1 Subject

Affected Products	All
Subject	Troubleshooting PCIe devices with a UEFI Boot-Stick
Confidential/Public	Public
Date (yyyy.mm.dd)	2019.04.15
Author	GMX

2 Affected Article Numbers

2.1 Product Data

Affected Number(s)	Product
N/A	All

3 Introduction

This CTN explains how to troubleshoot PCIe devices with a UEFI Boot-Stick. To create the UEFI Boot-Stick, follow the steps described in the AN "How to create a bootable USB stick with a UEFI shell". It is available in the restricted area of the congatec website www.congatec.com.

3.1 Basic Key Functions

The following table explains some basic key functions of the UEFI shell.

Control	Description
Page Up / Page Down	Scrolls up / down the shell view.
Arrow Up	Shows previous commands.
Tab	Auto-completes file or directory names. Type the first letter(s) and press tab key.
Ctrl+Alt+F12	Takes a screenshot of the current shell output and saves it to the boot-medium. This feature is not available on all products. Requires a UEFI screenshot driver. This feature must be enabled in BIOS Setup. Check if this feature is available and enabled in BIOS Setup under "Boot – UEFI Screenshot Capability".

3.2 Basic Commands

The following table explains some basic of the UEFI shell.

Command	Description
`exit`	Exits the shell and boots to the next device as determined by the BIOS boot settings or boots to BIOS Setup in case no other device is present.
`reset`	Initiates a warm reset.
`ls`	Displays current directory tree with its content.
`cd`	Changes the current working directory on the medium. For example: `cd mypath/folder`
`help`	Shows information about a command. For example: `help pci`

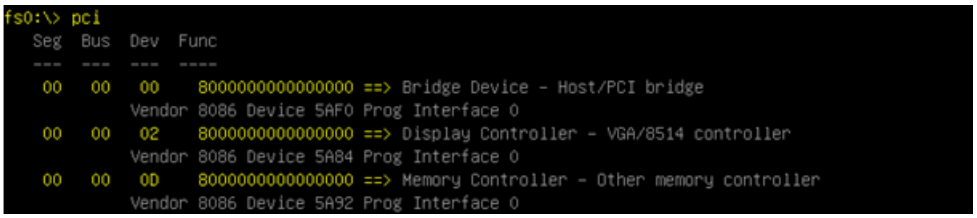
4 Troubleshooting PCIe Devices

4.1 Check if Device is Detected

Follow the steps below to check if the PCIe device is detected and enumerated in the PCI configuration space:

1. Get the Vendor and Device ID for the PCI device from the vendor or try to find these IDs on the website www.pcilookup.com
2. Boot to the UEFI Boot-Stick
3. Enter the command:

   `pci`
4. Detected PCIe devices are listed as shown in the screenshot below (Example):



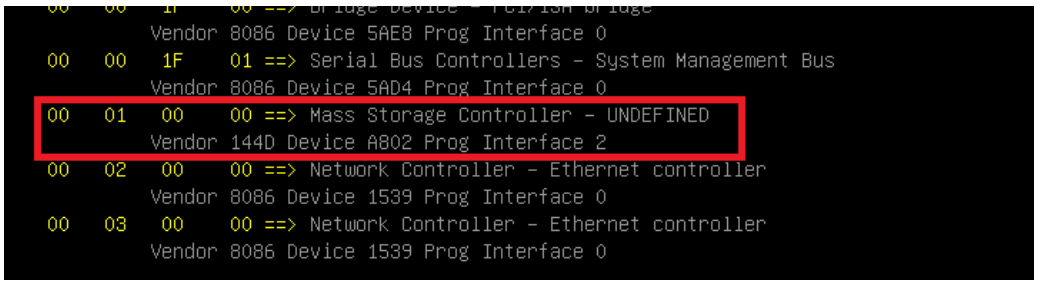
5. Look for the Vendor and Device ID of the PCIe device from step 1:
   a. If the device is listed, note the "Bus", "Dev", and "Func" ID of the device and continue with the steps described in section 4.2 "Check Device Information".
   b. If the device is not listed, follow the steps described in section 4.3 "Create Dump of All PCIe Devices" and 4.4 "Create PCI Dump of a Specific PCIe Device" to prepare the information for congatec technical support.

