Windows'11: Identification of software blocking USB HID device access

Purpose of this document:

This document describes a method to identify software which might block HID device drivers if a another software cannot use it as expected.

Situation:

If the motor controller is detected by Windows' "Device Manager" but still cannot be connected to maxon's software, this might be caused by some other software blocking the required HID device access.

Technical background:

maxon's software "Motion Studio", "ESCON Studio", "EPOS Studio" uses Windows so-called HID (= Human Interface Device") drivers to establish an USB connection in between maxon's software and the motor controller (e.g. ESCON2, ESCON, EPOS4). HID is a Windows' standard driver which is in use to connect any types of USB devices (e.g. keyboards, mouse, cameras, ...) without the need for specific USB drivers of 3rd parties. maxon's software uses the standard Windows' HID drivers too, so that there is no need for installation of add-on USB drivers.

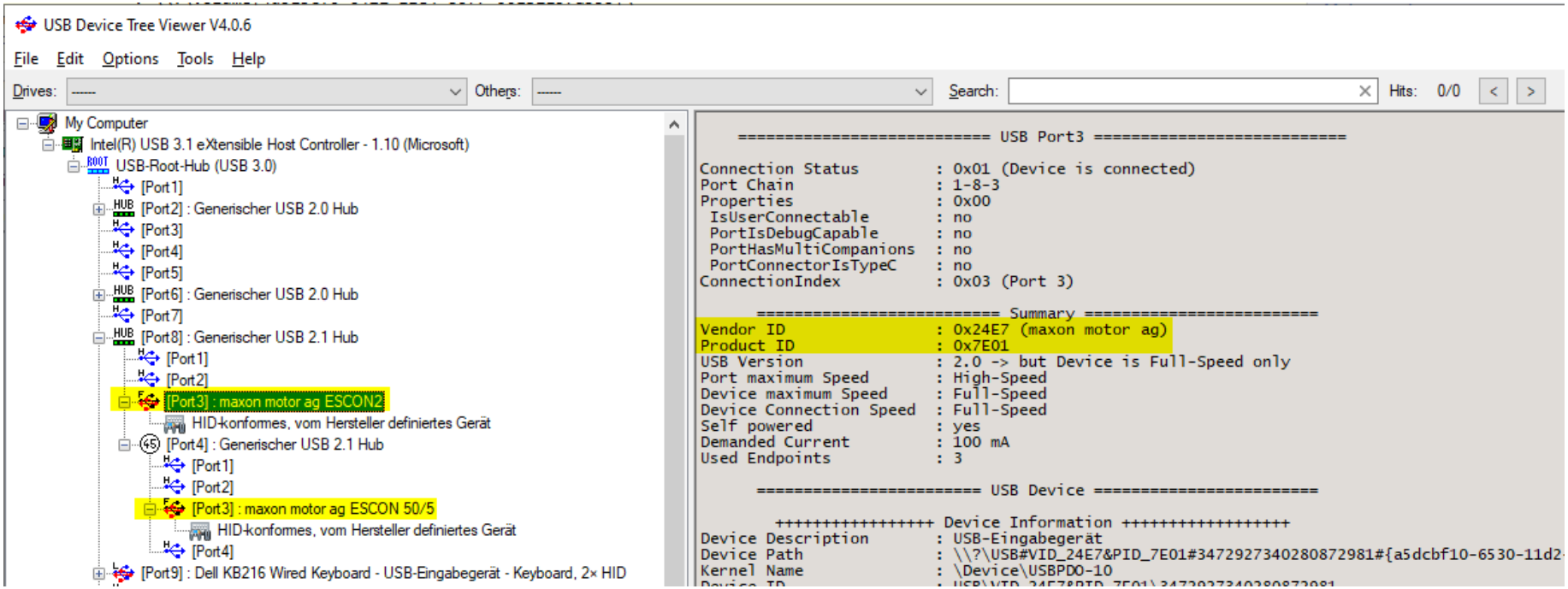
Required tool downloads:

1. Download and extract the "USBTreeView.exe" tool:.
   ⇨ https://www.uwe-sieber.de/usbtreeview_e.html#download
2. Download and extract the WACOM STU HID Diagnostic Tool **"hidinfo.exe":**
   ⇨ https://developer-support.wacom.com/hc/en-us/articles/9354478692503-STU-HID-Diagnostic-Tool
3. Download and extract the Sysinternals Handle tool "**handle.exe":**
   ⇨ https://learn.microsoft.com/en-us/sysinternals/downloads/handle
4. Download and extract the Sysinternals Process Explorer "**procexp64.exe"**
   (Remark: Process Explorer is a more powerful version of the Windows Task Manager. It offers the option to search for process IDs (pid from the output of the handle.exe tools) if the name of the process is not informative enough. In the Process Explorer, you might then see the parent process and could also "kill" it immediately using the context menu if required)
   ⇨ https://learn.microsoft.com/de-de/sysinternals/downloads/process-explorer

