Baumer
Passion for Sensors

Application Note

Baumer GAPI SDK for NVIDIA® Jetson TK1 with Linux® Ubuntu® 14.04

AN201518/0.6/2018-03-09

Description
This document explains how to install the ARM®-based single board computer Jetson TK1 for the usage of Baumer Industrial Cameras.

Products
NVIDIA® Jetson TK1
Baumer GAPI SDK Linux® - Ubuntu®
Baumer GigE Industrial Cameras

Preparation
Before the Baumer GAPI SDK can be installed on NVIDIA® Jetson TK1 the operating system (OS) “Linux® for Tegra® R21.5” must be installed. For further information see chapter 2 – Getting started.

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1 Technical Background

The NVIDIA® Jetson TK1 is a single board computer with an ARM®-based central processing unit (CPU). It's a quad-core CPU based on the ARM® Cortex® A15 architecture. It further integrates a graphics processing unit (GPU) based on the NVIDIA® Kepler architecture. The NVIDIA® Jetson TK1 supports Gigabit Ethernet with Jumbo Frames and data rates up to 1 Gbit/sec as well as USB 3.0 featuring data rates of up to 5 GBit/sec.

2 Getting Started

2.1 Installing a new OS on NVIDIA® Jetson TK1

Installing a new OS on NVIDIA® Jetson TK1 requires a host PC with Linux® OS (we recommend using Ubuntu® 14.04). It is necessary to install the OS version "Linux for Tegra R21.5" on the NVIDIA® Jetson TK1 to get the Baumer SDK working.

First download the *Driver Package* and the *Sample File System* from the following link:
https://developer.NVIDIA.com/embedded/linux-tegra-archive

Then, follow the guide on the NVIDIA® website to install the new OS:
https://developer.NVIDIA.com/embedded/jetpack

Note: Please refer to the Installation Guide for Linux on how to connect a camera, aquire images and build an application.

2.2 Installing Baumer GAPI SDK

To install the Baumer GAPI SDK download the NVIDIA® Jetson TK1 software package from the Baumer website (www.baumer.com). You can download the software package directly to the NVIDIA® Jetson TK1 by connecting it to the internet. Then install the software by using the Linux® terminal. Change to the directory where the downloaded file is stored (e.g. /home/user/Downloads).
The file is called "baumer-gapi-sdk-linux-v2.4-xxxxx-Linux4TegraR21.4-JetsonTK1.deb" [1].
Start the installation by executing the following command:

sudo dpkg -i baumer-gapi-sdk-linux-v2.4-xxxxx-Linux4TegraR21.4-JetsonTK1.deb[1]

[1] xxxx is a version number

2.3 CPU Usage and Power Consumption

Frame Rate	Data Rate	Power Consumption	CPU Usage**
5 fps	100 Mbit/s	6.9 W	11 %
53 fps	988 Mbit/s	7.4 W	15 %
107 fps	1931 Mbit/s*	8.8 W	20 %

Table 2: CPU Usage and Power Consumption

Table 2 shows the CPU usage and power consumption of the NVIDIA® Jetson TK1 during constantly getting pictures from different Baumer GigE industrial camera. For that the Baumer SDK example 001 (image capturing by polling) with an increased amount of requested images was used.

Note: Measurements progressed with optimized network configuration and hardware.

*) To operate with Dual GigE cameras the NVIDIA® Jetson TK1 was expanded with a mini PCIe card which provides two additional GigE interfaces.
**) The Tegra® K1 is able to deactivate cores depending on the load. To get a comparable CPU Usage value all cores were forced to be active. This also increases the Power Consumption, what means that it's possible that the Power Consumption is lower in convenient use.

3 Support

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

Worldwide

Baumer Optronic GmbH
Badstrasse 30 · DE-01454 Radeberg
Deutschland

Phone +49 3528 4386 845
support.cameras@baumer.com

4 Legal Notes

Baumer Group

The Baumer Group is one of the worldwide leading manufacturers of sensors, encoders, measuring instruments and components for automated image-processing. Baumer combines innovative technologies and customer-oriented service into intelligent solutions for factory and process automation and offers an unrivalled wide technology and product portfolio. With around 2,600 employees and 38 subsidiaries in 19 countries, the family-owned group of companies is always close to the customer. Baumer provides clients in most diverse industries with vital benefits and measurable added value by worldwide consistent high quality standards and outstanding innovative potential. Learn more at www.baumer.com on the internet.

Baumer
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Baumer Optronic GmbH
Badstrasse 30 · DE-01454 Radeberg
Phone +49 3528 4386 0 · Fax +49 3528 4386 86
sales@baumeroptronic.com · www.baumer.com