# Qualifying the USB device on Linux.

This section presents how to qualify an USB device on Linux, more specifically the DNAfx_git device. It will give us useful information we will commonly use all along this project.
I guess it may also be a good USB mini tutorial for whoever wants to understand or integrate a USB device, whatever it could be.

You will not need to be root in this section.
First of all, plug the DNAfx_git and have a first look at your usb devices through lsusb.

```
[bgillet@izabel ~]% lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 008: ID 138a:0090 Validity Sensors, Inc. VFS7500 Touch
Fingerprint Sensor
Bus 001 Device 006: ID 04f2:b596 Chicony Electronics Co., Ltd Integrated
Camera
Bus 001 Device 018: ID 0483:5703 STMicroelectronics HB100
Bus 001 Device 004: ID 1050:0010 Yubico.com Yubikey (v1 or v2)
Bus 001 Device 007: ID 046d:0825 Logitech, Inc. Webcam C270
Bus 001 Device 005: ID 046d:c534 Logitech, Inc. Unifying Receiver
Bus 001 Device 003: ID 05e3:0608 Genesys Logic, Inc. Hub
Bus 001 Device 014: ID 04e8:6860 Samsung Electronics Co., Ltd Galaxy series,
misc. (MTP mode)
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

Here we see the device is on Bus 001, registered as Device 018, and had a vendor:product id of 0483:5703.
This id will never change for this product, but in case you try another device (ie. the pro device) here is how to find it so to adapt it.

Also, a device file will be created/removed as it is plugged/unplugged.
It's number may vary depending on the USB devices usage on a same platform.

To identify the current device file used, just plug / unplug it and list the /dev to find which device file is created for it.

To qualify the device and the way it is declared on USB, run the following command.
(For the example, we have identified current device as /dev/hidraw5)

```
[bgillet@izabel ~]% udevadm info -a -n /dev/hidraw5
…/…
looking at parent device '/devices/pci0000:00/0000:00:14.0/usb2/2-1':
       KERNELS=="2-1"
       SUBSYSTEMS=="usb"
       DRIVERS=="usb"
       ATTRS{authorized}=="1"
       ATTRS{avoid_reset_quirk}=="0"
```

```
        ATTRS{bConfigurationValue}=="1"
        ATTRS{bDeviceClass}=="00"
        ATTRS{bDeviceProtocol}=="00"
        ATTRS{bDeviceSubClass}=="00"
        ATTRS{bMaxPacketSize0}=="64"
        ATTRS{bMaxPower}=="100mA"
        ATTRS{bNumConfigurations}=="1"
        ATTRS{bNumInterfaces}==" 1"
        ATTRS{bcdDevice}=="00c8"
        ATTRS{bmAttributes}=="c0"
        ATTRS{busnum}=="2"
        ATTRS{configuration}==""
        ATTRS{devnum}=="7"
        ATTRS{devpath}=="1"
        ATTRS{idProduct}=="5703"
        ATTRS{idVendor}=="0483"
        ATTRS{ltm_capable}=="no"
        ATTRS{manufacturer}=="STMicroelectronics"
        ATTRS{maxchild}=="0"
        ATTRS{physical_location/dock}=="no"
        ATTRS{physical_location/horizontal_position}=="center"
        ATTRS{physical_location/lid}=="no"
        ATTRS{physical_location/panel}=="right"
        ATTRS{physical_location/vertical_position}=="lower"
        ATTRS{power/active_duration}=="1510739"
        ATTRS{power/autosuspend}=="2"
        ATTRS{power/autosuspend_delay_ms}=="2000"
        ATTRS{power/connected_duration}=="1510739"
        ATTRS{power/control}=="on"
        ATTRS{power/level}=="on"
        ATTRS{power/persist}=="1"
        ATTRS{power/runtime_active_time}=="1510498"
        ATTRS{power/runtime_status}=="active"
        ATTRS{power/runtime_suspended_time}=="0"
        ATTRS{product}=="HB100"
        ATTRS{quirks}=="0x0"
        ATTRS{removable}=="removable"
        ATTRS{remove}=="(not readable)"
        ATTRS{rx_lanes}=="1"
        ATTRS{serial}=="00000000001A"
        ATTRS{speed}=="12"
        ATTRS{tx_lanes}=="1"
        ATTRS{urbnum}=="17"
        ATTRS{version}==" 2.00"
…/…
```

Several parent devices exist, find the one which contains idVendor and idProduct with respectively 0483 and 6703 as identified though lsusb.

Key information here are things like SUBSYSTEMS that lsusb -v does not provide, but not only. Those will be useful all along in this document.