Guideline:

1. **Download and extract the tools** to a temporary folder
2. **Connect your maxon motor controller** (e.g. ESCON, ESCON2, EPOs4) **to your PC's USB and power up(!) the motor controller.**

3. **Initial test: Check if motor controller's USB is detected -> Start "UsbTreeView.exe" tool:**



- ⇨ If your (powered up) maxon motor controller is connected via an USB hub**, open the subtrees of the hub(s)** to **check if maxon's motor controller is listed somewhere.**
- ⇨ All **maxon motor controllers have the Vendor ID 0x2E47**. The "Product ID" depends on the concrete controller's product type.
- ⇨ If your **maxon controller is not listed** at all, there is **probably an issue with the USB hub or USB cable present**, or the USB port might be damaged worst case. Please note maxon's Support Center document "Measures in case of USB or Firmware update issues".
- ⇨ If your connected and powered up **motor controller is listed but maxon's software** (e.g. "Motion Studio", "ESCON Studio", "EPOS Studio") **is not able to establish an USB connection**, this means that USB generally seems to work but the USB access still seems to be blocked somehow. **Please proceed with the next steps to identify what might block the USB access** for maxon software.

4. **Open up a command prompt** as "**Administrator"**
   Remark: Type in "Cmd" in Windows search field to find and select "Open as Administrator".

5. Navigate to the tools folder

6. Enter the command:
   hidinfo.exe kernel
   => Check the resulting report which typically looks like this:

```
C:\Apps\hidinfo-x86-v2.6.14745.41>hidinfo.exe kernel
HID diagnostic tool v2.6.14745.41
Copyright ® 2011-2017 Wacom Company Limited

"HID\Vid_8087&Pid_0AC2" kernel="\Device\00000083" [xRW] Manufacturer=<failed:1168> Product=<failed:1168> SerialNumber=<failed:1168>
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b369_REV&0016&Col05" kernel="\Device\00000123" [xRW] Manufacturer="" Product="" SerialNumber=""
"HID\Vid_8087&Pid_0AC2" kernel="\Device\00000081" [xRW] Manufacturer=<failed:1168> Product=<failed:1168> SerialNumber=<failed:1168>
"HID\INTC816" kernel="\Device\00000052" [sRW] Manufacturer=<failed:50> Product=<failed:50> SerialNumber=<failed:50>
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b369_REV&0016&Col06" kernel="\Device\00000124" [sRW] Manufacturer="" Product="" SerialNumber=""
"HID\VEN_DELL&DEV_0A21&Col01" kernel="\Device\00000060" [s--] Manufacturer="Microsoft" Product="HIDI2C Device" SerialNumber="9999"
"HID\VEN_DELL&DEV_0A21&Col02" kernel="\Device\00000061" [s--] Manufacturer="Microsoft" Product="HIDI2C Device" SerialNumber="9999"
"HID\VEN_DELL&DEV_0A21&Col03" kernel="\Device\00000062" [xRW] Manufacturer="Microsoft" Product="HIDI2C Device" SerialNumber="9999"
0b0e:0e40:0120 kernel="\Device\000000c1" [sRW] Manufacturer="GN Audio A/S" Product="Jabra Evolve2 40" SerialNumber="A0008E51D0E50E"
"HID\VEN_DELL&DEV_0A21&Col04" kernel="\Device\00000063" [xRW] Manufacturer="Microsoft" Product="HIDI2C Device" SerialNumber="9999"
0b0e:0e40:0120 kernel="\Device\000000c2" [sRW] Manufacturer="GN Audio A/S" Product="Jabra Evolve2 40" SerialNumber="A0008E51D0E50E"
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b035_REV&0006&Col01" kernel="\Device\0000011d" [s--] Manufacturer="" Product="" SerialNumber=""
"HID\VEN_DELL&DEV_0A21&Col05" kernel="\Device\00000064" [xRW] Manufacturer="Microsoft" Product="HIDI2C Device" SerialNumber="9999"
0b0e:0e40:0120 kernel="\Device\000000c3" [xRW] Manufacturer="GN Audio A/S" Product="Jabra Evolve2 40" SerialNumber="A0008E51D0E50E"
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b035_REV&0006&Col02" kernel="\Device\0000011e" [sRW] Manufacturer="" Product="" SerialNumber=""
0b0e:0e40:0120 kernel="\Device\000000c4" [sRW] Manufacturer="GN Audio A/S" Product="Jabra Evolve2 40" SerialNumber="A0008E51D0E50E"
413c:b06e:0101 kernel="\Device\0000008a" [xRW] Manufacturer=<failed:87> Product="" SerialNumber=<failed:87>
"HID\Vid_8087&Pid_0AC2" kernel="\Device\00000082" [xRW] Manufacturer=<failed:1168> Product=<failed:1168> SerialNumber=<failed:1168>
"HID\ConvertedDevice&Col02" kernel="\Device\00000066" [sRW] Manufacturer=<failed:1> Product=<failed:1> SerialNumber=<failed:1>
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b369_REV&0016&Col02" kernel="\Device\00000120" [xRW] Manufacturer="" Product="" SerialNumber=""
"HID\ConvertedDevice&Col03" kernel="\Device\00000067" [sRW] Manufacturer=<failed:1> Product=<failed:1> SerialNumber=<failed:1>
"HID\ConvertedDevice&Col01"
[QueryDosDeviceW() error=6] [s--] Manufacturer=<failed:1> Product=<failed:1> SerialNumber=<failed:1>
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b369_REV&0016&Col03" kernel="\Device\00000121" [sRW] Manufacturer="" Product="" SerialNumber=""
413c:b06f:0101 kernel="\Device\000000c0" [xRW] Manufacturer=<failed:87> Product="" SerialNumber=<failed:87>
24e7:1c01:0100 kernel="\Device\00000129" [xRW] Manufacturer="maxon motor ag" Product="ESCON 70/10" SerialNumber="0000000000000000"
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b369_REV&0016&Col01"
[QueryDosDeviceW() error=6] [s--] Manufacturer="" Product="" SerialNumber=""
"HID\{00001812-0000-1000-8000-00805f9b34fb}_Dev_VID&02046d_PID&b369_REV&0016&Col04" kernel="\Device\00000122" [sRW] Manufacturer="" Product="" SerialNumber=""

C:\Apps\hidinfo-x86-v2.6.14745.41>
```

