (e.g. 192.168.1.255)
mtu	Maximum Transmission Unit (e.g. 9000 bytes)

#### Example

```
auto eth1
iface eth1 inet static
address 192.168.1.10
netmask 255.255.255.0
broadcast 192.168.1.255
mtu 9000
```

## 6.2 Configuring Dual-GigE Interface (Bonding)

Bonding allows you to group the two links of a Dual-GigE camera (e.g. HXG/SXG series) to form a “virtual” link, allowing the camera to treat the two bonded links as if they were a single link.

To connect a Dual-GigE camera to the host using "bonding", you will require two host Ethernet adapter ports.

The adjustable parameters are shown in the table below.

Command	Description
bond0	name
bond_miimon x	time interval for checking the link status (e.g. 100 ms)
ethx	x = number of your interfaces (e.g. 3 and 4)
address	IP address of your adapter (e.g. 192.168.1.10)
netmask	Netmask of your adapter (e.g. 255.255.255.0)
mtu	Maximum Transmission Unit (e.g. 9000 bytes)

### Example

```
iface eth3 inet manual
    bond-master bond0
iface eth4 inet manual
    bond-master bond0

# Bonding Interface with two member interfaces: eth3 and eth4
auto bond0
iface bond0 inet static
mtu 9000
bond_miimon 100
address 192.168.1.10
netmask 255.255.255.0
gateway 0.0.0.0
up /sbin/ifenslave bond0 eth3 eth4
down /sbin/ifenslave -d bond0 eth3 eth4
```

## 7. Support

In the event of any questions or for troubleshooting please contact our support team.

### Worldwide

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