Application Note

Baumer GAPI SDK for USB Multi-Camera Systems with Linux®
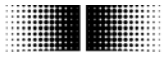## AN201707/0.2/2018-03-16

Description
This document describes the use of USB multi-camera systems on Linux®-based computers.

Products
Baumer GAPI SDK – Linux®
Baumer USB Industrial Cameras

Contents

1 Technical Background

The USB module of the Linux® kernel features a memory limit of 16 MB, which will lead to restrictions in the use of USB multi-camera systems.

2 Modification of the kernel's USB module memory

2.1 Memory limit determination

The memory limit of the Linux® USB module can be determined by running the following command:

```
# cat /sys/module/usbcore/parameters/usbfs_memory_mb
```

By default, the returned value should be 16. This memory limit is a kernel boot argument that has to be changed at boot time. The kernel boot arguments are managed by the systems bootloader. The most major distributions such as Ubuntu®, Debian® or Fedora® all use the grub bootloader. The procedure to change the boot arguments for the grub bootloader is described below.

2.2 Change memory limit with GRUB bootloader

The file `/etc/default/grub`[1] contains an entry `GRUB_CMDLINE_LINUX_DEFAULT`. On Ubuntu® systems the complete entry looks similar to following: `GRUB_CMDLINE_LINUX_DEFAULT="quiet splash"`.

By adding the argument `usbcore.usbfs_memory_mb=xxx`[2] the memory limit will be increased at the next boot.

For increasing the memory limit to 1000 MB, the complete entry should look like this:
`GRUB_CMDLINE_LINUX_DEFAULT="quiet splash usbcore.usbfs_memory_mb=1000"`

In order to apply the changes to grub, you need to call `grub-mkconfig -o /boot/grub/grub.cfg` as root user.

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[1] In order to modify this file, you need to have the administrative rights of the root user.

[2] Memory size for the USB module, given in Megabyte.

2.3   Change Memory Limit with the U-Boot-Loader

Some ARM-Boards use the U-Boot-Loader to start the system. This section explains how to change the USB memory-limit for the Nvidia Jetson. Paths might be slightly different on other Boards.

To increase the memory limit you have to edit the Linux[®] kernel boot arguments. To change the boot arguments edit the file `/boot/extlinux/extlinux.conf` with an editor of your choice.

Look for an entry that starts following:
```
APPEND console=ttyS0,115200n8 console=tty1 no_console_suspend=1
lp0_vec=2064@0xf46....
```

Add at the end of this line:
`usbcore.usbfs_memory_mb=XXX` (Replace XXX by a value that fits to your needs. Do not add a newline after this entry.)

You should restart your system now and check the USB memory limit with the following command:

```
# cat /sys/module/usbcore/parameters/usbfs_memory_mb
```

If memory was increased successfully the returned value should match to boot argument.

3 Support

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

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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.

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