7. Search for an **entry starting with "24e7:1c01"**, containing **Manufacturer="maxon motor ag"** and the **product's name**
(e.g. Product="ESCON 70/10")

   ⇨ The number 0x24e7 is the so-called "Vendor ID" of maxon USB devices. All maxon USB devices (= motor controllers) have this unique "Vendor ID".

   ⇨ The number 0x1c01 is the so-called "Product ID" which is unique for the "ESCON 70/10" visible in the screenshot. The "Product ID" depends on the conncrete maxon product type.

   ⇨ Look for the **kernel device address: kernel="\Device\00000xxx**" listed in same line of the report
(e.g. kernel=\Device\00000129 above)

8. Use the **found(!) kernel device address** (reported in the output of tool "hidinfo") and execute the next tool:
handle.exe -a "\Device\00000xxx"
(e.g.: handle.exe -a "\Device\00000129" based on the information retrieved in the sample report above)

```
C:\Apps\hidinfo-x86-v2.6.14745.41>handle64.exe -a \Device\00000129

Nthandle v5.0 - Handle viewer
Copyright (C) 1997-2022 Mark Russinovich
Sysinternals - www.sysinternals.com

EsconTestCmdTestPrg.exe pid: 27520  type: File          38C: \Device\00000129
```

   ⇨ This shows us, that in this example the application "EsconTestCmdTestPrg.exe" with the pid 27520 currently owns the handle of the HID device, i.e. it cannot be accessed by another software in parallel. This is the software which blocks the USB connection of the motor controller and maxon's software.

   ⇨ Depending on which application or process blocks it, you could then try to close the application or "kill" the process which blocks the access to the device. Windows "Task manager" can be used for that. If you want to know more details about the process (e.g. parent process information), you can use Sysinternals Process Explorer "procexp64.exe".

   ⇨ If a specific driver or software is causing the issue (i.e. blocking the USB HID access), you might have to deinstall this driver or software if it is not mandatory for some other application. Deactivation or deinstallation of such a "blocking" 3rd party software or driver might be the only solution to get rid of the issue in future.

9. **Try to establish the USB connectio**n in "Motion Studio", "ESCON Studio" or "EPOS Studio" after(!) the "USB HID blocking" software had been identified, "killed", disabled or deinstalled (as described before).

Example of a concrete customer's issue:

- A customer reported that maxon Motion Studio (operated under Windows'11) had not been able to connect to his "ESCON 70/10" although the ESCON had been properly detected by Windows Device Manager.
- The customer run the described tools and finally got the message that the required HID driver had been in use by:
  C:\WINDOWS\System32\DriverStore\FileRepository\logi_lamparray_usb.inf_amd64_cdf3ca3c77d5f267\logi_lamparray_service.exe
  This software had been part of the Ghub package from Logitech. After this software had been disabled or deinstalled, maxon's software was successfully able to connect to the motor controllers via USB (and Windows HID drivers).