4.2 Check Device Information

If the device is detected as explained in section 4.1 “Check if Device is Detected”, follow the steps below to get more information about the device:

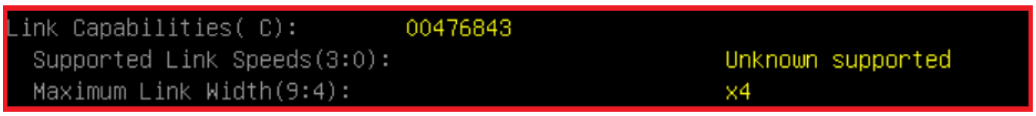
1. Enter the command:

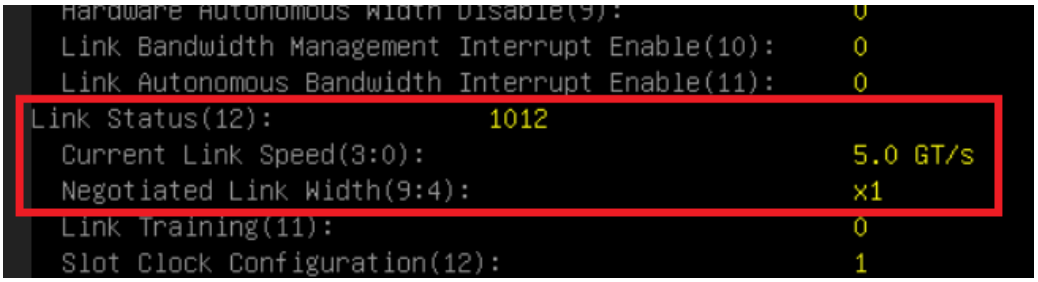
```
pci bus device function –i –b
# Replace bus with the “Bus” ID of the PCIe device
# Replace device with the “Dev” ID of the PCIe device
# Replace function with the “Func” ID of the PCIe device
# Refer to section 4.1 “Check if Device is Detected” to get these IDs
#
# For example, enter command:
# pci 01 00 00 -i -b
# to get more information about the device highlighted in the screenshot below
```



2. The device information is listed and can be used for debugging.

   For example, compare “Maximum Link Width” with “Negotiated Link Width” as shown in the screenshots below. Press “Enter” key to scroll through the device information.





   If the “Negotiated Link Width” is lower than the “Maximum Link Width”, the related BIOS Setup settings are set for a lower link width than the maximum link width supported by the device. If another link width is required and supported by the system, adjust the related settings in BIOS Setup.

3. If further troubleshooting is required, follow the steps described in section 4.3 “Create Dump of All PCIe Devices” and 4.4 “Create PCI Dump of a Specific PCIe Device” to prepare the information for congatec technical support.

4.3 Create a List of All Detected PCIe Devices

Follow the steps below to create a text file with a list of all detected PCIe devices. This file may be requested by congatec technical support for debugging.

1. Boot to the UEFI Boot-Stick
2. Enter the command:

```
pci > pcilog.txt
```

3. The PCI dump is saved to the UEFI Boot-Stick as pcilog.txt

4.4 Create PCI Dump of a Specific PCIe Device

Follow the steps below to create a text file with an interpreted version of the PCI configuration space for a specific PCIe device. This file may be requested by congatec technical support for debugging.

1. Boot to the UEFI Boot-Stick
2. Enter the command:

```
pci bus device function –i > pcilog_device.txt
# Replace bus with the “Bus” ID of the PCIe device
# Replace device with the “Dev” ID of the PCIe device
# Replace function with the “Func” ID of the PCIe device
# Refer to section 4.1 “Check if Device is Detected” to get these IDs
```

4. The PCI dump is saved to the UEFI Boot-Stick as pcilog_device.txt

5 Revision History

Revision	Date (yyyy.mm.dd)	Author	Changes
1.0	2019.04.15	GMX	Initial Revision